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From the Editor's desk

Greetings for the new academic year.

The editorial Board would like to bring to the notice of all the academicians that as per a Public Notice, dated 11 February, 2025, of UGC, the UGC-CARE listing of Journals is discontinued. It would develop suggestive parameters for choosing peer-reviewed journals by faculty members, students and the Higher Educational Institutions. The information can be obtained from UGC website.

Uploaded on the UGC website is a list of 1474 UGC CARE listed journals as on 10 February, 2025, for referencing purposes to the stakeholders for all academic activities. This list of UGC-CARE Journals (now discontinued) is intended to serve as a reference resource only; the inclusion or exclusion of a journal in this list does not imply validation or endorsement by the Commission. Following is the link for the same:

https://www.ugc.gov.in/e-book/Final_list_of_UGC-CAREjournals.pdf

The Indian Journal of Home Science is listed on number 1335, having UGC coverage time period from July 2020 to 10 th February, 2025.

The IJHSc meets the parameters now set by UGC.

The researchers must write the research paper in a well- structured manner strictly following the guidelines given by each journal. A properly written research paper is a good communicator and easily accepted by the journals. It reflects the quality of the researcher.

With best wishes

-Prof. Maneesha Shukul

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WASTE TO WEALTH: HARNESSING TEXTILE WASTE AS A VALUABLE RESOURCE

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ABSTRACT

The global textile industry is creating an environmental crisis of unprecedented scale. Most of the textiles waste end up in landfills or are incinerated, with a marginal amount being effectively recycled, creating severe environmental and economic challenges. Against the global backdrop, this research investigates the textile waste management practices of the stakeholders in Patna and attempts to devise sustainable alternatives to combat the broader environmental challenge. The study was conducted on a sample of 100 respondents, comprising of 50 boutique owners and 50 tailors. An interview schedule was used to collect data form the stakeholders. The research revealed that the current waste management practices of the participants were unsustainable, characterized by indiscriminate disposal of substantial textile quantities by majority of the stakeholders. On the other hand, local stakeholders, while expressing interest in recycling, were hindered by practical challenges including time constraints, limited manpower, and inadequate storage facilities. An innovative intervention in the research was, to redirect textile waste to local artisans, who ingeniously transformed discarded materials into valuable products. The products underwent evaluation by 10 experts by means of a Likert scale. Their positive assessment validated the potential of converting textile waste into valuable, marketable commodities. When introduced to the original stakeholders, these products generated significant interest and a willingness to engage with recycling initiatives. This approach not only addressed waste management issues but also created economic opportunities and supported community development and established a circular economy approach for the textile waste. By converting waste into valuable products, the research provides a practical pathway for communities to contribute meaningfully to reducing textile waste and promoting sustainable practices. The research also highlights the potential of collaborative strategies in addressing environmental sustainability, showing that effective waste management can simultaneously solve economic and ecological challenges.

Keywords: Textile waste, Stakeholder, Local artisans, Waste management.

INTRODUCTION

Textile waste

The textile industry ranks as the second most polluting industry worldwide, creating severe environmental challenges. Globally, 10 percent of carbon emissions is from the Textile industry. A substantial amount of textile waste – 85 percent, is either dumped in landfills or burned, while a meagre one per cent gets recycled, posing major threats to both the environment and economy. Five percent of the landfills, across the globe, are dumped with textile waste, thus increasing

burden on land. With the escalating number of Fast Fashion brands across the world, the production, demand, and consumption of clothing has increased significantly in the last fifty years. (Aishwariya and Jaisri, 2020).

Classification of Textile Waste

Textile waste can be classified into following groups:

1. Pre-consumer textile waste – This is the waste generated before the textile material enters the commercial market or reaches the consumers. This waste is generated during the manufacturing process by very small manufacturing units to big industries. This comprises of fabric scrapes, leftover fabrics, yarn waste, fabric cut offs and trimmings.
2. Post-consumer textile waste – This would include the textile waste disposed by the consumers after being used. This mainly includes discarded clothing.
3. Dead stock – This is the unsold textiles found in a manufacturing unit or with retailers. This could be in the form of fabric, apparel etc.

Impact of textile waste

Textile waste, as other pollutants, has a profound impact on the three pillars of Sustainability:

1. Environment - Textile waste poses significant environmental challenges, impacting landfills, water, air, and soil. Large amounts of synthetic fibres, which are non-biodegradable, and take hundreds of years to decompose, accumulate in landfills, releasing greenhouse gases like methane and carbon dioxide while contaminating both soil and water resources through toxic pollutants like chemicals from dyeing and finishing processes thus adversely affecting the marine life and people relying on these resources (Bick, Halsey and Ekenga, 2018).
2. Economic - A lot of valuable resources, in the form of textile waste, is disposed off or dumped in the landfills. These scrapes can be converted into value added products and get back to the regenerative economy.
3. Social - The landfills where the textile waste is dump is mostly located in communities of lower income groups. They bear the consequences of pollution and face serious health issues due to the negligent disposal. Therefore, these vulnerable communities, who are not even directly involved in the whole cycle, have to pay a heavy price for the textile waste and its disposal.

Textile waste in India

As the sixth-largest textile supplier globally, India plays a pivotal role in the textile industry, but also significantly contributes to textile waste generation. The country produces an astounding amount (7793 kilo tonnes) of textile waste annually (Mohan, et. al, 2022)

The waste produced comes from the following sources:

- The waste produced during the manufacturing process (pre-consumer waste) which comprises of spinning waste, fabric cut off, yarn scrapes, trimmings, fabric dead stock and unsold garment inventory (3265 kilo tonnes).
- Consumer textile waste (post-consumer waste) which includes discarded clothing (3944 kilo tonnes).

- Remaining waste (584 Kilo tonnes) is the imported waste coming from other countries, which includes second-hand clothing in India. (Mohan, *et. al*, 2022)

Purpose of the study

The world is struggling with an unprecedented waste management crisis, with textile waste being a significant contributor. The current linear textile economy is unsustainable, and there is a pressing need to transition towards a more closed loop economy where the textile waste becomes a more valued product.

This study aims to address this critical issue by identifying waste management practices by the stakeholders, at the local level, exploring innovative solutions to transform post-consumer textile waste into sustainable and economically viable products and providing employment opportunities to the artisans in the informal sector. Some other potential approaches of the study are:

Collaboration with Local Artisans: The research emphasizes collaboration with artisans, which likely includes engaging local artisans from the local communities to convert the textile waste into functional products. Artisans have insights and skills to use such fabrics and repurpose them into new products.

Community Engagement: The initiative may involve community outreach programs and would also foster social connectivity and community involvement in the upcycling process. This approach will not only empower local artisans but also provide them a sense of ownership to the new products created by them from the waste materials.

Partnerships with Local stakeholders: The research would involve partnership of the local artisans with local stakeholders to access their pre-consumer textile waste and transform them into new products. This would not only provide employment opportunities to the artisans but would also reduce the burden of landfills from the textile waste.

By identifying effective waste management practices, developing new products from textile waste, evaluating their viability, and introducing recycling initiatives to stakeholders, this research seeks to contribute to a more circular and regenerative textile industry.

Alignment with SDG 12: Responsible Consumption and Production

This research has a close association with SDG 12 – Responsible Consumption and Production. Subsequently, for responsible production, the study would be identifying the textile waste management practices of the local stakeholders and would further formulate strategies to combat the problem of inconsiderate disposal, by devising recycling initiatives. Furthermore, converting the waste into value added products would address the issue of responsible consumption by getting the textile waste back into the supply chain.

OBJECTIVES

i. Identifying pre-consumer textile waste management practices by the stakeholders.
ii. Transforming textile waste into sustainable and economically viable products.
iii. Evaluation of the products developed by the textile waste.
iv. Introducing the textile recycling initiatives to the stakeholders.

METHODOLOGY

The methodology is divided into five phases:

Phase 1: Identification of textile waste management practices by the stakeholders

The research paper is a descriptive and exploratory type of research. The study used purposive sampling technique and selected 100 stakeholders which consisted of 50 boutique unit owners and 50 tailoring shop owners from the city of Patna. Respondents were selected from different areas of Raja Bazaar, Ashiyana-Digha road, Boring Road, Kurji and Patliputra. The study included survey cum interview method to obtain the information about respondent's current pre-consumer textile waste management practices and a Likert scale was also prepared to gather experts' opinion on the products that were made from the textile waste by artisans. An interview schedule was prepared with both open and close-ended questions. Also, a five-point Likert scale was created for the assessment of the products. Descriptive statistics were employed including tabulation, frequency distribution, Likert scale, pie chart and bar graphs for the analysis of the data collected.

Phase 2: Development of products

Total 10 products were developed by the local artisans using the pre-consumer textile waste collected from the stakeholders. The products developed were:

i. Organizer
ii. Pouch
iii. Specs cover
iv. File cover
v. Wallet
vi. Bottle cover
vii. Medicine bag
viii. Tote bag
ix. Lunch-bag
x. Phone cover

The development of the products took place in 5 stages:

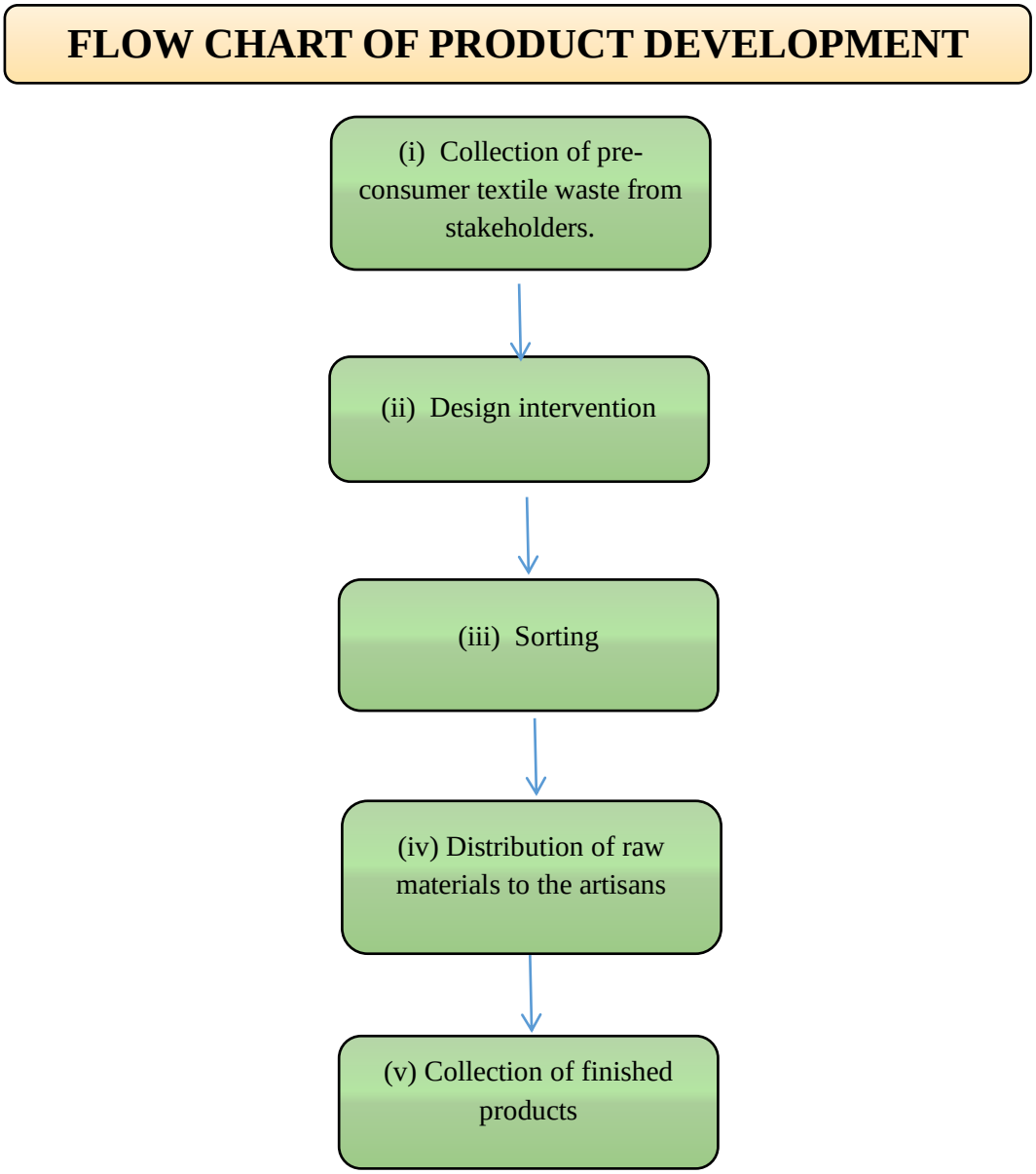


Fig 1: Flow chart of product development

The created products from the textile waste were:



Fig 2: Organizer



Fig 3: Pouch



Fig 4: Spectacles cover



Fig 5: File cover



Fig: 6: Wallet



Fig 7: Bottle cover



Medicine pouch



Fig 8:

Fig 9: Tote bag



Fig 10: Lunch bag



Fig 11: Phone cover

Phase 3: Evaluation of products.

The developed products were evaluated by 10 experts within the college premises by a five-point Likert scale on seven parameters:

i. Visual appeal,
ii. Functionality,
iii. Sustainability,
iv. Quality,
v. Price,
vi. Innovation and
vii. Overall impression of the products.

Phase 4: Introducing the recycling initiatives to the stakeholders

After the evaluation of the products were completed, the researchers got back to the stakeholders (boutique owners and tailors from the tailoring units) and displayed the products prepared from the waste material collected from them and thus, introducing recycling initiatives to the stakeholders.

RESULTS AND DISCUSSIONS

Assessment of pre-consumer textile waste management practiced by the stakeholders

Table 1: Stakeholders according to their years of experience (N=100)

Years of experience	Frequency	Percentage
Less than 10 years	36	36

10-20	33	33
20-30	16	16
30-40	9	9
40-50	4	4
50-60	2	2
Total	100	100

The analysis in the given Table 1 represents the distribution of responses of stakeholders on the basis of their years of experience. The following results depicts that majority (36%) of them have experience of less than 10 years while only few (2%) have experience of 50-60 years.

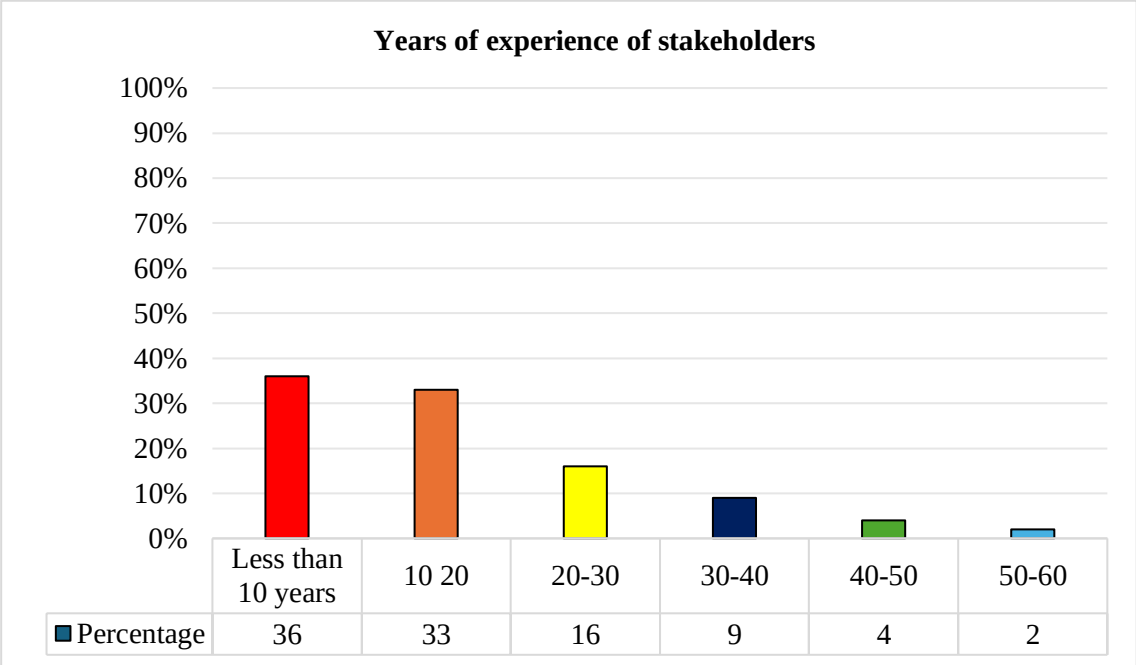


Fig 12: Years of experience of stakeholders

Table 2: Response of stakeholders on the basis of their textile waste disposal methods (N=100)

Textile waste disposal methods	Frequency	Percentage
Return	3	3
Reuse	9	9
Storage	5	5
Throw	66	66

Reuse + Storage	3	3
Reuse + Throw	3	3
Storage + Return	1	1
Storage + Throw	1	1
Throw + Return	6	6
Reuse + Return	2	2
Storage + Reuse + Return	1	1
Total	100	100

The data in Table 2 highlights the responses of stakeholders on the basis of their textile waste disposal methods. From the following results it is clear that majority (66%) of the respondents threw away the textile waste in their units. Whereas only a negligible amount (9%) would reuse the textile waste generated in their units.

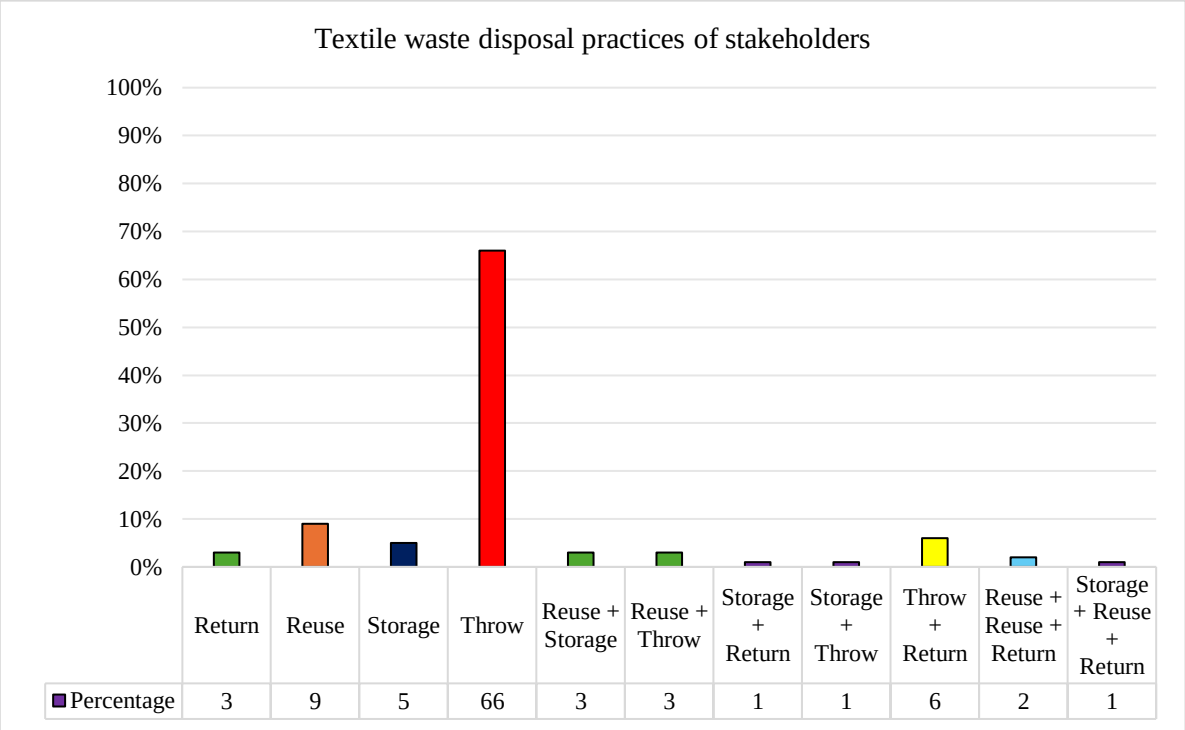


Figure 13: Textile waste disposal practices of stakeholders

Table 3: Response of stakeholders on the basis of source of collectionn of textile waste (N=100)

Who collects waste	Frequency	Percentage
Rag picker	55	55
Self	30	30
Customer	2	2
Customer + Rag picker	7	7
Self + Rag picker	2	2
Self + Customer	4	4
Total	100	100

Table 3 highlights the responses of stakeholders regarding textile waste collection. The results clearly indicate that majority (55%) the respondent's waste was collected by rag pickers and marginal number (2%) returned the textile waste to the customer.

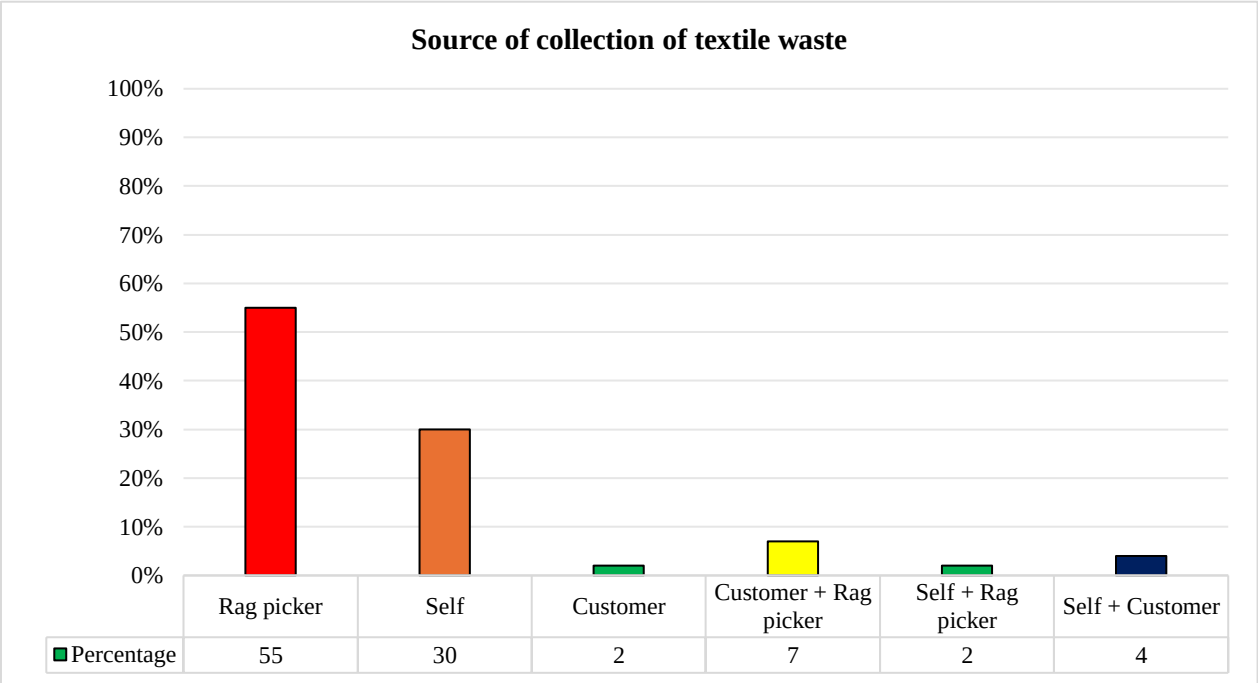


Figure 14: Source of collection of textile waste

Table 4: Response of stakeholders on the basis of their attempt to recycle the textile waste (N=100)

Attempted to recycle	Frequency	Percentage
Yes	42	42
No	58	58
Total	100	100

Table 4 highlights the responses of the stakeholders on the basis of their attempt to recycle the textile waste. The results reveal that majority (58%) of the respondents did not attempt to recycle the textile waste while the rest (42%) attempted to recycle the textile waste by making new products.

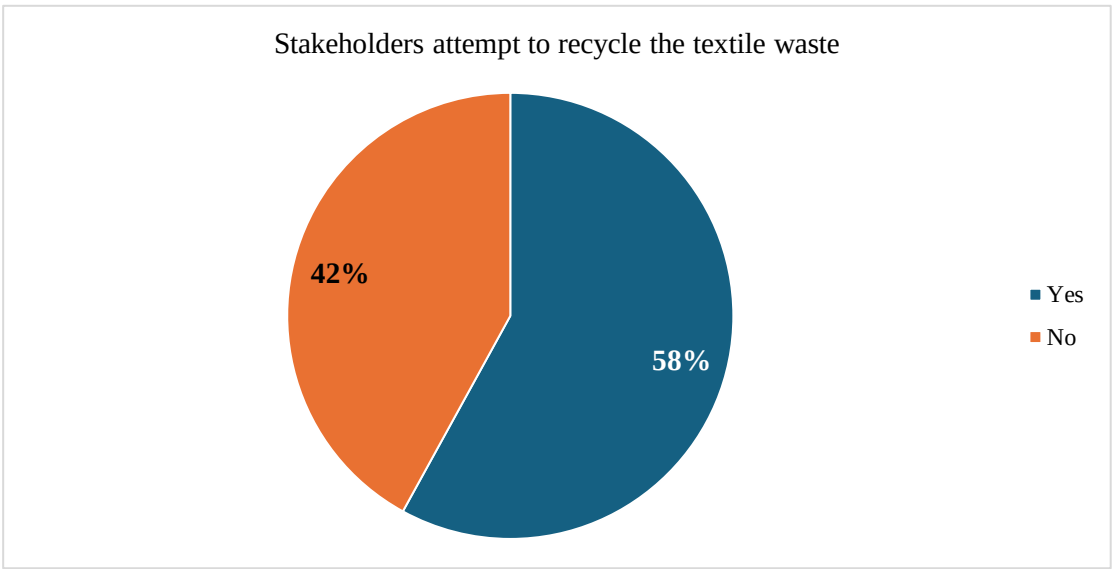


Figure 15: Stakeholders attempt to recycle the textile waste

Table 5: Reasons preventing the stakeholders from adopting more sustainable practices (N=100)

Reasons	Frequency	Percentage
Management	1	1
Manpower	1	1
No sale	1	1
Not reusable	10	10

Storage	1	1
They do	19	19
Time	56	56
Lack of interest + Time	3	3
Time + No sale	1	1
Lack of awareness	2	2
No waste	5	5
Total	100	100

It is evident from the above given figures that majority (56%) of the stakeholders had time management issues. Other issues included lack of manpower, management and manpower issues.

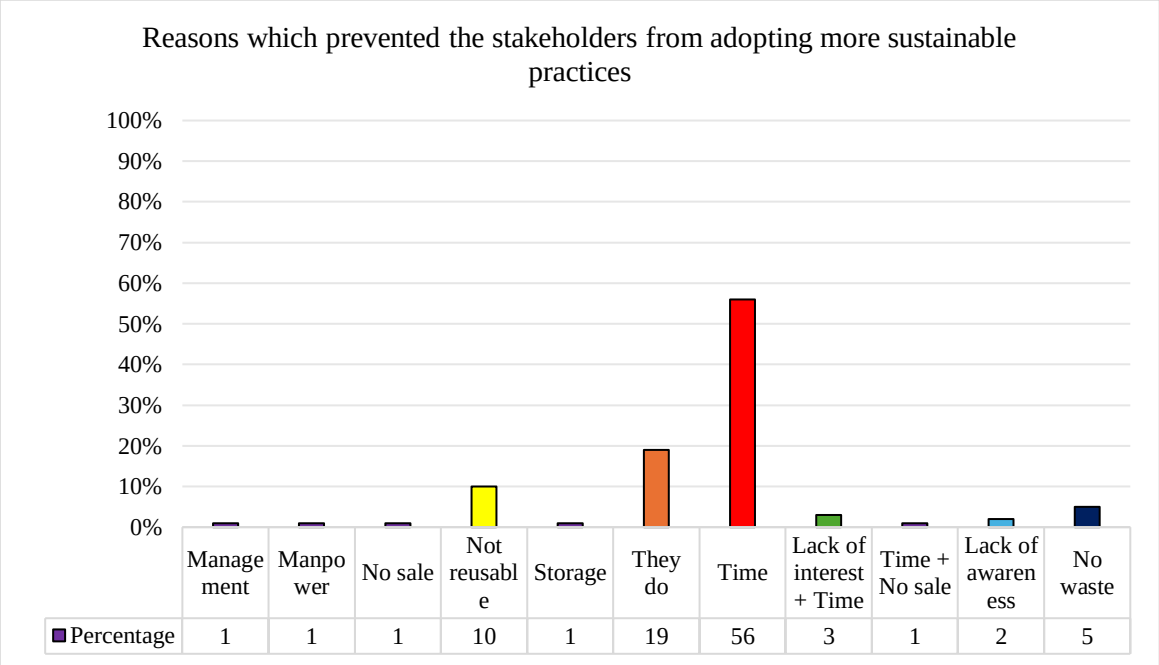


Figure 16: Reasons which prevented the stakeholders from adopting more sustainable practices

Table 6: Views of stakeholders regarding importance of textile waste management practices (N=100)

Views of stakeholders	Frequency	Percentage
Very important	37	37
Somewhat important	19	19
Important	15	15

Not important	29	29
Total	100	100

Table 6 clearly highlights the responses of stakeholders on the basis of their views regarding importance of textile waste management practices. It is clear from the results that a quiet a few (37%) of respondents stated that it was very important to manage the waste.

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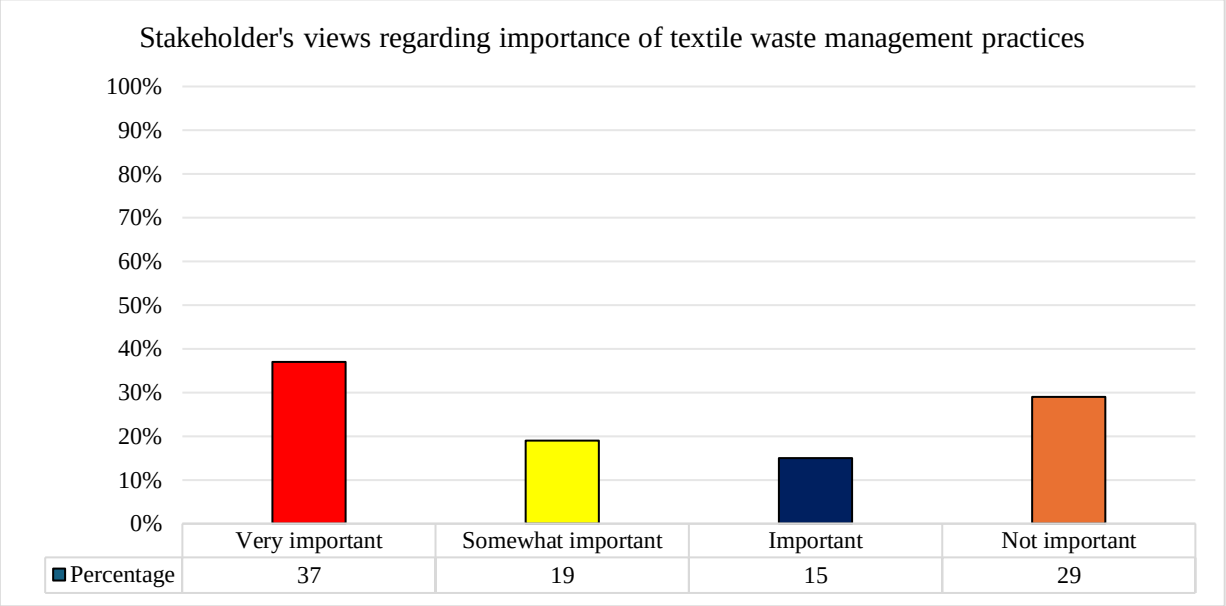


Figure 17: Stakeholder's views regarding importance of textile waste management practices

Table 7: Stakeholder's interest in learning new ways of textile waste management practices (N=100)

Stakeholder's interest	Frequency	Percentage
Yes	79	79
No	21	21
Total	50	100

The data shown in the Table 7 highlights the responses of the stakeholders on the basis of how interested they were in learning new ways of textile waste management practices. The results clearly show that majority (71%) of them were interested in learning new ways of creating products from the textile waste while the others (21%) were not interested in learning any new way of textile waste management.



Figure 18: Interest of in learning new ways of waste management practices

Analysing the products evaluated by the experts

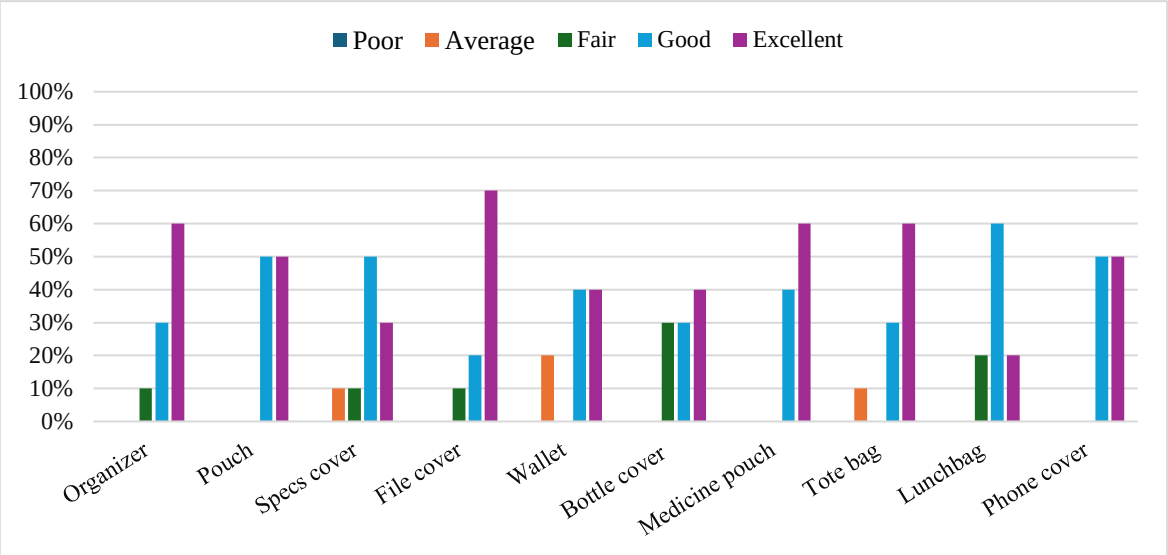


Fig 19: Visual appeal of the products

From the above figure, it can be seen that all the products were highly appreciated in terms of their visual appearance. The File cover was rated excellent by 70 percent of the experts. Spectacles cover received mixed rating among all the products. Phone cover and Pouch both were rated 50 percent 'excellent' and 50 percent 'good' by the experts.

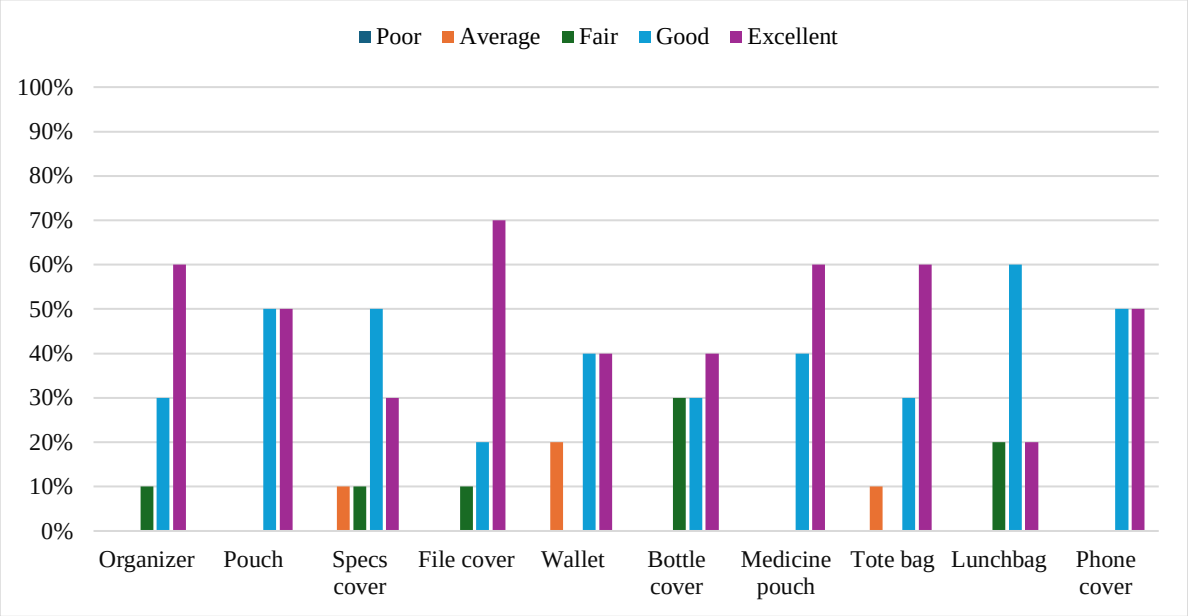


Fig 20: Functionality of the products

Figure 20 depicts that the functionality of the products was rated fairly well by the experts. Phone cover and Pouch were rated as excellent by 80 percent of the experts.

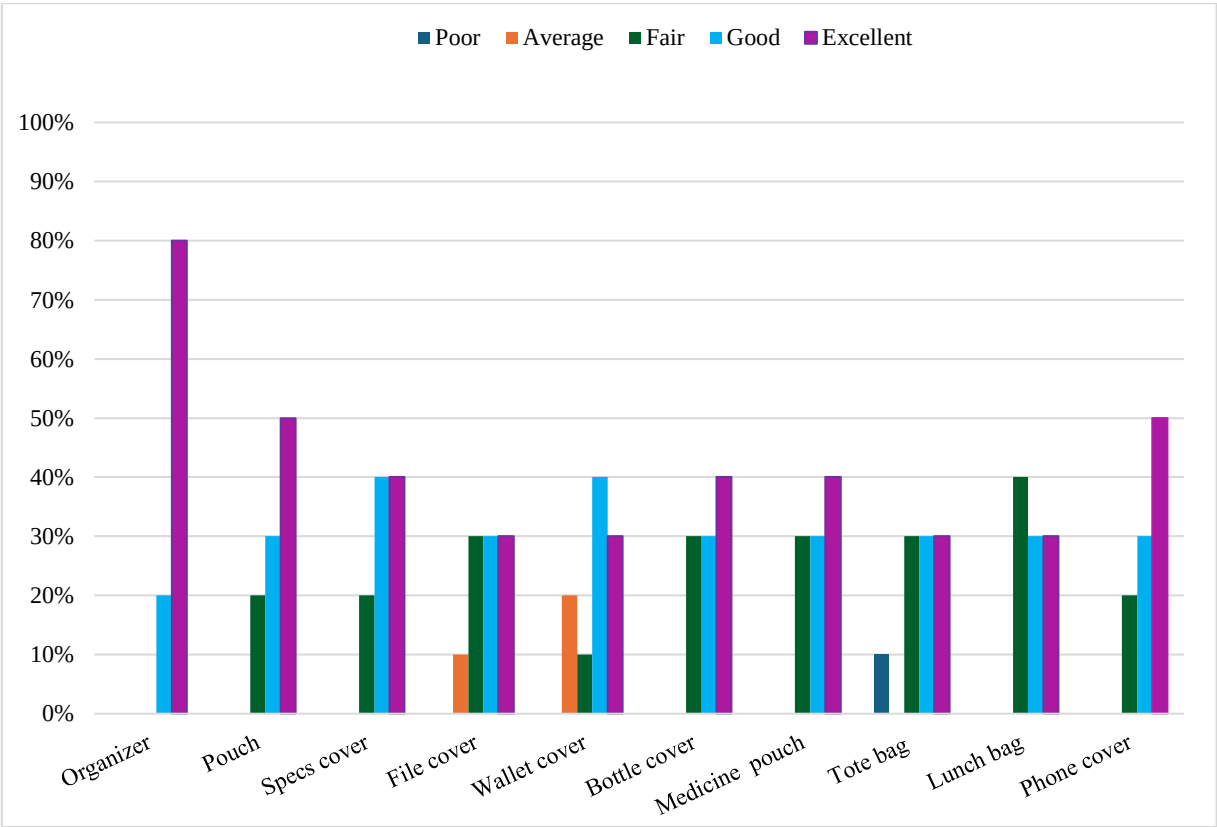


Fig 21: Sustainability of the products

Figure 21 clearly illustrates that 80 percent of the experts appreciated organizer in terms of its sustainability and Tote bag received only 10 percent poor review by the experts. Wallet was rated average by 20 percent and file cover was rated average by 10 percent.

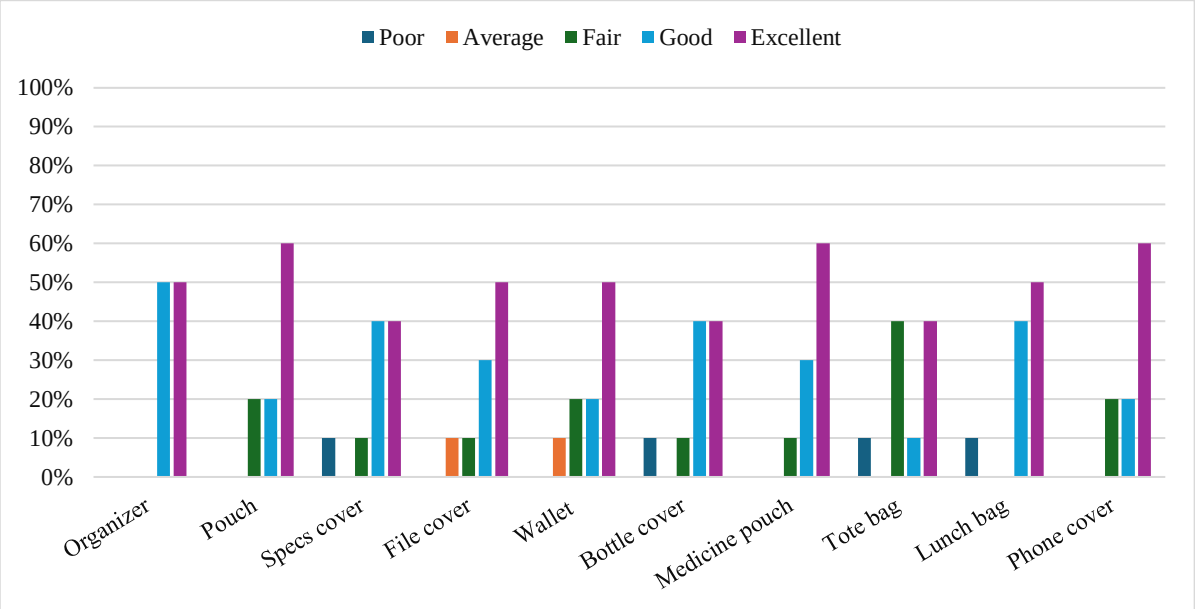


Fig 22: Quality of the products

Figure 22 highlights that all products were highly appreciated as far as quality was concerned. 60 percent of the experts rated Pouch, Medicine bag and Phone cover as excellent and Wallet and File cover got a mixed rating in terms of quality.

- **Price of the products**

The price of the products was decided after taking into consideration the raw material cost, labour cost, miscellaneous and profit. The final price of the products is given below:

i. Organizer: Rs. 330
ii. Pouch: Rs. 165
iii. Specs cover: Rs. 165
iv. File cover: Rs. 220
v. Bottle cover: Rs. 165
vi. Wallet: Rs. 165
vii. Medicine bag: Rs. 165
viii. Phone cover: Rs. 140
ix. Lunch bag: Rs. 220
x. Tote bag: Rs. 220

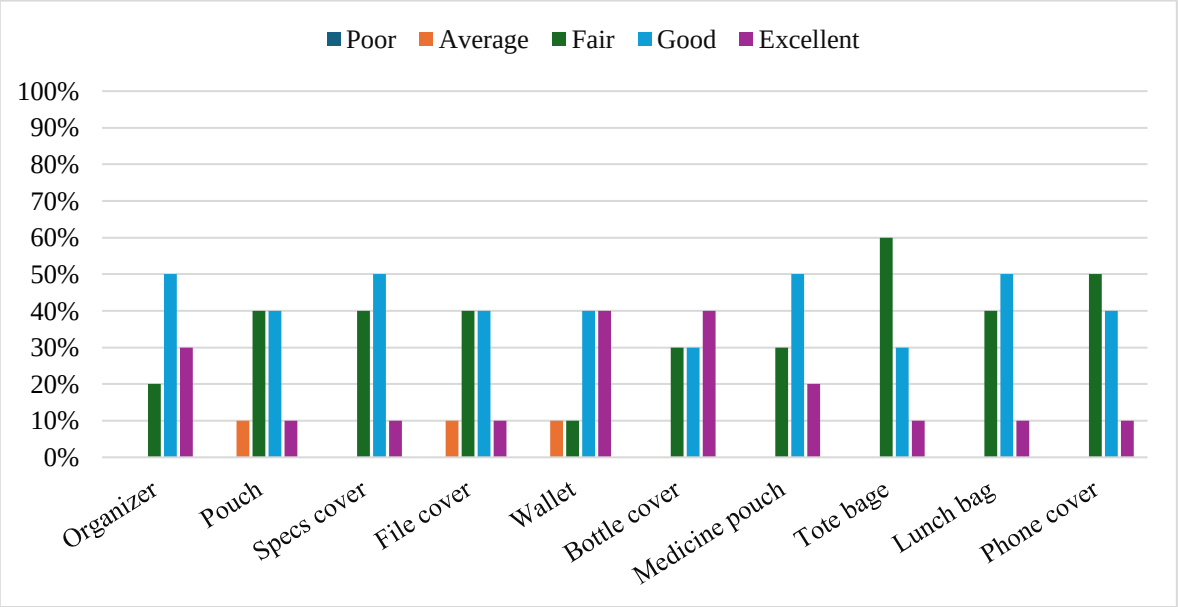


Fig 23: Price of the products

Figure 23 emphasizes that the price of the product got a fair rating from the experts. 60 percent of experts rated tote bag as fair in terms of price.50 percent of the experts gave Organizer, Spectacles cover, Medicine Pouch and Lunch bag a good rating. File cover, Wallet and Pouch got a mixed rating. None of the products were rated poor by experts as far as price was concerned.

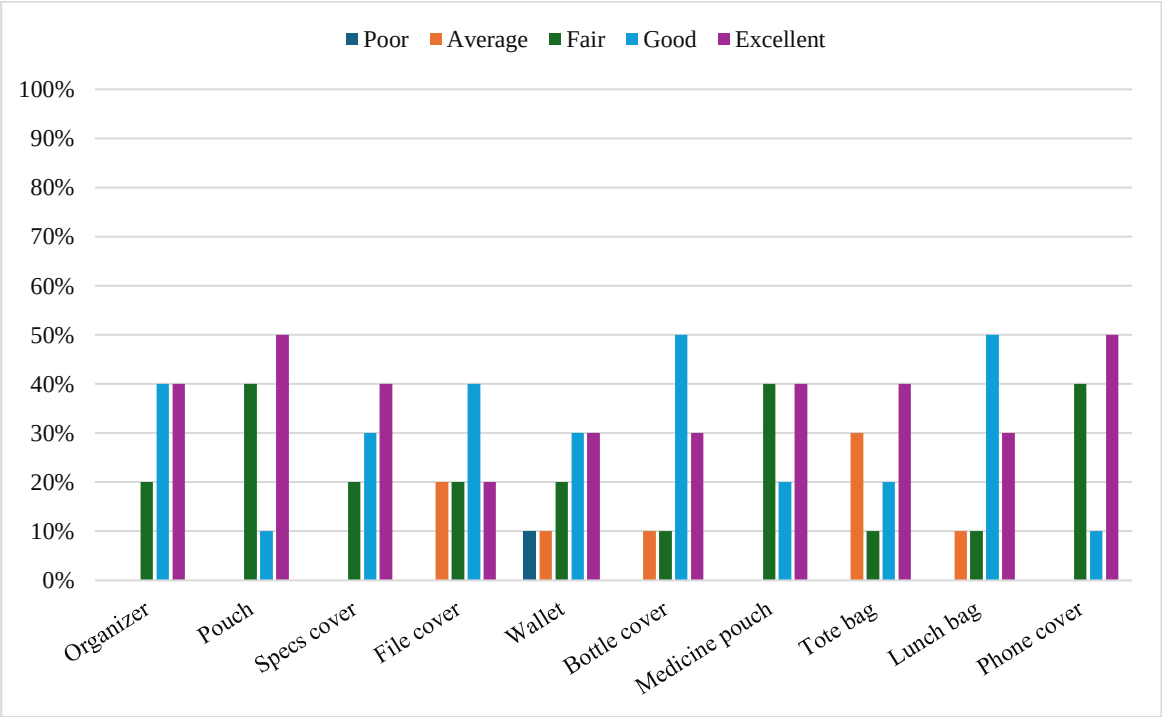


Fig 24:- Innovation of the products

Figure 24 highlights that on the basis of innovation of the products, 50 percent of experts rated Pouch and Phone cover as excellent. File cover and Wallet received a mixed rating.

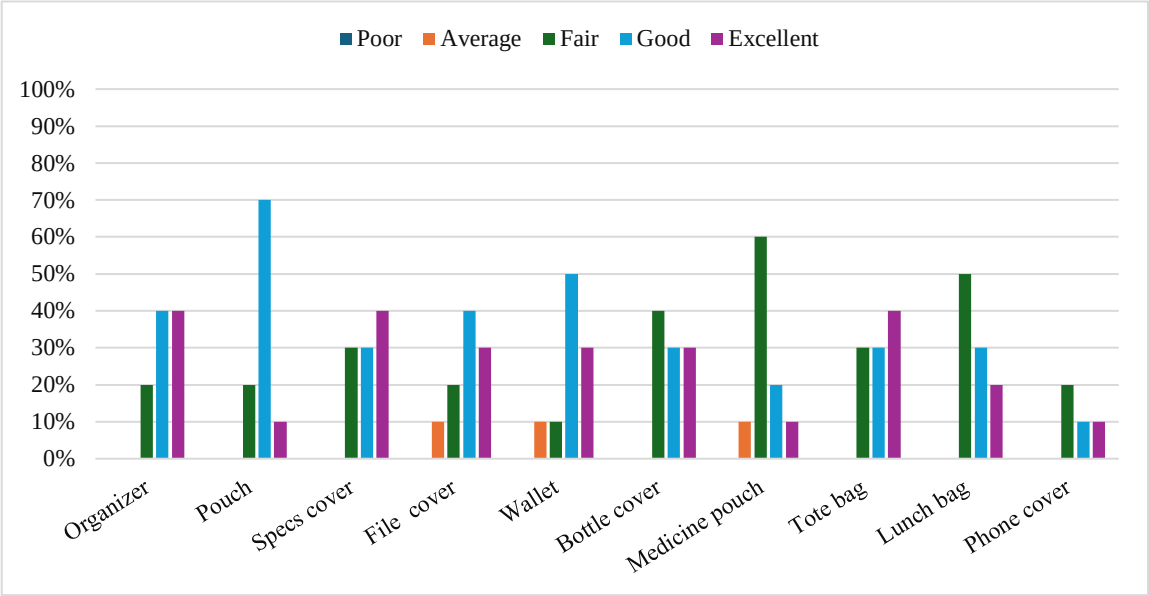


Fig 25:- Overall impression of the products

The graph in Figure 25 demonstrates that all the products got a good rating as far as overall impression was concerned. 70 percent of the experts rated Pouch as good. File cover got a mixed rating. None of the products were rated as poor by the experts.

Introducing the textile recycling initiatives to the stakeholders

The last and main objective of the study was introducing the textile recycling initiatives to the stakeholders by showcasing the products made out of textile waste by the artisans. It was quite heartening to see that most of the stakeholders demonstrated keen interest in collaborating and working with the artisans and they were also willing to teach them more techniques of designing as well as stitching, keeping in mind the taste of modern consumers they were catering to.

SUMMARY, CONCLUSION AND IMPLICATIONS

The research reveals that there were serious problems with how local stakeholders manage textile waste. The current practices of the stakeholders were not sustainable as they threw the waste in large, reckless amounts. Majority of the stakeholders were not even aware of where the waste was going or how it was being utilized. It was clear that while the stakeholders were willing to adopt recycling practices, significant barriers like lack of time, inadequate storage space and insufficient manpower were preventing them from adopting it. A significant step in the research was an innovative approach of redirecting textile waste to the local artisans. The local artisans demonstrated remarkable creativity in converting the collected textile waste materials into functional products which were: Organizer, Pouch, Spectacles cover, File cover, Wallet, Bottle cover, Medicine pouch, Tote bag, Lunch bag and Phone cover. These products then underwent expert evaluation. The experts appreciated the products for their exceptional visual appeal, superior quality, competitive pricing, impressive functionality, creative innovation and sustainability. Their positive assessment validated the potential of converting textile waste into valuable, marketable commodities. In the final step of the research, these innovative products were showcased to the original stakeholders and the recycling initiatives developed by local artisans were

comprehensively introduced to them. The stakeholders responded with keen interest and inclination towards adopting these recycling initiatives and expressed a strong desire to contact and collaborate with the artisans.This initiative included in the study would result in: proper textile waste management by the stakeholders, help in providing employment opportunities to the local artisans and result in a circular economy for the textile waste generated in the city.

SUGGESTIONS FOR FUTURE RESEARCH:

1. This study could be expanded to include a broad range of stakeholders.
2. A consumer-oriented product evaluation methodology could be implemented which would potentially provide a different perspective to the study.
3. A similar research could be conducted on household textile waste that is post-consumer textile waste.

REFERENCES

- Aishwariya, S., & Jaisri, J. (2020). Harmful Effects of Textile Waste. Fiber 2 Fashion: Ahmedabad, India. https://www.fibre2fashion.com/industry-article/8696/harmful-effects-of-textile-waste
- Bick, R., Halsey, E., & Ekenga, C. C. (2018). The global environmental injustice of fast fashion. Environmental Health, 17(1). https://doi.org/10.1186/s12940-018-0433-7
- DeVoy, J. E., Congiusta, E., Lundberg, D. J., Findeisen, S., & Bhattacharya, S. (2021). Post-Consumer textile waste and disposal: Differences by socioeconomic, demographic, and retail factors. Waste Management, 136, 303–309. https://doi.org/10.1016/j.wasman.2021.10.009
- Ellen MacArthur Foundation. (2017). A new textiles economy: Redesigning fashion's future. https://www.ellenmacarthurfoundation.org/publications/a-new-textiles-economy-redesigning-fashions-future
- FASHION FOR GOOD, Mohan, A., Bali, N., Reddy, P. L., Balecha, M., Dubey, M., Sureka, A., Reverse Resources, Fashion for Good, Saahas Zero Waste, Castle, N., Venati, H., Bourland, M., Sasi, R., Khanna, P., Maheshwari, K., Rodrigues, W., Khubele, A., & Jariwala, P. (2022). India’s Potential To Bring Textile Waste Back Into The Supply Chain. In WEALTH IN. https://reports.fashionforgood.com/wp-content/uploads/2022/07/Sorting-for-Circularity-Wealth-in-Waste.pdf
- Global Fashion Agenda & McKinsey & Company. (2020). The state of fashion 2020. https://www.mckinsey.com/industries/retail/our-insights/the-state-of-fashion-2020
- Global Fashion Agenda & The Boston Consulting Group. (2017). Pulse of the fashion industry. https://www.globalfashionagenda.com/publications-and-policy/pulse-of-the-industry
- Solanki, S. (2024). Tripartite MoU to reduce textile waste in India gives hope, but cautious steps needed, Down To Earth Gazebo. https://www.google.com/amp/s/www.downtoearth.org.in/amp/story/waste/tripartite-mou-to-reduce-textile-waste-in-india-gives-hope-but-cautious-steps-needed-94843
- United Nations Environment Programme. (2019). Emissions gap report 2019. https://www.unep.org/resources/emissions-gap-report-2019

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2

ADAPTIVE CLOTHING FOR THE PEOPLE WITH LOCOMOTOR DISABILITY: A DESIGN APPROACH

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ABSTRACT

Locomotor disability refers to difficulty in movement, especially from one location to another, which can be ascribed to a variety of ailments. This type of disability is widespread both globally and in India. Locomotor disability can greatly affect one's quality of life and brings forth many challenges in day-to-day functioning. Many studies on clothing requirements of disabled people reflect their experiences with regards to major problems in finding fashionable clothes that fit their disabilities and a great limitation in the clothing choices. With this background, the current research was conducted to investigate the clothing needs of people with locomotor disabilities. This study employed a mixed method approach. The results revealed a multitude of challenges encountered by individuals with locomotor disabilities. The findings unveiled that these individuals encounter not only difficulties with regards to the design features of their garments but also with regards to constructional features as well as accessories and notions used in their garments. Analysis of brands that provide solutions to such cases was conducted to provide them with further solutions. This study demonstrated the presence of numerous design elements that are often employed by various brands in their adaptive clothing collections. Moreover, no Indian brands could be located which offers design and clothing solution to people with locomotor disability. This shows a huge potential or market for such kind of clothing.

Keywords: Adaptive clothing, Brand, Constructional features, Design, Locomotor disability.

INTRODUCTION

The term "disability" refers to any physical, mental, cognitive, or developmental condition that limits, interferes with, or makes it challenging for an individual to engage in daily routines and interactions or to perform tasks. As per the World Report on Disability 2011, approximately 15% of the global population has a disability, with 2-4% facing substantial challenges in functioning (World Health Organisation& The World Bank, 2011). The worldwide prevalence of disability is increasing because of the aging population, the widespread occurrence of chronic diseases, and advancements in disability measurement methodologies and techniques. To address the challenges

encountered by individuals with impairments, interventions are needed to eliminate environmental and social obstacles. Approximately 10% of the global population, which is over 650 million individuals, live with disability.

Locomotor disability

Locomotor Disability is a condition that hinders movement, specifically affecting the legs. Generally, it is considered a disability associated with the bones, joints, and muscles. It hinders a person's ability to move, such as walking, picking up objects, or holding things. This is also referred as mobility disability. This disability category constitutes the majority of the total disabled population in India. According to the 2011 census, locomotor disability accounts for around 20.3% among all disabilities.

Adaptive clothing

Clothing that has been created or designed especially to help people dress themselves is known as adaptive clothing. A person with a particular need, a disability, a sickness, or someone who requires a little additional help with daily duties may benefit greatly from adaptive clothing, footwear, and accessories. Coherent Market Insight states that "the global market for adaptive apparel is estimated to be valued at USD 18.5 Bn in 2025 and is expected to reach USD 32.12 Bn in2032, exhibiting a compound annual growth rate of 6.7% from 2025-2032". The global adapted clothing market is experiencing expansion due to the rising elderly population and increasing impairments in both children and adults. Leading players in the worldwide adapted clothing market include Silvert's adapted Clothing & Footwear, Izzy Camilleri, NBZ Apparel International, Able2Wear, Adaptions By Adrian, Professional fit Clothing, Adaptive Clothing Showroom, Creation Comfort, Buck & Buck, PVH Corp., and several others. There have been studies on the clothing requirements of disabled people that shows that physically disabled consumers experience major problems in finding fashionable clothes that fit their disabilities and the choices are too limited.

SIGNIFICANCE OF STUDY

The purpose of the research was to identify specific clothing problems of people with locomotor disability and giving them design solutions. The lack of available information indicated a need for research in this area.

REVIEW OF LITERATURE

Azher *et al*. (2012) studied adaptive clothing for women with arthritis and found what was missing in their regular clothing and worked with them to determine their needs for independence and self-confidence. When Velcro, zippers, and elastic were added, the new functional clothing was most comfortable and useful. Each of the three participants unanimously concurred that the tailored clothing was not only fashionable but also functional, serving as both outerwear and casual attire.

Leccia (2020) examined adaptive clothing and how it changed over time through a knitwear line for wheelchair women. The researcher explained how the desire for this type of clothing arose and how the clothes evolved to suit functional needs but ignore psychological needs. The researcher further emphasized that only a few adaptive apparel companies have considered functional, creative design that follows industry trends and innovation.

Bhuyan and Bairagi (2020) in their study envisioned adaptable sportswear for wheelchair-bound tennis players of India. Pilot research was carried with wheelchair tennis players at the Karnataka State Lawn Tennis Association in Bengaluru. The study proposed designing criteria for poliomyelitis-afflicted tennis players who have lost mobility.

In a study on clothing design for physically disabled senior women, Allen (1975) discovered stylistic aspects in outer wear chosen by women that were 65 years or older. Five older women with arm/leg disabilities underwent testing of the clothing design. The practical qualities of both the clothing that is already worn and the clothing that is being created were evaluated. Each woman's dressing ability increased during the month she wore the designed outfit. Particularly useful features were a lengthy front zipper and an elasticized waistband.

Strickfaden et al. (2013) examined the relationship between wheelchair users' performance in job interviews and the material culture barrier of clothes. They found that people with disabilities prefer to dress that makes them blend in and appear the same so they may portray themselves as capable. Nakic and Bogovic (2019) examined how disabled people might use modern technology to develop personalized functional apparel that meets their needs and preferences. Wheelchair-friendly clothing is made possible by advances in technology. Thoren (1996) studied the systems approach to disability clothing and the problems disabled people face when they try to find suitable clothing. Sixty-five individuals with disabilities were interviewed, and the results reveal that their needs, including garment fit and functioning, shopping experience, and store service, are strongly influenced by their impairments. The researcher suggested that apparel manufacturers and retailers may work together to serve customers with disabilities, especially when combined with other information technology advancements.

Considerable endeavours are being undertaken to eradicate discrimination and problems that a disabled individual face in his/her day-to-day life, but still there exists a great gap in the way individuals with disabilities are treated or their issues are placed importance particularly those relating to their attire.

OBJECTIVES

1. To study the clothing requirements of people with locomotor disability.
2. To investigate the problems faced by people with locomotor disability with regards to their clothing.
3. To study the challenges faced by people with locomotor disability while selection, purchase, and alteration of apparel.
4. To design and produce prototypes of adaptive clothing for people with locomotor disability.

RESEARCH METHODOLOGY

This study aims to comprehend the clothing needs of individuals with locomotor disabilities, pinpoint specific clothing issues that these individuals encounter when choosing, buying, and altering clothing, and to design and produce prototypes of adaptive clothing for people with locomotor disability.

This study was conducted in four stages:
1st stage – A survey was conducted to find out difficulties faced by people with locomotor disability of 12 people.
2nd stage – 4 case studies were conducted to get the in-depth investigation about the individuals.
3rd stage –An analysis was done on existing adaptive clothing brands around the world to provide further solution.
4th stage - Prototype development.

To understand the problems and special clothing needs of people with locomotor disability a survey was conducted. An online form was circulated to the people with locomotor disability and the reply was received from only 12 respondents. Out of the twelve participants, four volunteered for the case study. Interviews were then conducted as part of a case study to learn more about the unique issues each respondent had with clothes. Because it was difficult to meet with the participants due to the COVID circumstances that were prevalent in society, participants were contacted by phone. Date and time of the interview were arranged according to their convenience.

From these four cases, one of the respondents volunteered for prototype development. This was followed by a study on brands for getting an insight on what adaptive features are being used in the market for implementing the design process for designing functional clothing, by generating ideas for effective prototypes and design solutions. Further design development and prototype creation were carried out, and the respondent subsequently evaluated the prototypes.

RESULTS AND DISCUSSION

A total number of 12 respondents were approached through purposive sampling which included 4 men and 8 women above the age of 18. Table 1 provides general information of the respondents on their age, gender, qualification, work profile and monthly income.

Table 1: Demographic details of the respondents

Variables	Frequency(n=12)	Percentage (%)
Age (years)		
18-30	5	41.7%
31-40	6	50.0%
41-50	1	8.3%
Gender		
Male	4	33.3%
Female	8	66.7%

Others	0	0%
Do you have locomotor disability		
Yes	12	100%
No	0	0%
Working		
Yes	8	66.7%
No	4	33.3%
Monthly income		
Below 10,000 rupees	3	25%
10,000 -1,00,000 rupees	9	75%
1,00,000-2,00,000 rupees	0	0
2,00,000-3,00,000 rupees	1	8.3%
Qualification		
High School	1	8.3%
Undergraduate	1	8.3%
Postgraduate	9	75%
Research Scholar	1	8.3%

It is evident from the above Table 1 that the age of the respondents was above 18 years and 50.0% were in age range of 31- 40 years and 41.7% were in the age range of 18-30 years whereas 8.3% were in the age range of 41-50 years. 66.7% respondents were female, and 33.3% respondents were male. All the respondents had locomotor disability. Table 1 also shows that 66.7% of the respondents were working and majority of them i.e. 75% were earning up to Rs 100,000/- per month. The survey reported that 75% of the respondents were postgraduate.

Table 2: Distribution of respondents according to their preferences for disabled friendly environment while shopping

Characteristics	**Frequency (n=12)**	**Percentage (%)**
	I like to go to those markets which are disable friendly and have enough space to move between the stalls	
Strongly agree	7	58.3%
Agree	4	33.3%
Neutral	0	0%
Disagree	1	8.3%
Strongly disagree	0	0%
	I like to go to the stores where ramps are present, and I am comfortable to use them	
Strongly agree	8	66.7%
Agree	2	16.7%
Neutral	1	8.3%
Disagree	0	0%
Strongly disagree	1	8.3%

	I like to go to stores where the shelves are not so high, and I can independently look for clothes all by myself	
Strongly agree	8	66.7%
Agree	2	16.7%
Neutral	1	8.3%
Disagree	1	8.3%
Strongly disagree	0	0%
	I like to go to the shops where there is proper assistance given regarding helping me with sizes, colours, different options etc	
Strongly agree	9	75.0%
Agree	2	16.7%
Neutral	0	0%
Disagree	1	8.3%
Strongly disagree	0	0%

Table 2 reveals that 58.3% of the respondents strongly agreed with going to markets which are disabled friendly and had enough space to move between the stalls and only 8.3% disagreed with it. Whereas 66.7% strongly agreed with going to the stores where ramps were present and they were comfortable to use them. While an equal percentage (66.7%) strongly agreed to go to the stores where the shelves were not so high and they could independently look for clothes all by themselves and only 8.3% of them disagreed with it. About 75.0% of the respondents strongly agreed with going to the shops where there was proper assistance given regarding helping them with sizes, colours, different options etc.

The data shows that respondents prefer disabled-friendly environment around them while they shop: places that have ramps, disable friendly trial rooms etc. An environment that is "disabled friendly" is one in which there are no obstacles to the freedom, convenience, or safety of any person with a disability. Dedicated parking for PwD (Person/People with disability) that is close to the building is known as disabled-friendly parking. They are well-lit at night so users may navigate them with ease. Often, ramps are provided as alternatives. Steps should not be used frequently since they might result in trips and mishaps. Instead of using stairs, one should instead utilise gentle ramps.

Table 3: Distribution of respondents according to their choices of clothing constructional feature

Characteristics	**Frequency (n=12)**	**Percentage (%)**
	I like clothes with Velcro.	
Strongly agree	1	8.3%
Agree	1	8.3%
Neutral	5	41.7%
Disagree	5	41.7%
Strongly disagree	0	0%

	I like clothes with zipper.	
Strongly agree	2	16.7%
Agree	7	58.3%
Neutral	2	16.7%
Disagree	1	8.3%
Strongly disagree	0	0%
	I like clothes which are easy to open and easy to close.	
Strongly agree	7	58.3%
Agree	3	25.0%
Neutral	2	16.7%
Disagree	0	0%
Strongly disagree	0	0%
	I like clothes with magnetic buttons.	
Strongly agree	1	8.3%
Agree	3	25.0%
Neutral	5	41.7%
Disagree	3	25.0%
Strongly disagree	0	0%

Table 3 elaborates choices of clothing constructional feature that are preferred by the respondents. 41.7% of the respondents were neutral and disagreed about liking clothes with Velcro. Only 8.3% of respondents said they preferred garments with a Velcro fastener. 58.3% of respondents affirmed that they preferred clothing with zippers. About 58.3% of respondents strongly agreed that they preferred clothing that was simple to open and close. 25% of those surveyed concurred that they preferred clothing with magnetic buttons.

Clothing closures serve a very important role, and the types of closures used have changed a lot over the time. Table 3 demonstrates that respondents like clothing that is simple to open and close, thus for the present research of designing garments, it was chosen to focus on closures such magnetic snap buttons and zippers for simplicity of use and convenience of wearing the garment.

Table 4. Brief of type of disability of the respondents their predominant characteristics and clothing problem as revealed in the case study

Type of Disability	Predominant Characteristics	Clothing Problem
Polio (Respondent 1)	Difficulty in walking Use of Calliper left foot	Narrow bottom hems of trouser Large Shoe size due to Calliper Shoe with closed mouth do not fit.
Rheumatoid arthritis (Respondent 2)	Weak knee joints Weak shoulder joints Stiffness in arms and joints Hip Replacement	Issues in wearing Upper Wear without front zippers or buttons. Winter wear/warm jumpers with front zipper

	Pain in joints	Difficulty in tying laces
Cerebral palsy (Respondent 3)	Floppy fingers	Hands don't look flattering Sleeves with wider sleeve
Loco motor (Respondent 4)	Wide shoulders Shortened legs	Sleeve length too long. Long Trouser length. Trousers with low stretch ability.

It is evident from the Table 4 that respondents prefer wearing comfortable, affordable, and quality clothing. These findings formed a base for developing designs and prototypes. After second stage of case studies, out of 4 participants, 1 female participant who volunteered for design development process, who has polio in her right leg and wears a calliper, was selected for in depth study of her wardrobe and for giving her design solutions.

But before giving her design solutions, research was done on the leading online brands that specialize in adaptive clothing. This was done to gain an in-depth understanding of the clothing features utilized by these prominent brands and to obtain a concise overview of the adaptive features. The study indicated that very few brands offer limited solutions for people with locomotor disabilities. Brands use Velcro and invisible magnetic buttons as fasteners to make clothing adaptive and comfortable. It is further revealed that there is a huge scope for Indian brands and designers to focus on adaptive clothing.

This study was followed by developing flat sketches for lower garment. Following are the important features to be incorporated into the designs:

- Soft elastic band
- A side slit at the opening of ankle for placement of Velcro or invisible magnetic snap button.
- Longer length and slightly loose fit around the ankle.
- Trousers will be kept in focus.

Technical flat sketches

The trousers that are designed are made by keeping in mind the requirements of the respondent of case study 1, who has polio in her leg and wear calliper.

Style-1

Technical illustration of adaptive Pants with Narrow hem bottom (as respondent illustrated a desire to wear narrow bottom trouser in her interview) with Velcro opening for respondent so that she can wear narrow bottom hem pants easily without worrying about if it will fit her foot calliper or not.

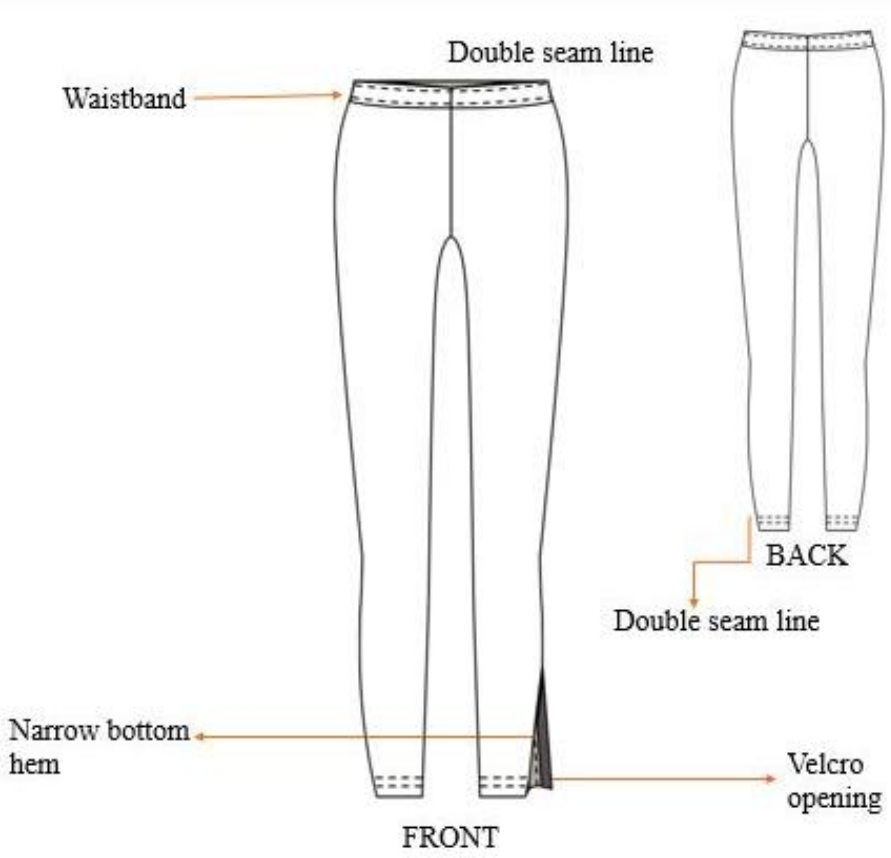


Figure 1: Design features and the characteristics of adaptive legging

Style-2

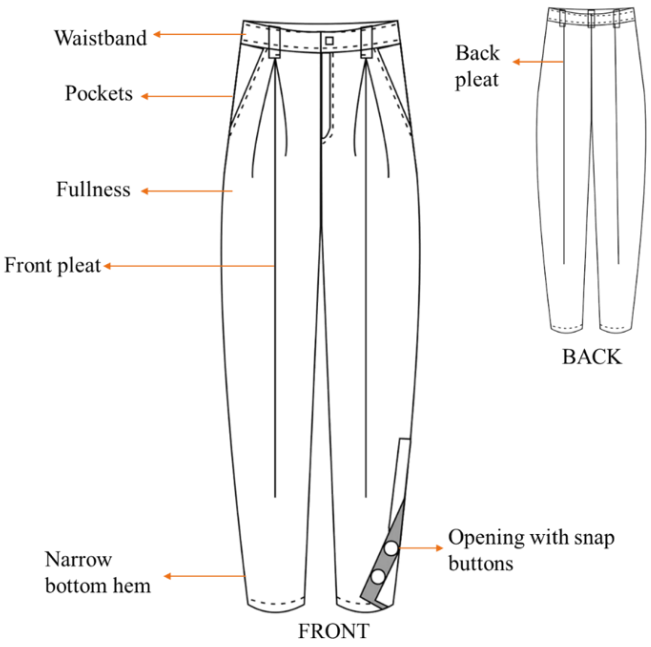


Figure 2: Loose fit adaptive pants with magnetic snap buttons for easy access

Style-3

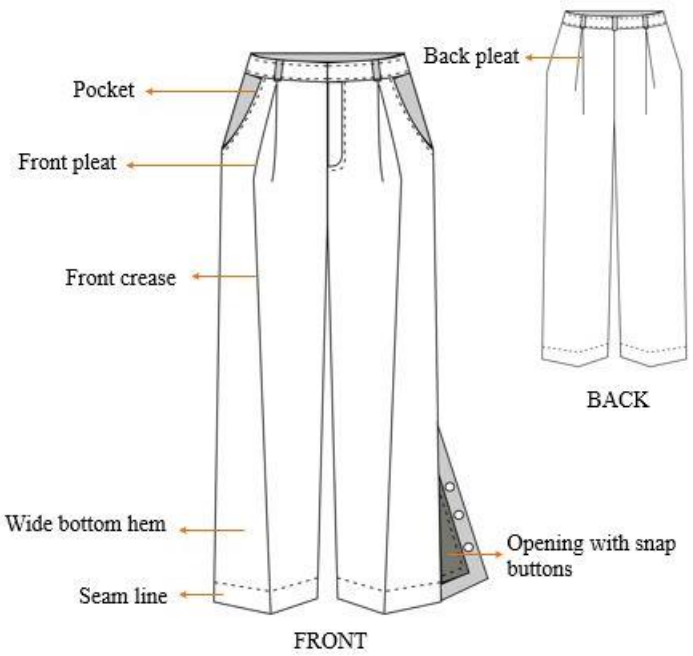


Figure 3: Straight cut trouser with snap button opening

Style-4

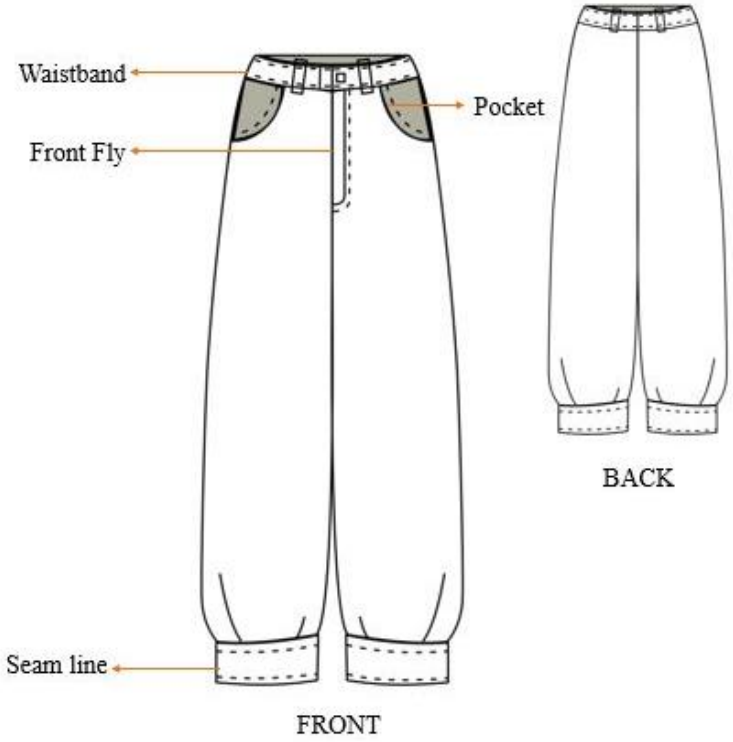


Figure 4: Baggy trouser with wide leg bottom hem

Style-5

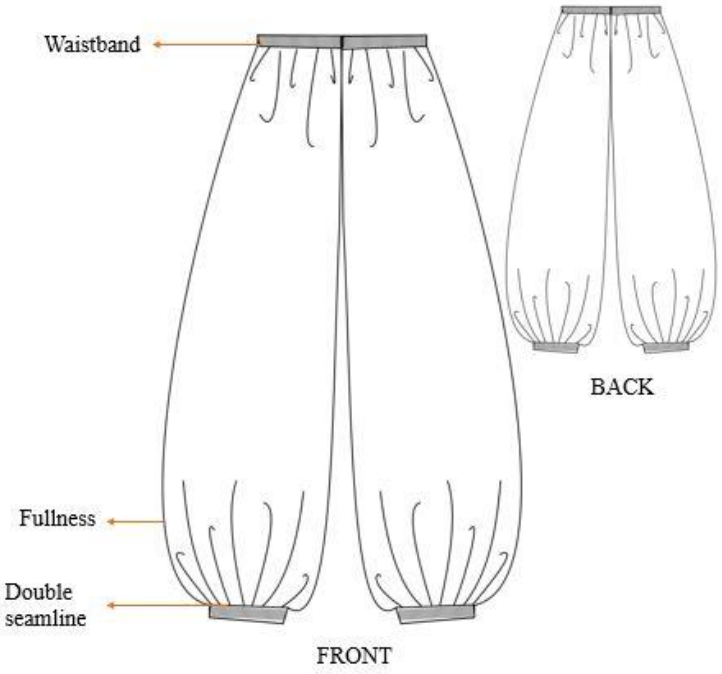


Figure 5: Harem trouser with elastic opening at the ankle for easy access.

These styles (Fig. 1, Fig. 2. Fig. 3, Fig. 4, Fig. 5) were shown to the respondent. She was very happy with the designs and gave her suggestions for further development of prototypes. She was also requested if she can share her feedback and pictures wearing the prototype. She clicked pictures of the 3 prototypes (Fig. 6, Fig. 7, Fig. 8) but she refused to click photos of two of the prototypes as they were not comfortable. Following are the images of the prototypes worn by the respondent.



Figure 6: Prototype 1



Figure 7: Prototype 2



Figure 8: Prototype 3

Suitability of developed prototypes were analysed by using the data collected while evaluating the developed prototypes. 1-10 scale was provided as 1 the least likeable attribute and 10 the most likeable attribute. And the respondent was asked to rank one of her most favourite prototypes. The following are the suitability assessments and future suggestions.

Table 5: Suitability assessment of Prototype 1

	Attributes	Choose from scale 1 to 10 (1 - Least likeable to 10 - Most likeable)									
 Prototype 1	Design										0
	Ease of wearing										0
	Comfort while walking										0
	Ease to open and close										0
	Describe the changes you want	The length of the above should be shortened									

Prototype 1 was found to be highly suitable on all aspects (Table 5). The style was highly appreciated and was said to be made into the final garment in the interview, but it was also mentioned that the length of it should be shortened a little. The final prototype was made in 3D to illustrate how it would look actually on the respondent if it was made in real life. Moreover, some

styling suggestions and design solutions were also given to the respondent for the uppers to match with the Prototype 1 (Fig. 10).

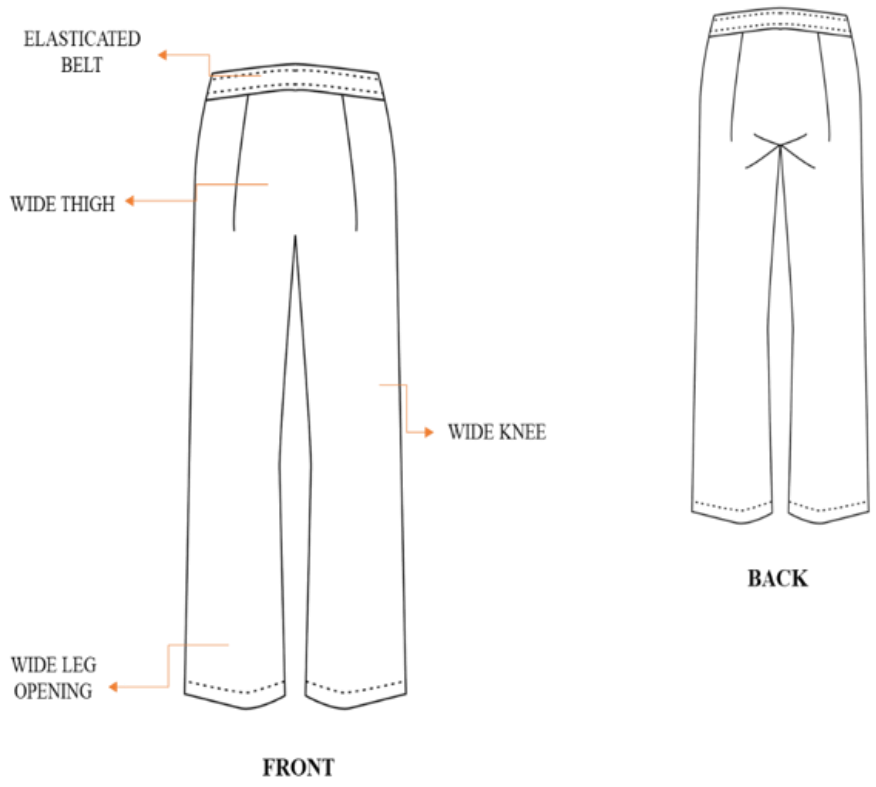


Figure 9: Flat sketch of final prototype

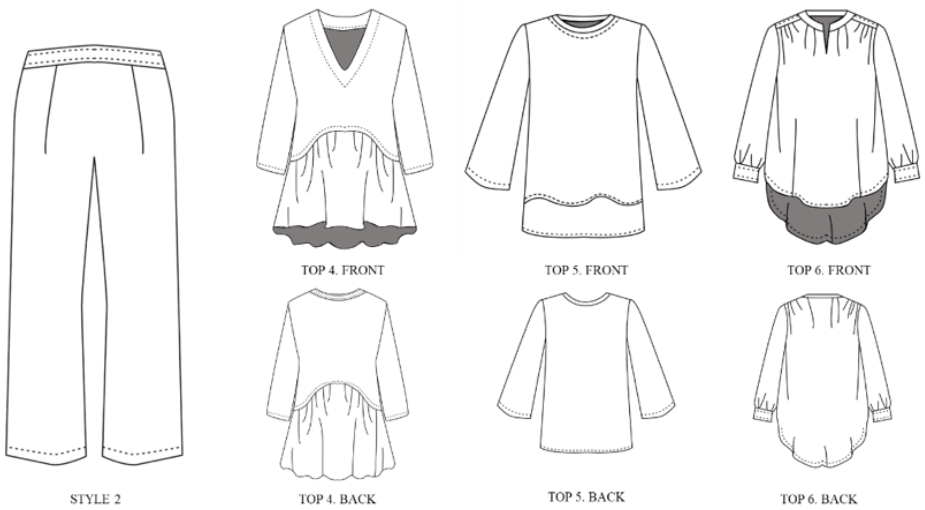


Figure 10: Flat sketches for final prototype styling suggestions



Figure 11: Final prototype with 3D rendering

Prototype 1 was found to be quite appropriate in every way (Fig 9). The fabric that will be used to create it in real life was taken into consideration when creating this 3D simulation (Fig. 11). It was recommended to use light-to-medium weight materials like cotton, khadi and denim. The respondent expressed a strong preference for the design. Additionally, the trousers' ease of wear was considered desirable. The garment was also quite appropriate in terms of walking comfort and simplicity of opening and closing. The highly acclaimed design prototype was reportedly turned into the finished item of clothing.

CONCLUSION

Adaptive clothing is clothing that has been specifically made to assist people in dressing themselves. Adaptive apparel, footwear, and accessories can make a significant difference in the life of an individual with a specific need, impairment, disease, or someone who needs a little extra assistance with everyday tasks. From the present study, it was revealed that the respondents held a firm consensus with their preferences to go to the markets or stores that are disable friendly. The findings of the study unfold that most of them agreed with the fact that the silhouettes of ready-made clothing didn't look appealing on their body. It was concluded that they found their ready-made clothing uncomfortable because of their special needs. They strongly agreed to like the clothes that were easy to open and easy to close. Further it was concluded that people were facing problem in their clothing with regards to their individual locomotor disability as they were having difficulty in moving their arms above head. They faced difficulty in getting dressed and undressed. Additional issues related to clothing were that the bottom hem of their trousers was too narrow, length of jeans and trousers were not according to their need. The case studies revealed that there is a lack of brands or designers in India who provide adaptable apparel, leaving disabled individuals with limited options and forcing them to adapt to their circumstances. As the respondent who

volunteered for case study mentioned that she wore salwar suits mostly and wanted to wear trousers, but she never found one that has comfort and that suits her. Many style options were given to her by developing various styles of trousers - broader at bottom hem, some made adaptive by using magnetic snap buttons, some involved extra room for ease and comfort at the required places/leg room. After her feedback, many more styling options were provided to the respondent who felt satisfied and happy with her new looks.

The government should focus on the textiles for disabled people to empower them in terms of self-growth. There is a requirement of creating more awareness amongst designers and brands especially in India about adaptive clothing requirements of a huge population. This indicates a significant market opportunity and potential for this particular segment. There is need to increase awareness regarding clothing problems of people with disability among people through online programs. There should be online platforms dedicated to addressing clothing issues faced by those with locomotor disabilities or any other disabilities. These platforms should be freely accessible to the public, allowing everyone to get knowledge about the issue.

REFERENCES

- Allen, J. C. (1975). Clothing design for the physically handicapped elderly woman. *Home Economics*, 1-68.
- Azher, N., Saeed, M., & Kaloom, S. (2012). Adaptive clothing for females with arthritis impairment. *Journal of University Medical & Dental College*, 3(2), 52-59.
- Bhuyan, K. S., & Bairagi, N. (2020). Studies on Designing Adaptive Sportswear for Differently Abled Wheelchair Tennis Players of India. In A. Majumdar, D. Gupta &S. Gupta (Eds.), *Functional Textiles and Clothing* (pp.67-83). Springer Singapore.
- Leccia, M. (2020). Adaptive fashion: Knitwear for people with special needs. http://hdl.handle.net/10589/154188
- Nakic, M., & Bagovic, S. (2019). Computational Design of Functional for Disabled People. *Tekstilec*, 62(1), 23-33.
- Strickfaden, M., Johnson, L. M., & Pow, S. T. (2013). Disability, Identity, Sameness & Differentness: First Impressions of Clothing. *International Textile and Apparel Association (ITAA*) Annual Conference Proceedings.
- Thoren, M. (1996). Systems approach to clothing for disabled users. Why is it difficult for disabled users to find suitable clothing. *Applied Ergonomics*, 27(6), 389-396.
- World Health Organisation and The World Bank (2011). World Report on Disability 2011.
- https://www.who.int/publications/i/item/9789241564182
- https://www.coherentmarketinsights.com/market-insight/adaptive-clothing-market-2294
- https://www.disabled-world.com/disability/statistics/

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3

AN INNOVATIVE ECO-FRIENDLY APPROACH: AN APPLICATION OF NATURAL DYES ON THE BAMBOO YARNS

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ABSTRACT

Natural dyes and their application in dyeing represent one of the earliest forms of artistic expression. Individuals began utilizing natural dyes as their initial rational medium to represent their identities and cultures through this art form. Since ancient times, natural dyes have been used to colour textiles; however, synthetic dyes took their place in the 19th century. Any dye, pigment, or substance that comes from natural sources—such as plants, animals, and minerals—is referred to as natural dye. These sources are sustainable and renewable bio resources that have little effect on the environment. There are no carcinogens or dangerous compounds in natural dyes. The bamboo fibres were dyed four different colours using locally accessible natural dye-producing plants. For yellow, blue, red, and black, respectively, Allum cepa Linn, Indigofere tinctoria Linn, Rublia cordifolia Linn, and Querus dealbata (Fagaceae) were utilized. The quality criteria of the dyed bamboo yarns were examined by testing them for colour fastness to washing at 40^0 C, rubbing grey scale rating, sweat, and light blue wool rating. The dyed bamboo yarns can be used to create sustainable, eco-friendly knitted and woven textiles. The textile industry is currently in high demand for eco-friendly methods of natural dyeing bamboo yarns in order to create intimate and new-born clothing.

Key words : Bamboo Yarns, Colour Fastness, Natural Dyeing, Sustainability

INTRODUCTION

Natural dyes have superior digestibility and are derived from sources that can be continually replenished. When compared to the use of synthetic dyes, colouring the fabric with natural dyes offers a number of benefits, including reduced impact on the environment, the opportunity for premium pricing, a wider range of colour options from a single dye source, and the absence of any potential risk to human health (Sanjeeda & Taiyaba 2018).Because of their low impact on the environment, long history, and aesthetically pleasing qualities, natural dyes have become more popular for use on textile materials around the world. Since the year 1990, a large number of researchers have been exerting a great deal of effort to look for new sources of natural dyes and varied techniques of application (Samanta & Agarwal 2009). India is home to a broad array of natural dyes and boasts a vast biodiversity across the country. Roots, leaves, bark, trunks, and fruits of plants can all be used to extract various colouring agents. Natural dyes include things like henna, madder, pomegranate, turmeric, and eucalyptus, to name just a few examples (Sanjeeda & Taiyaba

2018).

The bamboo is a type of cellulosic fibre and it is environment friendly. Fabric manufactured from bamboo is a type of natural textile that is crafted from the pulp of bamboo grass. Fabric made from bamboo is becoming increasingly popular due to the fact that it possesses a variety of exceptional qualities and is more environment friendly than the majority of other textile fibres (Cohen & Johnson 2010).

Bamboo yarns are approximately eight %stronger than viscose yarns, but around twenty % weaker than cotton yarns. Because of its numerous desirable qualities, bamboo fibre is a good candidate for use in the production of textiles. The texture of bamboo cloth is similar to that of silk and it is incredibly smooth and lightweight. Because of this, it is breathable and comfortable to wear even on hot days. In addition to this, it is extremely hydroscopic, meaning that it can take in more water than traditional fabrics such as cotton or polyester. It's possible that bamboo fabric has an antibacterial activity that is retained in the fabric itself. The antibacterial characteristics along with the application of natural dyes on bamboo yarns are also considered to have potential therapeutic applications.

The fabric developed with these naturally dyed bamboo yarns will be suitable for making intimate apparels, new-born garments etc. Studies on the use of natural dyes on cotton and other natural fibres, such as silk and linen, were conducted. However, using natural dyes on bamboo yarns will result in creative, environmentally responsible methods for the sustainable textile sector. The present study focuses on the implementation natural dye resources on the bamboo yarns for developing varieties sustainable and eco-friendly knitted or woven fabrics for the various purposes.

OBJECTIVES

- To dye the bamboo yarns using naturally available vegetable dye resources
- To analyse the quality parameters of the naturally dyed bamboo yarns

HYPOTHESIS

Application of different natural dyes on bamboo yarns will influence sustainable approaches in the textile industry.

METHODOLOGY

The bamboo yarns were dyed in 4 different colours using natural dyes. The locally available natural dye yielding plant resources were used for dyeing. Allum cepa Linn, Indigofere tinctoria Linn, Rublia cordifolia Linn, and Querus dealbata (Fagaceae) were used for dyeing the bamboo yarns in yellow, blue, red and black colour respectively. The dyed yarns were tested at South India Textile Research Association (SITRA) to analyse the quality parameters. The quality parameters were identified by using the International Organization for Standardisation (ISO) principles. The colour fastness to perspiration in acidic-alkaline, colour fastness to light in Blue Wool, colour fastness to washing at 40°C, and colour fastness to rubbing in Grey Scale were carried out to analyse the quality of the dyed bamboo yarns.

Dyeing of Bamboo Yarns Using Allium Cepa Linn

The developed yarns were selectively pre-soaked in a mordant solution of 5 gram per litre of

potassium aluminium sulphate prior to dyeing. The dyeing procedure was carried out at a liquor ratio of 1:20. Poured 8% of the extracted bulb slurry of allum Cepa Linn in to the dye bath. The temperature was retained at 90° C for 1 hour. The pH of the dye bath was kept 4 by the addition of acetic acid. 2 g/L of non-ionic cleansing agent at a temperature of 60° C for 10 minutes was used for soaping the dyed yarns. Finally the dyed yarns were washed in normal water and dried. The dyed yarns are shown in Figure:1



Figure - 1 Dyed Bamboo Yarns Using Allium Cepa Linn

Dyeing of Bamboo Yarns Using Indigofere Tinctoria Linn

The dye vat was prepared by mixing indigo powder, calcium hydroxide and banana juice. The ratio is 1:2:4. Banana was acting as a reducing agent in the vat dyeing process. The reducing agent takes the oxygen from the indigo and makes it soluble in water. The vat was ready by forming bronzy surface with blue bubbles. The next process was heating the vat up to 90°C and adding the yarn skeins in the dye bath. The pH of the dye bath was 12 and dyeing duration is 50 minutes to 1 hour. The material to liquor ratio is 1:30. After the oxidation the greenish yarns turned to indigo colour. Finally the yarns were washed in normal water and dried under shade. The dyed yarns are shown in Figure: 2



Figure - 2 Dyed Bamboo Yarns Using Indigofere Tinctoria Linn

Dyeing of Bamboo Yarns Using Rublia Cordifolia Linn

The yarns were selectively pre-soaked in mordant solution of 5 gram in one litre of potassium aluminium sulphate prior to dyeing. The liquor ratio is 1:60. Then added 25% of the extracted liquid of ground root of the Rubia Cordifolia Linn into the dye bath. The ratio is fixed

based on the total volume of dye bath. The temperature for bath was reserved at 90° C for 1 hour. The pH was maintained at 12. Finally the dyed yarns were washed in normal water and dried in the shade. The dyed yarns are shown in Plate: 3



Figure - 3. Dyed Bamboo Yarns Using Rublia Cordifolia Linn

Dyeing with Querus dealbata (Fagaceae)

The dye modifier was prepared by soaking small rusty iron nails in a jar by pouring water and vinegar (CH3COOH) to cover the objects. It was kept for 3 weeks and frothy water was formed.

The yarns were soaked in the 25% of the extracted liquid of bark and nuts of Querus dealbata. The ratio is fixed based on the total volume of dye bath. The yarns were dipped in the dye solution for one hour. The temperature is 50°C to 60°C. The liquor ratio is 1:30 and then allowing the dye bath to cool to room temperature. Pour the prepared dye modifier into dye bath by mixing 1:1 ratio of the dye modifier and clear water. Then the pre-dyed wet yarns were dipped inside the dye bath again for 20 to 25 minutes. Finally washed the yarns in normal water with a pH neutral soap to remove all sediments of iron from the fabric. The dyed yarns are shown in Plate: 4



Figure - 4 Dyed Bamboo Yarns Using Querus Dealbata (Fagaceae)

Assessment of Colourfastness Properties of the Dyed Yarns

The dyed yarns were tested for colour fastness to washing, rubbing, perspiration and light. The testing was conducted at SITRA (South India Textile Research Association), Coimbatore, Tamilnadu.

Colour Fastness to Washing

The colour fastness of the dyed yarns to washing was evaluated by using launderometer

(Plate: 3.28) with ISO 105 C10:2006 A1:RA-2020 Grey scale rating procedure.

The fabric measuring 10 x 4 was taken as a test sample. The darker colour fabric with same measurement was sewn along all four sides of the test specimen. Then mixing 5 gram of soap solution per litre of water. Placed the composite sample in the vessel combined with 10 steel balls. Added the prepared soap solution preheated to the test temperature±2°C. The container was closed and the machine kept on for 30 minutes at the temperature of 60°C. Opened composite specimen and separated it from the fabric swatch and dry the specimen by pressing it flat between new filter papers to eliminate additional water. Then dried by hanging it in air at a temperature not beyond 60°C. Accessed the variation in colour by using grey scale. Staining on cotton and wool were identified.



Figure - 5 Launderometer

Colour fastness to Rubbing

Using a crock metre (Plate: 3.29), the colour fastness of the colored yarns to rubbing was assessed using the ISO:105X 12-2016 RA-2021 – Grey Scale Rating method. Analysis was done on cotton staining in both wet and dry circumstances. For the rubbing finger, the desized, bleached cotton cloth was cut into 50 mm squares (±2 mm). The crock block was fixed after developed fabric samples were punctured into 25 mm × 100 mm ± 2 mm. 20 times in a clockwise direction, 20 times in an anticlockwise direction, and 10 times in a clockwise and ten times in an anticlockwise manner using a reduced force of nine and a half N. The procedure for damp fabric was the same. The cotton rubbing fabrics' yellowing was evaluated using the Grey discoloration scale. Using a grey scale, the amount of color that was transferred from the specimen to the white fabric was measured.



Figure - 6 Crock Meter

Colour Fastness to Perspiration

The colour fastness of the dyed yarns to Perspiration – acidic and alkaline were calculated by using perspirometre (Figure: 7) with ISO:105X 12-2016 RA-2021 – Grey Scale Rating procedure. The colour staining on cotton and wool were identified in acidic and alkaline conditions.

Each liter of the alkaline solution was treated with 5g sodium chloride, 2.5g disodium hydrogen orthophosphate, and 0.5g 1-histidine mono-hydrochloride mono-hydrate. 0.1N sodium hydroxide was used to raise the pH of the alkaline solution to 8.0. Each liter of the acidic solution contained 0.5g of 1-histidine mono-hydrochloride mono-hydrate, 2.2g of sodium dihydrogen orthophosphate, and 5g of sodium chloride. 0.1N sodium hydroxide was used to raise the pH of the solution to 5.5. Two 6 by 6 centimeter pieces of white cotton fabric were included with each specimen. To construct a composite sample, the developed fabric was cut to the same size and positioned between the two segments of white cloth, with the hem running down one side. Weight of each composite specimen was identified. Calculated the amount of test solution according to a liquor ratio of 1:50 per specimen.

One mixed specimen was wetted in a pH 8.0 solution with a 20:1 liquor ratio, and it was allowed to sit in this solution for 30 minutes at room temperature. poured out the solution and held the combined sample between two 7.5 x 6.5 cm glass plates with a force of roughly 4.5 kg. Another sample was treated using the same procedure, but this time the solution had a pH of 5.5. The equipment containing the models was placed in an oven set at 37±2˚C for four hours. After removing the sample from the white fabric, it was individually dried in air at a temperature of no more than 60˚C. Grey scale was used to determine how much colour was transferred from the specimen to the white fabric.

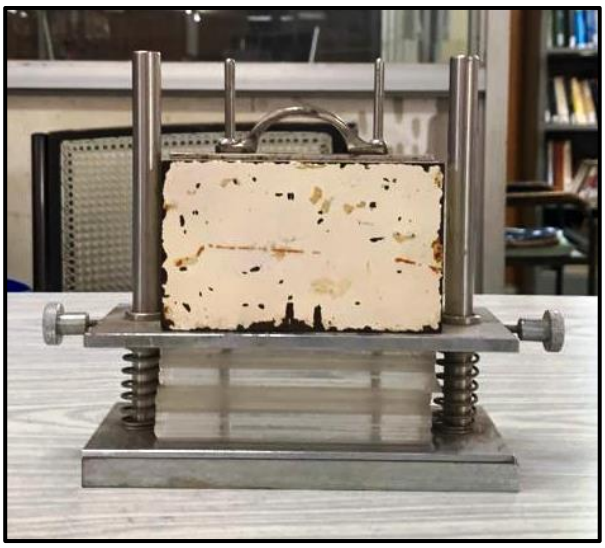


Figure: - 7 Perspirometer

Colour Fastness to Light

A wetherometer (Figure 8) was used to assess the dyed yarns' colour fastness to light (a Xenon Arc Lamp) in accordance with the ISO-105/B02 2014 Blue Wool Rating process. The samples and eight blue wool standard fabric standards are subjected to the artificial xenon arc

lamp. By contrasting the test specimen's colour change with that of the blue wool reference samples, the colour fastness is assessed. The samples' colour variations were compared to samples of blue wool, and a rating for colour fading was noted.



Figure - 8 Wetherometer

FINDINGS AND DISCUSSION

The analysis of the quality parameters of the dyed yarns are described below

Evaluation of the Colourfastness of Dyed Yarns

The South India Textile Research Association (SITRA) conducted tests on the colored yarns in order to evaluate the quality characteristics. The principles of the International Organization for Standardization (ISO) were used to determine the quality parameters. There were tests for colour fastness to perspiration in acidic-alkaline, colour fastness to light in Blue Wool, colour fastness to washing at 40°C, and colour fastness to rubbing in Grey Scale. The coloured yarns' colour fastness to light, sweat, rubbing, and washing was evaluated. The outcome is displayed in Table:1

Table - 1 Properties of Colourfastness of the Dyed Yarns

Sl. No.	Test Standards	Name of the Test	Result			
			Black	Blue	Yellow	Red
1	Colour Fastness to washing at 40° C (ISO 105 C10:2006 A1:RA-2020 Grey Scale Rating)	Change in Colour	4	4	3	4
		Staining on Cotton/Wool	4/4	3/2	3/3	4/4
2	Colour Fastness to Rubbing (ISO:105X12 – 2016 RA-2021 Grey Scale Rating)	Staining on Cotton(Dry/Wet)	4/2	4/3	4/2	4/2

3	Colour Fastness to Perspiration (ISO:105:E04:2013RA-2018 Scale Rating)	Change in colour (Acidic)	4	4	4	4
		Change in colour (Alkaline)	4	3	2	3
		Staining on Cotton/ Wool (Acidic)	3/3	4/4	4/4	4/4
		Staining on Cotton/ Wool (Alkaline)	3/3	3/3	2/2	3/3
4	Colour Fastness to Light (Xenon Arc lamp) ISO -105/B02 2014 Blue Wool Rating	Average Rating	Above class - 3	Above class - 3	Above class - 3	Above class - 3

Colour Fastness to Washing

A colour fastness to washing test using an ISO 105 C10:2006 A1:RA-2020 Grey Scale Rating was conducted at 40° C. The colour shift of the coloured yarn was used to analyse the colour fastness to washing. Analysis was also done on the stains on wool and cotton. The corresponding colour changes for black, blue, yellow, and red are 4, 4, 3, and 4, respectively. For cotton/wool, the staining is 4/4 for black, 3/2 for blue, 3/3 for yellow, and 4/4 for red. Figure 1 displays the Grey Scale grade for color fastness to washing at 40° C.

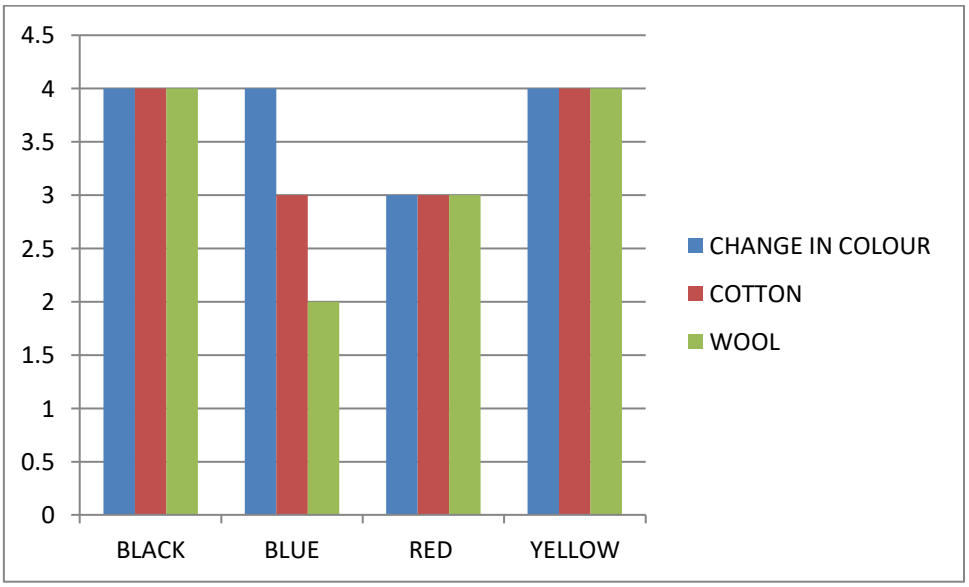


Figure1. Colour Fastness to Washing at 40° C in Grey Scale Rating

Colour Fastness to Rubbing

The colour fastness to rubbing was analysed in ISO:105X12 - 2016 RA-2021 Grey Scale Rating procedure. The staining on cotton in dry and wet conditions was analyzed. The colour

fastness to rubbing in staining on cotton in dry condition was 4 Grey Scale rating for black, blue, yellow and red yarns. In wet condition it was 3 for Blue yarns and 2 for black, yellow and red yarns. The figure:2 shows the colour fastness to rubbing in Grey Scale rating.

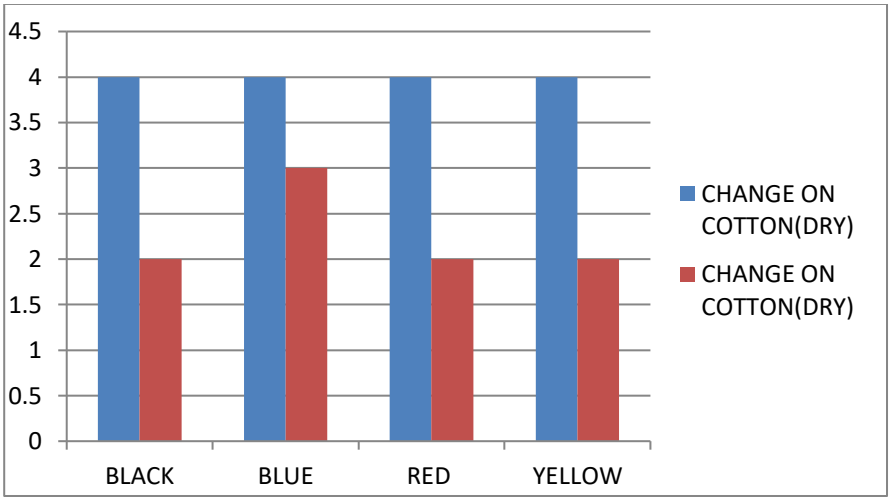


Figure:2. Colour Fastness to Rubbing in Grey Scale Rating

Colour Fastness to Perspiration

The ISO:105:E04:2013RA-2018 Scale Rating analysis was used to determine the color fastness to sweat. Cotton and wool were stained in acidic and alkaline environments, and the color changes in these settings were assessed. Figure 3 displays the Grey Scale grade for color fastness to perspiration.

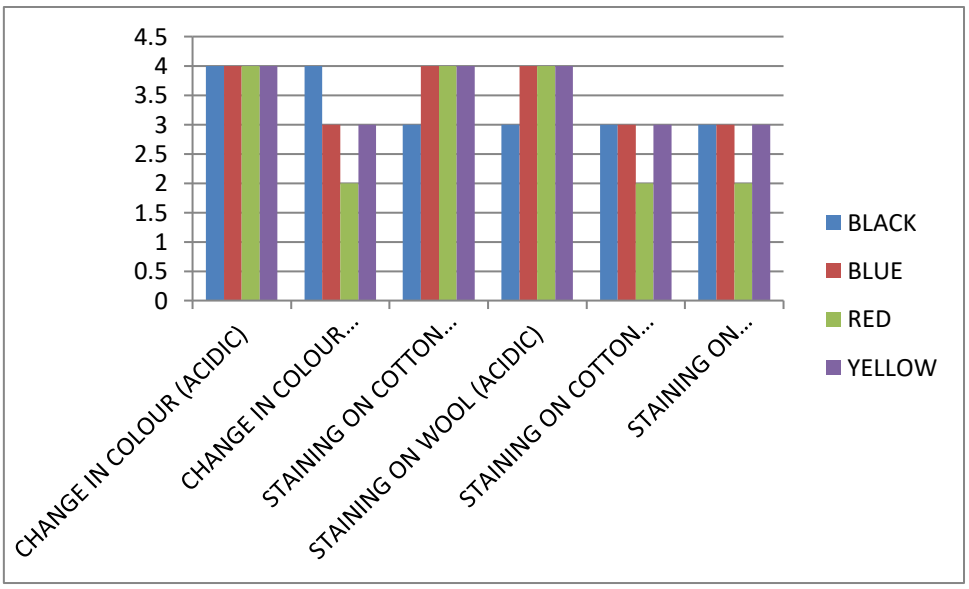


Figure:3 Colour Fastness to Perspiration in Grey Scale Rating

The change in colour in acidic condition was 4 for all the colours. The change in colour in alkaline was 4 black, 3 in blue, 2 for yellow and 3 for red. The staining on cotton/ wool (acidic) was

3/3 in black and 4/4 for blue, yellow and red. The staining on cotton/wool (alkaline) was 3/3in black and blue yarns and, 2/2 for yellow and 3/3 for red.

Colour Fastness to Light

The colour fastness to light was analysed in Xenon Arc lamp with ISO -105/B02 2014 Blue Wool Rating. For this analysis the rating was above class 3 for black, blue, yellow and red yarns.

CONCLUSION

Natural dyes used to bamboo strands will provide the textile industry with new, sustainable, and environmentally beneficial methods. The goal of the current project is to generate a variety of sustainable, environmentally friendly knitted or woven fabrics for a range of uses by using natural dye resources to bamboo yarns. The fabric made from these naturally dyed bamboo yarns can be used to make clothing for new-borns and other intimate clothes.

The growing understanding of various natural dye sources that provide appealing hues and broadening the range of shade cards for various types of sustainable and natural yarns or textiles. Here, an attempt has been made to further improve sustainable fabric by using natural colours on sustainable bamboo yarns. The coloured yarns' quality parameters, such as their colour fastness to rubbing, washing, sweat, and light indicate that they can be used to create more intricate knitted and woven bamboo garments. This environmentally friendly strategy will open up new possibilities in the fashion and textile industries.

REFERENCES

- Adeel, S., Bhatti, I.A., Elnnagar, K., Alam, M. M., & Ali, N. (2011). Dyeing Of Cotton Fabric Using UV Irradiated Turmeric (Curcuma longa L.) as Natural Dye. Research Journal of Textile and Apparel. 15, 71-76.
- Agarwal B.J & Patel, B.H. (2000), The reincarnation of natural colourants – A review, Chemical Weekly. 16(5), 139-146.
- Akkewar, D.M. (1999). National colour of commercial importance. Convention on Natural Dyes. 9-11th December, Department of Textiles Technology, IIT, Delhi. pp. 132.
- Alam, S.M.M., Islam, S. and Akter, S. (2020). Reviewing the Sustainability of Natural Dyes. Advance Research in Textile Engineering, 5(2), 01 – 06.
- Bose, S. & Nag, S. (2012). Isolation of Natural Dyes from the Flower of Hibiscus Rosa-Sinensis, by the exhaustion process. American Journal of PharmTech Research, 2(3),94-99.
- Christie, R. M., Hill, J. M., & Rosair, G. (2006). The crystal structure of CI Pigment Yellow 97, a superior performance Hansa yellow pigment. *Dyes and Pigments*, *71*(3), 194-198. Retrieved 19th May 2022 from https://doi.org/10.1016/j.dyepig.2005.07.001
- Chungkrang, L., Bhuyan, S., & Phukan, A.R. (2021). Natural Dyes: Extraction and Applications. International Journal of Current Microbiology and Applied Sciences 10(1): 1669-1677. Retrieved 18 July 2022 from https://doi.org/10.20546/ijcmas.2021.1001.195
- Cohhen, A.C., & Johnson I. (2010). J.J. Pizzuto's fabric science. Fairchild Books, a Division of Conde Nast Publications, P-53.
- Glover, B.(1998). Doing what comes Naturally in the dye house. Journal of the Society of Dyers and Colourists, 114(1), 4-8.

- Gohl. E.P.G. & Vilensky, L.D. (1983). Textile Science- An explanation of fibre properties. CBS publisher and distribution, NewDelhi.
- Gulrajani, M.L. and Gupta, D. (1992) Natural Dyes and Application to Textiles. Department of Textile Technology, Indian Institute of Technology, New Delhi, India, 110-115.
- Gupta, V. K. (2019). Fundamentals of Natural Dyes and Its Application on Textile Substrates. In A. K. Samanta, N. S. Awwad, & H. M. Algarni (Eds.), Chemistry and Technology of Natural and Synthetic Dyes and Pigments. IntechOpen. Retrived 18th July from https://doi.org/10.5772/intechopen.89964
- Kamel, M.M., Kamel, M., Youssef, B.M., & Shokry, G.M. (2008). Dyeing of cationised cotton with acid dyes. *Journal of The Society of Dyers and Colourists, 114*, 101-104.
- Kumar, R.P.S., Bhuvaneshwari, V., Sathiyavimal S., Amsaveni R., Kalaiselvi M., & Malayaman, V. (2015). Natural Colours from Dyeing Plants for Textiles. International Journal of Biosciences and Nanosciences,2, 160-174.
- Mahanta, D. & Tiwari, S.C., (2005). Natural dye yielding plants and indigenous knowledge on dye preparation in Arunachal Pradesh, North east India. Research Communications, Current Science, 88(9), 1474-1480.
- Mathur, J.P., Mehta, A. & Bhandari, C.S. (2003). Use of neem bark as wool colourant - Optimum conditions of wool dyeing. Indian Journal of Fibre and Textile Research, 28, 94-99.

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4

DRAPED IN HERITAGE: TRADITIONAL COSTUMES OF GANGI, TEHRI GARHWAL

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ABSTRACT

Traditional attire serves as a powerful marker of cultural identity, social status, and historical continuity, while simultaneously fulfilling functional and environmental needs. This study explores the traditional costumes of Gangi, a remote village in Tehri Garhwal, Uttarakhand, where textile practices reflect not only heritage, resilience, and sustainable craftsmanship but also deep-rooted social customs. By documenting the structure, evolution, and symbolic meanings of local attire, this research aims to preserve these indigenous textile traditions that are gradually diminishing due to modernization. A qualitative research approach was adopted, incorporating ethnographic fieldwork, interviews with local artisans, and participant observations of weaving and embroidery practices. Findings highlight the influence of geographical, climatic, and socio-cultural factors on costume design while also reflecting the gradual yet noticeable transition toward contemporary clothing due to modernization, economic shifts, and external influences. However, traditional garments continue to hold cultural significance during festivals and rituals. Women's attire includes garments such as *lawa, angda,* and *sanpa*, complemented by intricate jewellery like *Bulak* and *Chandrahaar*, which symbolize marital status and lineage. Men's and children's clothing, crafted from locally sourced materials**,** demonstrate the community's resourcefulness in balancing tradition with protection against the region's harsh climatic conditions**.** This study emphasises the need for cultural preservation, policy interventions, and sustainable livelihood opportunities for artisans. By documenting and analyzing these indigenous textile traditions, it advocates for a nuanced approach that respects heritage while adapting to evolving socio-economic realities, ensuring the continuity of Gangi's rich textile legacy.

Keywords: Cultural Identity, Modernization, Sustainability, Textile Heritage, Traditional Costumes.

INTRODUCTION

Understanding the Cultural Fabric of North India

North India is a region of immense cultural and historical significance, extending from the snow-capped Himalayas to the fertile plains of the Ganges basin. This vast landscape is home to diverse communities with deeply rooted traditions, artistic expressions, and textile practices shaped by centuries of dynasties and civilizations. Traditional attire serves as a fundamental marker of identity, reflecting social status, environmental adaptation, and intergenerational craftsmanship.

Among these diverse regions, Uttarakhand holds a unique place. Known as "Devbhoomi" (Land of the Divine), it is revered for its sacred pilgrimage sites, rich cultural traditions, and distinct textile heritage. The state is divided into Garhwal and Kumaon (Table-1), each preserving unique styles of dress, embroidery, and weaving techniques. Inhabitants of remote villages have long relied on locally produced textiles, passing down costume-making traditions through generations (Negi, 1993).

Table-1: Administrative Divisions Of Uttarakhand: Administrative Headquarters, Its Constituent Districts

Divisions	Headquarters	Districts
Garhwal	Pauri	Chamoli Dehradun Haridwar Pauri Garhwal Rudraprayag **Tehri Garhwal** Uttarkashi
Kumaon	**Nainital**	Almora Bageshwar Champawat Pithoragarh Nainital Udham Singh Nagar

Tehri Garhwal: A Confluence of Heritage and Geography

Tehri Garhwal, nestled in the Himalayas, is a region characterized by its rugged terrain, extreme climatic conditions, and deeply ingrained cultural traditions. Bordered by Uttarkashi, Pauri Garhwal, Rudraprayag, and Dehradun, this region has historically adapted its way of life—including clothing—to suit its natural environment. The district is known for its indigenous weaving and textile crafts, which have remained largely unaltered for centuries (Capila, 2002).

The geographical landscape of Tehri Garhwal has influenced both the materials used in traditional attire and the styles developed. Locally sourced wool and cotton textiles dominate the region's clothing, ensuring durability and warmth in cold conditions. However, with increased exposure to external markets and shifting socio-economic trends, there has been a gradual decline in the use of traditional garments in favour of contemporary attire (Capila, 2002).

Gangi: A Repository of Textile Traditions

Gangi, a remote village in Ghansali tehsil of Tehri Garhwal, serves as a living repository of age-old weaving and clothing traditions. Traditional costumes in this village are deeply embedded in social customs, seasonal needs, and cultural symbolism, with each garment holding significance beyond its functional purpose. Passed down through generations, these garments continue to represent community identity, craftsmanship, and heritage preservation.

Men's attire in Gangi includes layered woolen coats, loose trousers, and waistbands, which provide insulation from extreme temperatures while allowing flexibility in movement. Women's garments, such as *lawa*, *angda*, and *sanpa*, feature intricate stitching and layering techniques that offer protection against harsh winters. These garments are often complemented by symbolic jewellery, including *Bulak* (nose ring) and *Chandrahaar* (necklace), which indicate marital status and lineage. Children's clothing mirrors adult garments, reinforcing cultural continuity from an early age.

In addition to clothing, textile embellishments, accessories, and headgear play a vital role in defining social identity and status. Jewellery and headpieces, often handcrafted using traditional techniques, serve both ornamental and ritualistic functions, making them an essential component of the region's intangible heritage.

The Evolution of Traditional Costumes in Gangi

Despite their historical and cultural significance, the traditional costumes of Gangi are witnessing a gradual transformation. This shift is influenced by multiple factors, including:

- **Practicality and Adaptation:** Traditional garments, though rich in heritage, are often cumbersome for daily wear.
- **Climate Variability:** Changes in seasonal patterns have impacted clothing choices.
- **Education and Mobility:** Increased literacy rates and migration to urban areas have introduced newer fashion preferences.
- **Economic and Social Factors:** Tourism, commercialization, and exposure to external markets have led to a preference for modern fabrics and readymade clothing.

Justification and Significance of the Study

The documentation of Gangi's traditional costumes and accessories is crucial due to:

- **Preservation of Textile Heritage:** Traditional attire is an integral aspect of India's intangible cultural heritage. Recording these garments safeguards their historical significance.
- **Understanding Cultural Symbolism:** Documenting the symbolic and ritualistic elements of traditional dress provides insights into social customs and identity formation.
- **Contribution to Ethnographic and Anthropological Research:** This study provides a detailed record of costume evolution in Himalayan communities.

By documenting the traditional costumes, this research contributes to cultural preservation efforts while creating an archival record for future reference. Through ethnographic documentation and community engagement, this study offers valuable insights into the resilience of indigenous textile traditions amid changing socio-economic landscapes.

OBJECTIVES

1. To document the traditional attire and accessories of the Gangi community.
2. To understand the symbolic and ritualistic significance of traditional dress in Gangi.
3. To study the adaptation of traditional attire amidst socio-economic transformations.

HYPOTHESIS

Socio-economic and environmental changes have influenced the traditional attire of Gangi community; however, it is hypothesized that the attire still maintains its cultural relevance and symbolic significance, particularly in ritualistic and ceremonial contexts.

Research Questions

1. What are the traditional garments and accessories worn by the Gangi community, and how are they categorized by gender and age?
2. What is the symbolic and ritualistic significance of different elements of traditional attire in Gangi?
3. How has socio-economic transformation influenced the adaptation of traditional attire in contemporary times?

METHODOLOGY

Research Design

This study follows a qualitative ethnographic approach with descriptive analysis to document the traditional attire and accessories of the Gangi community and their symbolic and ritualistic significance.

- Ethnographic fieldwork was conducted to observe, record, and describe traditional costume elements, their usage, and associated cultural practices.
- A descriptive case study method was employed to capture variations in attire across gender, age groups, and ceremonial settings, providing a contextual understanding of their traditional practices.
- Oral histories and visual documentation supplemented the research to ensure a holistic representation of textile heritage.
- The symbolic meanings embedded in attire and accessories were interpreted through thematic analysis of narratives and visual data, paying close attention to cultural expressions, ritual usage, and contextual symbolism.
- Informed consent was obtained from all participants, ensuring voluntary participation and respectful engagement with cultural knowledge bearers. Permissions were taken for clicking pictures , and for audio and video recordings. These were also shared with the participants, if they so desired. Ethical considerations were observed while handling personal narratives and cultural artefacts, with particular care taken to avoid misrepresentation.

Locale of the Study

The research was carried out in Gangi and its seasonal settlement, Reeh, in Tehri Garhwal, Uttarakhand.

- Gangi, a remote high-altitude Himalayan village, served as the primary site for studying traditional clothing practices.
- During winter, the inhabitants migrate to Reeh (approximately 10 km downhill) to escape extreme cold, providing an opportunity to observe seasonal changes in attire.

Sampling and Data Collection

Sampling Technique

- Purposive sampling was used to select individuals with first-hand knowledge of traditional costumes, including elderly custodians, middle-aged wearers, and younger generations.
- A cross-generational sample ensured insights into both preservation and adaptation of clothing traditions.

Sample Size

A total of 45 participants were selected across three age groups to represent generational perspectives:

- 15–30 years (young adults exposed to modern influences)
- 31–45 years (middle-aged individuals balancing tradition and change)
- 46+ years (elders preserving textile heritage)

Data Collection Methods

- Semi-structured interviews with men, women, and artisans to document garment components, symbolic meanings, and cultural significance.
- Focus group discussions with village elders and weavers to explore historical narratives and oral traditions related to clothing.
- Participant observation of daily and ceremonial attire, including fabric draping styles, jewellery usage, and seasonal variations.
- Photographic and video documentation of costume details, accessories, and textile production techniques.

Data Analysis

- Thematic analysis was employed to identify key patterns in costume use, symbolism, and transformation.
- Comparative study of traditional versus contemporary attire was conducted using historical references, oral accounts, and field observations.
- Findings were categorized based on age, gender, seasonal variations, and ceremonial significance.

FINDINGS AND DISCUSSION

This section presents the key findings of the study, categorized according to the three research objectives. It includes documentation of traditional attire, an analysis of the role of clothing in cultural identity and rituals, and an exploration of changes in clothing practices due to modernization.

Traditional Attire and Accessories of the Gangi Community

Women's Attire

Women's traditional dress in Gangi consists of multiple layers of locally woven wool garments, offering warmth and protection against the cold climate.

- **Angda**: A black full-sleeve woollen shirt, resembling a sweater, fastened with silver hooks (Fig.-1).
- **Lawa/Pankhi**: A five-meter-long unstitched woollen garment, wrapped around the waist and secured with *Pathed* (a red woollen belt) (Fig.-3). Lawa is traditionally black, whereas *Pankhi* is white with colored borders (Fig.-2).
- **Mundasa (Headgear)**: A rectangular scarf wrapped around the head, symbolizing marital status and cultural identity (Fig.-4).
- **Knitted Accessories**: Locally made woollen socks, gloves, and caps are essential for winter wear.



Fig.-1: Women Wearing *Angda* (Upper-Garment)
Source: *Photograph taken by the researcher*



Fig.-2: Lawa (lower-garment)



Fig.-3: Pathed (Woven Fabric Worn like A Belt)

Source: *Photograph taken by the researcher*

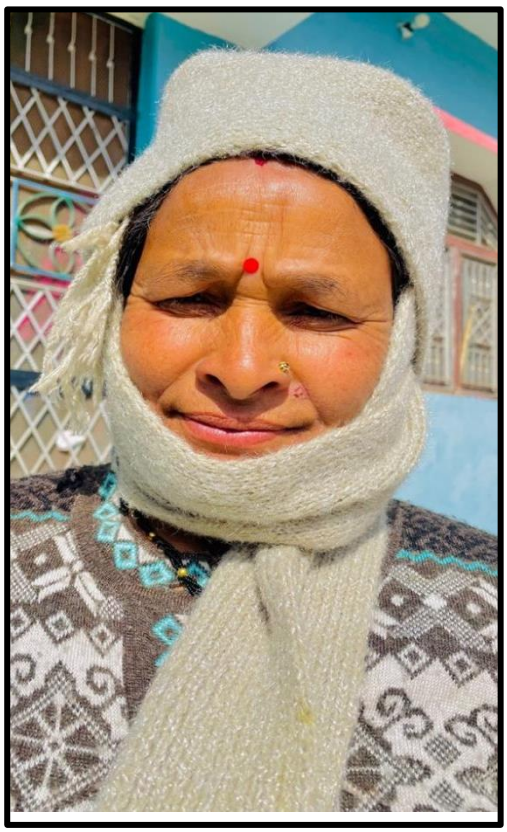


Fig.-4: Mundasa (Headgear)

Source: *Photograph taken by the researcher*

Men's Attire

Men's clothing in Gangi emphasizes functionality and insulation, reflecting the region's extreme weather conditions.

- **Dhigula**: A loose, off-white woollen coat, secured with a belt or rope (Fig.-6).
- **Hizar/Selta**: Woollen pants, tailored for comfort, fastened with a drawstring (Fig.-5).
- **Pathed**: A red woollen belt used to secure garments (Fig.-3).
- **Sanpa (Headgear)**: A rectangular cloth wrapped around the head, similar to the *Mundasa* worn by women.



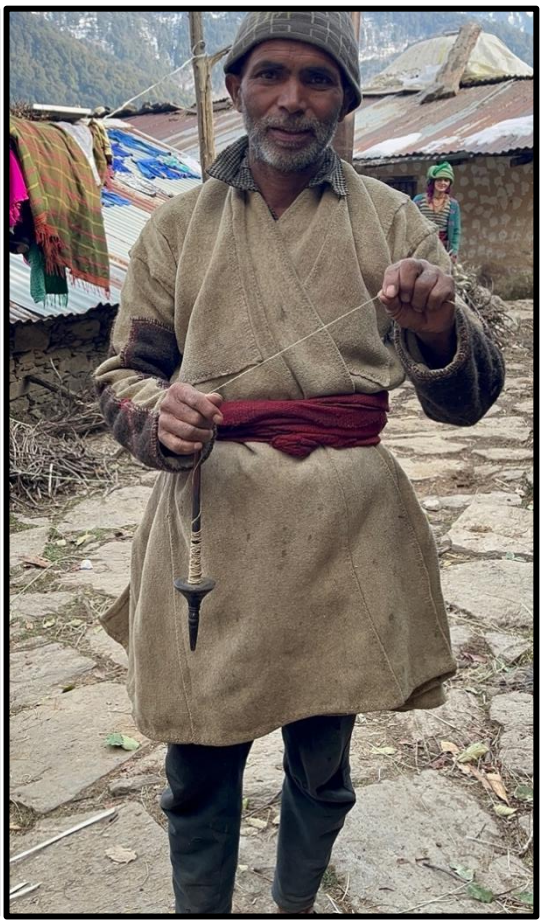


Fig.-5: Selta (Lower-Garment) **Fig.-6: Dhigula (Upper-Garment)**

Source: *Photograph taken by the researcher*

Special Attire for Life Events

Certain life events require distinct clothing, reflecting customs and traditions associated with different phases of life.

- **Bridal Attire**: Traditionally, brides wore *Angda*, *Lawa/Pankhi*, and *Pathed*, However, *lehengas* in red colour bought from the market are now preferred.
- **Groom's Attire**: Historically handmade, grooms' attire has transitioned to store-bought formal suits.
- **Widows' Attire**: Widows wear plain black *Lawa* and *Angda*, and do not wear ornaments, symbolizing mourning and simplicity.
- **Festival Wear**: Men and women wear their best traditional clothing, reinforcing cultural continuity through ceremonial dress.

Children's Attire

Children's clothing closely resembles that of adults, ensuring early exposure to traditional attire.

- **Girls**: Wear miniature versions of *Angda*, *Pankhi*, and *Pathed*, though school tracksuits are becoming more common for daily wear. (Fig.-7)
- **Boys**: Dress in *Dhigula*, *Selta*, and *Pathed*, with a white headgear called *Sanpa*, secured with a goat-hair rope.
- **Festival Wear**: On special occasions, children either wear newly made traditional outfits or market-bought garments.



Fig.-7: Attire of A Young Girl Of Gangi
Source: *Photograph taken by the researcher*

Ornaments and Accessories

Jewellery and adornments hold cultural, religious, and social significance, particularly for women.

- **Women's Jewellery**: Includes headpieces (*Chunti*), nose rings (*Bulak, Phooli*), earrings (*Jhumki, Kundal*), necklaces (*Matarmala, Charev*), bangles (*Dhaguli, Chudiyan*), and anklets (*Paichi, Bichua*). Widows do not wear jewellery as a cultural convention. (Fig.-8)
- **Men's Accessories**: Unlike women, men wear minimal jewellery, mostly watches and *Nazar-bandh* (a protective thread).
- **Children's Accessories**: Girls wear *Phuli* (nose pin) and bangles, while both boys and girls wear *Nazar-bandh* for protection against negative energies.



Fig.-8: Women Of Gangi At The Time Of Jatrada (Festival Made In Gangi)
Source: *Photograph taken by the researcher*

Grooming and Footwear

- **Women**: Hair is plaited and covered with headgear; tree bark extracts and mustard oil are used for bathing and skincare.
- **Men**: Maintain short, well-oiled hair, covered with *Sanpa or Topa*; footwear includes sandals, leather shoes, or slippers.

Symbolic and Ritualistic Significance of Traditional Attire

Traditional attire in Gangi extends beyond mere functionality, serving as a cultural artifact that encodes social identity, spiritual beliefs, and ceremonial practices. The garments and accessories worn by the community hold symbolic meanings that reflect social hierarchies, gender roles, and

ritualistic customs. While modernization has introduced shifts in daily wear, the preservation of traditional attire remains deeply intertwined with religious observances and ceremonial rites.

Traditional Attire as a Marker of Identity and Social Status

Clothing in Gangi functions as a visual indicator of social status, age, and marital position, reinforcing community values and hierarchical structures:

- **Community Affiliation**: Traditional garments distinguish members of the Gangi community from other regional groups, symbolizing their distinct cultural heritage.
- **Marital and Social Status**: Women's jewellery, particularly *Bulak* (nose ring) and *Chandrahaar* (necklace), signifies marital status, while specific fabrics and embroidery patterns indicate social standing and familial lineage.
- **Life-Stage Differentiation**: Attire varies across different life stages—for instance, widows wear plain, unadorned garments, reflecting their altered social identity, while newly married women don bright colours and intricate jewellery as a sign of prosperity.

Ritual and Religious Significance of Traditional Dress

Religious and ritualistic practices in Gangi dictate specific clothing customs that reinforce sacred spiritual beliefs:

- **Temple and Ritual Attire:** Special garments are designated for worship, ceremonies, and seasonal festivals, emphasizing purity and spiritual reverence. Traditional outfits in auspicious colors such as red, yellow, and saffron are worn during key religious events.
- **Sacred Jewellery and Amulets:** Ornaments such as *Chandrahaar* and *Matarmala* are believed to offer spiritual protection, while *Nazar-bandh* (protective thread) is worn by both men and children to ward off evil influences**.**
- **Ceremonial Purity:** Prior to religious rituals, clothing must be freshly cleaned, reflecting cultural associations between attire and spiritual purity. This practice aligns with Hindu and indigenous Himalayan belief systems, where personal cleanliness and dress are integral to performing sacred rites.

Seasonal and Ceremonial Adaptations

The community's traditional attire also reflects seasonal variations and ceremonial requirements, ensuring both practicality and adherence to cultural norms:

A. Climatic Considerations:

Winter clothing, including *Angda, Lawa*, and woolen socks, is thickly layered for insulation, while summer attire incorporates lighter fabrics, with increasing use of synthetics due to market availability.

B. Festival-Specific Clothing:

Festival attire features seasonal embellishments with Navratri, Diwali, and Makar Sankranti reviving fully traditional outfits.

C. Bridal and Ceremonial Attire:

Bridal garments blend tradition with modern trends, while male ceremonial attire has largely shifted to ready-made clothing, reserving *Dhigula and Selta* for elders. Despite everyday influences, ceremonial attire remains vital, reinforcing cultural identity, spirituality, and social customs, ensuring the resilience of Gangi's textile traditions.

Evolution and Adaptation of Traditional Attire in Gangi

Despite retaining its original form, Gangi's traditional attire is subtly shifting due to socio-economic and environmental changes. Interviews reveal that while older generations wear it daily, younger individuals mix modern clothing. This transition stems from factors like climate change, rising literacy, and urban exposure.

Retention of Traditional Attire

Despite modernization, a strong sense of cultural pride persists among the community, particularly regarding their traditional costumes. All respondents—whether they actively wore traditional attire or not expressed deep awareness and reverence for their ancestral clothing. During cultural events and religious festivities such as *Jatrada and Bhairo Ka Kauthik*, wearing traditional attire is considered a mark of identity and honour, reinforcing communal belonging.

- Elderly men and women continue to wear traditional garments daily, valuing their durability, warmth, and symbolic significance.
- Middle-aged individuals follow a hybrid approach, wearing traditional clothing during specific seasons or occasions but incorporating modern elements into daily wear.
- Younger generations, particularly those pursuing education or employment outside the village, are gradually shifting towards modern clothing styles such as tracksuits, coats, and ready-made garments from neighbouring towns.

Factors Influencing the Shift toward Modern Clothing

Field data suggests that while traditional attire remains a cultural mainstay, the integration of modern clothing is influenced by multiple factors, including practicality, climate change, education, and exposure to external communities.

A. Heavy and Restrictive Costumes: Traditional garments in Gangi, though protective, are often bulky and restrict movement, particularly in fieldwork and agriculture. Multi-layered woollen attire becomes uncomfortable in warmer months, leading individuals to prefer lightweight, ready-made clothing.

B. Changing Climatic Conditions: Climatic changes have significantly influenced clothing choices. Previously, the village experienced year-round cold weather, making woollen garments

essential. However, with warmer summers, residents now opt for lighter, store-bought clothing, while winter still sees the use of indigenous attires.

C. **Increase in Literacy Levels and External Exposure:** Increasing literacy and external exposure have further influenced attire preferences. Education and employment opportunities outside Gangi have broadened perspectives, leading to personalized choices based on comfort and fashion trends.
D. **Urban and Neighbouring Village Influences:** Proximity to urban centers has facilitated a fashion exchange. Unlike earlier generations, younger individuals no longer face pressure to wear traditional attire exclusively. Exposure to contemporary styles encourages hybrid dressing, blending traditional elements with modern garments.



Fig.-9: Attire of women of Gangi 10 years back

Source: *Researcher*

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Fig.-10: Present day attire of Gangi Women

Source: *Researcher*

The Persistence of Traditional Attire in Cultural Contexts

While modern clothing is increasingly adopted for daily wear, traditional garments continue to be deeply embedded in cultural rituals and seasonal practices. During festivals, weddings, and religious ceremonies, individuals across all age groups proudly wear their traditional attire, reinforcing its significance. For older generations, traditional garments remain a marker of identity, while for younger individuals; they serve as occasional attire reserved for cultural pride and community bonding. Ornaments, symbolic jewellery, and ceremonial garments still hold spiritual significance, ensuring their continued use in ritualistic settings.

Challenges and Considerations for Future Preservation

Despite a strong cultural foundation, the shift towards modern attire raises concerns about the long-term preservation of Gangi's textile heritage. Key challenges include:

- The declining daily use of traditional attire among younger generations raises concerns about its transmission.
- The lack of dedicated efforts to document and revive indigenous textile traditions threatens craftsmanship, necessitating sustainable interventions.
- Government policies, artisan cooperatives, and tourism-based initiatives are essential to preserving traditional garments while adapting to modern needs.

Despite increasing shifts toward contemporary clothing, *Angda, Lawa, and Mundasa* remain culturally significant, especially in religious and ceremonial settings. Economic factors, climate change, and urban exposure contribute to their reduced daily use. While elders uphold traditions, younger generations prioritize practicality, with machine-made fabrics and fashion trends replacing handwoven textiles.

Education programs, sustainable tourism, and textile revitalization must balance heritage conservation with evolving socio-economic realities, ensuring Gangi's rich textile legacy remains a vital part of Uttarakhand's cultural identity.

SUMMARY, CONCLUSION, AND IMPLICATIONS

A. Persistence of Traditional Attire: Traditional clothing in Gangi continues to hold deep cultural and symbolic significance, especially among older generations. Ritualistic and ceremonial occasions, such as festivals and weddings, reinforce the use of traditional garments, ensuring their continued relevance.

B. Gradual Adaptation and Socio-Economic Influences: While older individuals retain traditional attire, younger generations increasingly integrate modern garments into their daily wardrobes. Factors driving this shift include climate change, increased mobility, literacy, and urban influences from nearby towns. The practical limitations of traditional clothing, such as bulkiness and restricted movement, have led to seasonal and situational adaptations.

C. Impact of Modernization and External Influences: Education and employment opportunities outside the village have broadened clothing preferences, leading to the adoption of hybrid

dressing styles. Market-driven changes and exposure to contemporary fashion have contributed to a gradual decline in exclusive reliance on indigenous garments.

D. Challenges to Cultural Preservation: The declining daily use of traditional garments among younger generations raises concerns about the long-term survival of textile craftsmanship. The lack of structured documentation and policy interventions may accelerate the decline of Gangi's traditional textile practices. Economic factors, including migration and limited demand for handmade textiles, threaten the sustainability of local weaving traditions.

CONCLUSION

This study explored the complex interplay between tradition and modernity in the textile heritage of the Gangi community. Traditional clothing continues to play a vital role in expressing cultural identity. However, its use in daily life is steadily declining due to changing socio-economic conditions and lifestyle shifts. Despite this decline, the community actively keeps its textile traditions alive during festivals, rituals, and other special occasions. These practices help ensure that the heritage remains a living entity rather than a relic of the past

Yet, the lack of formal documentation, organized preservation efforts, and evolving attitudes among younger generations present significant challenges. To address these issues, there is a pressing need for community-based initiatives, educational outreach, and targeted policy measures, such as workshops on appreciation of local textile heritage, museum collaborations, and government support for artisans.

By combining cultural participation with institutional support, Gangi's traditional attire can be safeguarded and passed on as a source of pride, identity, and continuity for future generations.

Implications and Recommendations

- **Cultural Preservation and Documentation:** Comprehensive documentation of Traditional attire and textile techniques through archival research, museum exhibits, and digital projects**,** while educational initiatives, storytelling, and workshops can facilitate intergenerational knowledge transfer within the community.
- **Policy and Artisan Livelihood Support:** Government and non-government initiatives should offer economic incentives to sustain traditional weaving and garment-making. Geographical Indication (GI) tags and protection mechanisms can prevent cultural dilution and exploitation. Strengthening cooperative societies and self-help groups can empower artisans, ensure financial stability, and encourage youth participation.
- **Sustainable and Adaptive Strategies:** Promoting eco-friendly textiles and modern adaptations of traditional garments can boost market appeal. Collaboration with designers, researchers, and heritage organizations can create revivalist collections, ensuring both cultural continuity and economic viability.

Future Research Directions

- Comparative studies between Gangi and other Himalayan communities to assess regional variations in textile adaptation and modernization.
- A deeper ethnographic exploration into the intergenerational transmission of traditions, customs and dress practices.

REFERENCES

- Bagchi, D. (2011, June). Ground water brochure, district Tehri Garhwal, Uttarakhand Dehradun, Uttarakhand: Ministry of Water Resource. Government Of India
- Bhatt, A. (2023). (PDF) *Indian culture: A study of uttarakhand* - researchgate. https://www.researchgate.net/publication/375661640_INDIAN_CULTURE_A_STUDY_OF_UTTARAKHAND
- Bhat, D, Joshi, G.C., & Tiwari, L.M. (2009). Culture, Habitat and Ethno-Medicinal practices by Bhotia Tribe people of Dharchula Region of Pithoragarh District in Kumaun Himalaya, Uttarakhand.
- Capila, A. (2002) *Images of women in folk songs of Garhwal Himalyas*, 1st Ed. Concept Publishing Company, N. Delhi.
- Chatterjee, B. B. (1976). The Bhotias of Uttarakhand. Quarterly 3 (1).
- Goel, A., Maurya, P., & Goel, B. (2009). Traditional Textile Designing Practices of Weavers of Uttarakhand. Indian Research Journal of Extension Education, 9(2).
- Handa O.C. (1998). Textiles, costumes, and ornaments of the Western Himalaya. India. Indus publishing company.
- Joshi, S. C. (2015). Tribal Art and Craft of Uttarakhand.
- Negi, S.S. (1993). Uttarakhand: Land & People. New Delhi: MD Publications Pvt. Ltd.
- Pokhriyal, N. (2002). Study Of Traditional Costumes Of Tehri Garhwal(Uttaranchal Hills) And Its Contemporisation (unpublished Master's Dissertation), Department of Fabric and Apparel Science, Lady Irwin College.
- Srivastava, N., & Goel, A. (2018). Documentation of traditional costumes, textiles, and accessories of Bhotia tribe of Uttarakhand. International Journal of Home Science, 4(3).
- Tewari, k. (2023). Aipan: intangible cultural heritage of Uttarakhand . Blue Rose Publishers.

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UP-CYCLING REJECTED GARMENTS FROM THE READYMADE GARMENT INDUSTRY INTO WOMEN'S APPAREL: A CIRCULAR FASHION APPROACH TOWARDS WASTE UTILIZATION

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ABSTRACT

The textile and fashion industries are leading global pollution sources, with fashion being the second largest polluter after oil. A major challenge is the substantial fabric waste from the readymade garment sector, which includes cutting scraps, leftover pieces, and faulty garments. To tackle these issues within the framework of circular fashion, the study emphasizes utilizing waste through up-cycling, a process that repurposes waste materials into new products, thereby reducing waste and minimizing environmental impact. Specifically, rejected T-shirts and joggers from the industry were transformed into women's western wear using techniques such as cut-work, patchwork, knotting, slitting in creative colour combinations. A survey of college students (prospective consumers), and industry professionals (prospective manufacturers) revealed that the up-cycled garments were considered both creative and appealing. Among prospective consumers, a one-way ANOVA followed by Tukey's HSD test revealed significant differences in the acceptance of the up-cycled garments. Additionally, a strong positive correlation was observed between prospective consumer's familiarity with up-cycling and their acceptance ratings ($r = 0.79$, $p < 0.01$), indicating that greater awareness positively influenced preference. For prospective manufacturers, one-way ANOVA results showed that the up-cycled garments were not equally accepted across various evaluated attributes. Their assessments reflected varied levels of acceptance, suggesting clear preferences for certain garment designs based on functional and aesthetic criteria. This project highlights the role of up-cycling in promoting circular fashion, advancing sustainability, and reducing textile waste.

Keywords: Sustainable, T-shirts, Up-cycling, Waste utilization.

INTRODUCTION

Circular Fashion

One of the most significant areas of environmental policy affecting the fashion and textile industries among others in recent years is the circular economy, which is the antithesis of the linear economy now in use [1]. According to Cuc and Tirpa [2] and Debrukhkar [3], circularity aims to minimize waste and keep textile products in continuous use through design, manufacturing, and consumption.

It ensures that products are eventually returned safely to the biosphere at the end of their lifecycle. In order to lessen their environmental effect, fashion and textile firms are currently looking for innovative circular solutions [5] and [4]. It might be argued that despite increased awareness of the circular economy and waste issues, the fashion and textile industries still lag behind other sectors [6].

Pre-Consumer Textile Waste

Pre-consumer textile waste is a significant contributor to the overall environmental impact of the fashion industry. During garment production, a substantial portion of fabric—often around 15%—is wasted on the cutting room floor due to pattern inefficiencies and production errors [9]. Additionally, many apparel factories discard large quantities of perfectly usable textiles weekly because of minor defects or quality control standards, with some plants generating tens of thousands of pounds of such waste regularly [3]. Overproduction further exacerbates the problem, as manufacturers produce excess stock to keep up with rapidly changing fashion trends and unpredictable consumer demand [8]. This surplus often results in unsold inventory that accumulates at warehouses and retail outlets. To protect proprietary designs, manufacturers sometimes intentionally damage leftover garments before disposal [7]. Unfortunately, much of this pre-consumer waste ends up in landfills or is incinerated, leading to unnecessary environmental harm [10]. This problem highlights the urgent need for more sustainable production practices and better resource management in the textile industry [10].

Up-cycling

Up-cycling is significant because it is a method that allows designers to extend the lifecycles of textiles and reduce the needless, natural resource-intensive textile production. Up-cycling prevents "unwanted" objects from ending up in the trash because it employs pre-existing materials and frequently requires minimal resources to create [2].

Environmental Concerns

Efforts must be made to preserve our environment and control the waste generation in apparel sectors and one of the ways in which this is done is by utilizing reject garments from the industry and up-cycling them. Since, this concept of up-cycling for sustainability is not well known yet in the apparel sectors, it needs to be documented for promotion and study purposes. Keeping the above points in mind, this study has been formulated with the objective to use reject garments from the industry and develop suitable up-cycled garments for young women and thereafter to study the acceptability of the constructed garments by prospective consumers and prospective manufacturers.

OBJECTIVES OF THE STUDY

- To design and develop women’s western wear by up-cycling rejected T-shirts and joggers from the readymade garment industry.
- To assess the acceptability of the constructed up-cycled garments among prospective consumers and prospective manufacturers.
- To examine the relationship between consumer familiarity with up-cycling and their acceptance of up-cycled garments.

REVIEW OF LITERATURE

The concept of circular fashion emphasizes minimizing waste and promoting sustainable resource use across the product lifecycle [2]. Despite growing awareness, the fashion industry continues to lag in adopting circular practices [3]. A major contributor to fashion waste is pre-consumer textile waste, which includes cutting scraps, surplus inventory, and rejected garments. Studies show that around 15% of fabric is wasted during the cutting process, and manufacturers often discard large volumes due to minor defects or overproduction [9]. Up-cycling has emerged as a viable solution to tackle textile waste, allowing designers to creatively reuse pre-existing materials while reducing environmental impact. While up-cycling is gaining popularity, its scalability and acceptance within the industry remain areas of concern [5]. Research has shown a positive consumer response, particularly among young people, toward eco-friendly and unique fashion items [7]. However, challenges such as design limitations, production feasibility, and market demand continue to influence its wider adoption.

HYPOTHESIS

H_1: There is a significant difference in the acceptability of different up-cycled garments developed from rejected T-shirts and joggers.

H_2: There is a significant positive correlation between prospective consumers familiarity with up-cycling and their acceptance ratings of up-cycled garments.

H_3: Prospective manufacturers show varied levels of acceptance for up-cycled garments based on design, production efficiency, and marketability.

METHODOLOGY

Research Design

This study adopted an applied research design aimed at addressing the growing environmental concerns in the textile industry by focusing on sustainability through up-cycling. Specifically, the research explored the creative reuse of pre-consumer textile waste which was rejected garments such as T-shirts and joggers from the readymade garment sector. Fashionable and functional women's western wear were made. The objective was twofold: first, to create aesthetically appealing and wearable up-cycled garments using innovative construction techniques; and second, to assess the acceptance and market potential of these garments among young female consumers and industry stakeholders such as manufacturers, designers, and retailers. The study was both descriptive; as it involved detailed documentation and analysis of the garment development process, and exploratory, as it investigated perceptions and market receptivity toward the relatively new concept of up-cycled fashion within the framework of circular economy practices.

Designing and Development of Women's Wear using Up-Cycling Concept

Collection of Surplus and Reject T-shirts and Joggers:

Twenty rejected T-shirts and ten rejected joggers were collected from the garment industry. They were sorted based on color and the nature of defects, with severely defective items separated from those with minor flaws.

Designing and Construction of Up-cycled Garments:

10 different trendy designs for women's western wear through creative and innovative pattern making were created while taking the sizes of the t-shirts and joggers into considerations. Patterns for basic torso, skirt, dress and pant were made using ASTM D5585-21 Standard Body Measurements for Adult Female Misses Figure Type, US size 8 and adapted to the required designs by using the techniques such as knotting, patchwork, slashing and draping. Knotting involved tying sections of fabric to create visual interest, texture, or structure without needing additional stitching or trims, which minimized material waste. Patchwork allowed smaller usable fabric pieces from defective garments to be combined into new, cohesive designs, making the most of every salvageable part. Slashing was the controlled cutting of fabric—was used to introduce style elements like fringes or layered effects, creatively disguising minor flaws in the original material. Draping helped reshape oversized or oddly proportioned garments into flattering silhouettes by skillfully manipulating fabric flow on the dress form. The garments were developed keeping in mind the target group, market suitability and current trends.(Fig. 1)



UG1
Dress with inner



UG2
Shrug with long skirt



UG3
Dress with cuttings



UG4
Patchwork Dress



UG5
Dress with shoulder ties



UG6
Slashed Top with Asymmetrical Skirt



UG7
Top with knot and frill skirt



UG8
Long top with shoulder cutwork and Tie Skirt



UG9
Top with knotting and Shorts with cuttings



UG10
Top with neckline cutwork and pants with cutwork

Fig.1. Constructed Up-cycled Garments

Assessment of Constructed Garments:

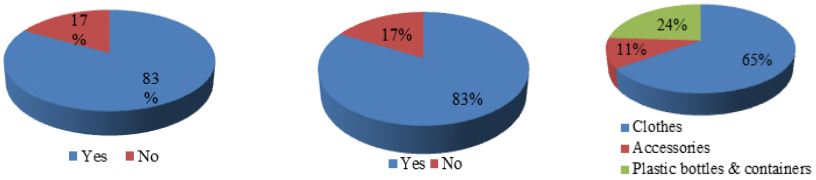
Selection of respondents: Purposive sampling was used and assessment by two hundred college going girls (prospective consumers) and fifty garment manufacturing unit merchandisers and designers, shopkeepers (prospective manufacturers).

Preparation of Questionnaire and Collection of Data: A structured questionnaire was prepared and administered on the respondents. Views of the prospective manufacturers were taken in terms of garment attributes such as garment design/pattern, use of up-cycling concept, production efficiency, marketability and overall preference. Views of the prospective consumers was taken regarding garment attributes such as garment design, being fashionable and trendy up-cycled concept used and overall preference. For this, a five-point scoring Performa based on a Likert scale was employed. Each of the following scores: 1, 2, 3, 4, and 5 was assigned to: poor, fair, good, very good, and excellent. The collected data were compiled, tabulated, and examined.

Analysis of the data: A thorough examination of the data was conducted utilizing pie charts, bar charts, percentage charts, and ranking diagrams. To determine whether there is a significant difference in preference for various manufactured up-cycled clothing, a one-way ANOVA test was conducted. Since the F-test indicated that there was a significant difference between some of the tested groups, Tukey's Honest Significant Difference (HSD) test was employed. Correlation analysis was conducted to see if there is a significant correlation between the acceptability ratings of young women for constructed up-cycled garments and familiarity with up-cycled fashion.

RESULTS AND DISCUSSION

Prospective consumer's knowledge on up-cycling



(a) knowledge about the concept of up-cycling (b)Up-cycling adopted (c)Products up-cycled

Fig. 2. Prospective consumer's knowledge on up-cycling (n=200)

The majority of prospective consumers (83%) were familiar with the idea of up-cycling (Fig-2a), and a comparable percentage used the method to reuse textile waste (Fig-2b).Clothes made up the largest amount (65%) of the different products recycled (Fig-2c), followed by plastic bottles / containers (24%) and accessories (11%). Thus, it is seen that a number of prospective consumers were doing some up-cycling and showed interest as a creative hobby which can lead to a good start for environment friendly venture.

Constructed Garments Feedback from Prospective Consumers

The garments were assessed by prospective consumers as given in Table 1.

Table 1: Preference for Up-cycled Garments from Prospective Buyers

Attributes	Garment design		Fashionable and trendy		Up-cycled concept used		Overall Preference		Rank
Garment	WS	Mean	WS	Mean	WS	Mean	WS	Mean	
UG1	680	3.4	700	3.5	740	3.7	700	3.5	IV
UG2	740	3.7	800	4.0	700	3.5	740	3.7	III
UG3	800	4.0	700	3.5	840	4.2	780	3.9	II
UG4	680	3.4	700	3.5	740	3.7	700	3.5	IV
UG5	580	2.9	740	3.7	580	2.9	640	3.2	V
UG6	840	4.2	840	4.3	760	3.8	820	4.1	I
UG7	760	3.8	680	3.4	680	3.4	700	3.5	IV
UG8	540	2.7	540	2.7	520	2.6	540	2.7	VI
UG9	520	2.6	520	2.6	540	2.7	520	2.6	VII
UG10	520	2.6	520	2.6	540	2.7	520	2.6	VII

N= 200 (Prospective Buyers) WS= Weighted Score

Slashed top with asymmetrical skirt was found to be the most preferred up-cycled garment by the respondents, probably because of the interesting design aesthetics.

One-way ANOVA results and Post-hoc tests (e.g., Tukey's HSD) showed that all up-cycled garments developed were not equally accepted at $p < 0.01$. The correlation analysis showed a high positive relationship between acceptability ratings of young women for constructed up-cycled garments and their familiarity with up-cycling with a correlation coefficient of $r = 0.79$, $p < 0.01$.

Feedback from Prospective Manufacturers

General opinion about up-cycling for reject and surplus garments was taken from the prospective manufacturers (Fig. 3), and it was found that majority of them felt that there may be concerns regarding scalability of up-cycling reject garments as a long-term waste reduction solution. However, contradictory to the concerns, the respondents were highly satisfied with the constructed garments and showed keen interest in taking it up in their respective organizations. Many of them requested for special training sessions which could be conducted to educate their pattern makers on this sustainable approach towards pattern making.

The up-cycled garments are assessed and the following attributes are considered for assessment by prospective manufacturers as given in Table 2.

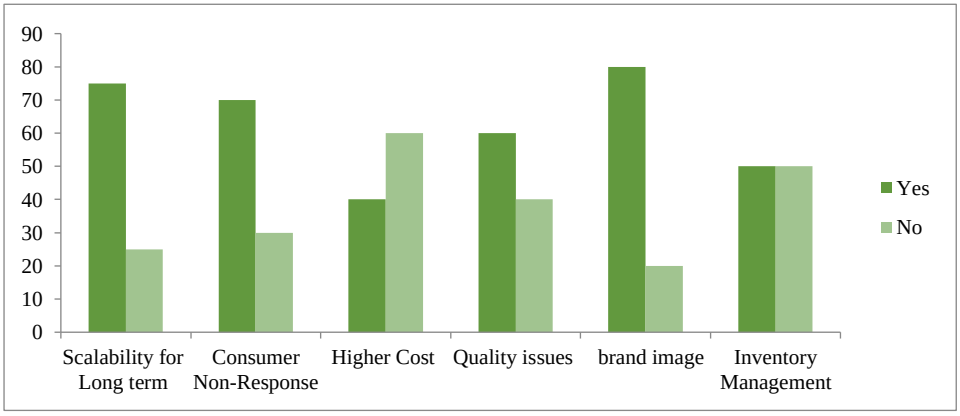


Fig. 3. Concerns in Making Up-cycled Garments for Prospective Manufacturers

Shrug with long skirt as well as patchwork dress are found to be the most preferred garments by the respondents (Plate 5.14). Production efficiency is found to be the least in Slashed top with asymmetrical skirt probably because of the time taking complicated pattern and components it involved.

The up-cycled garments were assessed for various attributes by prospective manufacturers as given in Table 2. One-way ANOVA results showed that all up-cycled garments developed were not equally accepted. Post-hoc tests (e.g., Tukey's HSD) revealed that respondents showed a significantly higher preference for the constructed up-cycled garments (UG1 and UG3), (UG3 and UG5), (UG7 and UG8) at $p < 0.05$.

Table 2: Preference for Up-cycled Garments from Prospective Manufacturers

Attributes	Garment design		Up-cycling Concept		Production Efficiency		Marketability		Overall Preference		Rank
Garment	WS	Mean	WS	Mean	WS	Mean	WS	Mean	WS	Mean	
UG1	170	3.4	145	2.9	185	3.7	170	3.4	180	3.6	II
UG2	190	3.8	200	4.0	210	4.2	210	4.2	200	4.0	I

UG3	160	3.2	135	2.7	170	3.4	170	3.4	155	3.1	V
UG4	210	4.2	210	4.2	175	3.5	210	4.2	200	4.0	I
UG5	185	3.7	170	3.4	190	3.8	185	3.7	180	3.6	II
UG6	200	4.0	175	3.5	135	2.7	135	2.7	160	3.2	IV
UG7	175	3.5	185	3.7	160	3.2	185	3.7	175	3.5	III
UG8	130	2.6	190	3.8	160	3.2	135	2.7	150	3.0	VI
UG9	135	2.7	160	3.2	145	2.9	135	2.7	140	2.8	VII
UG10	145	2.9	130	2.6	145	2.9	145	2.9	140	2.8	VII

n= 50 (Prospective Manufacturers) WS= Weighted Score

CONCLUSION

This research demonstrated the effectiveness of up-cycling rejected garments (specifically T-shirts and joggers) into fashionable women's apparel within a circular fashion framework. The study found high levels of awareness among young consumers regarding up-cycling, with 83% being familiar with the concept and 65% having previously engaged in some form of textile up-cycling. The creatively constructed garments were generally well-received, particularly designs UG6, UG3, and UG2, which scored highest in terms of fashion appeal, marketability, and innovation. A strong positive correlation ($r = 0.79$, $p < 0.01$) was observed between consumer awareness and garment acceptability. While prospective manufacturers expressed concerns about production scalability, their overall feedback reflected satisfaction with design outcomes and market potential, especially for garments UG2 and UG4.

Practical and Future Implications

The results highlight up-cycling as a viable, eco-conscious design strategy that can reduce textile waste while creating marketable products. Manufacturers and designers are encouraged to explore small-batch or customized production models for up-cycled apparel, especially for niche markets such as sustainable fashion for young adults. Integrating up-cycling into mainstream manufacturing processes could also support brand sustainability goals and appeal to environmentally aware consumers. Policymakers should consider providing incentives or subsidies for industries that adopt up-cycling and other circular practices, including tax benefits, sustainability certifications, or green supply chain credits.

Suggestions for Stakeholders

- **Manufacturers** should invest in training labor for up-cycling techniques and set up dedicated units for small-scale, design-driven production.
- **Designers** are encouraged to embrace modular and zero-waste pattern techniques to creatively reuse irregular or discarded textiles.
- **Policymakers** should support awareness campaigns and offer regulatory support to incentivize waste reduction in the textile sector.
- **Retailers** could promote up-cycled collections under sustainable fashion lines and educate consumers through storytelling and transparency.

Suggestions for Future Research

Future studies could explore:

- The economic viability and cost-efficiency of up-cycled garments at scale.
- Consumer buying behavior across different age groups, regions, and income segments.
- Comparative lifecycle assessments (LCA) of up-cycled versus conventionally manufactured garments.
- The use of digital technologies (e.g., 3D patterning, AI-based waste sorting) to streamline and innovate up-cycling processes.
- Long-term wearability and user satisfaction studies of up-cycled products to assess durability and functional performance.

Up-cycling is identified as a key strategy for closing the loop on textile waste, with strong consumer interest, especially among young women, in unique, eco-friendly products. The willingness of manufacturers to embrace up-cycling, despite challenges, indicates a promising path towards circular fashion.

REFERENCES

- Aziz, A.: Indian garments industry export performance: A case study. International Journal of Economic and Business Review 8(7), 32–38 (2020).
- Cuc, S., Tripa, S.: Redesign and upcycling – A solution for the competitiveness of small and medium-sized enterprises in the clothing industry. Industrial Textile 69(1), 31–35 (2018).
- Devrukhkar, S. N.: A qualitative study on the implications of textile waste up-cycling and its sustainability. International Journal of Research in Economics and Social Sciences (IJRESS) 7(9), 106–114 (2017).
- Dobilaite, V., Mileriene, G., Juciene, M., Saceviciene, V.: Investigation of current state of pre-consumer textile waste generated at Lithuanian enterprises. International Journal of Clothing Science and Technology 29(4), 491–503 (2016). https://doi.org/10.1108/IJCST-08-2016-0097
- Jordeva, S., Tomoyska, E., Trajkovic, D., Zafirova, K.: Current state of pre-consumer apparel waste management in Macedonia. Fibres & Textiles In Eastern Europe 23(1), 14–15 (2015).
- Kavitha, S., Manimekalai, G.: A study on waste disposal management in garment industry. International Journal of Textile and Fashion Technology 4(5), 37–42 (2014).
- Lau, Y. L.: Reusing pre-consumer textile waste. Springer Plus 4(2), 1–2 (2015). https://doi.org/10.1186/2193-1801-4-S2-O9
- Mistry, H.: Upcycling of pre-consumer textiles waste. Retrieved from https://textilevaluechain.in/in-depth-analysis/articles/textile-articles/upcycling-of-pre-consumer-textiles-waste/ (2020, July 7).
- Muthu, S. S.: Fashion brands and consumers approach towards sustainable fashion. In: Fast Fashion, Fashion Brands & Sustainable Consumption, pp. 38–39. Springer (2018). https://doi.org/10.1007/978-981-13-1269-4
- Rani, S., Jamal, Z.: Recycling of textiles waste for environmental protection. International Journal of Home Science 4(1), 164–168 (2017).

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NATURAL DYEING IN PRESENCE OF NATURAL MORDANTS ON COTTON FABRIC

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ABSTRACT

Despite of common draw backs of natural dyes, growing awareness for eco-friendly products has caused more interest to the consumers for using natural dyes. Today many peoples are using eco-friendly natural products in the world. Natural dyeing calls for mordant, which complements the fixation of the natural colorant at the fabric by way of the formation of the complex with the dye. Few important chemical mordants consisting of alum, potassium dichromate, ferrous sulphate, copper sulphate, zinc sulphate, tannin, and tannic acid makes a chemical bond with the herbal colourants, which allows in absorption and fixation of herbal dyes and additionally prevents bleeding and fading of colours i.e., improves the fastness houses of the dyed fabrics. Natural dyeing, also can be accomplished with the assist of natural mordant, because natural mordant additionally acts as primary mordant for metal salts. This paper, is focused on the development of natural colour, using natural colour and mordants, used by the artisans and waevers of Ri-Bhoi and Garo Hills districts of Meghalaya state. These artisans are used sustainable dyeing technique. Traditionally, artisans are used regionally available plants and minerals sources for dyeing of yarn and fabrics. The natural mordants for dyeing manner are acquired from exclusive plant life inclusive of Terminalia chebula (sohtung leaves), Oroxylum indicum (waitlam pyrthat), Baccaurea ramiflora (sohkhu leaves or gosampe leaves), Areca catechu (betelnut or arecanut), Berbis wallichiana (diengrnong bark). This case study base paper, is a part of a training workshop conducted by the Development Commissioner Handicraft (DCH) in Sarikhushi village, Ri-bhoi District, Meghalaya for the artisans of natural dyeing craft and author was also part of this training workshop.

Keywords: Dyeing, Natural, Mordant, Cotton, Textile, Artisan, Weaver

INTRODUCTION

Dyeing method from natural sources on textile material, is a one of the oldest forms of art. The people of local communities of different countries and states are preserving these age-old techniques, passing them from generation to generation. Meghalaya state of India is a land of spectacular natural beauty, green hilly region of thick pine jungles and dense bamboo groves and broom grass that grows in the wild. The two districts of the Meghalaya state - Ri-Bhoi and Garo Hills are renowned for their traditional and sustainable natural dyeing technique. They mainly work on Eri silk. For natural dyeing, they use locally available plants and minerals sources such as leaves, seeds, tree bark, iron ore. In this unique process of natural dyeing, they use natural dyes with natural mordants such as *terminalia chebula* (sohtung leaves), *kurz* (waitlam pyrthat), *baccaurea ramiflora* (sohkhu leaves or gosampe leaves), *betelnut* (arecanut), *diengrnong bark.* This research work is the part of a training

workshop/project work conducted by the Development Commissioner of Handicraft (DCH) in sarikhushi village, Ri-bhoi District, Meghalaya for the artisans of natural dyeing craft where author worked self with the artisans. The aims of the work were as follows**: -**

OBJECTIVES

- To highlight present scenario of the natural dyed products in the market
- To experiment of natural mordants and dyes with on different natural textile material
- To develop new products with available resources and material
- To test the fastness properties of the developed dyed textile materials

REVIEW OF LITERATURE

Prabhu K. H and Bhute A. (2012) concluded in their paper *"Plant Based natural Dyes and Mordants: A Review"* The standardized natural extracts are very a whole lot useful for Textiles, meals, pharmaceuticals and cosmetics. This may be improved through proper selection of natural mordants and extraction together with high-quality software of era and ecological manner. *Chakrborty R. and at al (2022)* find out in their paper *"Review on Extraction, Mordanting and Application of Natural Dyes on Jute"* that, Natural dyes can find much use in spite of poor fastness, especially if innovative methods of proving their fastness are developed. Being eco-friendly, can be play a bigger role in dyeing of ecofriendly products. *Banerjee A. and Kotlana OP (2018)* concluded in their paper *"Dyeing of Eri Silk with natural dyes in presence of natural mordants*" is that, natural mordant agents improve the colour fastness to washing and light considerably, which may be motivate producing fabric with eco-friendly. *K. Makdoh and Marvellous B.* (2020) pointed in their *paper "Plant Species used for Dyeing Eri-Silk and their Conservation by the Bhoi Women of Meghalaya"* is that, the usage of eco-friendly dyes additionally helps in conservation of surroundings.

METHODOLOGY AND RESEARCH WORK

For achieving of the objectives, Primary and Secondary both data were used. Secondary data collected from the published books, magazines, articles, website etc. As earlier mention that, this paper is based on case study, therefore, for collection of primary data research work done accordingly. Observation method, survey method, interview, personal communication methods etc. were used for research work. After development of samples, fastness properties (washing & rubbing) were tested in research laboratory. Project Work had completed in different following phases such as market survey, textile material collection, natural dyes and mordant collection, preparation of fabrics, extraction of natural dyes, mordanting and dyeing, design and sample development, assessment of fastness properties of developed samples.

Market survey

For understanding of market scenario and trend, market survey was the mandatory part the training and it was based on different parameters like current trends of fabric, colours, raw material, designs, product categories, consumer's demand and choice, seller's view, potential future aspects etc. For better understanding of new trends and style, information collected from various A class and B class cities of India like Jabalpur, Allahabad, Varanasi, Lucknow, New Delhi, Kanpur, Guwahati and Shilong. Market survey had completed through different research techniques like observation method, personal talk to sellers, visits of shops, consumer's view etc. Market survey was helpful for

making of planning of workshop, it was helpful for generate new ideas and views for design and products.

Material collection (textile material, dyes and other):

Natural dyeing process and Sample development was done on two different type of textile material - first cotton fabric and second Eri silk yarn. both type of textile Material were purchased from Ri-Bhoi district and Guwahati market. Natural dyes and mordants were collect from Sarikhushi village from Ri-Bhoi District, Meghalaya. Other material like non-ionic detergent, mustard oil, lime etc. were collect from local market of Sarikhushi village.



Figure 1 Images of different natural dyes source and mordants

Preparation of dyeing material

Before dyeing and mordanting of the cotton textile material, pre-treatment process was done with non-ionic detergent and hot water and then thoroughly squeezed and rinsed with cold water and dried at room temperature. Degumming of silk yarn was performed in a solution containing soda ash and non-ionic detergent.

Natural dyes:

The diverse range of natural dyes and mordants in Ribhoi produces impressive colours on textile materials especially on eri silk fibres. Sohtung leaves and snep sohmylleng yield earthy tones like browns and greens. anatto seeds yield deep red hues, while turmeric offers vibrant yellows. Waitlam pyrthat is a source of rich indigo-like blues, while sla sohkhu produces shades of purple. Mordants enhance the colour spectrum, creating more profound and permanent shades.

Natural Mordants:

Mordants plays an important role as they help bind the dyes to the fabric and enhance colourfastness. The natural pigment determines the mordant to use. For example, *Iron ore* requires *Sohtung leaves* and *waitlam pyrthat* as mordants; *Onion peels* require *Sohkhu* or *Gosampe* leaves. To extract the mordant, the dyers boil the leaves for forty-five minutes and then remove the mordant. Then follows mordanting at 80ºC for thirty minutes and left to stand for another thirty minutes. The next step is rinsing, squeezing, and drying the mordanted material at room temperature, followed by dyeing. Mordanting requires skill and experience with perfect.

Extraction of natural dyes:

Aqueous solution of all the natural dyes, was prepared by boiling water and dye source. in this process, dye source was continue boiled, stirred and heated with water for 60 minutes and after that, left to stand for fifteen minutes before straining. For development of samples, following natural sources were used: -

Table 1 Colour and their natural sources for dye and mordants

Name of Dye colour	Natural source for dye	Natural mordant
Black	Iron ore and Sia nuli (leaves)	Sohkhu leaves (*Baccaurea ramiflora*)
Golden yellow	Turmeric (*Curcuma longa*)	Diengrnong bark
Green	Turmeric (*Curcuma longa*) and waitlam pyrthat (*Orixylum indicum*)	Sohtung leaves (*Terminalia chebula*)
Orange	Anatto seeds (*Bixa Orellana*)	Sohtung leaves (*Terminalia chebula*)
Gray	Iron ore	Sohtung leaves (*Terminalia chebula*)
Brown	Snep sohmylleng (*Tsuga canadensis*)	Sohtung leaves (*Terminalia chebula*)

Dyeing

The dyeing process continues for about an hour at 80º-85ºC, followed by soaping with non-ionic soap and drying at room temperature.



Figure 2 Dyeing process and developed shades of natural dye on cotton fabric

Evaluation of the colour fastness: using with five-point grading scale:
(Poor - 1, Average - 2, Good - 3, Very good - 4, Excellent - 5)

Colour fastness to washing: - Colourfastness to was of dyed cotton yarn evaluated in a launder-o-meter in accordance with a method prescribed in IS105-C10-C3.

Colour fastness to rubbing: - It was determined by a crock-meter following the method as prescribed in IS:766-1988.

Colour fastness to light: assessed on MBTF (mercury bulb tungsten filament) light fastness tester following a process prescribed in IS: 2454-1985.

Table -2. Colour fastness to washing, rubbing and light (Fabric – Cotton)

Sno.	Colour	Natural dye	Mordant	To washing	To rubbing	To light
1.	Golden yellow	Turmeric (*Curcuma longa*)	Diengrnong bark	3-4	Dry – 5 Wet – 4-5	4
2.	Orange	Anatto seeds (*Bixa Orellana*)	Sohtung leaves (terminalia chebula)	4-5	Dry – 4-5 Wet – 3-4	4
3.	Brown	Snep sohmylleng	Sohtung leaves (terminalia chebula)	4-5	Dry – 4-5 Wet – 4	4-5
4.	Gray	Iron ore	Sohtung leaves (terminalia chebula)	4	Dry – 4 Wet – 3-4	4
5.	Green	Turmeric (curcuma longa) and waitlam pyrthat (orixylum indicum)	Sohtung leaves (terminalia chebula)	4	Dry – 5 Wet – 4	4-5
Grade scale --- Poor – 1, Average – 2, Good – 3, Very good – 4, Excellent - 5						

RESULT AND ANALYSIS

This study was done to exploit the best possible combination of natural mordants, viz *sohtung leaves and sohkhu leaves* with natural dyes in order to achieve improved result in colour fastness, durability, eco-friendly and ease of application. Ecofriendly dyes are colored materials derived mainly from plant assets like culmination, leaves, bark, roots, fungi and lichens. these flowers are particularly used for the extraction of dyes and mordant. specific plant parts like leaves, bark, end result, stem and even the peels are used for extracting one-of-a-kind colorations.

After development of samples, all samples were tested in research and development testing lab NITRA Varanasi which is described in Table – 2. Table is showing that overall fastness (washing, rubbing and light) of the natural dyes in presence of natural mordants found good to very good (between 3 – 5 point, sample size 10*10 inch).

So here It may be concluded that, all of the herbal mordants are having appropriate complicated forming capability which can maintain or greater appropriate dye molecules together to shape insoluble large complex which decorate the light fastness of the dyed substrates. this may be because of reason of complexation of the coloured issue inside the fibre shape results in the polymerization of the dye molecules and is answerable for improvement in light fastness of the dyed substrates. in that case chromophore can be covered from photochemical oxidation after dyeing in presence of natural mordants.

The rating of colour fastness to washing of cotton dyed material with targeted natural dye in presence of herbal mordants usually produces properly shade fastness to washing properties. improvement in such shade fastness to washing may be the outcome of formation of insoluble large complex fashioned by the colouring factor gift inside the dyes and the natural mordants.

A common exact rubbing fastness score of the desired herbal dyes while carried out on cotton fabric indicates very little deposition of the colourants at the surface of the fabric at the end of the dyeing process.

CONCLUSION AND SUGGESTIONS

The women artisans of Ri-Bhoi district have taken initiatives to conserve the uncultivated plants, leaves, flowers and species used for dyeing them in their home gardens. Which reflects the rich knowledge the community has on the use of natural dyes and their environmental consciousness as these are safe and eco-friendly. *Banerjee A. and Kotlana OP* concluded in their paper *"Dyeing of Eri Silk with natural dyes in presence of natural mordants (2018)* is that, these mordant agents enhance the color fastness to washing and light drastically, for inspire the handloom weavers and artisans to use these dyes and mordants for producing fabric. In recent years eco-friendly natural dye has made a serious impact on fashion designers have rediscovered the beauty in natural dyes due to its known advantages as well as eco-friendly nature. *K. Makdoh and Marvellous B.* concluded in their paper *Plant Species used for Dyeing Eri-Silk and their Conservation by the Bhoi Women of Meghalaya (2020)* is that, the traditional know-how possessed via the human beings of the place on the usage of plant life as herbal dye has now not handiest raised attention approximately traditional importance and values of those flowers but has


Figure 3

additionally helped in conservation of biodiversity and surroundings. In India, if this generation is for use for producing revenue, employment and for growing a sturdy base for renewable assets for the dye industry research and development program is required at the traditional use of this historical past colour in a more scientific way without compromising high-quality and aesthetic enchantment. so as to enhance colourfastness to mild and washing is very a great deal essential for you to increase the acceptability of natural dye inside the market.

REFERENCES

- *Benerjee A. N. & Kotnala OP (2018),* Dyeing of Eri Silk with Natural dyes in Presence of Natural Mordants, Indian Journal of Traditional Knowledge, vol. 17(2), Pp-396
- *Das H. & Kailat D. (2016):* Fibers and Dye yielding plants of North east India, ResearchGate publication, ISBN 306232075
- *Ksanbok M. & Marvellous B. (2020):* Plant Species used for Dyeing Eri-Silk and their Conservation by the Bhoi Women of Meghalaya, India, International Journal of Ecology and Environmental Sciences 46 (2): 129-133, ISBN 978-981-10-0620
- *NIIR Board of Consultants, Engineers* (2005), The Complete book on Natural Dyes & Pigments ISBN: 978-817-833-0327, Asia Pacific Business Press Inc.
- *Vankar S. P (2018):* Handbook on Natural Dyes for Industrial Applications (Extraction of Dyestuff from Flowers, Leaves, Vegetables), ISBN – 938-10-39-755, Niir Project Consultancy Service (NPCS)
- *Chakraborty R. & Samanta A. K. at al (2022):* Review on Extraction, Mordanting and Application of Natural Dyes on Jute, current Trends in fashion technology and textile engineering, ISSN 2577-2929, vol – 7, issue 4, Pp 1-10
- Prabhu K. H. & Bhute A. S. (2012): Plant based natural dyes and mordants: A Review, Library Scholar Research, ISSN 2231-3184, Vol 2, Issue – 6, Pp – 649-664
- Lawrence M. (2020): The Complete Book on Natural Dyes & Pigments, ISBN:13- 978-8178330327, Publication NPCH
- https://www.bandhej.com/blog/post/natural-dyeing-at-umden
- https://ryndia.in/natural-dyeing-traditions-techniques-in-ri-bhoi-garo-hills/

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BALANCING DURABILITY AND COMFORT: CONSUMER INSIGHTS INTO GRAMS PER SQUARE METER AND YARN COUNT PARAMETERS

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ABSTRACT

Fabric quality is a cornerstone of consumer satisfaction in the textile and fashion industry. This study explores the role of Grams per Square Meter (GSM) and yarn count as essential parameters in determining fabric quality and influencing consumer preferences. GSM, which measures fabric weight, and yarn count, are widely acknowledged as indicators of a fabric's durability, comfort, and overall performance. These parameters not only guide consumers in their purchasing decisions but also serve as benchmarks for manufacturers aiming to deliver high-quality textiles. Higher GSM fabrics are often associated with applications that require strength and durability, such as upholstery and drapery, while lightweight GSM fabrics are preferred for breathable and flowy garments. Similarly, yarn count plays a crucial role in fabric quality, with higher thread counts typically indicating finer, smoother, and more luxurious fabrics. These metrics directly impact how consumers perceive the feel, texture, and longevity of textiles, making them integral to the design and production process.

Keywords: Consumer preferences, Durability, Fabric Quality, GSM (Grams per Square Meter), Yarn Count.

INTRODUCTION

The textile and fashion industry are reliant on fabric quality to meet consumer expectations and ensure product satisfaction. Two critical parameters, Grams per Square Meter (GSM) and yarn count play a pivotal role in defining fabric characteristics. GSM measures the weight and density of a fabric, determining its thickness, durability, and suitability for various applications (Kadolph, 2007; ASTM, 2023). Similarly, yarn count reflects the fineness or coarseness of the threads used. These two parameters directly influence the fabric's texture and appearance (Gao & Zhang, 2019). Understanding these parameters and their interplay is essential for creating high-quality apparel that meets both functional and aesthetic needs.

Recent studies emphasize the importance of balancing GSM and yarn count to optimize fabric performance. Higher GSM values typically lead to thicker, more durable fabrics, suitable for

applications requiring increased longevity, such as winter wear (Smith & Barker, 2020). On the other hand, higher yarn counts produce finer, smoother textiles favored in luxury and summer apparel (Singh & Sharma, 2021). Consumer satisfaction hinges on achieving the right balance between these factors, as preferences vary significantly based on the fabric's intended use and climatic conditions (Repon *et al*., 2018)

The textile industry is constantly innovating to meet the dual objectives of comfort and durability. By analyzing consumer preferences and aligning them with fabric properties, manufacturers and designers can enhance product appeal and market relevance. This study delves into these dynamics, providing actionable insights to bridge the gap between production and consumer needs. A review article by Sanad (2016) mentions that previous research highlights the importance of fabric metrics in consumer satisfaction.

SCOPE OF THE STUDY

This research emphasizes the role of GSM and yarn count as quantitative indicators of fabric quality in woven and knitted cotton apparel. It includes various applications and everyday apparel. The study focuses on consumer preferences, primarily among young adults, and examines how these metrics influence buying decisions. Additionally, it provides a practical framework for designers and manufacturers to optimize fabric properties in response to market trends.

SIGNIFICANCE OF THE STUDY

Understanding the relationship between Grams per Square Meter (GSM) and yarn count is essential for various stakeholders in the textile and apparel industry. This knowledge not only enhances decision-making processes but also contributes to the overall efficiency and satisfaction of end-users.

For **consumers**, knowledge of GSM and yarn count allows for informed purchasing decisions, leading to greater satisfaction with fabric performance. Studies indicate that consumers prioritize fabric characteristics such as durability, softness, and breathability when selecting textiles (Li *et al.*, 2024). By understanding how these parameters affect fabric quality, consumers can better align their choices with personal preferences regarding comfort.

For **manufacturers**, insights into consumer preferences help optimize raw material selection and innovate fabric production techniques. Prior research highlights that aligning textile production with consumer demand enhances market competitiveness and sustainability (Tyagi & Singh, 2023). By adjusting GSM and yarn count, manufacturers can fine-tune fabric properties, ensuring that their products meet market expectations while maintaining cost efficiency and environmental responsibility.

For **designers**, an understanding of GSM and yarn count facilitates the creation of textiles that balance aesthetic appeal and functional utility. Research suggests that fabric weight and texture significantly influence consumer perception of quality (Zeng *et al.*, 2024). By leveraging this knowledge, designers can tailor products to specific demographics, ensuring that their creations align with both fashion trends and practical needs.

OBJECTIVES OF THE STUDY

1. To investigate consumer preferences related to GSM and yarn count in cotton woven and knitted apparel, and understand the factors influencing these choices.
2. To provide actionable insights for manufacturers and designers, helping to align fabric properties with consumer expectations and market demands.

KEY METRICS IN FABRIC QUALITY

GSM (Grams per Square Meter)

GSM is a standard measure of fabric weight per unit area, directly influencing its texture and durability. Lightweight fabrics with low GSM values are often associated with breathability and comfort, making them ideal for summer wear. Conversely, heavyweight fabrics with high GSM values offer enhanced durability and warmth, suitable for winter clothing. Studies have noted the correlation between GSM and consumer preferences in various climates (ASTM, 2023). Research by Misra et al. (2020) examined the effects of varying GSM levels on fabric properties such as crease recovery and thermal resistance. The study concluded that higher GSM fabrics exhibited improved crease recovery and thermal resistance but had reduced air permeability. These findings highlight the importance of selecting appropriate GSM levels to balance performance attributes in line with consumer expectations

Yarn Count

Yarn count serves as an indicator of yarn fineness, with higher counts denoting finer yarns and smoother textures. Fine yarns are typically used in premium apparel, whereas coarser yarns with lower counts are preferred for casual or utility wear. This metric plays a vital role in determining fabric feel and performance, as noted in textile science literature (Singh & Sharma, 2021). Yarn count plays a pivotal role in determining the mechanical and functional properties of fabrics. Studies have shown that finer yarn counts (higher numbers) produce softer, lighter, and more breathable fabrics, making them ideal for applications such as apparel and home textiles (Das & Ishitaque, 2004). Conversely, coarser yarn counts (lower numbers) are associated with increased fabric strength and durability, suitable for heavy-duty applications like industrial textiles (Mansoor *et al*., 2013). The choice of yarn count also affects fabric drape, pilling resistance, and abrasion resistance, which are critical factors in determining the longevity and usability of textile products (Behera & Hari, 2010).

A Study by Das *et al*., (2017), explores the intricate relationships between GSM (Grams per Square Meter), yarn count, and stitch length in rib and interlock knit fabrics. It found that GSM, a measure of fabric weight and density, is inversely proportional to yarn count and stitch length. This means that as the yarn count and stitch length increase, the GSM decreases. The research focused on (1x1) rib and (1x1) grey interlock fabrics, utilizing yarn counts of 28Ne, 30Ne, and 32Ne for rib and 34Ne, 36Ne, and 40Ne for interlock fabrics. Understanding these relationships helps textile industries select appropriate GSM, count, and stitch length to produce high-quality knit fabrics.

Özdil *et al*., (2014) investigated how various factors, including yarn count, affect the drapeability and bending properties of cotton fabrics. Their findings indicated that fabrics produced from finer yarns exhibited better drapeability and lower bending rigidity in both warp and weft

directions. This means that as the yarn becomes finer, the fabric tends to drape more gracefully and feels less stiff. The differences observed in these properties were statistically significant, underscoring the importance of yarn count in fabric design and performance.

Das & Alagirusamy, R (2010) mention that consumers often prefer fabrics with lower GSM and finer yarn counts for lightweight and soft apparel, such as summer wear or intimate clothing. Higher GSM fabrics are preferred for winter wear due to their warmth and thickness.

EXPERIMENTAL METHODOLOGY

Consumer surveys using questionnaires are vital tools in the textile industry, providing essential insights into consumer preferences and behaviors regarding fabric selection. By analyzing data on preferred fabric types, quality expectations, and purchasing patterns, businesses can better align their products with market demands, ensuring greater customer satisfaction and competitive advantage. These surveys help companies identify trends, improve product development, and refine marketing strategies to cater to evolving consumer needs (Gocek & Beceren, 2012).

To conduct a survey a questionnaire was designed after an open discussion with a textile expert focus group of five professionals was formed based on their expertise in textile construction, GSM (grams per square meter), and yarn count. Structured, open-ended questions were crafted to encourage in-depth discussions on fabric selection practices, focusing on the relationship between GSM, yarn count, and consumer preferences. The insights gathered highlighted the significance of these factors in determining fabric suitability for various apparel applications. Based on the expert feedback, a comprehensive questionnaire was developed to assess consumer preferences, specifically targeting respondents with foundational knowledge of textile construction to ensure relevant and informed responses.

Sample selection

Fabric quality in the apparel sector is frequently evaluated based on sensory attributes such as texture, softness, and overall tactile appeal, which are key factors influencing consumer preferences. While general consumers rely primarily on their sense of touch and feel to judge fabric quality, these assessments can be subjective and vary widely between individuals. To ensure a more accurate and objective evaluation, this study specifically targeted participants with specialized knowledge of fabric construction. These individuals possess a comprehensive understanding of critical technical parameters, including grams per square meter (GSM) and yarn count, which significantly influence the structural and aesthetic properties of both woven and knitted fabrics. By selecting respondents familiar with these technical aspects, the study aimed to achieve more consistent and reliable insights into fabric quality, bridging the gap between sensory perception and measurable fabric characteristics.

Raju and Harinarayana (2016) highlighted the ease of use, cost-effectiveness, and versatility of Google Forms. A questionnaire was made in Google Form and the link was emailed to selected participants, providing a convenient and accessible way to complete the survey at their own pace. The email included a brief introduction, survey purpose, and instructions. The user-friendly form collected responses on GSM and yarn count preferences for woven and knitted fabrics, along with

the reasons behind their choices. A conditional logic was included in Google form after demographics to exclude participants who do not know GSM and Yarn count.

The study surveyed 100 respondents with knowledge of fabric construction, GSM, and yarn count, to assess preferences for GSM and yarn count in specific fabric types, including plain weave and locked stitch cotton fabrics.

RESULTS AND DISCUSSION

Demographics of Respondents

The study surveyed a sample group with a significant majority of respondents aged between 17-21 years, accounting for 71% of the total participants Additionally, 77% of the respondents were female, and an equal percentage (77%) were pursuing a bachelor's degree (Fig.1). These demographic details suggest that the primary consumers analyzed in this study were young adults, particularly women, who are currently engaged in academic pursuits. Such demographic insights are crucial as they help in understanding fabric preferences within this consumer segment.

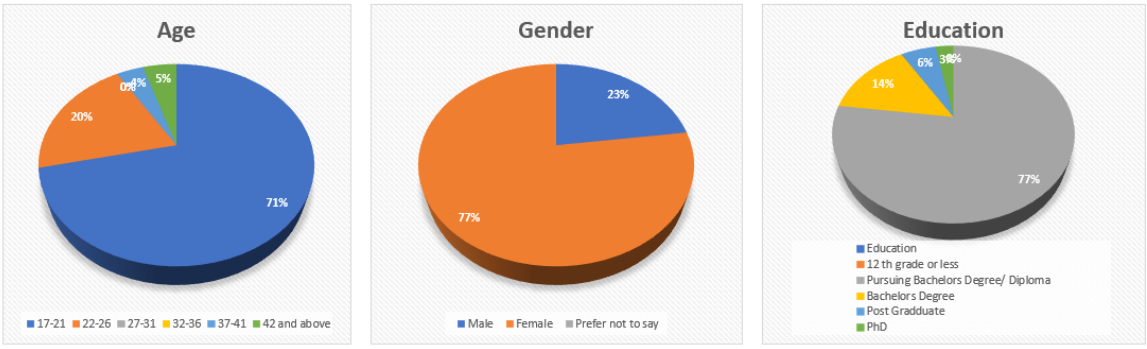


Fig. 1 - Demographics

GSM and Yarn Count Preferences -Woven Fabric

The findings (Fig 2) indicate a strong preference for specific GSM and yarn count ranges among consumers when selecting woven cotton fabrics. Specifically, 66% of respondents favored a GSM range of 126-175 for cotton plain weave fabrics. This range likely balances durability and comfort, making it suitable for everyday wear. Furthermore, when analyzing yarn count preferences, 67% of respondents preferred a yarn count between 36-45 Ne for cotton plain weave fabrics. This suggests a preference for finer, smoother woven fabrics, which enhance both the tactile experience and fabric performance.

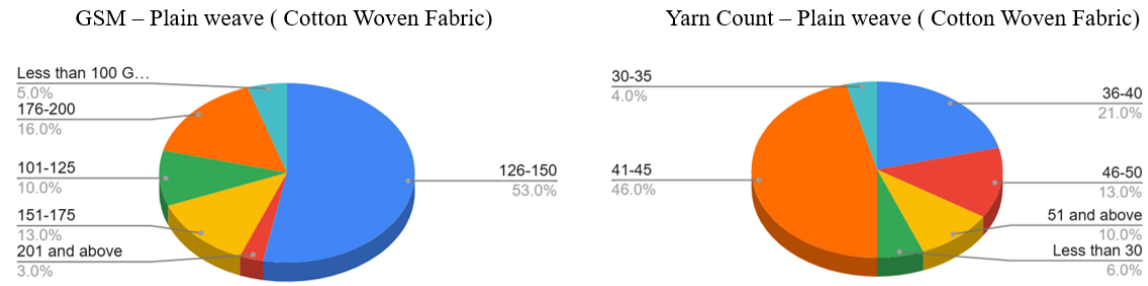


Fig. 2 – GSM and Yarn Count for Woven Fabric

GSM and Yarn Count Preferences - Knitted Fabric

Similar trends were observed in knitted fabric preferences (Fig. 3.). A substantial 74% of respondents favored a GSM range of 126-175 for cotton locked-stitch fabrics. This indicates that consumers look for a moderate weight in knitted fabrics, ensuring adequate drape and comfort. Likewise, 74% of respondents preferred a yarn count between 36-45 Ne for cotton locked-stitch fabrics, reinforcing the demand for finer, higher-quality yarn in knitted textiles.

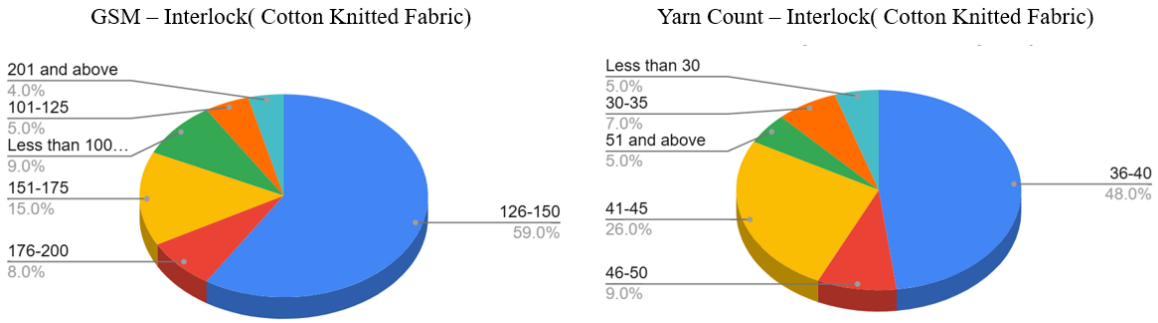


Fig -3 - GSM and Yarn Count for Knitted Fabric

Reasons Behind GSM and Yarn Count Preferences

The study identified several factors influencing consumer choices regarding GSM and yarn count. Key considerations include: (Fig. 4.)

- **Fabric Comfort and Feel**: Respondents highlighted the importance of softness and smoothness, which are largely dictated by yarn count. A higher yarn count (finer yarn) results in a softer fabric, which consumers find desirable for daily wear.
- **Durability and Performance**: Many participants associated GSM with durability, preferring mid-range GSM (126-175) as it offers a balance between lightweight and sturdiness.
- **Aesthetic Appeal**: The yarn count also affects fabric appearance, with finer yarns leading to smoother textures and refined finishes.
- **Suitability for Different Apparel Types**: Consumers preferred a GSM range that aligns well with both woven and knitted apparel, ensuring versatility across clothing categories.

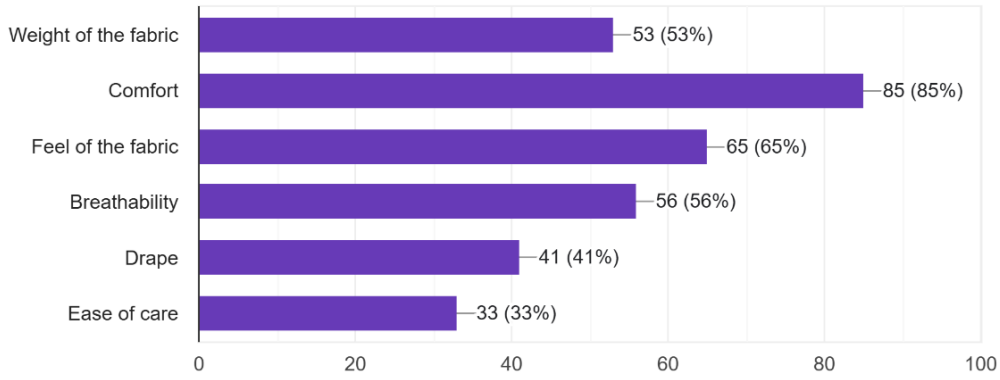


Fig -4 – Reasons for Specific GSM Choice

Implications for Manufacturers and Designers

The findings of this study provide actionable insights for fabric manufacturers and fashion designers:

- **Manufacturers** can optimize fabric weight and yarn count based on consumer preferences to enhance product appeal and meet market demands.
- **Designers** can align their fabric selections with preferred GSM and yarn count ranges to create garments that align with consumer expectations for comfort, durability, and aesthetics.
- **Retailers** can use these insights to guide inventory selection and marketing strategies, ensuring that popular fabric specifications are well-stocked.

CONCLUSION

This study highlights the importance of GSM and yarn count in fabric quality assessment and consumer decision-making. Understanding these preferences enables manufacturers and designers to tailor their production strategies effectively, ensuring alignment with market demands. The study serves as a valuable resource in bridging the gap between fabric quality attributes and consumer expectations, ultimately contributing to an improved purchasing experience and better product offerings in the textile industry.

A detailed examination of GSM and yarn count preferences reveals that consumers prioritize a balance of comfort, durability, and fabric aesthetics. The study highlights the need for the textile industry to innovate and adapt to these preferences by refining material selection and production techniques. Manufacturers should leverage these insights to enhance fabric quality while ensuring sustainability and efficiency in production processes. Moreover, designers must integrate these findings into their creative process to craft garments that align with evolving consumer trends.

Future research could further explore variations in preferences across different demographics and geographic locations, providing a broader perspective on global textile consumption. Additionally, an in-depth analysis of emerging fabric technologies and sustainable practices can contribute to the ongoing evolution of the textile industry. By continuously adapting to

consumer needs and technological advancements, the industry can ensure the production of high-quality, market-relevant fabrics that enhance customer satisfaction.

REFERENCES

- American Society for Testing and Materials (ASTM). (2023). Standard Practice for Evaluating Fabric Quality. ASTM International.
- Behera, B. K., & Hari, P. K. (2010). Woven textile structure: Theory and applications. Woodhead Publishing.
- Das, A., & Alagirusamy, R. (2010). *Science in clothing comfort*. Woodhead Publishing India.
- Das, A., & Ishitaque, S. M. (2004). Influence of yarn count and twist on the low-stress mechanical properties of woven fabrics. *Journal of the Textile Institute*, 95(1-6), 283-294.
- Das, S., Hossain, M., Rony, M. S. H., Hashan, M. M., Haque, A. U., & Majumder, M. (2017). Analyzing technical relationships among GSM, count, and stitch length of (1x1) rib and (1x1) grey interlock fabric. *International Journal of Textile Science*, 6(2), 64-71. https://doi.org/10.5923/j.textile.20170602.06
- Gao, H., & Zhang, Y. (2019). Fabric Engineering and Quality Control. *Textile Research Journal*, 89(7), 1235-1250.
- Gocek. I., & Beceren. Y.I (2012). Assessment of the Importance Level of the Factors Affecting CS according to the Textile Consumers. *International Journal of Business and Social Science*, 3(16): 157-164.
- Kadolph, S. J. (2007). Textiles. Pearson Prentice Hall.
- Li, M., Choe, YH., & Gu, C. (2024). How perceived sustainability influences consumers' clothing preferences. *Scientific Reports*, 14(1): 123-134.
- Mansoor, T., Nawab, Y., & Ashraf, M. (2013). Effect of yarn count on the mechanical properties of woven fabrics. *Journal of Textile Science and Engineering*, 3(2): 1-5.
- Misra, S., Salacova, J., & Militky, J. (2020). Multicriteria decision-making in complex quality evaluation of ladies dress material. *AUTEX Research Journal*, 20(3): 1-10
- Özdil, N., Özgüney, A. T., Süpüren Mengüç, G., & Sertsöz, S. (2014). Influence of yarn and fabric construction parameters on drape and bending behavior of cotton woven fabrics. *Tekstil ve Konfeksiyon*, 24(2), 168-179.
- Repon, R., Shiddique, N.A., Paul, D., Al Mamun, R., Shahria, S. and Quayum, M. (2018) Effect of Yarn Count & Stitch Length on the Fabric Width, GSM, WPI, and CPI of 1×1 Rib Fabrics. *International Journal of Textile Science*, 7: 94-100
- Sanad, R. A. (2016). Consumer attitude and purchase decision towards textiles and apparel products. *World Journal of Textile Engineering and Technology*, 2(1): 16-30.
- Singh, P., & Sharma, R. (2021). Textile Science: Principles and Applications. New Delhi: Academic Press.
- Smith, B., & Barker, T. (2020). Advances in Textile and Apparel Technology. Cambridge: Woodhead Publishing.
- Tyagi, G. K., & Singh, N. (2023). Recent sustainable development and innovations in textile industry. *Trends in Textile Engineering & Fashion Technology*, 8(2).

- Vasantha Raju, N., & Harinarayana, N. S. (2016). Online survey tools: A case study of Google Forms. Paper presented at the National Conference on "Scientific, Computational & Information Research Trends in Engineering," GSSS-IETW, Mysore.
- Zeng, F., Wang, G., Qiao, J., Wang, Q., Wu, M., Zeng, X., & Hong, X. (2024). Modeling the relationship between fabric textures and the evoked emotions through different sensory perceptions. *Journal of Engineered Fibers and Fabrics*, 19(1): 1-15.

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CONSUMER PERSPECTIVES ON PINEAPPLE TEXTILES: A FEEDBACK-BASED ANALYSIS

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ABSTRACT

This research explores the extraction, processing, and application of pineapple leaf fibers (PALF) in the production of traditional textiles in Manipur. Sourcing raw materials from local pineapple farmers, both manual and mechanical extraction methods were employed, complemented by a water retting. The resulting high-quality pineapple fibers yielded 3-4% per leaf. Spinning was accomplished using a motorized charkha, resulting in yarns of two counts for weaving into fabrics. Traditional throw shuttle looms were utilized to create plain weave fabrics incorporating union blends of silk, rayon, cotton, and polyester with pineapple fibers, enhancing the traditional aesthetics of Manipuri textiles. Physical properties of the fabrics were tested following ASTM standards, assessing parameters such as tensile strength, weight, fabric count, thickness, stiffness, and drape. A consumer feedback survey was conducted with Meitei weavers and consumers to evaluate the aesthetic appeal and cultural significance of the textiles. A SWOC analysis identified the strengths, weaknesses, opportunities, and challenges of utilizing PALF in traditional textiles, revealing its sustainability and cultural relevance while highlighting processing difficulties and market barriers. This study underscores the potential of pineapple leaf fibers as a viable alternative to conventional textile materials, promoting eco-friendly practices in the textile industry.

Keywords: Eco-friendly, PALF; Traditional textiles; Meitei; Spinning; SWOC;

INTRODUCTION

The northeastern region of India is known for its rich diversity, with over 38 tribes each showcasing unique designs, color schemes, and ceremonial motifs that reflect their cultural heritage. These distinctive textile patterns not only differ between tribes but also within clans of the same tribe and across various villages, serving as symbols of social status [9].

Northeast India features Manipur as a key player in the handloom industry, where weaving is integral to its socio-economic structure. While mulberry silk has traditionally been a primary raw material, there is a growing interest in exploring alternative natural resources for weaving due to increasing consumer demand for novelty [3].

Pineapple (Ananas comosus) cultivation is an important agricultural practice in Manipur, one of the seven sister states. Locally referred to as "Kihom," the pineapple plant is essential to the region's agricultural framework and economy. As reported by the Imphal Free Press (2023), Manipur yielded an impressive 134.82 metric tons of pineapple fruits during the 2021-2022 harvest season, making it the sixth largest pineapple producer in the country. Pineapple fruit is used for export,

canning, and juice production, but its leaves—typically discarded, hold potential as a source of pineapple leaf fiber (PALF).

PALF is a sustainable textile fiber with long, fine, lustrous strands, making it an appealing alternative to traditional fibers like silk [6]. Its durability and versatility enable it to be used in various textile applications. This innovation not only boosts Manipur's handloom industry but also promotes economic sustainability while preserving the region's cultural heritage.

PALF-based textiles can attract a wider market, offering a balance of aesthetic appeal and affordability. This research highlights the potential of PALF to empower local artisans, revitalize traditional weaving practices, and provide sustainable, silk-like fabrics for a broader population.

OBJECTIVE

To evaluate the use of pineapple leaf fibers (PALF) in traditional Manipuri textiles for their processing, performance, sustainability, and cultural relevance.

METHODOLOGY

Extraction and spinning of fiber

The extraction of pineapple fibers began by sourcing raw materials from local pineapple farmers. The process utilized both manual hand extraction and mechanical methods, along with a water retting phase lasting 5-7 days, depending on the weather conditions. Mechanical extraction was carried out at the CSIR-NEIST branch laboratory in Lamphel, Manipur, under controlled conditions [10] [11]. After extraction, the fibers were thoroughly washed and scoured to eliminate any remaining impurities [1]. The scouring process involved using 2g of commercial detergent and 2g of sodium carbonate (soda ash) per liter of water, with a material-to-liquor ratio 1:40. The solution was heated to 60°C and maintained for 45 minutes, after which the material was rinsed with water. Once cleaned, the fibers were dried. This method ensured the production of high-quality pineapple leaf fibers. The fiber yield from each leaf was 3-4%. The pineapple yarn (30’s and 8’s) were spun using a motorized charkha modeled after the phoenix charkha, developed by the researcher. Before spinning with the motorized charkha, the ends of the combed pineapple fiber strands were joined to create a continuous length, ensuring a smoother and uninterrupted spinning process [12] [13]. The Continuous strands of pineapple leaf fiber were fed through the charkha's feeder and twisted in the Z-direction. Spinning was carried out at an optimal motorized speed of 200 RPM.

Construction of pineapple fabrics

Samples were woven in Manipur using a two-shaft throw shuttle loom. Plain weave union fabrics pineapple yarn with silk, rayon, cotton, and polyester, along with traditional motifs and colors, successfully represented Manipuri textiles- Rani phee, Muga Innaphee, Lengyan phee, and Muga phanek. The warp yarn counts used-50’s for silk, 22’s for rayon, 25’s for cotton, and 18’s for polyester while 8’s and 30’s pineapple yarns were used for weft to achieve desired texture and drape. Using undyed pineapple and warp yarns preserved the fibers’ natural color, enhancing the fabric’s authenticity and aesthetic appeal.

Physical properties test

The physical properties of the developed fabrics were tested at The Maharaja Sayajirao University of Baroda using ASTM standards. Tests included tensile strength and elongation (ASTM D5035), fabric weight (GSM) (ASTM D3776-96), fabric count (ASTM D3775-98), thickness (ASTM D1777-96), stiffness (ASTM D1388-18), and drape coefficient (using a drapemeter).

Consumer feedback

An evaluation was carried out to explore the potential of pineapple yarn as an alternative to conventional materials in textile weaving. Traditional textiles made from pineapple yarn were compared to Manipur's silk textiles, focusing on physical characteristics. Feedback on aesthetics, cultural significance, and practical usability was collected from 74 Meitei consumers and weavers (aged 18–60). Respondents provided demographic details, and interviews were conducted using a 24-question bilingual (English and Manipuri) questionnaire covering background, sample evaluations, and market feasibility.

SWOC Analysis

A SWOC analysis was conducted to assess the use of pineapple leaf fiber (PALF) in traditional Manipur textiles, following these steps:

1. **Strengths**: PALF's advantages include sustainability and cultural relevance.
2. **Weaknesses**: Challenges include processing difficulties and inconsistent fiber quality.
3. **Opportunities**: Growing demand for eco-friendly products presents market potential for PALF-based textiles.
4. **Challenges (or Constraints)**: External barriers include technical limitations and a lack of consumer awareness.

RESULTS AND DISCUSSION

Properties of prepared yarn

A custom-built motorized spinning wheel, inspired by the Phoenix charkha, was developed specifically for spinning yarn from pineapple leaf fiber. While the attached motor has a capacity of 500 rpm, the charkha speed was adjusted to around 200 rpm to produce fine 100% pineapple leaf fiber yarn. The resulting yarn included a fine 30's count with 80-85 twists per inch (TPI) in a Z-twist and a thicker 8's count with 16 TPI in a Z-twist, both prepared without any treatment and ideal for traditional Manipuri textiles. Both yarns showed excellent evenness, with the 30's yarn having a mean deviation of 2.3% and the 8's yarn showing a deviation of 9.62%, reflecting minimal variation.



Fig.1: Prepared Fine Pineapple Yarn (30's)



Fig. 2: Prepared pineapple yarn (8's)

The 100% pineapple yarn (30's) demonstrated a maximum load capacity of 128 grams, with a tenacity of 0.72 g/den, a stress of 0.021 g/den, strain and elongation both at 1.4%. These figures reflect the yarn's resistance to breaking, strength relative to its density, and deformation under stress. The thicker yarn (8's) exhibited remarkable durability, withstanding a maximum load of 2176.42 grams at 100mm/min. It had a tenacity of 43.53 g/den, stress of 2.98 g/den, and an elongation of 2.62 mm, indicating its strength and stretchability under load. The strain was measured at 5.25%, showcasing the yarn's ability to endure external forces without sustaining permanent damage.

Construction of fabrics

Plain weave was used to create pineapple fabric samples resemblance of traditional textiles Rani phee, Lengyan Phee, Muga Innaphee, and Muga phanek in Manipur, which were silk/pineapple (Rani phee), cotton/pineapple (Lengyan), rayon/pineapple (muga Innaphee), and polyester/pineapple (Muga phanek) by using traditional motifs (Fig.3). These textiles hold cultural importance for the Meitei community and are worn on special occasions. Rani phee (Fig.4), named after a skilled weaver, is an upper garment for weddings. Lengyan phee, draped over the shoulder, is worn by both genders during festivities (Fig.5). Muga Innaphee (Fig.6) made in places like Khurkhul, is worn at events. Muga phanek, made from silk or muga, is used as a lower garment (Fig.7).

Pineapple fibers provide a stiffness similar to traditional fabrics, making them well-suited for weaving these textiles. Starch finishing is commonly used by local weavers to enhance stiffness. The resulting fabrics are thin, lightweight, and have good tensile strength without any treatment, making them versatile for various uses.

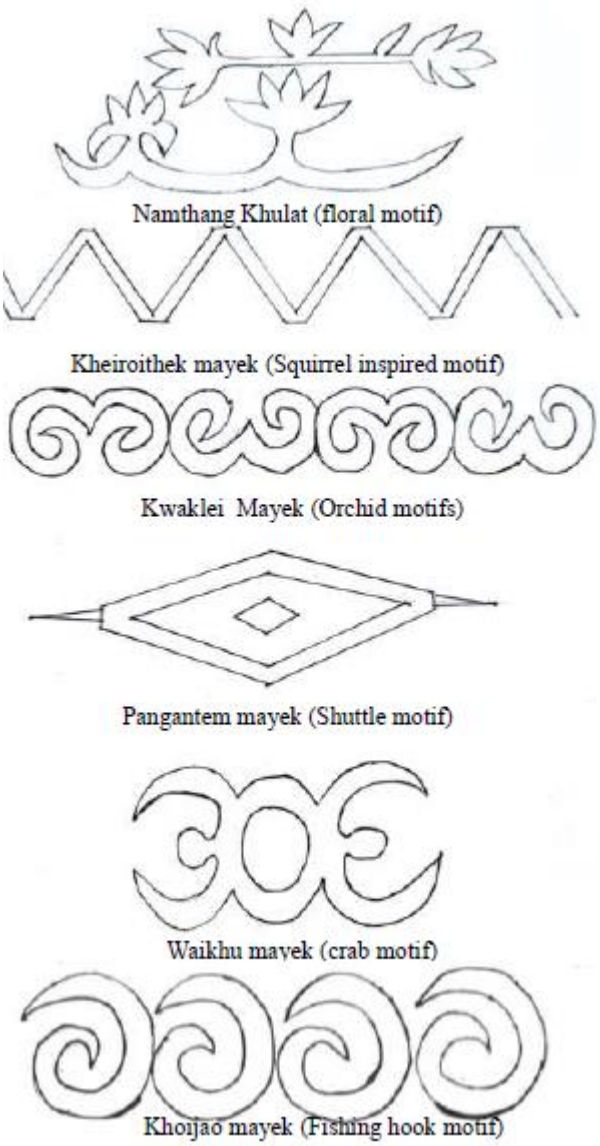


Fig. 3: Sketches of the traditional motifs



Fig. 4: Silk/Pineapple (Rani phee)



Fig. 5: Cotton/Pineapple (Lengyan phee)



Fig.6: Rayon/pineapple (Khurkhul muga Innaphee)



Fig. 7: Polyester/pineapple (Muga Phanek)

Properties of the fabric

Rani phee featured a warp yarn count of 50's and a weft yarn count of 30's, with fabric counts of 66 and 44, respectively. It had a cover factor of 14.68, a GSM of 56, and a thickness of 0.24 mm. Khurkhul muga phee had a warp yarn count of 21's and a weft yarn count of 30's, resulting in fabric counts of 16 and 36, with a cover factor of 9.24, a GSM of 77.48, and a thickness of 0.26 mm. Lengyan phee had a warp yarn count of 25's and a weft yarn count of 30's, with fabric counts of 16 and 44, a cover factor of 5.34, a GSM of 75.96, and a thickness of 0.30 mm. Muga phanek had a warp yarn count of 18's and a weft yarn count of 8's, with fabric counts of 39 and 32, a cover factor of 15.03, a GSM of 184.4, and a thickness of 0.57 mm. The fabric characteristics were essential for evaluating their suitability for various applications.

Table 1: Tensile of the constructed fabrics

Fabric	Tenacity (Kgf/mm)	Elongation (mm)	Maximum load (Kgf)	Percentage strain maximum load
Rani phee (Silk/Pineapple)	0.20	9.85	10.21	19.70
	0.30	2.75	14.76	5.50
Khurkhul muga Phee (Rayon/Pineapple)	0.32	9.67	15.91	19.34
	0.27	3.18	13.46	6.36
Lengyan Phee (Cotton/Pineapple)	0.20	11.05	9.90	22.11
	0.24	3.75	12.15	7.50
Muga Phanek (Polyester/Pineapple)	0.51	24.3	25.52	48.60
	0.45	2.71	22.70	5.421

Note: Gauge length= 50mm; Speed (mm/min) = 100

The tensile strength of the developed fabrics revealed variations in strength and elongation. Rani phee, Khurkhul muga phee, Lengyan phee, and Muga phanek all demonstrated strong performance, with Muga phanek showing the highest warp tenacity (0.51 Kgf/mm) and elongation (24.3 mm). The results highlight the suitability of fabrics for different applications based on their strength and stretchability (Table 1).

ANOVA Analysis

Tensile strength tests showed that Muga Phanek had the highest strength, with a warp load of 25.52 kgf and weft load of 22.70 kgf. Khurkhul Muga Phee followed, with 15.91 kgf (warp) and 13.46 kgf (weft). Rani Phee recorded 10.21 kgf (warp) and 14.76 kgf (weft), while Lengyan Phee had the lowest warp strength at 9.90 kgf and 12.15 kgf in the weft (Table 2).

Table 2: One-way ANOVA (Within group's variants) of the Fabric Tensile strength

Fabric	Maximum load mean (kgf)	Std. Dev.	Std. Error
Rani phee (Silk/Pineapple)	Warp -10.21	0.36	0.21
	Weft - 14.76	1.06	0.61
Khurkhul muga Phee (Rayon/Pineapple)	Warp -15.91	0.39	0.22
	Weft -13.46	0.39	0.22
Lengyan Phee (Cotton/Pineapple)	Warp - 9.90	0.40	0.23
	Weft -12.15	0.68	0.39
Muga Phanek (polyester/pineapple)	Warp -25.52	0.6	0.35
	Weft -22.70	0.96	0.55

Table 3: One-way ANOVA (between group's variants) of the Fabric Tensile strength

Fabric	Maximum load mean (kgf)	Sum of Squares SS	Mean Square MS	F-Stat	P-Value (0.05)
Rani Phee (Silk/Pineapple)	Warp-10.21	684.30	97.76	225.43	0
	Weft- 14.76				
Khurkhul muga Phee(Rayon/Pineapple)	Warp-15.91				
	Weft-13.46				
Lengyan Phee (Cotton/Pineapple)	Warp-9.90				
	Weft-12.15				
Muga Phanek (polyester/pineapple)	Warp-25.52				
	Weft-22.70				

A one-way ANOVA was conducted to analyze the tensile strength of various fabrics by examining the Sum of Squares (SS), Mean Square (MS), F-Statistic, and P-Value (0.05). The total variation in maximum load among the fabrics was quantified with an SS value of 684.30. The Mean Square, calculated at 97.76, represented the average variation in maximum load across samples. The F-Statistic was determined to be 225.43, indicating significant differences in mean maximum load among the fabrics. Additionally, the P-Value was found to be 0, confirming a highly significant difference in tensile strength among the fabric samples (Table 3).

Fabric stiffness and bending length by measuring warp and weft dimensions in both face-to-face and back-to-back orientations across four types of fabric were analyzed:

1. **Rani Phee**: Warp dimensions ranged from 3.12 cm to 3.38 cm, and weft dimensions from 9.32 cm to 9.68 cm, exhibiting the highest weft dimension.
2. **Khurkhul Muga Innaphee**: Warp dimensions ranged from 3.42 cm to 3.68 cm, and weft dimensions from 6.41 cm to 6.7 cm, having the highest warp dimension value.
3. **Lengyan Phee**: Warp dimensions were between 3.10 cm and 3.12 cm, with weft dimensions ranging from 8.76 cm to 8.86 cm.
4. **Muga Phanek**: Warp dimensions ranged from 2.98 cm to 2.99 cm, and weft dimensions from 7.90 cm to 8.00 cm, showing the lowest warp and weft dimensions.

The analysis provides insights into the dimensional characteristics of each fabric type, highlighting their variations in warp and weft dimensions.

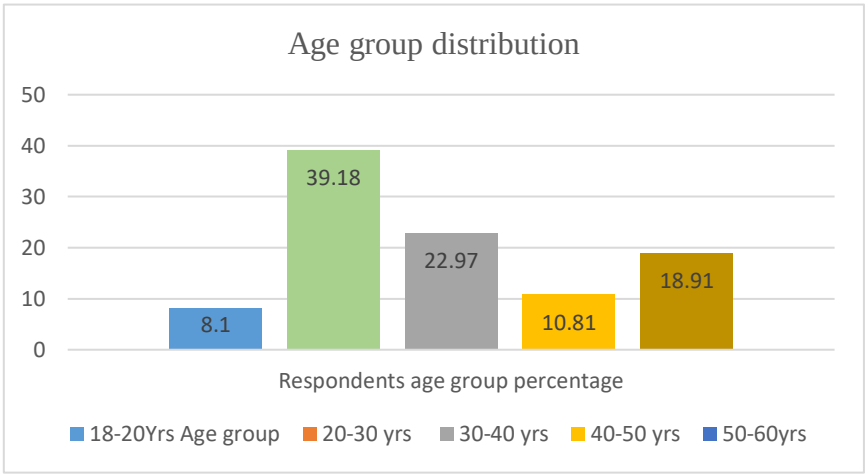
The **drape coefficient** values of fabrics made from Silk/Pineapple, Rayon/Pineapple, and Cotton/Pineapple were significantly higher than those of traditional textiles like Silk/Silk, Rayon/Silk, and Cotton/Silk, whether starched or de-starched. For example, Silk/Pineapple fabric achieved a drape coefficient of 67.57%, exceeded the original textile Silk/Silk (60.61%), which indicates better drapability. Likewise, Rayon/Pineapple fabric had a coefficient of 57.13%, surpassing the 53.65% of Rayon/Silk original traditional textile. Furthermore, Cotton/Pineapple fabric recorded a coefficient of 64%, outperforming original traditional textile (Cotton/pineapple). These findings imply that fabrics made with pineapple yarn provide drapability comparable to that of traditional textiles, which could benefit the Meitei community's traditional textile production.

Consumer feedback analysis

The study found that the pineapple leaf fiber is a viable alternative to conventional materials for weaving textiles.

Background information

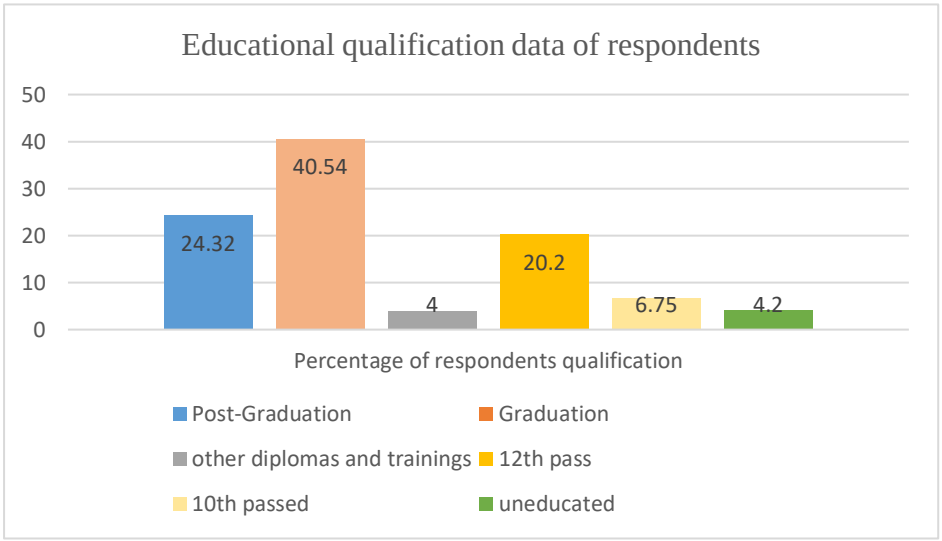
The consumers offered valuable insights into their demographics and affiliations. In terms of age distribution (Graph 1), the data indicated that the largest proportion of respondents, 39.18% were in 20-30 years age range. This was followed by the 30-40 years age group at 22.97%, and the 50-60 years age group at 18.91%. Respondents aged 18-19 years and 40-50 years represented 8.1% and 10.81%, respectively. Interestingly, only a small proportion of male respondents (5.4%) took part in the study, highlighting a predominantly female respondent base. This is likely because the textiles developed were primarily aimed at females, with the exception of Lengyan phee, which was designed for both genders.



Graph 1: Age group distribution of the respondents

Educational Qualification

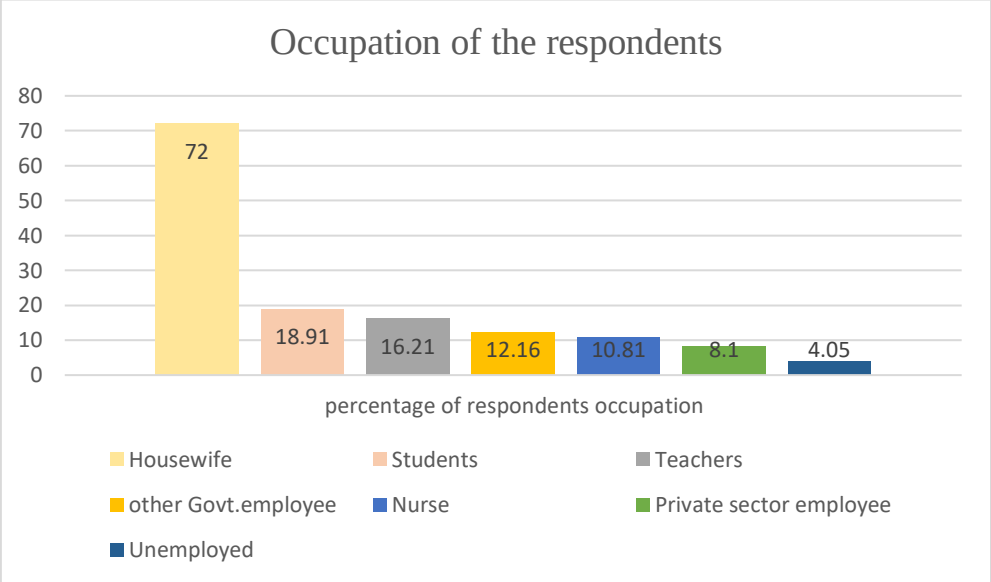
Among respondents (Graph 2), 40.54% were graduates, 24.32% post-graduates, 20.20% had completed 12th grade, and 6.75% had 10th-grade education. A small group (4%) held other qualifications, and 4.2% of those aged 50–60 was uneducated.



Graph 2: Educational Qualification of the respondents

Occupation

The distribution of occupations among respondents, shown in the Graph 3 indicated that the majority (72%) were housewives. Students constituted 18.91% of the respondents, followed by teachers, including both private and government educators, at 16.21%. Other government employees accounted for 12.16% of the respondents, while those working in the private sector represented 8.10%. A small portion (4.05%) identified as unemployed (Graph 3).



Graph 3: Occupation of the respondents

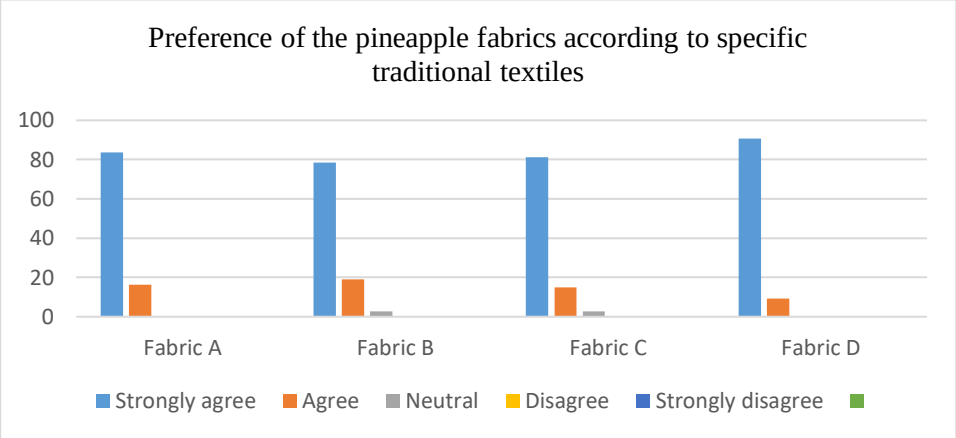
These insights are essential for a clear understanding and interpreting the feedback gathered from the questionnaires and for assessing the potential market reception of textiles made from pineapple leaf fiber.

Preliminary data about the study

All respondents regularly wore traditional textiles but were unaware of pineapple leaf fiber until informed by the researcher. They supported its use as eco-friendly and community-beneficial, found the fabrics visually appealing, and preferred them for their natural, organic qualities.

Look and feel of the samples

All respondents indicated that fabrics made from pineapple leaf fiber were appropriate for use as their traditional textiles. Additionally, 97.3% felt that the pineapple fabrics resembled silk textiles. Beyond local silk, 4% of the respondents had encountered other fabrics, such as khadi and tussar silk that were similar to the pineapple fabrics. Furthermore, 8% disagreed with the idea that using only traditional motifs on the fabrics would maintain the originality of their traditional textiles. Every respondent appreciated the natural colors of the pineapple fabrics. However, 7% of respondents could not identify the traditional colors used in their textiles. The remaining 93% listed traditional colors including white, off-white, cream, black, green, yellow, orange, violet, red, and pink.



Graph 4: Preference of the respondents (in percentage) for specific traditional textiles

In ranking the pineapple fabrics (Graph 4) based on their relevance to specific traditional textiles of the Meitei community (using a scale of 5 for strongly agree, 4 for agree, 3 for neutral, 2 for disagree, and 1 for strongly disagree), 83.78% of respondents strongly agreed with Fabric A (Silk/Pineapple) being suitable for Rani Phee, while 16.21% agreed. For Fabric B (Rayon/Pineapple) as Khurkhul Muga Innaphee, 78.37% of respondents ranked it a 5 (strongly agree), 18.91% ranked it a 4 (agree), and 2.7% remained neutral. In the case of Fabric C (Cotton/Pineapple) as Lengyan Phee, 81.08% of respondents strongly agreed, 14.86% agreed, and only 2.7% were neutral. Lastly, for Fabric D (Polyester/Pineapple) as Muga Phanek, a significant majority, 90.7%, strongly agreed, with the remaining 9.3% agreeing. Fabric D received the highest percentage of "strongly agree" responses compared to the other fabrics.

Market feasibility

In assessing market feasibility, all respondents believed that the developed pineapple fabrics would be commercially viable. Additionally, 97.3% expressed interest in trying fashion garments made from these fabrics, and 96% agreed that the fabrics would be suitable for garments in a niche market.

Price preference data showed that 87.83% of respondents were willing to pay Rs 8000 for Fabric A (Silk/Pineapple), with some even suggesting above Rs 10,000. For Fabric B (Rayon/Pineapple), most (66.21%) preferred Rs 6000-7000. Fabric C (Cotton/Pineapple) saw the highest preference (43.24%) in the Rs 6000-7000 range, with 35.13% choosing Rs 4000-5000. Fabric D (Polyester/Pineapple) was lower-priced, with 79.3% preferring Rs 2000-3000 and 12.7% selecting Rs 1000-2000 (Table 4).

Table 4: Price preference by the consumer

Fabric	**Price Range (Rs)**	**Percentage of Respondents**
Fabric A (Silk/Pineapple)	8000 and above	87.83%
	7000-8000	6.76%
	6000-7000	5.4%

Fabric	**Price Range (Rs)**	**Percentage of Respondents**
Fabric B (Rayon/Pineapple)	8000 and above	8.10%
	7000-8000	14.86%
	6000-7000	66.21%
	5000-6000	7.75%
	4000-5000	3%
Fabric C (Cotton/Pineapple)	8000 and above	4%
	7000-8000	6.5%
	6000-7000	43.24%
	5000-6000	10.81%
	4000-5000	35.13%
Fabric D (Polyester/Pineapple)	2000-3000	79.3%
	1000-2000	12.7%

The data shows strong market potential for pineapple leaf fiber fabrics due to consumer interest and cultural and environmental appeal. With development and proper pricing, they could thrive in both traditional and modern markets. Encouraged by 97.3% interest, the researcher tested the visual appeal of high-fashion garments made from the fabric (Fig.8).



Fig. 8: Fashion garments made from the pineapple fabrics

Mini mannequins measuring 7.5x5x25 cm were utilized to create the drape fashion garments. This method enabled a detailed analysis of how the pineapple fabrics drape and interact with the shape of the mini mannequins, offering valuable insights into their appropriateness for high-fashion uses.

SWOC Analysis

The SWOC analysis of using pineapple leaf fibers (PALF) in traditional textile production in Manipur reveals several important points:

1. Strengths: PALF is inherently sustainable and eco-friendly, which aligns with the growing demand for environmentally conscious products. Its ability to produce fine yarn and its tensile strength make it a viable alternative to traditional materials like silk. Additionally, selling waste leaves offers farmers extra income, contributing to economic sustainability. Incorporating PALF into traditional weaving methods helps preserve local skills while introducing a new raw material.

2. Weaknesses: The hand extraction process of PALF is labor-intensive and costly, which limits scalability and cost-effectiveness. There may also be issues with quality consistency due to variations in leaf quality. Furthermore, limited mass production and marketing efforts restrict widespread adoption and consumer awareness.

3. Opportunities: The increasing demand for sustainable products positions PALF as an eco-friendly option. It can also act as a silk substitute in traditional textile production. Exploring applications beyond traditional textiles could further expand PALF's market potential.

4. Challenges: The installation of extraction machines involves technical and financial challenges. Competing with synthetic fibers and limited market availability presents additional hurdles. It is essential to address gaps in consumer education to enhance awareness and acceptance of PALF.

CONCLUSION

In conclusion, the thorough investigation of using pineapple leaf fiber in textile production, as detailed in the various sections, highlights its potential as a sustainable and adaptable material. Feedback showed strong market potential for pineapple leaf fiber fabrics, driven by consumer interest and alignment with cultural and environmental values. With further development and proper pricing, these fabrics could gain a strong base in both traditional and modern fashion markets. Notably, 97.3% of respondents expressed interest in trying garments made from pineapple fabrics. Additionally, the awareness generated and the SWOC analysis provide insights into the opportunities and challenges of integrating this natural resource into the textile industry. Overall, this research establishes a strong foundation for further innovation and development in sustainable textile manufacturing, contributing to the enhancement of local economies and global sustainability objectives.

REFERENCES

- Adam, A., Yusof, Y., & Yahya, A. (2016). Extraction of pineapple leaf fibre: Josapine and moris, ARPN Journal of Engineering and Applied Sciences, 11(1), 161-165.
- Booth JE. (1996). Principles of textile testing. CBS Publishers and distributors Pvt. Ltd.
- Borthakur, M. (2013). Studies in northeast India Assamese Textiles. Mittal publication. (139-143).
- Bowmick, M., & Basak, S. (2021). Processing of plant fibre for yarn development. Faculty Development Program Book. National Institute of Natural Fibre engineering and Technology. (74-79).

- Das, A, K. (2017). Traditional textiles of Northeast India: A catalogue of INGNCA collection, Br. Publishing Corporation.
- Kamarudin, Z., & Yusof, M. (2016). Pineapple leaf fiber thread as a green and innovative instrument for textile restoration, International Journal of Sustainable Future for Human Security J-sustain N, 4(2) 30-35.
- Karolia, A. (2019). Traditional Indian Handicrafted textiles. Nyogi books.
- Nayak, L. K. (2021). Upgraded machine for extraction of some under exploited plant fibres, Faculty Development Program Book, National Institute of Natural Fibre engineering and Technology. (23).
- NCERT. (2014). Handwoven Traditional Textiles of Manipur, Traditional Indian Textiles. 58-74.
- Thangjam, R., & Sharan, M. (2024), Empowering the farmers and the weavers: The economic and social role of pineapple leaf fibre", International Journal of Agriculture Extension and Social Development, Vol.7 (1), 342-345.
- Thangjam, R., & Sharan, M. (2024). Prospect of utilizing biowaste pineapple leaf fibre for textile products. Prof. Rajmatta Bedamatta, Prof. Boeing Laishram & Dr. Sprash Johari, Research and Innovation for sustainable Development Goals. (187-200). Springer's Nature. https://link.springer.com/book/10.1007/978-981-975870-8
- Yusof, Y., Yahya, A. S., & Adam, A. (2014). A New Approach for PALF Productions and Spinning System: The Role of Surface Treatments, Journal of Advanced Agricultural Technologies, 1(2), 161-164. https://10.12720/joaat.1.2.161-164
- Yusof, Y., Nawi, A.N., & Alias, B. M. (2016). Pineapple leaf fiber and pineapple peduncle fiber analyzing and characterization for yarn production, ARPN Journal of Engineering and Applied Sciences, 11(6), 4197-4202.

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FTIR SPECTROSCOPIC AND QUALITATIVE PHYTOCHEMICAL ANALYSIS OF MEDICINAL PLANTS AND ITS EVALUATION OF EXTRACT TREATED ON SILK FABRIC AS ANTIBACTERIAL FINISH

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. HSAI-2023-TN-1395-LF[3]

ABSTRACT

The present study was subjected to analysis qualitative phytochemical screening, FTIR spectroscopy analysis of medicinal plants. Silk fabric is dyed using alum as a mordant and a methanolic extract of leaves. The silk fabric has been bleached and degummed. The dyed silk fabric reacts as antibacterial finish. Alkaloids, flavonoids, terpenoids, tannin, and phenol have all been found as phytochemical substances. The FTIR spectroscopy tests revealed varied characteristic peak values for several functional chemicals in plant powder, which were determined to have antibacterial and other biological activities. Among the plants examined, methanolic extract of Boerhavia diffusa and Coleus aromaticus had the highest antibacterial activity. Medicinal plant extract was finished with silk fabric, and its antibacterial activity against specific microorganisms such as *E. coli* and *S.aureus* was established. The inhibitory zones assessed well diameter of Boerhavia diffusa extraction treated fabric (25mm and 27mm) and Coleus aromaticus extraction treated fabric (31mm and 30mm) may significantly control the development of test organisms. The results demonstrated that the Boerhavia diffusa and Coleus aromaticus plant extract treated materials that are nontoxic, antimicrobial, and environmentally friendly, as well as naturally dyed home textiles. Furthermore, this can protect against a number of illnesses transmitted by contaminated textile materials.

Keywords: Antibacterial, FTIR, Natural dye, Qualitative phytochemical**,** Silk fabric

INTRODUCTION

Finishes on textiles are anticipated to have resistance from spreading infectious microorganisms such as bacteria, fungi, spores, viruses by killing them or inhibiting their growth by its mode of action. These finishes minimize the risk of spreading infectious diseases and also control the hygienic issues. The antimicrobial finishes on textiles are mainly classified into biocidal and biostatic finishes (Gao, 2008). Natural dyes used for textile applications were mostly from leaves, flowers and roots of medically significant plants or trees. Other natural dyes were reported

to be sourced from marine and microbial sources (Kasiri and Safapour, 2013). An ideal source for an eco-friendly antibacterial finish is natural dyes produced from plant extracts. There is growing interest in developing antimicrobial textiles using plant extracts as a natural preservative (Joshi, 2009). Each plant or herb's extract has potent antibacterial properties that could stop germs from proliferating. Among various fabrics like cotton and cotton blended fabric was treated with natural source extracts were made on a global scale. Utilizing cellulose fibres with an antimicrobial treatment is very beneficial and vital for medical textiles (Faheem Uddin, 2015).

The plant-based source has been used in medical textile applications including dressing gauzes and sutures and has the potential to be both antibacterial and antifungal (Gawish, 2017). In addition to leaves, flowers are valued for the functional finishing. Petals of Marigold flowers, pomegranate rind, myrobalan and tamarind hull were used as mordants or dyes to finish textiles and used in a variety of concentrations to pre-treat textile materials (Vastrad et al., 2017). Mostly mineral salts are most commonly utilized as mordants. Major metallic mordants are alum, ferrous sulfate, copper sulphate, and others (Geelani et al., 2016). Mordants have a crucial role in natural dyeing, enabling the creation of diverse color tones and fastness properties (Ismal et al., 2014). Alum is required to operate as a chemical agent, facilitating a reaction between the dye and the cloth (Hansen V, 2015). Woven, durable silk fabrics are excellent for simple party wear (Hong et al., 2012). Silk, a luxury fibre utilized in the fabric industry and a biopolymer with high biocompatibility, is suitable for pharmacological and biotechnology uses (Egaña & Scheibel, 2010).

According to the phytochemical assessment, alkaloids, flavonoids, terpenoids, phenol, and tannin was present. The researchers also revealed that all of the compounds found were associated with antibacterial activity in the aforementioned studies. Preeti Bajpai et al. (2014) examined the presence of phytochemicals that might be employed medicinally in *Aegle marmelos* leaves using aqueous and methanolic extracts. Numerous phytochemicals, including tannins, saponins, flavonoids, alkaloids, and terpenoids, were found in the extracts.S Nagajothi *et al*., (2018) studied the phytochemical analysis of *Andrographis paniculate*. The researcher's used solvents are aqueous, ethanolic, aqueous and alcoholic filtrate. Significant phytochemicals found were flavonoids, alkaloids, tannin, terpenoid and phenol compounds. The phytochemical screening of Boerhavia diffusa leaves extracted with n-hexane, ethyl acetate, and methanol was studied by Apurba Sarker Apu et al. in 2012. Alkaloid and flavonoid were present in methanol extracts. Trayee sarkar das *et al*., (2016) study on phytochemical analysis of *Aristolochia bracteolate* in three extracts such as ethyl acetate, hexane and methanol. Ashwini et al., (2014) conducted a phytochemical screening of Coleus aromaticus leaves using the methanolic extract technique. It demonstrated the presence of flavonoids, tannins, phenol, and terpenoids in methanol extract. As a consequence, methanolic extraction produced the best and beneficial results among the various solvents.

This study found significant beneficial bioactive compounds that were discovered using phytochemical and FTIR analysis. The potential antibacterial efficacy of the natural dyes extract from specific plant species, such as *Aegle marmelos, Andrographis paniculata, Aristolochia bracteolate, Boerhavia diffusa,* and *Coleus aromaticus*, against bacterial species such as Staphylococcus aureus and Escherichia coli, which are known to cause cross infections in hospitals and at home, is examined in silk fabrics using alum mordants. People might continue with their

everyday activities while being protected from degenerative illnesses due to this functional finishing fabric.

Along with the growing years, there is seen an increasing awareness of environmental sustainability and the shortage of synthetic antimicrobial agents is seen to have driven the textile industry toward the use of bio-based alternatives. The antimicrobial finishes has derived from plant sources not only provides an excellent biodegradability and reduced ecological impact but it is found to align with the need of consumer demand for green and non-toxic materials. Many studies have shown that the efficacy of various Phyto constitutes such as alkaloids, terpenoids, flavonoids, and phenolics which is been accessed with the antimicrobial protection as it gets linked with the textiles Unlike synthetic agents, natural compounds are less likely to contribute to microbial resistance or cause allergic reactions, making them particularly suitable for health care, baby products, and home textiles. Furthermore, functional textiles incorporating herbal extracts are now being promoted as value-added products in the global market (Geelani et al., 2016). Some Countries like Japan, Germany, and South Korea are having a strong investigation into the technical textiles which are herbal based as it is used to change the conventional chemically-treated fabrics. The current investigation bridges the gap between the nature resource utilization and the innovation made into the textile through integrating phytochemical-rich plant extracts with silk fabrics to have an antibacterial growth without synthetic additives. Given silk's biopolymer nature and luxurious texture, it presents a highly compatible medium for herbal finishing treatments.

OBJECTIVES

- To investigate the phytochemical analysis and FTIR of the medicinal plants
- To examine methanolic extract of medicinal plants for its antibacterial activity
- To finishes the selected fabric with medicinal plant extract
- To assess the antibacterial effectiveness of the finished fabrics

METHODOLOGY

This section outlines the methodology employed in the current research.

Selection of the Fabric and Medicinal Plants

For the current study degummed and bleached plain woven silk fabric was chosen. Where the With Ends per inch which is the EPI and the Picks Per Inch (PPI) were of 180 × 120 and a weight of 190 g/m². The fabric was for the current investigation was sourced from VSM Weaves India (P) Ltd., Erode, Tamil Nadu, India. Medicinal plants were collected from different regions of Madurai District, Tamil Nadu, India, and authenticated by Dr. Sharief M. U., Scientist, Tamil Nadu Agricultural University, Coimbatore. The five medicinal plant species were identified for the investigation through their report of antimicrobial and phytochemical properties which is been provided in the Table (1).

Table-1: List of Medicinal plants

Botanical name	**Family name**
Aegle marmelos L. Correa	Rutaceae
Andrographis paniculata (Burm. fil.) Nees	Acanthaceae

Aristolochia bracteolate Lam.	Aristolochiaceae
Boerhavia diffusa L.	Nyctaginaceae
Coleus aromaticus Benth	Lamiaceae

Source: Constructed

Preparation of Plant Extracts

In the present study, the collected plant leaves were initially washed, then shade-dried, and subsequently oven-dried at 40–50°C for 24 hours to eliminate moisture. The dried material was made into powdered format using a mechanical grinder and sieved through a fine mesh.Extraction was carried out using a Soxhlet apparatus. Approximately 20 grammes of powdered sample were introduced into a filter paper thimble and positioned within the extraction chamber. Methanol served as the solvent because of its polarity and established effectiveness in extracting phytoconstituents. The extraction occurred at 60°C for 6 hours, followed by an increase to 100°C to guarantee complete solvent evaporation. Extracts were collected and preserved in airtight containers at 4°C for subsequent use.

Fourier Transform Infrared Spectroscopy (FTIR)

Fourier-transform infrared (FTIR) analysis was used to ascertain the functional groups present in the powdered plant samples. Approximately 10 mg of each dried plant extract was combined with 100 mg of potassium bromide (KBr) to create clear pellets under hydraulic pressure. Spectral scanning was conducted in the range of 4000 to 400 cm^{-1} using a Shimadzu IR Affinity-1 spectrophotometer with a resolution of 4 cm^{-1}. Characteristic absorption bands were analyzed and interpreted to identify phytochemical components.

Phytochemical Screening

Qualitative phytochemical tests were conducted to identify the presence of key secondary metabolites including alkaloids, flavonoids, terpenoids, phenols, and tannins. Standard protocols as described by Savithramma et al. (2011) were followed.

Fabric Treatment with Plant Extracts

The silk fabric samples were cut into 10 cm × 10 cm swatches. Pre-treatment included soaking in water for 20 minutes at 70°C followed by washing with 1% sodium lauryl sulfate solution to remove any surface impurities. The textiles were subsequently cleaned with distilled water and air-dried. Simultaneous dyeing and finishing were executed using a padded mangle at 80°C for 30 minutes, with a material-to-liquor ratio of 1:20. Alum served as the mordant in all treatments. Subsequent to treatment, the fabric samples were rinsed and dried. The treated fabrics were visually documented (Fig. 2).

Figure -2

Silk fabric samples treated with methanolic leaf extracts



Silk fabric dyed with *Boerhavia diffusa* L. leaf extract



Silk fabric dyed with *Coleus aromaticus* Benth leaf extract

Source: Estimated

The treated silk fabric samples exhibited a uniform dye uptake and visible antibacterial finish. Fig. 2 illustrates the appearance of the fabrics dyed with methanolic extracts of *Boerhavia diffusa* and *Coleus aromaticus*, which were selected based on their superior antimicrobial performance.

Antibacterial Activity Testing

(A) Plant Extracts: Antibacterial efficacy of methanolic extracts was evaluated using the well diffusion method (EN ISO 20645). Test organisms Escherichia coli and Staphylococcus aureus were introduced into nutritional broth and cultured for 24 hours. The Mueller-Hinton Agar plates were uniformly inoculated with bacterial cultures. Wells with a diameter of 6 mm were formed, and 20 µL of each extract was dispensed into the wells. Plates were incubated at 37°C for 24 hours, and inhibition zones were measured in millimetres.

(B) Treated Fabric Samples: Treated fabric swatches were cut into 2 cm diameter circular samples and placed on inoculated Mueller-Hinton Agar plates. A sterile loop was used to spread bacterial cultures evenly across the agar surface. The same bacterial strains were used. Plates were incubated at 37°C for 24 hours, and inhibition zones around the fabric samples were measured.

Controls:

- Negative control: Untreated silk fabric
- Positive control: Standard antibiotic discs (ampicillin)

This allowed for the comparison of natural extract efficacy with standard antimicrobial benchmarks.

Data Analysis and Visual Presentation

Inhibition zones were measured in millimeters and averaged from triplicate trials. Results were documented in tables and represented visually through bar charts and photographic figures (e.g., Fig. 8 and Fig. 9). FTIR spectral data was plotted and compared across plant samples (Figs. 3–7).

RESULTS AND DISCUSSION

The finding of the current study based on qualitative analysis by phytochemical screening, FTIR analysis and antibacterial efficacy of the plant extracts and treated silk fabrics. The results have been systematically analyzed to evaluate the presence of functional bioactive compounds and their effectiveness as antibacterial agents when applied to textiles. Visual data, spectroscopic results, and antibacterial inhibition zones are discussed in correlation with the plant species and their chemical composition. Tables and figures support the quantitative and qualitative interpretation of the outcomes.

FT-IR (Fourier Transform Infrared Spectrophotometer)

The active components of functional groups were identified using an FTIR spectrum based on peak values in the infrared range. The FTIR spectra of *Aegle marmelos, Andrographis paniculata, Aristolochia bracteolate, Boerhavia diffusa,* and *Coleus aromaticus* are displays the peak values and frequency ranges of functional groups found in dry plant powder as determined by absorption spectra (Fig. 3 to 7).

The figure 3 shows the FTIR spectra of the Aegle Marmelos leave.

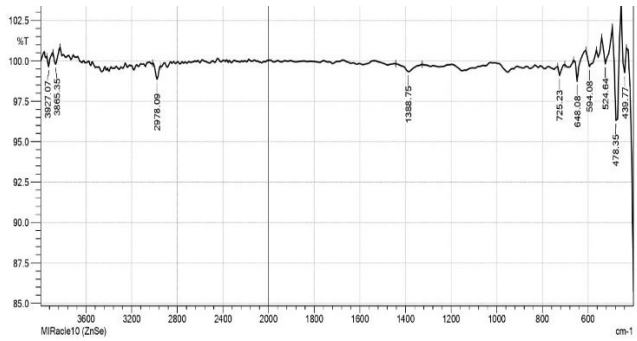


Fig.3: FT-IR spectra of *Aegle marmelos* leave

The figure 4 shows the FTIR result of spectra of Andrographis Paniculata leaves.

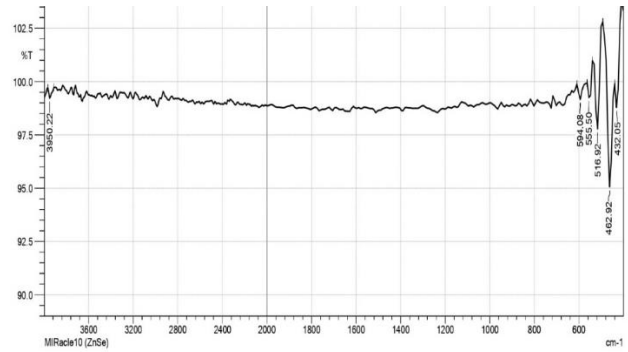


Fig.4: FT-IR spectra of *Andrographis paniculata* leave

The figure 5 shows the result of FTIR spectra of Aristolochia bractelate leaves.



Fig.5: FT-IR spectra of *Aristolochia bracteolate* leave

The figure 6 shows the FTIR result of spectra of Boerhavia Diffusa leaves.

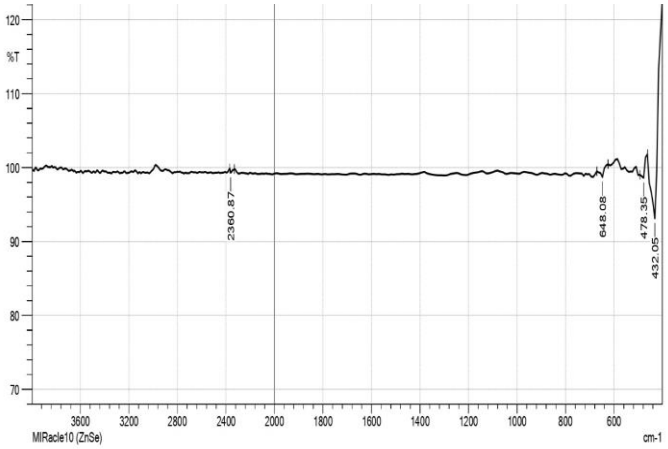


Fig.6: FT-IR spectra of *Boerhavia diffusa* leave

The figure 7 shows the FTIR result of spectrum of Coleus aromaticus leave powder.

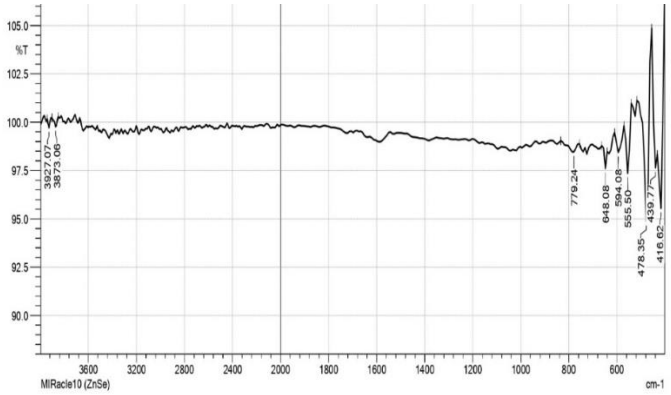


Fig.7: FT-IR spectrum of *Coleus aromaticus* leave powder

The FTIR analysis showed a distinct absorption bands about the corresponding to functional groups in the plant leaf powders. the peaks were observed between 3927.07 cm^{-1} to 3518.16 cm^{-1} are attributed to O–H stretching vibrations, which indicate the presence of alcohols and phenolic

compounds known for their free radical scavenging and antimicrobial potential. Absorption bands near 2978.09 cm^{-1} and 2360.87 cm^{-1} indicate C–H stretching, typically associated with alkane groups. The C=O and C–O functional groups, observed at 1388.75 cm^{-1}, are characteristic of esters and carboxylic acids, which are active in disrupting microbial membranes. Furthermore, C–N, C–Br, and C–S linkages seen between 648.08 cm^{-1} to 439.77 cm^{-1} suggest the presence of alkaloids and halogenated compounds, many of which contribute to antimicrobial activity which is also similar to the study of (Anand T. et al., 2012).

Qualitative phytochemical analysis

This analysis identified the highest concentration of phytoconstituents in two plant extracts: *Boerhavia diffusa and Coleus aromaticus*. Alkaloids, flavonoids, terpenoids, and tannins were identified in preparations of *Coleus aromaticus*. Alkaloids, flavonoids, phenol and tannin are detected in the extracts of *Boerhavia diffusa*. For each medicinal plant, the phytochemical elements that were present and absent were shown in Table 2.

Table-2: Qualitative phytochemical analysis

S. No.	Selected Plants	Phytochemical Analysis				
		Alkaloids	**Flavonoids**	**Terpenoids**	**Phenol**	**Tannin**
1	*Aegle marmelos*	+	-	+	-	+
2	*Andrographis paniculata*	-	+	-	+	-
3	*Aristolochia bracteolata*	-	+	+	+	-
4	***Boerhavia diffusa***	+	+	-	+	+
5	***Coleus aromaticus***	+	+	+	-	+

(+ indicate present – indicate absent)

The qualitative phytochemical screening results depcieted in the (Table 2) showed that the Coleus aromaticus and Boerhavia diffusa contained the strongedts number of bioactive particulares such as flavonoids, alkaloids, tannins, and phenols. All these compounds are commonly reported to inhibit bacterial growth through multiple mechanisms including protein precipitation, enzyme inhibition, and membrane disruption. For instance, the flavonoids are which are known to form a complexes with bacterial cell walls, inhibiting adhesion and invasion. Tannins can be inactivate microbial enzymes and thenproduce protein denaturation. Alkaloids often provides as an bacterial DNA and ribosomes resulting in hindering replication and transcription. The presence of all components in the most effective plant extracts substantiates the observed antibacterial activity.

Antibacterial screening of individual medicinal plants

Among the five different methanolic plant extracts, examined maximum inhibitory zones against both test bacteria *Escherichia coli* and *Staphylococcus aureus*. *Boerhavia diffusa*showed inhibitory zones of about 19mm and 20mm, *Coleus aromaticus* showed inhibitory zones of about 21mm and 22mm respectively (Table-3 and Fig. 8).

Table-3: Antibacterial screening of individual plants (Zone of Inhibition)

S. No.	Selected Plants	*Escherichia coli* (in mm)	*Staphylococcus aureus* (in mm)
		Methanol	**Methanol**
1	*Aegle marmelos*	19	17

2	*Andrographis paniculata*	18	18
3	*Aristolochia bracteolata*	16	17
4	***Boerhavia diffusa***	**19**	**20**
5	***Coleus aromaticus***	**21**	**22**

Source: Estimated

The antibacterial screening of the selected crude plant extracts (Table 3) and treated silk fabrics (Table 4) clearly showed that Coleus aromaticus extract has demonstrated the highest inhibition zones against E. coli (21 mm in extract form; 31 mm in fabric) and S. aureus (22 mm in extract form; 30 mm in fabric). This correlates directly along with its rich content of the flavonoids, tannins, and alkaloids which is provided in Table 2 and FTIR data (Fig. 7), supporting its potent antimicrobial activity. Boerhavia diffusa also showed considerable effectiveness, with inhibition zones of 19–20 mm in extract form and 25–27 mm after fabric application. Its phytochemical composition namely its flavonoids and phenols are found to be contributing to this bioactivity.

The increase in inhibition zones when plant extracts were applied to fabric may be due to improved diffusion and sustained antimicrobial release from the textile surface, aided by the use of alum as a mordant.

The following figure shows the result of the antibacterial screening of the individual plants for the current investigation.

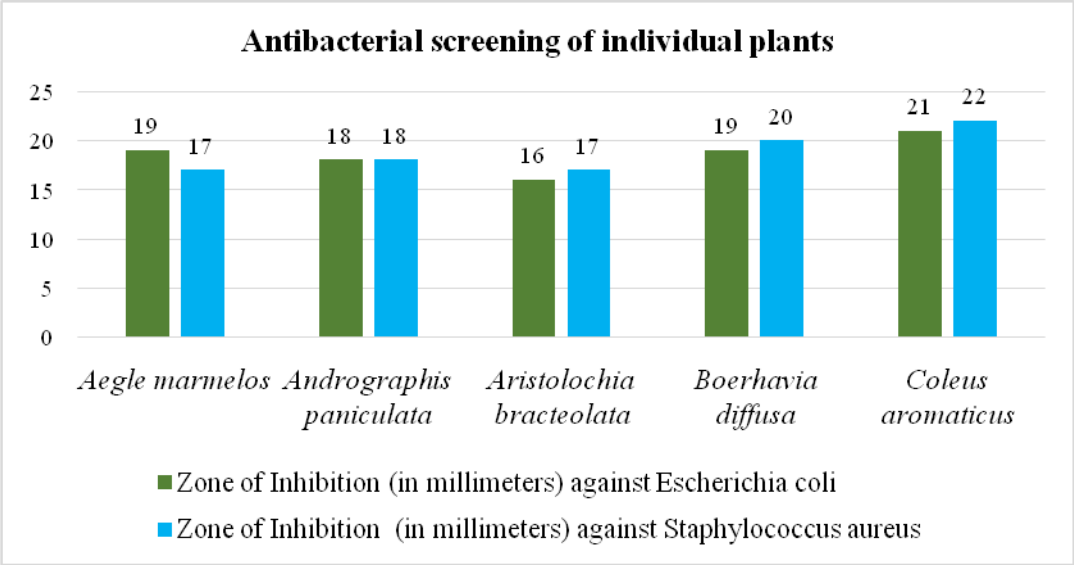


Fig. 8: Antibacterial screening of individual plants

Antibacterial activity of finished fabrics

Among the extracts finished fabric samples *Boerhavia diffusa* and *Coleus aromaticus* finished fabric samples showed good antibacterial inhibitory zones. In Table-7, the inhibitory zones obtained for all finished fabric samples were presented. *Boerhavia diffusa* extracts showed inhibitory zone of about 25mm and 27mm against selected microbes. *Coleus aromaticus extracts* showed inhibitory zone of about 31mm and 30mm against *Escherichia coli* and *Staphylococcus aureus* (Table 4 and Fig. 9).

Table-4: Antibacterial activity of finished fabrics

S. No.	Selected plants	Finished fabric Zone of Inhibition	
		***Escherichia coli* (in mm)**	***Staphylococcus aureus* (in mm)**
1	*Aegle marmelos*	26	25
2	*Andrographis paniculata*	25	24
3	*Aristolochia bracteolata*	26	28
4	***Boerhavia diffusa***	**25**	**27**
5	***Coleus aromaticus***	**31**	**30**

These results connects closely with the phytochemical composition presented in Table 2. The Coleus aromaticus which was shown to contain flavonoids, alkaloids, tannins, and terpenoids all of which are known to have bactericidal and bacteriostatic properties. In particular, flavonoids can inhibit nucleic acid synthesis and disrupt membrane integrity, while tannins may inactivate microbial adhesins and enzymes. The presence of O–H, C=O, and C–Br groups in the FTIR spectrum (Fig. 7) also brings a support to the existence of active antimicrobial constituents that can interfere with bacterial function at a molecular level. The larger zones of inhibition in fabric-treated samples, compared to the crude extracts alone (as seen in Table 3), can be attributed to enhanced diffusion properties when fixed on textile substrates and mordant-aided bonding with alum, which likely allowed a more gradual and sustained release of active compounds onto the microbial environment. This sustained discussion has provided an improvement into the bioavailability of phytochemicals to the bacteria, enhancing their effectiveness.

The figure 9 showed that antibacterial activity of the finished fabrics against the E.coli and S.aureus.

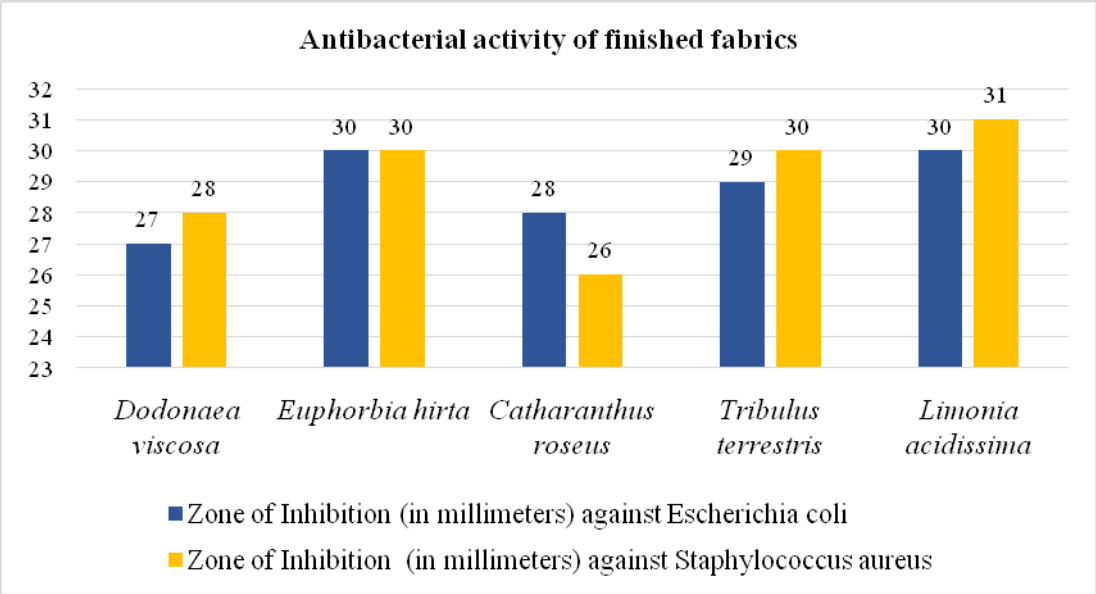


Fig. 9: Antibacterial activity of finished fabrics against *E. coli and S. aureus*

The Figure 9 visually provides the details on the inhibition halos surrounding the treated fabric discs, clearly indicating microbial suppression. The distinct and larger clear zones for Coleus aromaticus-treated samples validate its superior antimicrobial performance compared to other plant extracts. Along with the Aegle marmelos, Andrographis paniculata, and Aristolochia bracteolata showed moderate zones of inhibition ranging from 24 mm to 28 mm, suggesting that while they possess some bioactivity, the phytochemical profiles of Coleus and Boerhavia make them more suitable for functional textile applications in hygienic and medical use cases.

CONCLUSION

This study evaluated the efficiency of extraction from medicinal plant as antibacterial agents. The antibacterial activity varied greatly according to the taxonomic properties of the plant species and the biological characteristics of the studied bacteria. As a result, the activity of antibacterial in plant extracts is determined by the plant species, the solvent used, and the kind of microbe studied. This study verifies the antibacterial efficiency and medicinal uses of the selected plants, demonstrating that finished fabric may inhibit the growth of germs. In the future, the development of antimicrobial textiles treated with medicinal extracts will fulfil the demand for hygienic textiles in various kinds of health-care fields, preventing illnesses caused by various bacteria.

Suggestions and Future Research

The study has demonstrated the promising potential of the medicinal plant extracts especially the Coleus aromaticus and Boerhavia diffusa in imparting the antibacterial properties to silk fabric along with the eco-friendly methods. These treated fabrics are very effectively applied into the real-world contexts such as healthcare and hygiene settings, including hospital bed linens, surgical masks, patient gowns, and maternity or infant care textiles. Their natural origin and the biocompatibility provides them a suitable application for sensitive skin and also it helps in reducing the risk of allergic reactions or any microbial resistance which are commonly associated with the synthetic finishes. Further research is recommended to evaluate the wash durability and long-term antibacterial efficacy of these fabrics under repeated laundering conditions. Through the toxicological assessments like the cytotoxicity and skin compatibility tests can be conducted so as to ensure their safety for prolonged skin contact mainly in the medical and personal hygiene applications. through developing the microbial scope beyond E. coli and S. aureus which includes the fungal and drug-resistant pathogens will provide a more comprehensive understanding into the effectiveness. Additionally, more studies on scaling various treatment maintains for industrial application through assessing cost-efficiency, extraction yield and the standard application methods would provide the application for commercialization. Future exploration of alternative natural mordants, in place of alum, could further enhance the environmental sustainability of this approach.

REFERENCES

- AKHARAIYI Fred Coolborn, DINA Abayomi Olabanjo, OKAFOR Arthur Chinedu. (2019). Antimicrobial activities, phytochemical and antioxidant analyses of Phyllanthus mullerianus (KUNTZ) Exell methanol and aqueous leaf extracts, Arabian Journal of Medicinal & Aromatic Plants, 5(2), 23-41.

- Aldo Leal-Ega˜na and Thomas Scheibel. (2010). Silk-based materials for biomedical applications, Biotechnol.Appl. Biochem., 55, 155-67.
- Anand, T., K. Gokulakrishnan. (2012). Phytochemical analysis of Hybanthus enneaspermus using UV, FTIR and GC-MS. IOSR Journal of Pharmacy, 2(3), 520–524.
- Apurba Sarker Apu, Mahmuda Sultana Liza, A.T.M. Jamaluddin, Md. Amran Howlader, Repon Kumer Saha, Farhana Rizwan, Nishat Nasrin. (2012). Phytochemical screening and in vitro bioactivities of the extracts of aerial part of Boerhavia diffusa Linn., Asian Pacific Journal of Tropical Biomedicine, 2(9), 673-678.
- Ashwini S and Girish K. (2014). phytochemical screening and antibacterial activity of methanolic leaf extract of Coleus aromaticus benth, Int. J. Res. Pharm. Sci., 5(4), 270-274.
- Egwatkhide, P.A., S.O. Okeniyi, C.E. Gimba. (2007). Screening of antimicrobial activity and phytochemical constituents of some Nigerian medicinal plants, Advances in biological Research,1(5,6), 155–158.
- Faheem Uddin. (2015). Cellulose fibers: antimicrobial finishing, Encyclopedia, Biomedical Polymers and Polymeric Biomaterials (1st ed.). ,11, 1423-1440.
- Farina Mujeeb, Preeti Bajpai, Neelam Pathak. (2014). Phytochemical Evaluation, Antimicrobial Activity, and Determination of Bioactive Components from Leaves of Aegle marmelos, BioMed Research International, Article ID 497606, 11 pages.
- Gao Y. (2008). Recent Advances in Antimicrobial Treatments of Textiles, Textile Research Journal, 78(1), 60-72.
- Gawish SM. (2017). Effect of Mordant on UV Protection and Antimicrobial Activity of Cotton, Wool, Silk and Nylon Fabrics Dyed with Some Natural Dyes, J Nanomed Nanotechnol, 8, 1-9.
- Geelani SM, Ara S, Mir NA, Bhat SJ, Mishra PK. (2016). Dyeing and fastness properties of Quercus robur with natural mordants on natural fibre, Textiles and Clothing Sustainability, 2(8), 2-10.
- HONG, K.H., et al. Preparation and properties of multi-functionalized cotton fabrics treated by extracts of gromwell and gallnut. Cellulose. 2012, 19(2), 507-515
- Ingle KP, Deshmukh AG, Padole DA, Dudhare MS, Moharil MP, Khelurkar VC. (2017). Phytochemicals: Extraction methods, identification, and detection of bioactive compounds from plant extracts, J Pharmacogn Phytochem., 6, 32-6.
- Joshi M. (2009). Ecofriendly antimicrobial finishing of textiles using bioactive agents based on natural products, Indian Journal of Fibre & Textile Research, 34(3), 295-304.
- Kasiri MB and Safapour S. (2013). Natural Dyes and Antimicrobials for green treatment of Textiles, Environmental Chemistry Letters, 12(1), 229-286.
- Ö. E. Ismal, L. Yıldırım, E. Özdogan. (2014). Use of almond shell extracts plus bio mordants as effective textile dye, J. of Clean Prod.,70, 61-67
- Oliveira RN, Mancini MC, Oliveira FC, Passos TM, Quilty B, Thiré RM, et al. (2016). FTIR analysis and quantification of phenols and flavonoids of five commercially available plants extracts used in wound healing, Matéria (Rio de Janeiro), 21,767-79.
- Pinho, E., Magalhães, L., Henriques, Mariana Henriques andRosário Oliveira. (2011). Antimicrobial activity assessment of textiles: standard methods comparison, Ann Microbiol, 61, 493-498.
- Savithramma N, Rao ML, Suhrulatha D. (2011). Screening of medicinal plants for secondary metabolites, Middle-East Journal of Scientific Research, 8(3),579-84.

- S Nagajothi, P Mekala, A Raja, MJ Raja and P Senthilkumar. (2018). Andrographis paniculata: qualitative and quantitative phytochemical analysis, Journal of Pharmacognosy and Phytochemistry, 7(4), 1251-1253.
- Trayee sarkar das, Latha R, Agastian P. (2016). Evaluation of aristolochia bracteolata linn. For antimicrobial activity, α-glucosidase inhibition, and its phytochemical constituents, Asian j. pharm. clin res., 9 (1), 137-142.
- Vastrad JV, Walmiki LN, Goudar G. (2017). Dyeing of cotton yarn with marigold (Tagetes erecta) petals: An emphasis on pretreatments and mordants, Applied and Natural Sci Found. 9(2), 325-331.

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10

RECOGNITION AND BRAND CONTRIBUTION WITH RESPECT TO ECO-LOGICAL TEXTILES

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ABSTRACT

Eco-logical textiles refer to fabrics and products that are produced using viable and conservational methods. These textiles are made from livable resources such as hemp, pina, bamboo or reprocessed materials. They are fabricated with optimal use of water, energy, and chemicals which often involves processes that suppress waste generation, pollution in the environment and by providing considerable health benefits to the end users. The study was directed to examine the perception and recognition of end users in addition to the brands involvement in the promotion of eco-logical textiles. In order to study the above specified attributes and to collect primary data 120 participants were selected randomly and a survey was directed using questionnaire. The collected data was inspected statistically using the chi-square test. The study concludes that most of the participants have good recognition and understanding about eco-logical textiles. In addition to that the brands initiatives to maximize sales is been discussed.

Keywords: conventional textiles, eco-logical textiles, end users, recognition.

INTRODUCTION

Ecological balance is a state where there is a balance between different organisms within a community, including their genetic diversity, species diversity, and ecosystem diversity. This balance is maintained through natural succession and gradual changes over time, which allows for a sustainable and stable environment. The eco-logical textiles are those textiles generated from resources that are ecologically sound and imperishable while consideration is given to the duration of life of the product as well as its impression on the globe. The effective management of prevailing green textiles requires bearing all stages: starting from crafting for our habitat, stocking raw material, manufacturing a garment, dispersing them to the channels, store and also taking into account their reverse logistics and trash part's (Eryuruk,2012).

In general, the history of eco-logical textiles is a reciprocation to the negative ecological impact of the textile industry and a shift towards more conservational and ethical policies. It has been perceived that the end users' recognition is positive about the eco-logical textiles and the improvement it can bring in the entity of people but there are few hurdles that holds them from obtaining and producing eco- logical textiles a consonant part of their textiles shopping list (Saad, 2015).

End users also need more information on the range of affordable, feasible probability for engaging in more ecologically sound preferable textile practices, including restricting total consumption and acquiring better quality, classically-inspired textiles (Connell & Kozar, 2014).

It's interesting to note that with the growing recognition and importance of eco-logical practices, there has been a noticeable shift towards the use of eco-logical textiles. End users today are increasingly looking for textiles that are natural, chemical-free, and sustainable. End users often equate eco-logical textiles with properties such as natural, harmless, free of chemicals, and conservational. They perceive these textiles as harmless for the health and the ecosystem. This recognition is reinforced by various attestations such as GOTS (Global Organic Textile Standard) and Organic Content Standards (OCS). Certifications provide security that these textiles meet definite atmospheric and community standards. The Manufacturers who are not technologically prepared with state-of-the-art, eco-logical processes ready to be instituted may be fearful of educating consumers about current production practices and the associated environmental impacts (Brosdahl,2010). The psychographic variables include ecological impact, environmental concern, perception, etc. Demographic variables including age, sex, income, occupation, etc. influenced the shopper's willingness to support eco-logical textiles.

SCOPE

- To help policy makers to implement regulations to reduce the environmental impact that is caused by conventional textile industry and to promote the consumption of eco-logical textiles.
- To help the government to initiate different policies towards the production and consumption of eco-logical textiles.
- To help brands in building different marketing strategies to promote the purchase of eco-logical textile products, such as green labelling.

OBJECTIVES

1. To examine the recognition of end users about eco-logical textiles.
2. To probe the brand's involvement in the promotion of eco-logical Textiles among the end users.

HYPOTHESIS

H_0-There is association between the most preferred eco-logical brands and the initiatives that should be undertaken by the brands to boast their sales.

METHODOLOGY

Research design: The investigator researched a way in which the recognition of respondents was surveyed and their responses were also recorded.

Selection of method: The method selected for accumulating data was ensuring a questionnaire. The questionnaire was designed to collect data to develop them as quantitative data. The survey was conducted through an online medium for accumulating data from respondents.

Preparation of questionnaire: A questionnaire pattern was framed for the accumulation of information on the conduct of purchasers with respect to eco-logical textiles. The questionnaire was designed in plain language and arranged in a logical order to enable the respondents to answer the questions without any uncertainty. The first part deals with the profile of respondents which includes the demographical data. The next part includes the recognition of end users and the brand's involvement in the promotion of eco-logical Textiles.

Selection of sample: The survey was directed through Google form and the target samples were people surrounding my circle and it extended through word of mouth. Non-probability sampling was done. The number of participants were 120 and respondents were requested to provide an unbiased and independent opinion in answering the questions.

Collecting the survey: The questionnaire was sent through mail and social media. There was no personal engagement as the questions framed were very straightforward and easily, understandable. The responses were rapid and were able to generate results simultaneously.

Analysis of data: The collected data was analyzed through statistical analysis, tabulated and percentage calculation was represented graphically. The tabulation was opted to determine the associations between all the variables towards the recognition of end users about eco-logical textiles. Chi-square test was opted to determine association between the most preferred eco-logical brand and the eco-logical initiatives undertaken by the brand.

RESULTS AND DISCUSSION

Table I. Examining the recognition of end-users about eco-logical textiles

SI.NO	To examine the recognition of end-users about eco-logical textiles	Sample size n=120	Percentage (%)
1	Heard of the term	91	75.8
2	Beneficial	97	80.8
3	Own any product	49	40.8
4	Eco-logical textile campaign	35	29.2
5	Integrated and sustainable policy	20	16.7
6	Need for government initiatives	94	75.8
7	Aware of environmental impact	62	51.7

From the given Table I, we can interpret that amongst 120 respondents (75.8%) of them had heard the term eco-logical textiles theses respondents state that they are well aware and have good recognition, understanding about eco-logical textiles, (80.8%) felt that theses textiles products are beneficial in both the aspects environmentally and health aspect of the end-users. (40.8%) of the respondents own and use such textile products in their daily life. (29.2%) of the respondents had come across eco- logical textile campaign. (16.7%) had the recognition and awareness about the

integrated and sustainable textile policy which was an initiative by the Maharashtra government. (75.8%) Stated that there is an emerging need for government intervention and initiatives as it will create a greater impact on the end users and will benefit the brand's and policy makers to larger extend. (51.7%) were aware of the negative impact caused by the conventional textile industry such as soil and water degradation and brutal environmental impact which it will cause in the future.

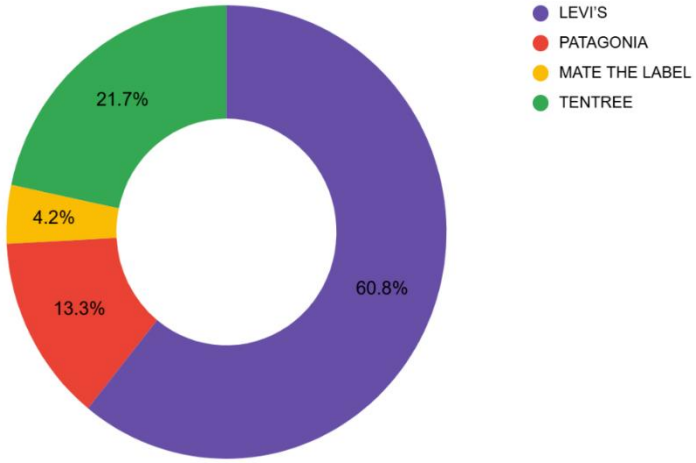


Figure II Eco-logical textile brands

From the given Figure II, it was interpreted that amongst 120 respondents the most popular and preferred brand were. LEVI'S which has been ranked first with (60.8%), followed by TENTREE which had been ranked second with (21.7%), Patagonia ranked the third with (13.3%), lastly MATE THE LABEL with (4.2%). These four brands stated above are the top working brands around the globe, many such brands have to be created in future to persuade the end users imperative needs and demand.

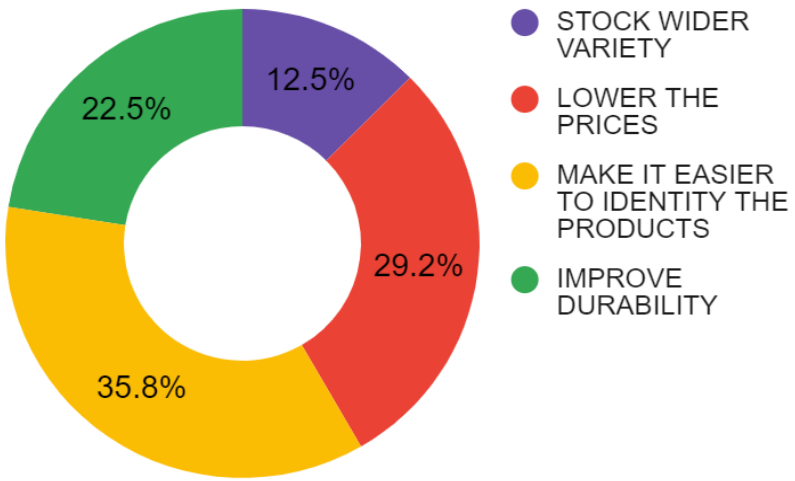


Figure III. Eco-logical textiles brand initiatives

From the given Figure III, we could interpret the data regarding the brand initiatives that has been taken care of states (12.5%) of the responses said brands need to stock wider variety, (29.2%) of the responses said prices had to be more feasible in order to encourage more purchases and circulation of eco-logical textile products among end-users, (35.8%) of the responses said identification of such products should be made much more legible, prominent and feasible (22.5%)of the responses Said brands needed to improve on durability of their eco-logical textile products. As all these aspects will have positive influence their buying behavior.

There is association between the most preferred eco-logical brands and the initiatives that should be undertaken by the brands to boast their sales.

Table Iv. Hypothesis

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.044[a]	9	.633
Likelihood Ratio	7.647	9	.570
Linear-by-Linear Association	.495	1	.482
N of Valid Cases	120		

From the Table IV. Chi square test was conducted to ascertain the association between the most preferred eco-logical brand and the initiatives that should be undertaken by the brands in order to boast their sales. The results obtained after carrying out the test (p-value = 0.633) with were greater than ($p<0.05$), the null hypothesis was accepted and had significant association between the variables at 5% level of significance. Thus, the eco-logical expectations are apparent end users demand being tied to brands. From the give tabulation we could also determine that LEVI'S had the highest count across all categories, indicating that end users anticipate more eco-logical initiatives from this specific brand. Therefore, all eco-logical textile brands need to work and focus more on improving cost efficiency, availability, feasibility, durability product variety and clear eco-labeling to meet end-users' expectations.

CONCLUSION

The study concludes that the majority of the respondents have a good recognition and understanding about eco-logical textiles. They feel that using these textiles will be beneficial to the eco-world and will have a positive impact on end users' health as well, most of the respondents have not come across any textile campaign, policies or initiatives by the government for promoting eco-logical textiles. Hence the research states that there is an imperative need and the government has to interfere, and initiate many eco-logical textiles policies for the betterment of end users and for the world in which we live. The most popular and preferred brand among the eco-logical textile brands was LEVI'S, these eco-logical brands exhibit modern design and high-quality products. These products are likely to be more expensive, have less availability, accessibility and need more

maintenance than conventional textiles the findings of this study will help marketers and government in developing strategies and encouraging eco-logical textile consumption among the end-users.

RECOMMENDATIONS FOR FURTHER INVESTIGATION

- A Study on Restoration of scraps into garments.
- To investigate repercussions of e-shoppers' switch towards eco-textile adaptation.
- To research on affordability and stipulation eco-textile market.

REFRENCES

- Brosdahl, D. J. C. (2010). Consumer knowledge of the environmental impacts of textile and apparel production, concern for the environment, and environmentally friendly consumption behavior. Journal of Textile and Apparel, Technology and Management, 6(4), 1–15.
- Connell, K. Y. H., & Kozar, J. M. (2014). Environmentally sustainable clothing consumption: Knowledge, attitudes, and behavior. Springer. https://www.springer.com/978-981-287-109-1
- Eryuruk, S. H. (2012). Greening of the textile and clothing industry. Fibres & Textiles in Eastern Europe, 20(6), 22–27.
- Gurova, O., & Morozova, D. (2016). A critical approach to sustainable fashion: Practices of clothing designers in the Kallio neighborhood of Helsinki. Journal of Consumer Culture, 20(4), 1–17. https://doi.org/10.1177/1469540516648377
- Montero, C. (2009). Consumer behavior and eco-friendly fashion apparel (OTS Master's Level Projects Papers). Old Dominion University. https://digitalcommons.odu.edu/ots_masters_projects/70
- Saad, A. (2015). Analysis of consumer perception about eco-friendly apparel (Technical report). Tampere University of Technology.

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EVALUATING PATTERNS OF E-RESOURCE UTILIZATION AMONG STUDENTS IN DIFFERENT ACADEMIC STREAMS

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HSAI Life membership number: [1] HSAI-2023-UP-1295-LF, [3] HSAI-2021-UP-828-LF

ABSTRACT

This study analyzes the utilization patterns of electronic resources (e-resources) among a sample of 200 respondents, focusing on their gender and academic stream. In both the Arts and Science streams, there was a substantial engagement with e-resources among respondents, with 84% of male and 78% of female students in the Arts stream, and 88% of male and 90% of female students in the Science stream utilizing e-resources. Cent percent of the male and female students of both the disciplines used google search engine as browser and web link of search engine for accessing e-resources. Majority of the students of arts (94% male, 70% female) and science (82% male, 78% female) used the e-resources for completing assignments/projects. Majority of the students of arts (66.64 % male, 85.71% female) and science (83.78 % male, 75.86% female) did not use membership-based e-resources while cent percent students from both the disciplines used open access e-resources. Majority of the students of arts (70 % male, 86% female) and science (96 % male, 84 % female) used pdf format of e-resources. Majority of the students of arts (96 % male, 86 % female) and science (92 % male, 84 % female) preferred to download e-resources. Majority of the male students of arts (70 % male) preferred e-newspapers while 62 % female students preferred e-books. Majority of male students of science (74 %) preferred e-newspaper while 44 % female students preferred e-books. A substantial correlation was noted between income and the use of e-resources, income and the use of membership-based e-resources, as well as gender and stream concerning the use of open-access e-resources.

Key words: E-Books, E-Resource, Open Access, Search Engine, Technology

INTRODUCTION

The intersection of national progress with science and technology is widely acknowledged. Science involves systematic exploration and empirical validation, while technology effectively applies these insights. The advancement of computers and their seamless integration into human life, largely facilitated by the internet, has led to a significant transformation in the field of education, offering uninterrupted access to educational resources. The term "E-Resource" encompasses digital repositories containing textual, multimedia, and scholarly journal materials, disseminated across a diverse range of platforms. E-resources refer to digitally stored information accessible via electronic systems and networks. This term encompasses various formats, including OPACs, CD-ROMs, online databases, e-journals, e-books, internet resources, and digital publishing models such as print-

on-demand and web-based content. Essentially, e-resources provide structured data in textual, numerical, graphical, or multimedia formats for academic and research purposes (Bavakenthy et al., 2003). Proficient utilization of these resources is vital for a well-informed education, as libraries undergo a transition into digital repositories catering to the needs of educators, students, and researchers. The internet plays a pivotal role in the endeavours of scholars, facilitating the dissemination of research findings, fostering communication, and providing unrestricted access to a global reservoir of academic materials (Madhusudhan, 2007). Several scholars have highlighted the internet as a powerful learning tool that provides both flexibility and convenience for learners while also creating vast opportunities for innovative teaching methods (Moos & Azevedo, 2009; Zhang et al., 2004; Macharia & Pelser, 2012).

OBJECTIVE OF THE STUDY

- To study the e-resource utilization by the students of arts and science streams
- To identify the association of e-resource attributes with selected parameters of respondents

METHODOLOGY

In the selection process, Uttar Pradesh was purposively chosen due to its status as the state with the highest number of universities in India. Among these universities, Banaras Hindu University was purposively with focus on two specific streams: Arts and Science. To ensure a balanced representation, the selection of respondents was carefully conducted. The study included a total of 200 Post Graduate students from the university, with equal representation of both genders. This sample size was considered adequate to draw statistically meaningful inferences while remaining practical for detailed data collection and analysis. This distribution encompassed fifty male and fifty female respondents from both the Science and Arts streams, using stratified random sampling where overall population was divided in four strata on the basis of stream (Arts and Science) and gender (male and female) followed by random selection of respondents irrespective to their subjects in both the faculties.

FINDINGS

Table 1 Distribution of respondents according to use of e-resources

S.No.	Use e-resources	Stream (n=200)							
		Arts (n=100)				Science (n=100)			
		Male (n=50)		Female (n=50)		Male (n=50)		Female (n=50)	
		F	%	F	%	F	%	F	%
1.	Yes	42	84	39	78	44	88	45	90
2.	No	08	16	11	22	06	12	05	10

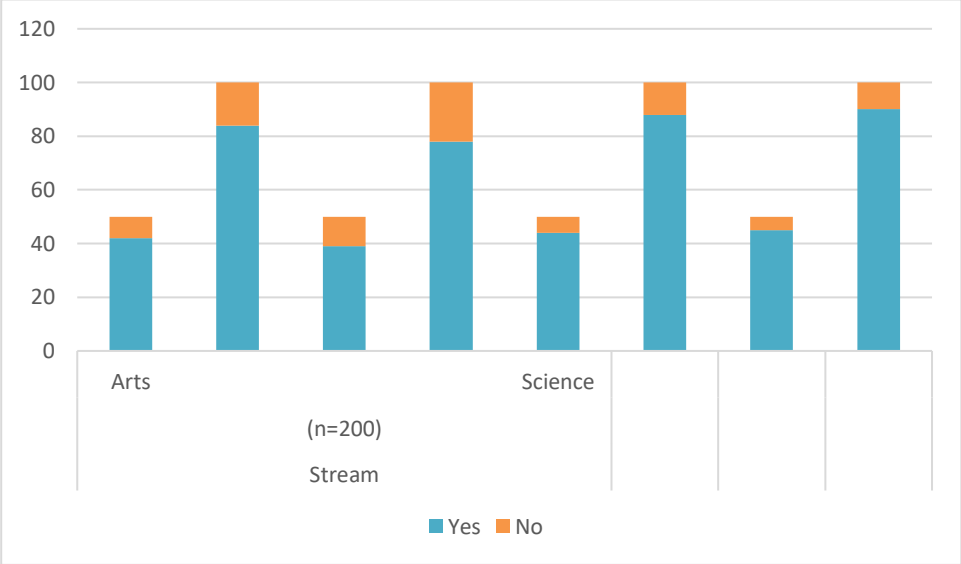


Fig. 1 Distribution of respondents according to use of e-resources

The data presented in Table 1 demonstrates that within the Arts stream, 84% of male respondents and 78% of female respondents actively engaged with e-resources, while 16% of male respondents and 22% of female respondents did not. Within the Science stream, a substantial proportion of respondents utilized e-resources, with nearly equal strength of male and female respondents demonstrating engagement (88 % and 90% respectively), while only 12% of male respondents and 10% of female respondents refrained from utilizing such resources.

Table 2 Respondent Distribution Based on E-Resource Access Sources

S.No.	Sources of access	Stream (n=170)							
		Arts (n=81)				Science (n=89)			
		Male (n=42)		Female (n=39)		Male (n=44)		Female (n=45)	
		F	%	F	%	F	%	F	%
1.	Web links of library	06	14.28	12	30.77	13	29.54	13	28.89
2.	Web link of publisher	10	23.81	08	20.51	08	18.18	04	8.89
3.	Web link of search engine	42	100	39	100	44	100	45	100
4.	Web link of journal	14	33.33	06	15.38	08	18.18	10	22.22

*Multiple responses were allowed

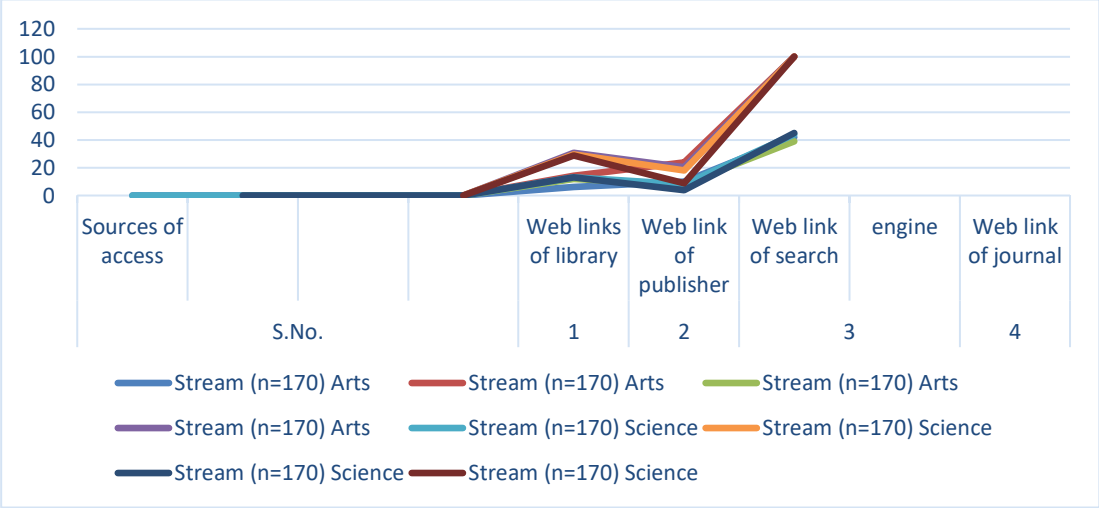


Fig. 2 Respondent Distribution Based on E-Resource Access Sources

Data in Table 2 unveils the dominant use of search engine web links for e- resource access across all academic affiliations. In the Arts stream, males preferred journal web links (33.33%), followed by publisher (23.81%) and library web links (14.28%). In contrast, females in the Arts stream favored library web links (30.77%), followed by publisher (20.51%) and journal web links (15.38%). In the Science stream, males balanced library web links (29.54%) with publisher and journal web links (18.18%). Female Science participants leaned toward library (20.89%) and journal web links (22.22%) with fewer choosing publisher links (8.89%).

Table 3 Respondent Distribution Based on Preferred Search Engines

S.No.	Search engine	Stream(n=200)							
		Arts (n=100)				Science (n=100)			
		Male (n=50)		Female(n=50)		Male(n=50)		Female(n=50)	
		F	%	F	%	F	%	F	%
1.	Google	50	100	50	100	50	100	50	100
2.	Yahoo	21	42	07	14	13	26	09	18
3.	Bing	03	06	00	00	08	16	02	04

*Multiple responses were allowed

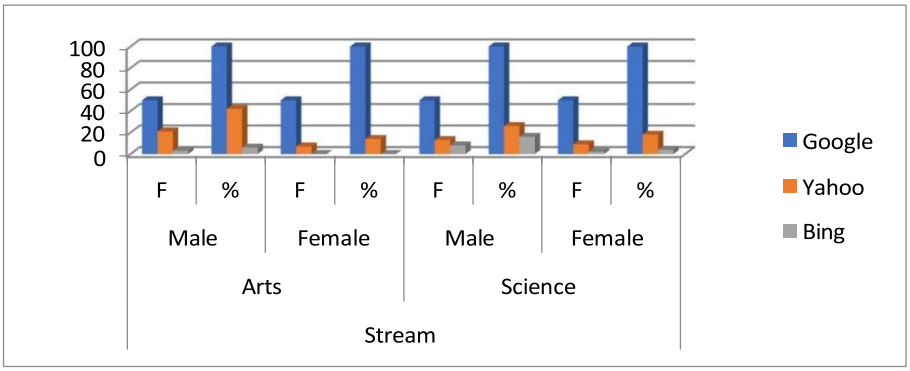


Fig. 3 Respondent Distribution Based on Preferred Search Engines

Table 3 unveils the undisputed reign of Google as the go-to search engine for all participants

in the study, irrespective of their academic background. Yet, a gender-based divide emerges in the Arts stream. Males predominantly favored Yahoo (42%) and Bing (6%), while females leaned toward Google (86%) and sparingly use Yahoo (14%). In the Science stream, the trend repeated. Males opt for Yahoo (26%) and Bing (16%), while females predominantly choose Google (82%) and scarcely pick Yahoo (18%).

Table 4 Distribution of respondents according to purpose of using e-resources

S.No.	Purpose	Stream (n=200)							
		Arts (n=100)				Science (n=100)			
		Male (n=50)		Female (n=50)		Male (n=50)		Female (n=50)	
		F	%	F	%	F	%	F	%
1.	Research work	30	60	25	50	34	68	28	56
2.	Only for information	18	36	29	58	21	42	19	38
3.	Completing assignments/projects	47	94	35	70	41	82	39	78

*Multiple responses were allowed

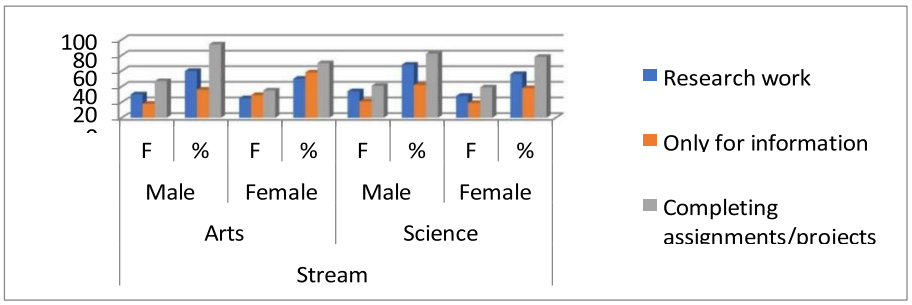


Fig. 4 Distribution of respondents according to purpose of using e-resources

Table 4 delves into how respondents utilize e-resources, providing insights into the interplay between academic streams and gender in shaping their usage patterns. In the Arts stream, male respondents primarily used e-resources for assignments and projects (94%) while Female Arts students predominantly employed e-resources for assignments and projects (70%), followed by information-seeking (58%) and research work (50%). In the Science stream, male students prioritized assignments and projects (82%), while Female Science students also emphasized assignments and projects (78%).

Table 5 Distribution of respondents according to awareness about subscription

S.No.	Awareness	Stream (n=200)							
		Arts (n=100)				Science (n=100)			
		Male (n=50)		Female (n=50)		Male (n=50)		Female (n=50)	
		F	%	F	%	F	%	F	%
1.	Yes	24	48	21	42	37	74	29	58
2.	No	26	52	29	58	13	26	21	42

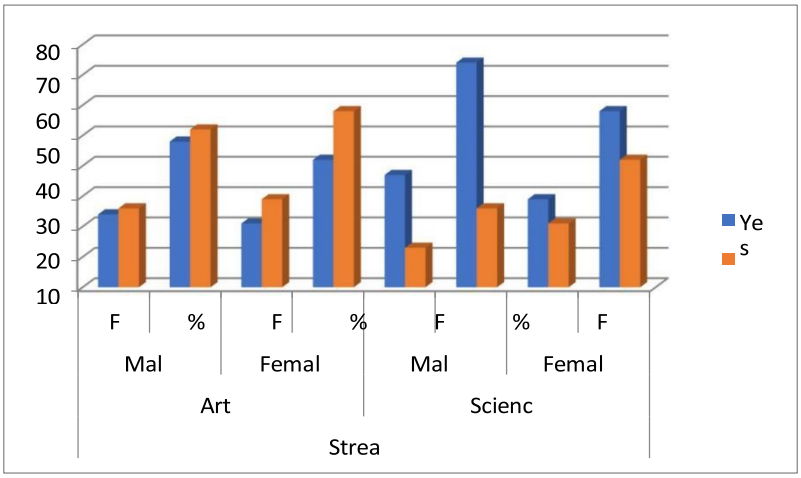


Fig 5 Distribution of respondents according to awareness about subscription

It can be seen in Table 5 that 52% of males and 58% of females in the Arts stream did not know about e-resource subscriptions, whereas 48% of males and 42% of females demonstrated negligence. On the other hand, for the Science stream, 74% of males and 58% of females knew about subscriptions, whereas 26% of males and 21% of females displayed negligence.

Table 6 Respondent Distribution Based on Membership-Based E-Resource Usage

S.No.	Use	Stream (n=111)							
		Arts (n=45)				Science (n=66)			
		Male (n=24)		Female (n=21)		Male (n=37)		Female (n=29)	
		F	%	F	%	F	%	F	%
1.	Yes	08	33.33	03	14.28	06	16.22	07	24.14
2.	No	16	66.66	18	85.71	31	83.78	22	75.86

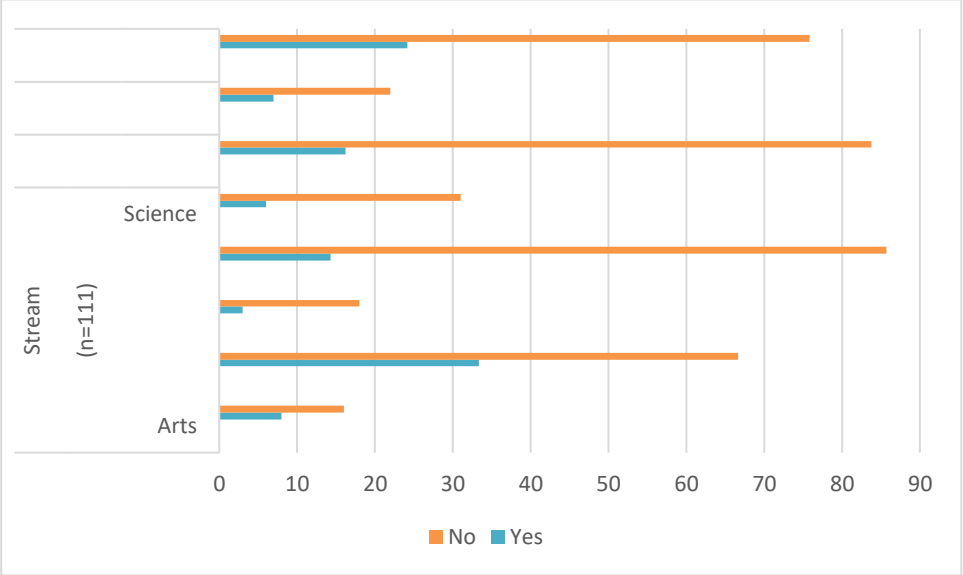


Fig. 6 Respondent Distribution Based on Membership-Based E-Resource Usage

The findings from Table 6 shed light on the utilization of subscription-based e- resources within our study's participant pool. In the Arts stream, a majority of both male (66.64%) and female respondents (85.71%) did not engage with subscription-based e- resources, while a notable portion, 33.33% of males and 14.28% of females, utilized these resources. In the Science stream, a substantial majority, 83.78% of males and 75.86% of females, chose not to use subscription-based e-resources. However, there was a distinct segment of users, comprising 16.22% of males and 24.14% of females, who found value in them.

Table 7 Respondent Distribution Based on Open Access E-Resource Utilization

S.No.	Use	Stream (n=200)							
		Arts (n=100)				Science (n=100)			
		Male (n=50)		Female (n=50)		Male (n=50)		Female (n=50)	
		F	%	F	%	F	%	F	%
1.	Yes	50	100	50	100	50	100	50	100
2.	No	00	00	00	00	00	00	00	00

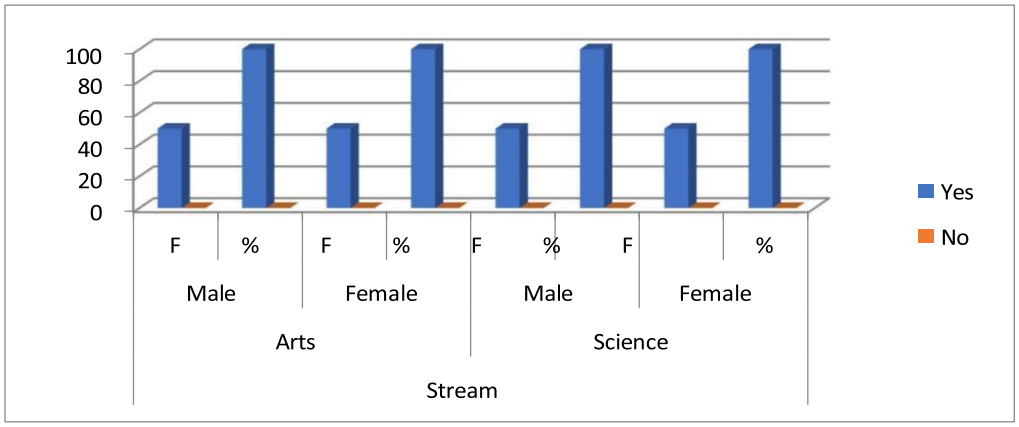


Fig. 7 Respondent Distribution Based on Open Access E-Resource Utilization

The data presented in Table 7 provides a striking insight: all respondents, without exception, from both academic streams and genders, actively engaged with open access e- resources. This resounding unanimity reflects the remarkable success of the open access movement in meeting the diverse informational requirements of students across various academic disciplines and genders.

Table 8 Distribution of respondents according to format of e-resources used

S.No.	Format	Stream (n=200)							
		Arts (n=100)				Science (n=100)			
		Male (n=50)		Female (n=50)		Male (n=50)		Female (n=50)	
		F	%	F	%	F	%	F	%
1.	PDF	35	70	43	86	48	96	42	84
2.	HTM	05	10	02	04	03	06	03	06
3.	Word	29	58	34	68	27	57	39	78

*Multiple responses were allowed

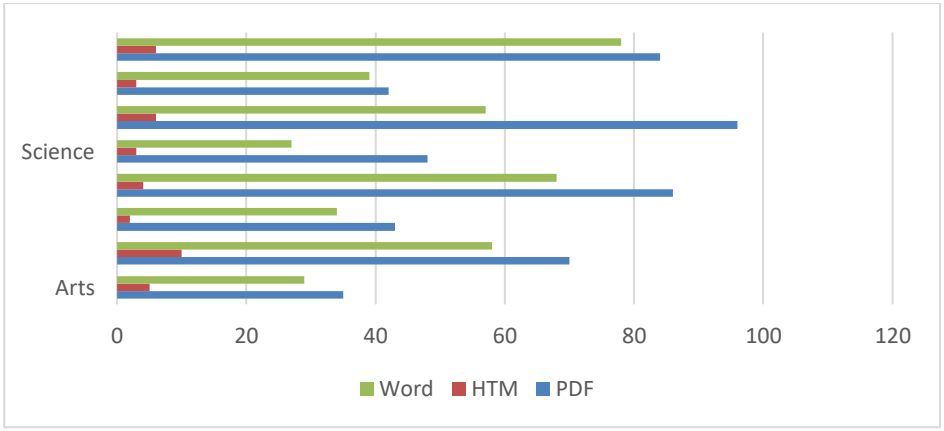


Fig. 8 Distribution of respondents according to format of e-resources used

The data depicted in Table 8 provides a comprehensive examination of the preferred formats for e-resources among respondents, offering valuable scientific insights into their choices. Within the Arts stream, it is evident that male respondents primarily favored PDF format (70%), followed by Word format (58%), and a smaller percentage opting for HTML format (10%). A significant majority of female respondents in the same stream preferred PDF format (86%), followed by Word format (68%), with only a minor percentage choosing HTML format (4%). In the Science stream, male respondents predominantly utilized PDF format (96%), followed by Word format (57%), with a small percentage opting for HTML format (6%). Among female respondents in the Science stream, the majority preferred PDF format (84%) and a minority selecting HTML format (6%). The relatively lower preference for HTML format (ranging from 4% to 10%) across all groups may be attributed to its inherent limitations, such as challenges in offline access and printing, compared to PDF and Word formats.

Table 9 Distribution of respondents according to their preference while using e- resources

S.No.	Action	Stream (n=200)							
		Arts (n=100)				Science (n=100)			
		Male (n=50)		Female (n=50)		Male (n=50)		Female (n=50)	
		F	%	F	%	F	%	F	%
1.	Download	48	96	43	86	46	92	42	84
2.	Take print out	16	32	14	28	09	18	07	14
3.	Read online and make notes	28	56	19	38	28	56	38	76

*Multiple responses were allowed

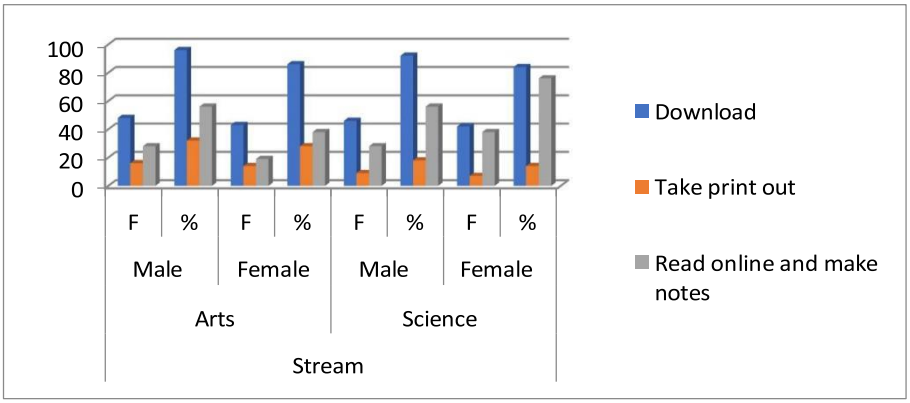


Fig. 9 Distribution of respondents according to their preference while using e-resources

Table 9 highlights students' study habits and e-resource preferences. In the Arts stream, males mainly downloaded materials (96%), while females also prefer downloading (86%). In Science, most students favored downloading (92% males, 84% females), with reading online and printing as secondary choices. These trends emphasize digital resources' role in academic study.

Table 10 Distribution of respondents according to preference to type of e-resources

S.No.	Type	Stream (n=200)							
		Arts (n=100)				Science (n=100)			
		Male (n=50)		Female (n=50)		Male (n=50)		Female (n=50)	
		F	%	F	%	F	%	F	%
1.	E-books	24	48	31	62	28	56	22	44
2.	E-journals	19	38	20	40	23	46	17	34
3.	E-newspaper	35	70	28	56	37	74	08	16
4.	E-database	07	14	03	06	15	30	10	20

*Multiple responses were allowed

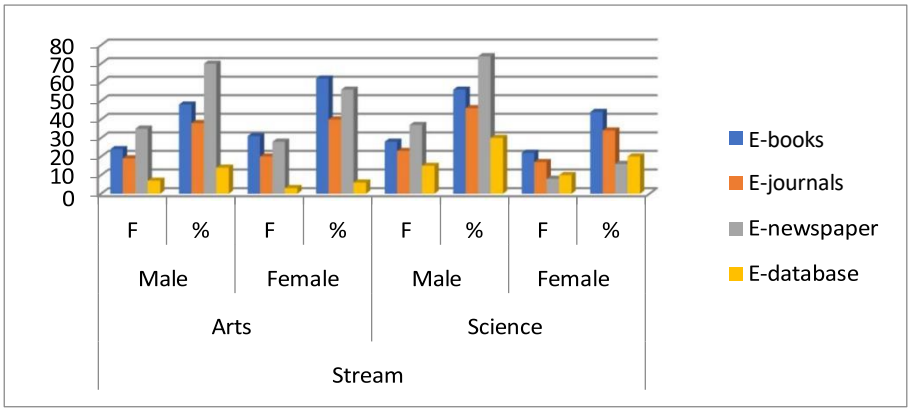


Fig. 10 Distribution of respondents according to preference to type of e-resources

Table 10 reveals variations in e-resource preferences by academic stream and gender. Arts stream males favored e-newspapers (70%), while females preferred e-books (62%). In Science, e-newspapers were most popular (74%), but females prioritized e-books (44%). These findings highlight the need for diverse e-resources and continuous research to adapt to evolving student preferences.

Table.11. Association of attributes with Gender, Stream, and Income

Attributes	Gender		Stream		Income	
	Pearson Chi-Square	Asymp. Sig. (p value)	Pearson Chi-Square	Asymp. Sig. (p value)	Pearson Chi-Square	Asymp. Sig. (p value)
Use of e-resources	0.157	0.692	0.627	0.428	11.569	0.003*
Purpose of use	1.848	0.397	1.818	0.403	1.858	0.762
Use of membership-based e-resources	0.500	0.479	0.980	0.322	4.917	0.038*
Use of open-access e-	3.357	0.047*	3.383	0.046*	1.670	0.434

resources						
Preference while using e - resources	3.621	0.164	0.905	0.636	3.333	0.504

*Significant at 5% level of significance.

The data depicted in Table 11 clearly illustrates a significant correlation between the application of electronic resources and diverse demographic variables. Specifically, a substantial correlation was noted between income and the use of e-resources, income and the use of membership-based e-resources, as well as gender and stream concerning the use of open-access e-resources. However, no statistically significant associations were identified between the use of e-resources and gender or stream, and among the purpose of use and preference when employing e-resources, with respect to gender, stream, or income. Furthermore, no significant correlation was observed between the application of membership- based e-resources and gender or stream.

DISCUSSION

The findings in Table 1 are supported by Thanuskodi (2012) and Sankaranarayanan and Nagarajan (2012) and indicate variation in e-resource usage by academic department and gender. Table 2 investigates further such variation, contrary to previous findings by Thanuskodi (2012) and Chauhan and Mahajan (2014). Table 3 theorizes the variation is in terms of accuracy of search, user interface, or habit, though Google dominance remains consistent with previous research (Sankaranarayanan & Nagarajan, 2012; Priyadarshini et al., 2015; Swain & Panda, 2009). Table 4 indicates the main contribution of e-resources to scholarly work with secondary preferences depending on gender and subject, contrary to previous research (Islam & Habiba, 2015; Thanuskodi, 2012; Ahmed, 2013; Chandra, 2013; Ravanan et al., 2013; Siddike & Islam, 2014; Madhusudan, 2010; Dhingra & Mahajan, 2012). Table 5 illustrates gendered differences in subscription awareness of e-resources, like previous research in digital literacy disparities (Van Deursen & Van Dijk, 2019). Tutorials and workshop promotion campaigns can be instrumental to achieving access equity (Birch & Burnett, 2009). Table 6 complements current findings (Ahmed, 2013; Kaur, 2017) on e-materials subscribed within academia. Table 7 displays the overall popularity of open-access materials, bolstering their role in education. Table 8 displays the popularity of PDFs due to preserving visual integrity (Wiley, 2018), whereas the lower use of HTML can be due to accessibility limitations (Hill & Morrow, 2011). Table 9 indicates developing study habits that integrate offline and online methods, in line with Thanuskodi (2012). But Table 10 contradicts previous studies (Priyadarshini et al., 2015; Madhusudhan, 2010; Vishala N. Bhandi, 2008; Sankaranarayanan & Nagarajan, 2012; Dhingra & Mahajan, 2012; Ahmed, 2013; Chandran, 2013). Additionally, the correlation between gender, academic stream, and the utilization of open- access e-resources suggests potential variations in access and preferences across demographic groups, potentially influenced by subject area preferences or disparities in technology access, as seen in earlier studies (Tenopir et al., 2003) as depicted in Table 11. Nevertheless, the absence of statistically significant associations between e-resource usage and gender or academic stream implies the presence of additional factors beyond demographic variables shaping usage patterns, which contrasts with some previous research on gender disparities in information-seeking behavior and highlights the need for further investigation into underlying factors (Van Deursen & Van Dijk, 2019).

SUMMARY, CONCLUSION AND IMPLICATIONS

E-resource usage was high across Arts and Science, with slightly greater use by Science students. Search engines, particularly Google, were the primary access points, revealing gender and stream-based disparities in library and journal link usage. Assignments and research were key purposes, with a general aversion to paid subscriptions. Open access resources were widely favored, with PDFs dominating. Males preferred e-newspapers, while females favored e-books. Downloading was the primary action, followed by reading and note-taking. Search effectiveness, interface design, and prior habits influenced preferences, emphasizing the need for better platform functionality. The shift toward open access suggests institutional investment, while subscription costs highlight the need for subsidized access. Hybrid learning support is crucial, given the blend of online and offline study. Limited demographic influence on e-resource use suggests factors like infrastructure and institutional support warrant further study. All these factors mean that there are profound changes in the emerging pattern of digital learning, requiring new policy approaches, comprehensive programs of training, and structural transformation of infrastructure to make the best use of e-resources.

SUGGESTIONS FOR FUTURE RESEARCH

Building on the present findings, future research may have deeper insights into how students engage with e-resources. Qualitative studies may help uncover why students' choices of web links, document formats, and resource types vary by gender and academic stream, or whether these choices are influenced by digital skills or course requirements. Longitudinal research may observe how usage of open-access and subscription-based resources shifts over time, particularly following institutional policy updates. Since income appears to be linked to resource use, further work may be needed to examine financial factors affecting adoption. Extending the scope to professional and technical disciplines may reveal broader trends. Finally, cross-university or regional comparisons may highlight contextual and policy influences on students' digital resource practices.

REFERENCES

- Ahmed, S. Z. (2013). Use of electronic resources by the faculty members in diverse public universities in Bangladesh. The Electronic Library, 31(3), 3–13.
- Bavakenthy, M., Veeran, M.C.K. and Salih, T.K.M. (2003). Information Access Management and Exchange in the Technological Age, Ess Publications, New Delhi.
- Birch, S., & Burnett, S. (2009). Digital literacy and information literacy: Sorensen's 'literacies' and the implications for policy and practice. Library & Information Science Research, 31(2), 91–97.
- Chandran, V. (2013). Use and user perception of electronic information resources: A case study of Siva Institute of Frontier Technology, India. Chinese Librarianship: an International Electronic Journal, 36, 85-98.
- Chauhan, S.K., & Mahajan, P. (2014). Use of UGC-Infonet E-resources by Social Science Academics in Indian Universities: An Evaluation Study. The Journal of Academic Librarianship 40, 359–366.
- Dhingra, N. J., & Mahajan, P. (2012). Electronic journals in the university libraries of Punjab: The present situation and future perspective. International Journal of Digital Library Services, 2(1), 53–69.
- Hill, J. R., & Morrow, A. (2011). The implications of HTML5 for educational multimedia

development. Educational Technology & Society, 14(1), 3–14.

- Islam, M. M., & Habiba, U. (2015). Using Pattern of internet and e-resources by the students and faculty members of a private university in Bangladesh. American Journal of Educational Research, 3(5), 541-546.
- Kaur, P. (2017) Yes of web resources and its retrieval pattern among research scholars of guru Nanak Dev University: A survey. International Journal of Innovative and Applied Research, 5(3), 51-61
- Macharia, J. K., & Pelser, T. G. (2012). Key factors that influence the diffusion and infusion of information and communication technologies in Kenyan higher education. Studies in Higher Education,1-15
- Madhusudhan, M. (2007). "Internet use by Research scholars in University of Delhi, India", Library Hi Tech News, No. 8, 36-42.
- Madhusudhan, M. (2010). Use of electronic resources by research scholars of Kurukshetra University. The Electronic Library, 28(4), 492-506.
- Moos, D. C., & Azevedo, R. (2009). Learning With Computer-Based Learning Environments: A Literature Review of Computer Self-Efficacy, Review of Educational Research, 79 (2), 576-600.
- Nicholas, D., Boukacem-Zeghmouri, C., Rodríguez-Bravo, B., Xu, J., Watkinson, A., Abrizah, A., Herman, E., Świgoń, M., & Zhang, Y. (2017). Where and how early career researchers find scholarly information. Learned Publishing, 30(1), 19–29.
- Priyadarshini, R., Janakiraman, A. and Subramanian, N. (2015). Awareness in usage of e-Resources among users at Agricultural College and Research Institute, Madurai: A case study. Europian Academic Research, II (11), 14816-17823
- Ravanan, C., Mary, A. L., & Stephen, L. (2013). User attitude towards digital information resources: A case study of Vellore district engineering college teachers. Journal of Advances in Library and Information Science, 2(1), 15-18.
- Sankaranarayanan, D. and Nagarajan, M. (2012). Impact of E-Resources among the Faculty Members of Constituent Colleges of Tamil Nadu Agricultural University. Journal of Advances in Library and Information Science Vol.1, No.1, 2012: 9-13
- Siddike, M. A. K., & Islam, M. S. (2014). Acceptance of e-resources by the medical researchers of international centre for diarrhoeal disease research, Bangladesh (ICDDR, B).Journal of Information & Knowledge Management, 13(02), 1450012.
- Thanuskodi, S.(2012).Use of E-resources by the Students and Researchers of Faculty of Arts, Annamalai University. International Journal of Library Science 2012; 1(1), 1-7.
- Tenopir, C., King, D. W., & Bush, A. (2003). Medical faculty's use of print and electronic journals: Changes over time and in comparison with other scientists. Journal of the Medical Library Association, 91(2), 195–201.
- Vishala, B. K. and Bhandi, M. K.(2008). Use of UGC-INFONET digital library consortium resources. In Proceedings of the 6th International Caliber-2008, Allahabad University, Allahabad, 28th -29th Feb and 1st March, 2008.Ahmedabad: INFLIBNET Centre, 583-596.
- Van Deursen, A. J. A. M., & Van Dijk, J. A. G. M. (2019). The first-level digital divide shifts from inequalities in physical access to inequalities in material access. New Media & Society, 21(2), 354–375.
- Van Dijk, J. A. G. M. (2005). The deepening divide: Inequality in the information society.Sage.

- Wilson, T. D. (1999). Models in information behaviour research. Journal of Documentation, 55(3), 249–270.
- Wiley, D. (2018). What is a PDF? Retrieved from https://opencontent.org/blog/archives/5208
- Zhang, H., Kitchenham, J., & Jeffery, B. R. (2008). Semi-quantitative Modelling for Managing Software Development Processes. This paper appears in: Software Engineering ASWEC 2008 19th Australian Conference. ISBN:978-0-7695-3100-7, 66-75.

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TRANSITION FROM CHALKBOARDS TO CHATBOTS: REFLECTIONS ON CHATGPT BY INDIAN ACADEMIA

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ABSTRACT

ChatGPT is a conversational AI tool with multi-fold benefits for educators, including enhancing the teaching-learning process through personalized learning, better writing skills, interactive learning, and increasing efficiency. The study draws out information regarding the source of awareness, extent of usage, devices preferred for access, purpose, and reasons for using ChatGPT, along with ChatGPT's input types and effectiveness. Adopting an exploratory design and snowball sampling method, the study aimed to garner data from 80 educators - 65% were women and 35% men, out of which 36 % were from the 31-40 years age bracket, having a doctoral degree (58 %), and over 25 % of the teachers specializing in science. Social media and peers played a significant role in their awareness of ChatGPT. Interestingly, the usage ranged from occasionally (29 %), several times a week (24%), to daily (22 %), with laptop (30 %) emerging as the dominant device preferred for access. Two important purposes for which the AI tool was used were note preparation (58%) and searching for new topics (55%). Saving time (74%) and making the work easy (73%) were the prime motives for using text (64 %), a combination of text and image (34 %) as the input for information retrieval. Paradoxically, only 52% found the AI think tank effective, indicating the reservedness of the teaching fraternity to intelligent systems driven by AI.

Keywords: Artificial Intelligence, Academic integrity, ChatGPT, Higher education, Teachers

INTRODUCTION

The capacity of a computer system to simulate human brain activity is artificial intelligence. Large language models (LLMs) are sophisticated artificial intelligence (AI) systems trained on an extensive corpus of text to comprehend and produce human-like language. LLMs power AI platforms such as EdTech Chatbots, Perplexity AI, Hugging Face Models, etc, to help teachers streamline. (Yifan et al., 2024). In addition, several local large language models such as Ollama, GPT4All, and LM Studio can be run on the teacher's device based on a specific teaching task.

The launch of ChatGPT in 2022 sparked much interest among users. Asians were the first to experiment with the technology, as evidenced by the publication of review papers. A bibliometric map revealed three main areas of research, including the teacher’s role in the modern

AI-driven world, AI use in education and its impact on the student community, and the impact of chatbots on the teaching-learning process (Montenegro-Rueda, 2023).

Research indicates that AI tools were used by the teaching fraternity for their professional development (Firat, 2023), curricula development, lesson planning, generating assignments and quizzes (Rahman and Watanobe2023), personalized and adaptive learning, retaining student interest, supporting student learning outside the working hours and help in grading student assignments (Qadir, 2022). In their qualitative research, Isiaku et al. (2024) recognized three thematic areas, learning, research, and ethics, while analyzing usage patterns among academicians. While the study acknowledges the use of ChatGPT for idea generation, it also cautions that over-dependence might degenerate the learned skills or even hinder the development of skills in academicians. Underscoring the AI-powered virtual assistant's skill in increasing productivity and saving time, supporting continuous learning as well as fostering a collaborative learning environment, the paper also undermines AI's power in skill development and creativity.

The human-like brain of ChatGPT can be stimulated using unique techniques such as asking open ended questions, giving story telling challenge, problem solving queries and posing hypothetical questions, combine unrelated concepts, unconventional perspectives, nudging artistic expressions, futuristic predictions, fusion of disparate elements in historical and cultural perspectives, encouraging ChatGPT to modify to a more complex state making it iterative, and treat it as an collaborator who can add up on the fundamental construct provided (Aithal et al., 2023).

A qualitative research study by Madden et al. (2023) on Jamaican teachers' views on ChatGPT in higher education points out that the AI tool could be helpful in lesson planning, writing research papers, and performing personal tasks of the study subjects. Another qualitative research showed through word clouds that subjects reported a positive impact of ChatGPT with terms like 'helpful', 'save-time', 'reduce-burden' while making 'announcements', responses to 'emails', course 'planning', preparing 'materials' for class (Hidayat-ur-Rehman and Ibrahim, 2024).

A bibliometric analysis conducted by Baber et al. (2023) indicates that the use of ChatGPT for many relevant application areas in marketing, healthcare, legal writing, and software coding has been in vogue. USA, China, and India seem to be the most active countries publishing on ChatGPT across a wide spectrum of subjects like computer science, medicine, social sciences, engineering, mathematics, decision sciences, business, management, accounting, and neuroscience.

Through a qualitative study, the authors (Hidayat-ur-Rehman and Ibrahim, 2024) established their hypothesis, viz. Educators can easily interact with ChatGPT consequently increasing their intention to use the technology, educators are intrinsically motivated to use ChatGPT, teachers possess sufficient AI competency and therefore can easily adopt ChatGPT, innovative teachers willingly experiment and use ChatGPT as a teaching aid, faculty believing in ChatGPT's role in students' engagement are more likely to gravitate towards its use in their teaching, educators strong belief in traditional teaching methods prevent them from using technology driven platforms.

The ethical implications of ChatGPT use in the education field were established through a qualitative study by Kooli (2023) which include assignment integrity submitted by the students should not be powered by AI, relying on ChatGPT to solely perform the role of a virtual research assistant substituting it with human brain and completely obliterating fact checking of the output, thereby compromising on the validity of data.

Qadir 2022, in his paper, points out that users must apply their rational thinking in sifting through the responses given by the AI tools and identify and use only the logical explanations backed strongly by the relevant research studies. Eliciting information with the right prompts is an art that has to be mastered by the users, especially as the output is directly dependent on the input prompts. Modifying the information given by the chatbots to eliminate nonsensical and illogical constructs is a skill that the user has to master.

Owing to the limited studies existing due to the recency of ChatGPT's launch, the current research has been planned to elucidate how educators in higher educational institutions use ChatGPT to perform their duties.

OBJECTIVES

1. To identify the sources of awareness and why teachers use ChatGPT to enhance teaching-learning.
2. To understand the extent of teachers', use of ChatGPT.

METHODOLOGY

Research design: An exploratory research design was adopted for the present study.

Sampling method: A purposive sampling method was employed to select the teachers using ChatGPT. A snowball sampling method was adopted to select the teachers working in degree colleges and universities across different states in India, including Andhra Pradesh, Kerala, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, and Telangana. About 100 responses were initially obtained, and after validation, 80 responses were selected with answers to all questions. The remaining 20 incomplete responses were not included in the study sample.

Data collection tool: A structured interview schedule was developed based on existing literature. The questionnaire covered various components, including profile characteristics, purpose and reasons for usage, sources of awareness, extent of usage, types of inputs provided, and effectiveness of ChatGPT. The data was collected in January 2025 by using a Google form. The participants were informed about the purpose of the survey and that the responses would be used solely for academic purposes, encouraging their voluntary and willing participation in the study. Consent was obtained from the participants.

Data analysis: The collected data was tabulated, and the frequencies and percentages of various aspects related to ChatGPT were computed.

RESULTS AND DISCUSSION

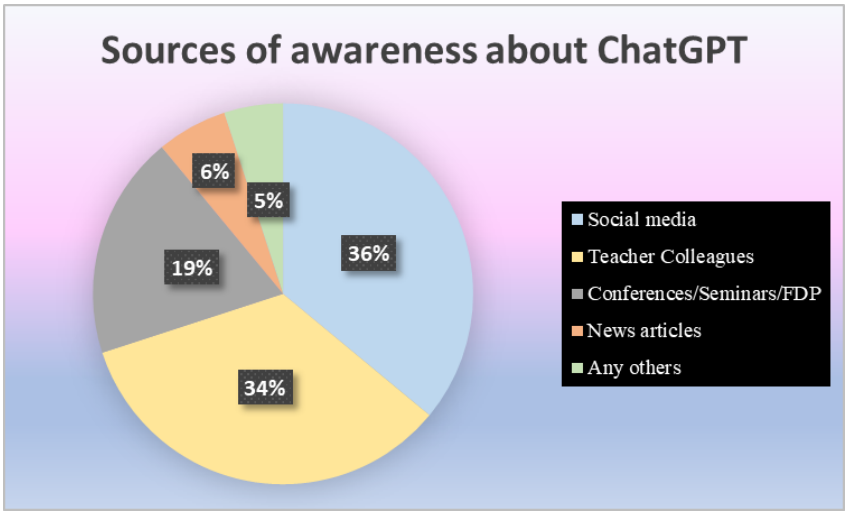
Table-1. Profile of the respondents

Gender	F	%
Female	52	65
Male	28	35

Total	**80**	**100**
Age categories		
21-30 years	8	10
31-40 years	29	36
41-50 years	23	29
51-60 years	20	25
Total	**80**	**100**
Education		
PG	34	42
Ph.D	46	58
Total	**80**	**100**
Specialization		
Science	20	25
Social Science	17	21
Commerce	15	19
Technology	12	15
Humanities	10	12
Arts	6	8
Total	**80**	**100**

The study sample revealed that (Table 1), out of 80 respondents, fifty-two (65%) respondents are female, and the remaining 28 (35%) were male. Concerning the age distribution of the respondents, a tiny percentage (10%) of them belong to the 21-30 years age group, followed by 31-40 years (36%), 41-50 years (29%), and 51 -60 years (25%). Regarding educational background, more than fifty (58%) of the respondents have doctorates, and the remaining forty-two percent are post-graduates. Concerning the specialization of the respondents, one-fourth (25%) of them are science faculty, followed by social science (21%), commerce (19%), technology (15%), humanities (12%), and arts (8%).

Figure 1: Sources of awareness about ChatGPT



From the above Figure (1) it can be observed that the majority of the respondents were aware of ChatGPT through social media (36%) closely followed by colleagues (34%), through faculty development programmes such as conferences, seminars attended (19%), news articles (6%) and only (5%) of them were relying on other than the above-mentioned sources like family, friends, etc.

Table-2. The extent of usage of ChatGPT among the respondents

Extent of usage of chat GP	21-30 years		31-40 years		41-50 years		51-60 years		Grand Total	
	(F)	%	(F)	%	(F)	%	(F)	%	(F)	%
Daily	2	2	9	11	6	8	1	1	18	22
Once a week	1	1	2	2	3	3	1	2	7	9
Several times a week	3	4	8	10	3	4	5	6	19	24
Occasionally	2	3	7	9	7	9	7	9	23	29
Rarely	0	0	3	4	4	5	6	7	13	16
Grand Total	8	10	29	36	23	29	19	25	80	100

Table 2 above presents data about the extent of ChatGPT usage among the respondents. Most of them use ChatGPT occasionally (29%), followed by several times a week (24%), daily (22%), rarely (16%), and once a week (9%). The occasional usage may be attributed to the fact that most of the respondents are involved in routine tasks related to teaching that do not require the assistance of ChatGPT. A tiny percentage of respondents use it once weekly, relying on it only when necessary, rather than consistently. When analyzing frequency across different age groups, a majority (36%) of the users fall between the age groups of 31-40 years due to their familiarity and adaptability to technological innovations. This is followed by those aged 41-50 years (29%), 51-60 years (25%), and 21-30 years (10%).

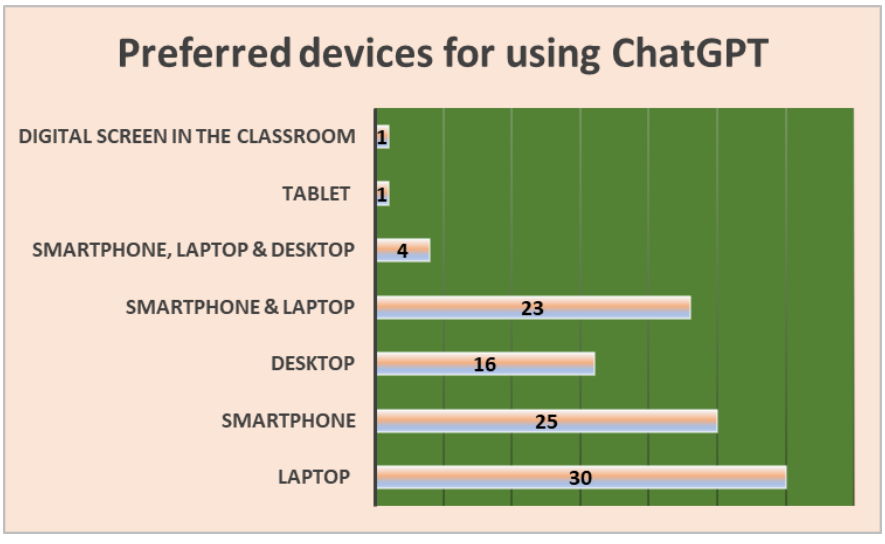


Figure 2: Preferred devices for using ChatGPT

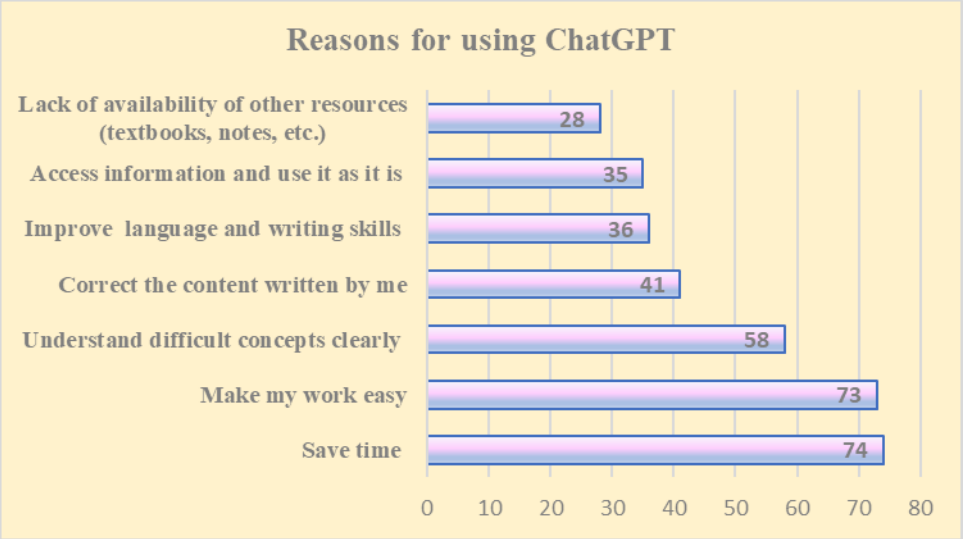
The data in Figure 2 shows that the majority (30%) of respondents use laptops, followed by smartphones (25%), and desktops (16%). In contrast, some teachers are also using both smartphones and laptops (23%), sometimes they also use desktops in combination with a laptop and a smartphone (4%), and a small percentage use tablets and digital screens in the classroom (1%). This suggests that respondents choose their devices based on convenience, often switching between them as and when needed. For instance, a respondent might use a smartphone at one time and a laptop at another, depending on the length of the search, the nature of the topic, and the purpose of the search. When seeking detailed information, laptops are generally preferred due to their practicality and ease of use compared to other devices.

Table-3. Purpose of using ChatGPT

S. No.	Purpose	Frequency	%
1.	Notes preparation	46	58
2.	Research/search for new topics	44	55
3.	Clarity of concepts	37	46
4.	Idea generation	36	45
5.	Class Preparation	35	44
6.	Write reports	23	29
7.	Write letters	18	23
8.	Write essays	14	18
9.	Write projects	13	16
10.	Learning language	12	15
11.	Thesis Preparation, journal writing	1	1
12.	Setting the question paper	1	1
13.	Quickly summarize the topic	1	1

Table (3) above indicates that more than fifty percent of the respondents are using ChatGPT primarily for class notes preparation followed closely by research topics (55%), clarity of concepts, idea generation, and class preparation (46%, 45%, and 44%) respectively for upgrading the content every year and to obtain new information related to courses. Most respondents rely on ChatGPT to meet the syllabus changes occurring in the curriculum. Since teaching and research go hand in hand, staying updated with the latest advancements in their respective fields is always very important for teachers. To achieve this, many teachers are using ChatGPT's generative AI capabilities. Whenever the subject is new, the respondents use ChatGPT to easily access timely information by sparing very little time to get concept and content clarity for class preparation. Additionally, nearly one-fourth of the respondents use ChatGPT for writing reports (29%), letters (23%), and essays (18%), as it helps to save time by generating tailor-made reports with a single prompt without wasting time on repeated reports. However, only a meager percentage (1%) use it for question paper setting and topic summary, as generating subject-specific questions for specific courses remains challenging.

Figure 3. Reasons for using ChatGPT



The results figure (3) revealed that more than three-fourths (74%) of the respondents were using ChatGPT to save time, followed closely by making work easier (73%), to understand complex concepts clearly (58%), and to correct the written content (41%). This may be attributed to the increasing responsibilities of teachers, who have to perform multiple tasks apart from their regular classroom teaching, like serving as coordinators of various committees in the institution. As a result, they often tend to conduct activities and submit reports. Hence, the teachers depend on AI tools to save time and present refined work. Moreover, to improve language and writing skills (36%), access information (35%), and overcome the lack of available resources like textbooks and notes (28%), particularly for new courses, a considerable proportion of the teachers are using ChatGPT.

A study conducted by Fathoni et al. (2024) reported that teacher education students felt that ChatGPT enhanced their productivity, helped them finish tasks faster, helped in lesson planning, made complex information easier to understand, and helped generate ideas for articles. The chatbot's user-friendly feature simplifies the data compilation process.

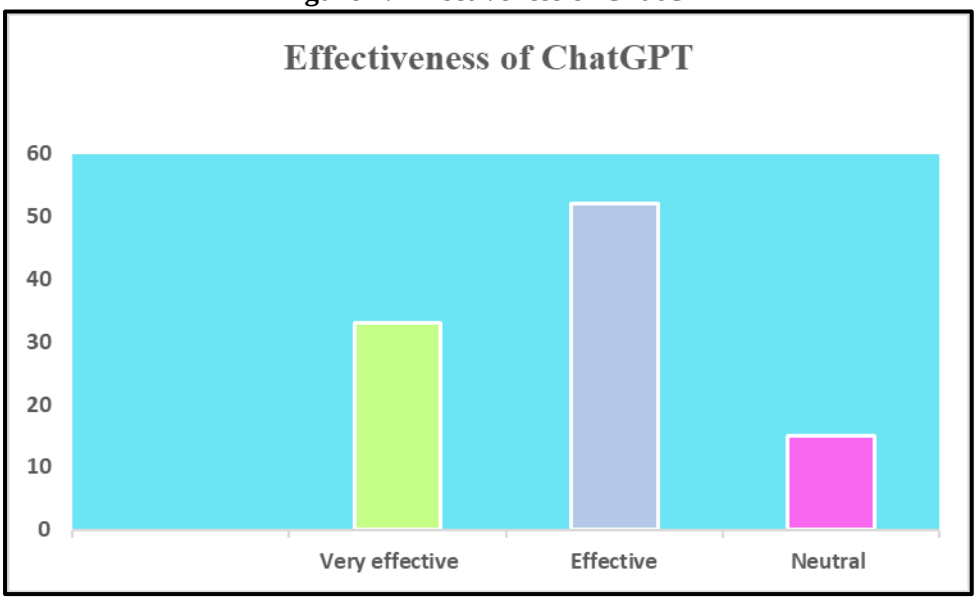
Table-4. Types of inputs provided to ChatGPT

Types of inputs	Frequency	Percentage
Text	51	64
Both text and image	27	34
Image	2	2
Grand Total	**60**	**100**

Concerning types of prompts provided to ChatGPT for obtaining information table (4), it reveals that over 60% of the respondents use text-based prompts, followed by text and image inputs (34%), and only 2% rely on images. The reason for preferring text-based input is that most of the disciplines require information in text form. However, the choice of input varies depending on the subject. Specific disciplines like Mathematics, English, and Textiles benefit from image

input to enhance understanding and visualization. Consequently, the type of input used depends on the specific requirements of the course being taught.

Figure 4: Effectiveness of ChatGPT



The teacher's opinion on the effectiveness of ChatGPT is presented in Figure 4. Slightly more than 50% of the respondents consider it effective, followed by 33% finding it very effective, while a small proportion (15%) remain neutral. Positive perception towards effectiveness is likely due to its ability to streamline tedious, routine tasks such as preparing lesson plans, reports, and letters, allowing users to complete them efficiently with minimal time investment. Saving time in repeated tasks frees time for other complex, higher-order thinking tasks.

CONCLUSION

ChatGPT is an excellent tool for teachers, researchers, and students. Nevertheless, it must be used responsibly and ethically. The tool should never replace an individual's cognitive process, such as critical thinking, problem-solving, and independent reasoning. Hence, the users must be sensitized about its ethical integration by training the users to use it as a support tool and not replace their critical thinking ability.

IMPLICATIONS OF RESEARCH

AI-powered technologies help teachers improve educational efficiency, providing an individualized learning environment. The present study helped explore the primary purpose and extent of teachers' utilization of ChatGPT. The respondents used ChatGPT to save time and enrich the curriculum. So, prompts play a key role in getting accurate information. Based on this, while designing hands on training programmes guidance on the use of ChatGPT especially in areas such as giving the right prompts, its ethical use in academics, the ability to spot the incorrect output, learning to detect AI text in student submissions, as well as pedagogical applications such as its use in curriculum design, and personalized learning of complex topics, use in enhancing the teaching learning process.

SUGGESTIONS FOR FUTURE RESEARCH

- Most studies focus on the immediate benefits of ChatGPT but not on the long-term impacts on the users' critical thinking and cognitive development. The academia can explore this critical area.
- The impact of ChatGPT on learning time as well as on writing skills can be measured.
- Issues related to plagiarism, data security, etc., may also be thoroughly investigated.
- The role of various Chatbots in improving teaching and learning processes can also be assessed from a teacher's perspective.
- Empirical studies on the AI tools' perceived benefits across all disciplines and educational levels and their implications in pedagogy can be conducted.

REFERENCES

- Aithal PS, Aithal S. Application of ChatGPT in higher education and research–A futuristic analysis. International Journal of Applied Engineering and Management Letters (IJAEML). 2023 Sep 29;7(3):168-94.
- Baber, H., Nair, K., Gupta, R., & Gurjar, K. (2023). The beginning of ChatGPT: a systematic and bibliometric review of the literature. *Information and Learning Sciences*, *125*(7/8), 587-614.
- Fathoni, A., Hartanto, T. M., Andriani, A., & Safitri, M. L. O. (2024). Jurnal Inovasi Pendidikan Volume 14, No 2, November 2024, 1-10. *Jurnal Inovasi Pendidikan*, *14*(2), 1-10.
- Hidayat-ur-Rehman, I., & Ibrahim, Y. (2023). Exploring factors influencing educators' adoption of ChatGPT: a mixed-method approach. *Interactive Technology and Smart Education*, *21*(4), 499-534.
- Isiaku, L., Kwala, A. F., Sambo, K. U., & Isiaku, H. H. (2024). Academic evolution in the age of ChatGPT: An in-depth qualitative exploration of its influence on research, learning, and ethics in higher education. *Journal of University Teaching and Learning Practice*, *21*(6), 67-91.
- Kooli, C. (2023). Chatbots in education and research: A critical examination of ethical implications and solutions. *Sustainability*, *15*(7), 5614.
- Montenegro-Rueda, M., Fernández-Cerero, J., Fernández-Batanero, J. M., & López-Meneses, E. (2023). Impact of the implementation of ChatGPT in education: A systematic review. *Computers*, *12*(8), 153.
- Qadir, J. (2023, May). Engineering education in the era of ChatGPT: Promise and pitfalls of generative AI for education. In *2023 IEEE global engineering education conference (EDUCON)* (pp. 1-9). IEEE.
- Rahman, M. M., & Watanobe, Y. (2023). ChatGPT for education and research: Opportunities, threats, and strategies. *Applied sciences*, *13*(9), 5783.
- Yao, Y., Duan, J., Xu, K., Cai, Y., Sun, Z., & Zhang, Y. (2024). A survey on large language model (LLM) security and privacy: The good, the bad, and the ugly. *High-Confidence Computing*, 100211.

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SEXUAL HARASSMENT OF WOMEN AT WORKPLACE WITH EMPHASIS ON PRIVATE ORGANIZED SECTORS OF COIMBATORE DISTRICT

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ABSTRACT

Women have an important role in the economic and social advancement of a country. Their involvement in the workforce has risen, but still women have been consistently placed in a subordinate role due to the male-dominated nature of our society. In some manner, they experience violence and inequalities which are often targeted by men. This predicament hinders their work efficiency and poses obstacles to both their career advancement and the progress of the country. The respondents selected were 400 women employees working in the private organized sectors from Coimbatore District. An Interview Schedule has been prepared to find out the sexual harassment of women taking place at workplace. Simple Random sampling technique was adopted for the study. The research seeks to determine women's awareness level of sexual harassment policy among the women employees in private organizations and remedial mechanism generally taken by the private sectors against the perpetrators. The Chi-Square test resulted in a value of 83.753, calculated with 66 degrees of freedom. The significance level was determined to be non-significant (Ns). The non-significant result (Ns) indicates that there is no significant association between the initial unwelcome sexual behaviors individuals noticed and tolerated and the nature of their job.

Keywords: Sexual Harassment, Private Organized Sector, Women Employees

INTRODUCTION

Sexual harassment at work is a widespread concern that requires immediate action and successful intervention. Described as any unwanted sexual behavior that makes the work environment intimidating, hostile, or offensive, sexual harassment undermines the dignity and rights of individuals, especially women. Despite growing awareness and legal safeguards, sexual harassment persists in workplaces globally, impacting not only victims directly, but also organizational culture, productivity, and morale. In this study, we will examine the intricacies and outcomes of sexual harassment against women in a professional setting.

Sexual harassment in the workplace is a serious issue that has significant repercussions for both the individuals involved and the organization as a whole. It can manifest in different ways, such as

unwelcome advances, inappropriate comments or jokes, unwanted touching, and other forms of unwelcome sexual behavior. Dealing with sexual harassment necessitates a variety of strategies such as having explicit anti-harassment policies, providing thorough training for staff and leaders, establishing a supportive reporting system, and quickly investigating and addressing any complaints. Organizations must establish a culture of respect to ensure all employees feel secure, valued, and free from any form of harassment. The study brings out the root causes, and legal structures to address it, in order to bring attention to this important problem and emphasize the need for preventive actions and assistance. Dealing with sexual harassment is not just about following laws, but also about making sure workplaces are fair and respectful for every employee. In light of all of this knowledge, the aim of this research is to understand the obstacles faced by the women employees at workplace and to identify their awareness on the sexual harassment policy.

OBJECTIVES

- To examine the demographic background of the respondents
- To study the nature of sexual harassment incidence at work place
- To find out the level of awareness on sexual harassment policy among the women employees in private organizations
- To recognize the remedial mechanism generally taken by the private sectors against the perpetrator

SCOPE OF THE STUDY

Considering globalization and the future workforce where both men and women may need to collaborate more closely, the sexual harassment challenges are extensive. Organizations play a key role in ensuring employees have the necessary awareness, knowledge, and skills to make critical decisions related to gender harmony in both their professional and personal lives. Therefore, it is essential for organizations to recognize the main types of sexual harassment currently present to establish a safe work environment for women. Sexual harassment is considered a moral issue mainly due to the harm it causes to others. In simpler terms, sexual harassment results in negative outcomes that need to be addressed by both the organization and employees to establish a safe and supportive workplace for women. Organizations should establish a sexual harassment policy, adhere to sexual harassment regulations, and take appropriate measures against the offender. Simply stopping sexual harassment may not be sufficient; more work may be needed to diminish its long-term effects. Giving importance to a prevention strategy is crucial.

REVIEW OF LITERATURE

Sexual harassment is pervasive in contemporary Indian workplaces. In a 2011 survey, it was reported that 88 percent of 600 female employees in the IT and BPO industries experienced workplace sexual harassment, with 70 percent attributing it to their superiors (Ramana, 2011). India has the greatest rate of claims of workers experiencing sexual harassment by coworkers or supervisors, according to a global survey by Nikita Prakash (2011) of 12,000 persons across 24 nations. Approximately 42 to 50 percent of women employees in affluent nations have experienced harassment. Between 30-40 percent of female employees in Asia-Pacific nations and 40-50 percent

in the European Union admitted experiencing some sort of harassment (Roopa Vijaywarjiya, 2013).

Yasmin Nighat and Jabeen Sadia (2017) discovered in their research "Workplace Harassment: Psychological Effects and Coping Strategies in Public and Private Organizations of Lahore-Pakistan" reported that most of the 138 respondents (68%) experienced a moderate level of sexual harassment, while in the Government sector; the respondents (49%) indicated experiencing a low level of sexual harassment.

A study by Rasool, Maqbool, Samma, Zhao, and Anjum (2019) looked at a toxic workplace that was caused by a number of factors, including rudeness, ostracism, bullying, and harassment. The researcher used a survey questionnaire method to examine the data. The questionnaire, which had 53 items in all, used a five-point Likert scale. The data was collected from 23 locations of five Chinese banks close to Shanghai. The completed questionnaires were 186, including six partial ones, were returned out of 250 that were distributed to particular personnel (such as administrative staff, middle managers, and senior managers). According to the findings, whether through direct or indirect links, a toxic workplace negatively affects worker productivity and sadness at work has a negative impact on employee's productivity.

Agardh, Priebe, Emmelin, Palmieri, Andersson, and Östergren (2022) discovered in their research on "Sexual harassment among employees and students at a large Swedish university: a cross-sectional prevalence study" exposed that 24.5% of female staff and 26.8% of female students reported experiencing sexual harassment. Unwelcome remarks, provocative looks or gestures, and "accidental" brushing or contact were the most commonly reported forms of harassment by both staff and students. Among female students, 2.1% reported having been the victim of attempted or actual rape. While students experienced the majority of events at social gatherings associated with student life, the majority of staff reported that events occurred during the university's daily operations. When the offender was a member of the same group (staff or students), women were more likely to report having less power than the offender.

HYPOTHESIS

Lower the hierarchical position in job status, higher the vulnerability to sexual harassment at workplace

METHODOLOGY

The current research was conducted to investigate the characteristics of sexual harassment faced by the women at workplace, awareness towards the sexual harassment policy, remedial measures taken by the private organizations of Coimbatore District. The study was confined to Coimbatore district. The district comprises twelve blocks. They are Perianaickanpalayam, Sarcarsamakulam, Madukarai, Thondamuthur, Annur, Karamadai, Sulur, Sulthanpet, Pollachi (North), Pollachi (South), Kinathukadavu and Anamalai. All the 12 blocks were selected for the study. The quantitative analysis will be carried out by the framed Interview Schedule. In terms of the qualitative approach, individuals who hold influential positions at work was chosen for in-depth interviews, to discuss the prevalence of workplace harassment and their proposed solutions. Coimbatore district has been purposively selected for the study. The women employees (400) employed in private organized sectors of Coimbatore district were selected by simple random sampling for the study. The respondents comprised women working in banks, manufacturing,

hospitals and educational institutions where considerable number of women work. Survey method was adopted for the data collection.

FINDINGS AND DISCUSSION

The findings of the research are deliberated under the following categories:

A. Demographic background of the respondents
B. Nature of sexual harassment in the workplace
C. Awareness on sexual harassment policy among the women employees in private organizations
D. Remedial mechanism generally taken by the private sectors against the perpetrator

A. DEMOGRAPHIC BACKGROUND OF THE RESPONDENTS

Demographic information allows understanding the characteristics of the respondents whether it's their age, education, marital status, type of family and family income. Demographic questions seek basic information about the respondents. The demographic uniqueness of the respondents that are conversed here are age, marital status, education, religion, community and family details which are tabulated in Table 1.

Table 1: Demographic background of the respondents

	Profile of the respondents	Classification	Frequency(N=400)	Percentage (%)
1.	Age (years)	18 – 23	188	47.0
		23 – 28	120	30.0
		28 - 33	45	11.3
		33 – 38	23	5.8
		38 - 43	17	4.2
		43 and Above	7	1.7
2.	Marital Status	Married	127	31.8
		Unmarried	259	64.7
		Widow	8	2.0
		Divorced/ Separated	6	1.5
3.	Education	Illiterate	6	1.5
		Primary level	11	2.8
		Middle School	12	3.0

		S.S.L.C.	10	2.5
		H.S.S.C.	28	7.0
		Graduate	265	66.3
		Post Graduate	63	15.6
		M. Phil.	1	.3
		Ph.D.	4	1.0
4.	Religion	Hindu	313	78.3
		Muslim	30	7.4
		Christian	48	12.0
		Any other	9	2.3
5.	Community	OC	54	13.5
		OBC	260	65.0
		SC/ST	79	19.7
		Others	7	1.75
6.	Place of Residence	Village	141	35.3
		Town	141	35.3
		City	118	29.4
7.	Type of family	Nuclear	192	48.0
		Joint	164	41.0
		Single	44	11.0

The respondents were 400 from private organized sectors of Coimbatore District from the 12 blocks (rural and urban) of the district. The data reveals that 47 percent of the women working were in the age group ranging between 18-23 years, 30 percent of them were working in the age ranging between 23-28 years, and 11.3 percent of the participants fell between the ages of 28 and 33 years and 5.8 percent middle aged (33-38 years). It is known from the study that 64.7 percent of the women employees were unmarried and thirty one percent of the respondents were married. The other respondents were widowed (2%), divorced/separated (1.5%). Sixty six percent of the women employees were Graduates and 15.6 percent were Post Graduates and seven percent of the women employees have completed Higher Secondary School Education and one percent of them have completed their Ph.D. Degree.

Nearly 78.3 percent respondents were Hindus, 12 percent of them were Christians and 7.4 percent were Muslims. The distribution of respondents by community revealed that individuals from other backward class communities were (65%); SC/ST (19.7%), OC (13.5%) and others (Denotified, Nomadic and Semi-Nomadic Communities (DNCs) were only 1.8 percent. Regarding the place of residence, 35.3 percent of the respondents were residing both in towns and villages. About 29.4 percent of the women employees were residing in cities. About 48 percent of them were living in nuclear families, 41 per cent of the respondents were in joint families and about 11 percent were single and they were alone. Approximately 44.5 percent of the participants were residing away from their families due to work in a remote location. (One study)

B. NATURE OF SEXUAL HARASSMENT IN THE WORKPLACE

The Supreme Court has outlined that sexual harassment in the workplace encompasses actions like physical touch, requesting sexual favors, making sexually suggestive comments, displaying pornography, and any other unwanted sexual behavior, whether verbal or non-verbal. Identifying unwelcome behavior is seen as a key element in sexual harassment.

Figure 1 provides a transparent view of the type of sexual harassment women experience in the workplace.

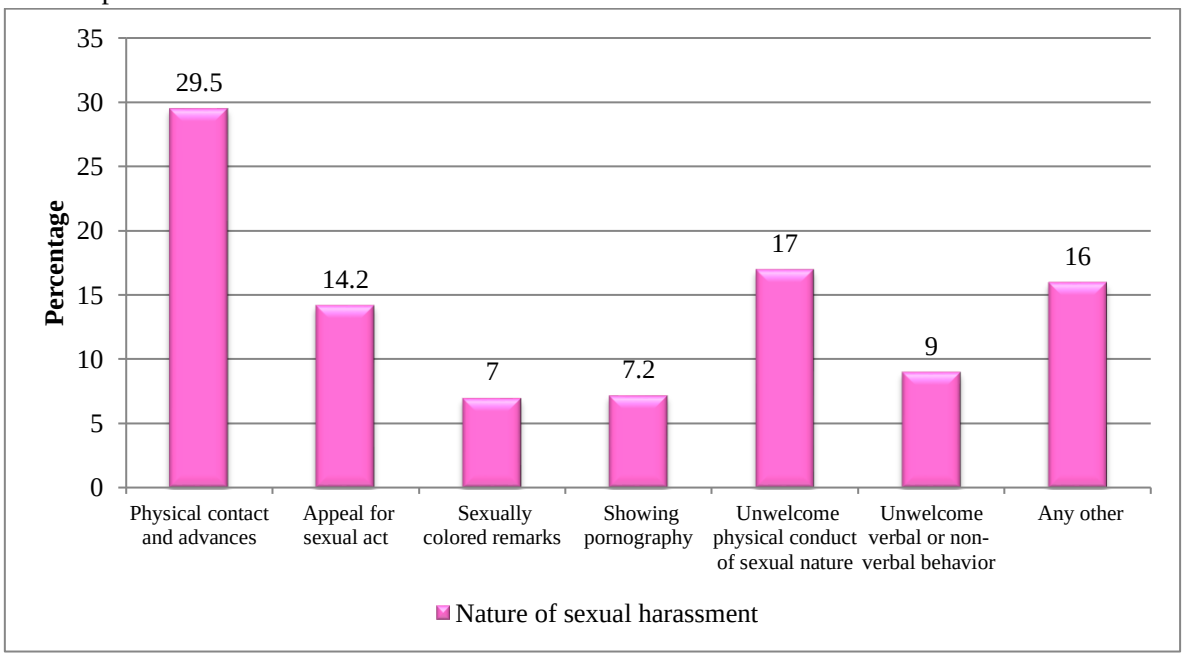


Figure 1: Nature of sexual harassment in the workplace

The data shows that, a noteworthy of the respondents (29.5%), sexual harassment primarily takes the form of physical contact and advances of a sexual nature. Unwelcome sexually suggestive physical behavior was perceived as sexual harassment by 17% of the respondents. Approximately 14.2 percent of the participants indicated that they defined sexual harassment as a persistent demand or request for sexual favors made as a prerequisite for providing a favor to the respondents. About 7.2% of the respondents regarded the display of pornography as sexual harassment. Some of the respondents were unable to voice their opinions because they were unaware of what pornography was.

Nine percent of those surveyed said that unwanted sexually suggestive words or gestures qualified as sexual harassment. The participants' views align with the legal explanation of sexual harassment. The research "Impact of Workplace Harassment on Mental Well-being and Coping Mechanisms in Public and Private Institutions in Lahore, Pakistan" revealed that a large proportion (68%) of 138 participants in private industries was experiencing a moderate degree of sexual harassment, consistent with the findings of this study which indicates that 16% of participants mentioned touching, disrespectful language, physical contact with women, and body language as forms of moderate harassment experienced by the employees(Yasmin and Jabeen, 2017).

C. AWARENESS ON SEXUAL HARASSMENT POLICY AMONG THE WOMEN EMPLOYEES IN PRIVATE ORGANIZATIONS

The Supreme Court of India issued guidelines for employers on how to address and prevent sexual harassment at work in the Vishakha v. State of Rajasthan case of August 1997. The establishment of a Complaints Committee under the leadership of a woman is a crucial aspect outlined in the guidelines. This was made compulsory for all organizations. An inquiry regarding the requirements set by the Supreme Court for forming a complaints committee was included in the interview schedule to know how many respondents were aware of them. Table 2 shows the awareness on sexual harassment policy among the employees.

Table 2: Awareness on sexual harassment policy

1	**Awareness on Sexual Harassment Policy**	**Frequency (N=400)**	**Percentage (%)**
	Yes	381	95.3
	No	19	4.7
2	**If yes, the employer constituted the committee**	**Frequency (N=400)**	**Percentage (%)**
	Yes	368	92.0
	No	32	8.0
3	**Satisfied with the purpose of the committee**	**Frequency (N=400)**	**Percentage (%)**
	Yes	353	88.3
	No	30	7.5
	No response	17	4.2

Awareness about constituting a committee for taking appropriate action

The data presented in the preceding table make it abundantly clear that the majority of respondents roughly (95.3 percent) out of 400 respondents knew about the Supreme Court Guidelines regarding the establishment of a Complaints Committee to address workplace sexual harassment complaints from female employees. Approximately 4.7 percent of the participants were unaware of the Sexual Harassment Policy.

Employer constituted such a committee

As a follow-up to the preceding inquiry, respondents who were aware of the guidelines established by the Supreme Court were inquired whether their employers had a Complaints Committee to

address women's sexual harassment complaints in the workplace. The employees (92%) of those who responded said that their employer had established a Complaint Committee in accordance with Supreme Court guidelines. Eight percent of these respondents stated that their workplace did not have a complaints committee. Hence, it can be inferred that the respondents' workplaces did not comply with the Supreme Court Orders.

Satisfied with functions of the committee

The complainants who reported about sexual harassment were also questioned about their satisfaction with the committee's performance. Approximately 88.3 percent of the individuals who filed complaints were contented with the steps taken by the Complaints Committee against the perpetrator. Just 7.5 percent expressed dissatisfaction with the Complaints Committee's actions against the perpetrator, while 4.2 percent chose not to respond to the question.

D. REMEDIAL MECHANISM GENERALLY TAKEN BY THE PRIVATE SECTORS AGAINST THE PERPETRATOR

Employers need to ensure that the workplace is free from sexual harassment. Consequently, they are anticipated to implement several measures to prevent, manage, and address instances of sexual harassment in the workplace. The inquiry focused on whether employers had implemented any such measures. So, they were requested to disclose the actions taken to address sexual harassment in their workplaces. The procedures adopted to prevent sexual harassment are represented in Table 3 and Figure 2.

Table 3: Remedial mechanism generally taken by the private sectors against the perpetrator

S. No.	Procedure implemented to thwart sexual harassment	Frequency (N=400)	Percentage (%)
1	Committee constituted in par with the Supreme Court	58	14.5
2	Strict warning against the perpetrator pertaining to sexual harassment through exhibiting notices	71	17.5
3	Orientation and training programs for constructing knowledge about sexual harassment at work place	74	18.5
4	Making proper seating arrangement for women employees to ensure security and safeguard	98	24.5
5	No step so far taken	99	25.0

This inquiry was posed to the 400 employers who acknowledged the challenges encountered by women as a result of workplace sexual harassment. The employers (98) restructured the seating of female employees to ensure their safety and well-being, 74 employers were provided structured orientation and training for staff to raise awareness of sexual harassment in the workplace, 71 employers exhibited notices warning that strict action would be taken against the perpetrator involving in sexual harassment, 58 employers have formed a committee in compliance with the Supreme Court's instructions. The outcome shows that despite being aware of Supreme Court directives, 99 employers have not successfully put in place efficient strategies to stop sexual

harassment in their workplaces. According to a study conducted in 2003 in Maharashtra by Ministry of Human Resource Development, 62 percent has not taken any step to prevent sexual harassment at work place which is related to the results of this study where 25 percent of the employers have not taken any steps to prevent sexual harassment at workplace.

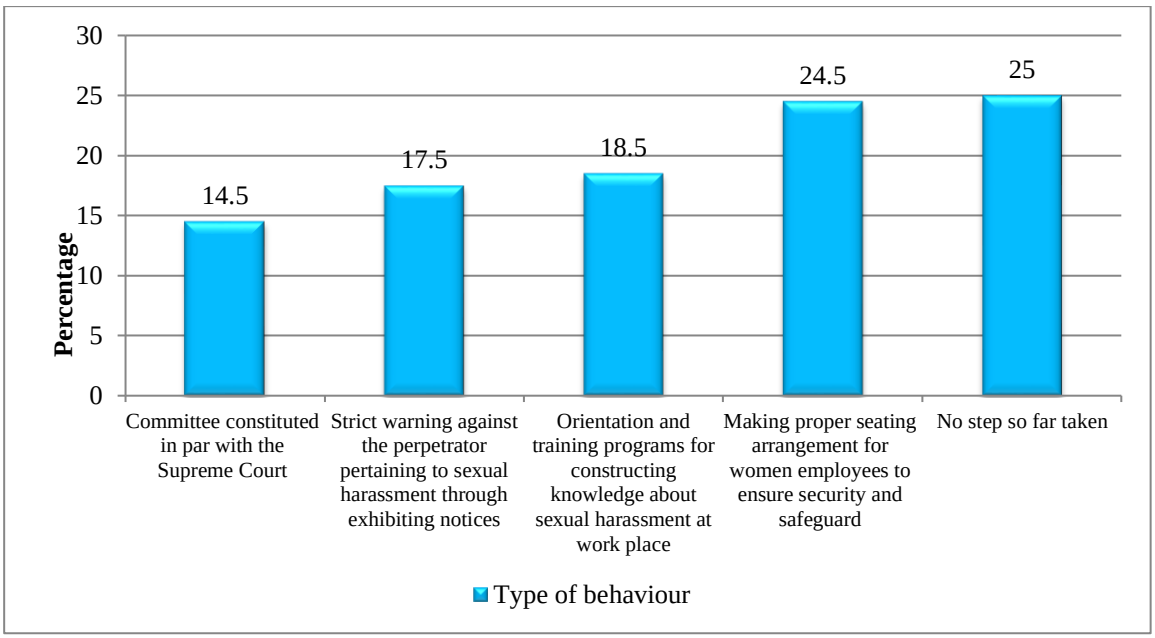


Figure 2: Remedial mechanism generally taken by the private sectors against the perpetrator

E. HYPOTHESIS

Lower the hierarchical position in job status, higher the vulnerability to sexual harassment at workplace.

Table 4 depicts the hierarchical position in job status and vulnerability to sexual harassment at workplace using chi-Square Test.

Table 4: Hierarchical position in job status and vulnerability to sexual harassment at workplace

Hierarchical position in job status	Vulnerability to Sexual Harassment at Workplace														Total
	Body language		Inappropriate sexual comments		Touching		Asking for sexual favor		Speech or gestures		Presenting pornography		Not applicable		F
	F	%	F	%	F	%	F	%	F	%	F	%	F	%	
Managerial	4	15.4	1	3.8	2	7.7	1	3.8	1	3.8	1	3.8	16	61.5	26
Supervisor	1	6.3	1	6.3	1	6.3	-	-	1	6.3	-	-	12	75.0	16
Clerical	4	16.7	1	4.2	3	12.5	-	-	-	-	1	4.2	15	62.5	24
Casual Labor	2	14.3	-	-	-	-	-	-	-	-	-	-	12	85.7	14
Contract Labor	1	6.7	-	-	-	-	1	6.7	-	-	-	-	13	86.7	15
Teacher	4	15.4	1	3.8	1	3.8	-	-	1	3.8	-	-	19	73.1	26
Nurse / Health Care Taker	1	2.3	1	2.3	2	4.5	-	-	1	2.3	-	-	39	88.6	44
Sales girl	3	20.0	1	6.7	-	-	-	-	-	-	-	-	11	73.3	15
Bank employees	1	9.1	1	9.1	-	-	-	-	-	-	-	-	9	81.8	11
Construction workers	-	-	-	-	-	-	-	-	1	20	-	-	4	80.0	5
Farm laborers	-	-	-	-	-	-	-	-	-	-	-	-	1	100	1
Factory workers	3	1.5	4	2.0	5	2.5	1	.5	1	.5	2	1.0	187	92.1	203
Total	24	6.0	11	2.8	14	3.5	3	.8	6	1.5	4	1.0	338	84.5	400

Chi-Square Test

	Value	df	Sig.
Chi-Square	83.753	66	Ns

Ns -Not Significant

The Chi-Square test was utilized to reveal the connection between the variables which is the hierarchical position in job status and vulnerability to sexual harassment at workplace. The Chi-Square statistic measured 83.753 with 66 degrees of freedom. The significance level was determined to be non-significant (Ns). The non-significant result (Ns) indicates the absence of a statistically significant correlation between the hierarchical position in job status and the nature of their job. This suggests that the hierarchical position in job status does not appear to influence the vulnerability to sexual harassment at workplace to a significant degree.

SUMMARY, CONCLUSION AND IMPLICATIONS

The "Study on Compliance to Provisions of the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act 2013 with focus on Private Organized Sectors of Coimbatore District" reveals both achievements and areas for improvement. While some organizations have implemented robust mechanisms for prevention, reporting, and redressal of sexual harassment, there remains a significant need for wider awareness and more stringent

enforcement across the board. The positive strides include the establishment of Internal Complaints Committees (ICCs) in many workplaces, which are crucial for handling complaints sensitively and effectively.

However, there is a noticeable gap in regular training and sensitization programs for employees at all levels. Enhanced efforts in these areas could foster a more inclusive and safe work environment for women. Moving forward, continuous monitoring and evaluation of compliance, coupled with enhanced training initiatives, can lead to greater adherence to the Act's provisions. Furthermore, fostering a culture of zero tolerance towards sexual harassment through proactive measures will not only ensure legal compliance but also contribute to a more supportive workplace environment where all employees can thrive without fear of harassment.

Research can enlighten the development of stronger, more comprehensive laws and regulations addressing sexual harassment. This includes clearer definitions, stricter penalties, and better support for victims. The findings of the study can lead to revisions of existing workplace policies and procedures to ensure they are more effective in preventing and addressing harassment. This includes improving reporting mechanisms and ensuring fair treatment for all parties involved. It can also guide the development of mental health resources tailored to the needs of harassment survivors, addressing issues such as trauma, anxiety, and depression and also understanding the long-term psychological effects of harassment can lead to more effective therapeutic approaches and support systems.

SUGGESTIONS FOR FUTURE RESEARCH

- Investigate how sexual harassment experiences differ across various intersecting identities such as race, ethnicity, gender identity, sexual orientation, socioeconomic status, and disability.
- Conduct longitudinal studies to assess the long-term psychological, emotional, and career-related impacts of sexual harassment.
- Evaluate the effectiveness of current reporting mechanisms and procedures. Research could focus on identifying barriers to reporting and exploring alternative methods that might encourage more survivors to come forward.
- Explore the rise of digital and online harassment, including social media platforms and virtual environments.

REFERNCES

- Agardh, Priebe, Emmelin, Palmieri, Andersson, and Östergren. (2022). Sexual harassment among employees and students at a large Swedish university: who are exposed, to what, by whom and where - a cross-sectional prevalence study, BMC, Public Health, Dec 1;22(1):2240, doi: 10.1186/s12889-022-14502-0.
- Meegan Candice Manuel (2017), "The Experience and Perception of Sexual Harassment in the Workplace", Master of Administration in the Faculty of Economic and Management Sciences in the subject Industrial Psychology, University of the Western Cape.

- Mohapatra, D. (2015, July). “Female Workers in the Unorganized Sector in India, International Conference on Studies in Humanities and Social” Sciences, 99-102.

- Nighat Yasmin and Sadia Jabeen (2017), “Workplace Harassment: Psychological Effects and Coping Strategies in Public and Private Organizations of Lahore-Pakistan”, FWU Journal of Social Sciences, Summer 2017, Vol.11, No.1, 310-321.

- Nikita Prakash, (2011), A Report on Sexual Harassment at the Workplace, Birla Institute of Technology and Science, Pilani from http://www.scribd.com/doc/54777972/Project-Sexual-Harassment-at-Workplace.
- Ramana Chowdary (2011) Sexual Harassment at Work Place- Special Reference to BPO Companies, Sri Venkateswara University, Centre for Women's Studies, Academic Consultant, https://svuniversity.academia.edu/DrRamanaChowdaryDabbara.
- Roopa Vijaywarjiya, (2013), Sexual Harassment of Women at Workplace in India: Law and its Applicability, AltiusShodh, Journal of Management and Commerce from http://www.altius.ac.in/pdf/60.pdf.
- Samma Faiz Rasool & Rashid Maqbool & Madeeha Samma & Yan Zhao & Amna Anjum, (2019), "Positioning Depression as a Critical Factor in Creating a Toxic Workplace Environment for Diminishing Worker Productivity,"Sustainability, MDPI, vol. 11(9), pages 1-18,

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MENTAL HEALTH STATUS OF WOMEN TEA PLANTATION WORKERS IN MUNNAR OF KERALA

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ABSTRACT

Agro-based plantation industries in the developing world are constituted by rural unskilled workers. Women dominate the workforces in these industries but their congregation is found at the lower tier. The workplace is one of the key environments that affect our mental wellbeing and health. This study seeks to elicit the socio economic profile of the women tea plantation workers, to assess the overall mental health status, identify factors that contribute to mental health challenges among women in tea plantations. A total of 100 women workers were selected from Devikulam Block, Kerala by using purposive sampling method. The data was collected through interview schedule and mental health scale. The study revealed a notable prevalence of mental health challenges among women tea plantation workers reported symptoms of anxiety (76 %) and stress (62 %) depression (51 %). The study also revealed that more than half of the respondents 72 per cent acquired medium level of mental health status. It could be concluded that the research underscores the urgent need for a holistic approach to address the mental health challenges faced by women tea plantation workers. Developing educational programs to raise awareness about mental health issues, reduce stigma, and promote available support services can empower women workers to seek help when needed.

Key words: Munnar, Tea plantation, worker, mental health, stress, anxiety, depression.

INTRODUCTION

Mental health conditions are prevalent worldwide, affecting approximately one in eight individuals. The occurrence of various mental disorders varies across genders and age groups. Mental health encompasses a state of well-being that allows individuals to effectively manage life's challenges, realize their potential, learn, work, and contribute to society. Mental health is a fundamental human right and plays a critical role in personal, community, and socio-economic development (World Mental Health Report, 2022).

Women are often regarded as the central figures in a nation's progress and are seen as the architects of its future. It is widely acknowledged that when women advance, they propel not just their families but also their communities and the nation forward (Patil et al., 2007). There is a common belief that women are more effective stewards of economic resources compared to men. They tend to reinvest profits back into human capital, such as education and health, thus contributing to the overall development of their families and communities (Amin, 2008). Despite

being nearly half of the global population, women's potential remains largely untapped for economic development (Palanithurai, 2009). According to data from the National Commission for Women (NCW), approximately 94% of working women in India are employed in the unorganized sector. However, this widespread involvement also brings attention to the challenges they face in these informal settings.

To improve their situation, there is an urgent need for inclusive policies that recognize and protect informal women workers. The lives of women working in the tea plantations of Munnar are incredibly challenging. They are required to pluck 27 kilograms of tea leaves daily, earning a meager daily wage of Rs 470. The COVID-19 pandemic has exacerbated their hardships, particularly for the predominantly female workforce in Munnar Panchayat. The pandemic has led to increased suffering among these workers, with rising cases of depression, anxiety disorders, panic attacks, and post-traumatic stress disorders. Access to psychiatrists or clinical psychologists is severely lacking in most tea gardens, and those in need of consultation must travel long distances for diagnosis and treatment. Based on existing literature, there is a pressing need to investigate the mental health status of women plantation workers in Munnar Panchayat to address this overlooked aspect of their well-being.

Idukki district, established on January 26, 1972, comprises Devikulam, Udumbanchola, and Peerumedu taluks, stemming from the second largest district in Kerala. As per the 2011 census, its population stands at 1,108,974, with 552,808 males and 556,166 females, reflecting a sex ratio of 1006. Despite being the second largest in area, Idukki boasts the lowest population density, with over half of its expanse covered by forests. Urban regions are densely populated, while villages remain sparsely inhabited. Renowned as the "spice garden of Kerala," Idukki is nestled in the Western Ghats, with its name derived from the Malayalam term 'Idukku,' signifying a narrow gorge. The district's landscape is characterized by the Periyar River, flowing through a gorge flanked by the imposing Kuravan and Kurathi mala rocks, home to the massive Idukki arch dam. Archaeological excavations in Marayoor, Thengakkal, Bison Valley, and Thondermalai reveal traces of prehistoric civilization, underscoring the region's historical significance. Idukki played a pivotal role in the ancient spice trade, with abundant growth of spices like pepper and cardamom, making it a key player in Kerala's plantation industry. In fact, the district contributes significantly to the state's cardamom, tea, coffee, and rubber production (Kerala State Planning Commission Report, 2020).

According to Nayar et al., 2018, focused on Economic Factors and Mental Health the study sheds light on the adverse effects of low wages and poor working conditions on the mental health of female tea plantation workers in Kerala. Menon & Pillai, 2019, examining gender dynamics patriarchal structures within the tea industry, this research offers a nuanced understanding of how gender dynamics exacerbate stress and anxiety among women workers in Munnar. Kumar & Rajan, 2020 focusing on Occupational Hazards and Mental Health, the association between pesticide exposure and mental health disorders, this study highlights occupational hazards faced by women in tea plantations.

Thomas & George (2017) conducted a study focusing on Social Support Networks. Their research emphasizes the protective role of social support in buffering the impact of work-related stressors on mental health.

Gupta et al., (2019) examining the accessibility and effectiveness of mental health interventions, this study identifies gaps in healthcare services for women plantation workers. Addressing these gaps is crucial for improving mental health outcomes and promoting well-being. Krishnan & Menon (2018), exploring cultural barriers to seeking mental healthcare, this research

underscores the importance of culturally sensitive interventions. This study provides insights into broader socio-economic factors shaping the tea industry. Understanding these dynamics is essential for developing holistic approaches to address mental health challenges (Fernandez & Joseph, 2020). According to Sharma et al., (2019), an intersectional approach to examine the unique mental health challenges faced by Dalit women in tea plantations.

OBJECTIVES

1. To elicit the socio-economic profile of the women tea plantation workers
2. To analyse the working condition of the respondents
3. To assess the mental health status of women tea plantation workers.
4. To identify the factors contributing mental health

METHODOLOGY

Munnar Panchayat in Idukki District was selected as the area for the study. Munnar Panchayat, located in the Idukki district of Kerala, India, is renowned for its picturesque landscapes and is a significant center for the tea plantation industry. The study employed a purposive-cum-convenience sampling method to select 100 women plantation workers from the Kannan Devan Hills Plantation village, located in Silent Valley, Munnar Panchayat. Out of a total population of 357 women workers in the area, the sample size was determined based on practical considerations, research objectives, and resource availability. The Purposive sampling was used to ensure that the participants selected met specific criteria essential to the study, such as being currently employed in tea plantations, residing within the identified geographic area, and having a minimum work experience of more than five years as the employees in this are working for more than ten years.. This approach allowed the researcher to target respondents who were most likely to provide relevant and meaningful insights into the mental health conditions and socio-economic realities of plantation workers. Further Convenience sampling was adopted to facilitate data collection, given logistical constraints such as time, accessibility of remote hill regions, and availability of respondents during working hours. Selecting 100 respondents approximately 28% of the total population was considered adequate to ensure a reasonable representation while maintaining feasibility in terms of fieldwork and resource allocation. This combined sampling strategy ensured that the study captured in-depth information from a representative group of workers who were both accessible and well-suited to the research aims, allowing for a focused analysis of mental health challenges in the tea plantation context. An interview schedule was used to elicit the socio-economic status of the women tea plantation worker. A five point mental health scale was developed by the researcher was distributed amongst 11 judges from the related area to test its validity and reliability. A researcher-developed mental health assessment scale was used to evaluate the mental well-being of women tea plantation workers. The 10-item scale was contextualized for the local population and reviewed by 11 experts in mental health and social sciences. Content validity was established with a scale-level CVI of 0.82. Reliability testing yielded a Cronbach's alpha of 0.754, indicating acceptable internal consistency. Exploratory factor analysis further supported construct validity, revealing two distinct dimensions, emotional well-being and coping ability.

Both primary and secondary data were collected for the study. The collected data were statistically analyzed via SPSS package versions 26 and interpreted using appropriate tables and figures.

RESULTS

The data collected from respondents (N=100) was entered into the statistical software SPSS for thorough examination. The analysis, categorized under Socio economic profiles, working condition mental health status and constrains faced by the women workers in tea plantation industry.

Table –1: Personal Profile

Variable	n=100	%
Age in (years)		
Below 30	20	20.0
Between 30-50	66	66.0
Above 50	14	14.0
Religion		
Hindu	79	79.0
Christian	21	21.0
Caste		
Forward	4	4.0
Backward	96	96.0

From table 1, it can be inferred that, 66 % of the women worker were from the age group of 30-50 years of age and 14 % of them belonging to the age group of above 50 years. Most respondents belong to the Hindu faith (79 %) and 21 % are Christians. All religious groups celebrate their religious festivals. They do have separate prayer houses like church and temples, which are mainly constructed by the employees of KDH village. Cultural and religious festivals are usually celebrated by the contribution of tea workers. The company authorities support them in their celebrations. Ninety six per cent of the respondents were backward caste and only four per cent were forward caste. It was heartening to note there could be no religious and caste discrimination.

Table 2: Social Profile

Characteristics	n=100	%
Type of House		
Asbestos roof house	52	52.0
Iron roof house	48	48.0
Type of Family		
Nuclear family	78	78.0
Joint family	22	22.0
Marital Status		
Married	80	80.0
Widow	9	9.0
Separated/divorced	11	11.0
Number of Children		
1-2	81	81.0
More than two	19	19.0
Educational Status		
Illiterate	13	13.0
Up to Std 10^{th}	62	62.0
10^{th} and Above	25	25.0

The tea garden authority provides cost-free accommodation for permanent workers. All the tea plantation workers are living under the arrangement of tea estate authority. From table 2, it was understood that 52 % of the respondents are resides in asbestos roof house and 48% are iron roofed house.Seventy eight percent of the respondents are belonging to nuclear families and 22 % belongs to joint family. The home size was very small and is not sufficient to sleep comfortably. Although the roof protects against bad weather, the ventilation facility is not sufficient and the floor is not well constructed. However, more than half of them (76%) were not satisfied with the size and quality of houses including sanitation and drinking water. Around 89% of respondents were not satisfied with the housing accommodation provided by the authority. The tea garden authority takes the responsibility for maintenance of their houses, but the process is lengthy.

Regarding marital status 80 % of the respondents were married, 9 % were widows and 11 % of them were either separated or divorced. About 81 % of them have 1-2 children 19 % of them have more than two children. The data shows that most of workers (87%) are literate. Among the workers who can read and write, majority of them completed up to SSLC (62 %), very few have crossed the 10^{th} and above (25 %). Only 13% workers are illiterate. However, no workers were found to have crossed the higher secondary level. When they were asked about the reason for not continuing their education, the common answer was poverty, unavailability of schools in the locality and unawareness of the importance of education by guardians.

Table 3: Economic variables

Characteristics	**n=100**	**%**
Total monthly Income		
Below Rs.5000/-	8	8.0
Rs.5000/- to Rs.7000/-	65	65.0
Above Rs.7000/-	27	27.0
Savings		
Yes	89	89.0
No	11	11.0
Assets		
Yes	75	75.0
No	25	25.0

In terms of total monthly income, the majority of respondents (65%) reported earning between Rs. 5000 to Rs. 7000, while a smaller proportion (8%) earned below Rs. 5000, and 27% earned above Rs. 7000. This distribution indicates that a significant portion of the workers earn a modest income, which is typical for labor-intensive industries like tea plantations. Regarding savings, a large majority (89%) of the respondents reported having savings, suggesting a degree of financial planning and stability among the workers. However, it is concerning that 11% reported having no savings, highlighting potential financial vulnerabilities within the population. In terms of assets, three-quarters (75%) of the respondents reported owning assets. This indicates a level of economic stability and asset accumulation among a significant portion of the sample. However, the remaining 25% reported not owning any assets, suggesting disparities in wealth distribution within the population.

Working Profile of the Respondents

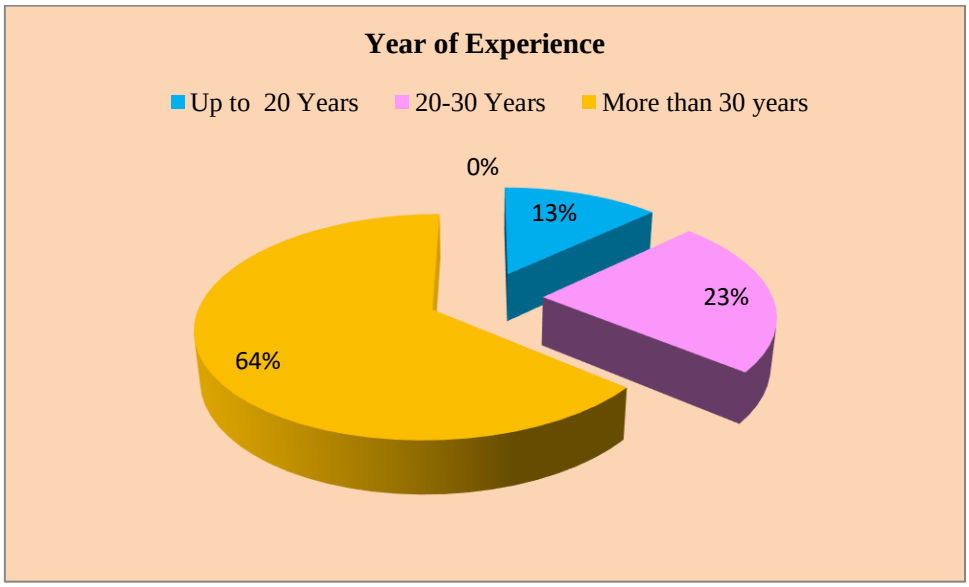


Figure 1: Working Experience

It was observed that all of the tea plantation workers were born and raised within tea gardens, considering them as their primary source of livelihood. Changing tea gardens is uncommon for them, and they typically continue working in the same garden for as long as they remain physically capable. The majority (64%) of workers have been employed for more than 30 years, with 13% having worked for up to 20 years and 23% for 20-30 years. Some respondents expressed concerns about the laborious nature of tea plantation work, highlighting the physical strain it imposes and its potential to lead to health complications and decreased productivity.

Women workers typically work five days a week, with additional hours during peak months, which they willingly undertake for extra income. During the peak season, the pressure of tea leaf plucking intensifies, leading most workers to engage in additional hours. While 98% of respondents work five days a week, only 2% work seven days a week during peak periods. Most workers mentioned having specific times for mid-day breaks to weigh their plucked leaves, which also serve as opportunities for meals and refreshments. The duration of these breaks varies from ten minutes to two hours, with some workers foregoing breaks to meet daily targets more quickly and leave the workplace sooner.

Mental Health Status of women tea plantation workers

The mental health status of tea plantation workers can vary based on a range of factors, including their working conditions, living conditions, socioeconomic status, and access to healthcare. In many cases, plantation workers may face challenging circumstances that can impact their mental well-being. The most common mental infirmity reported by the respondents is shown in Figure 2.

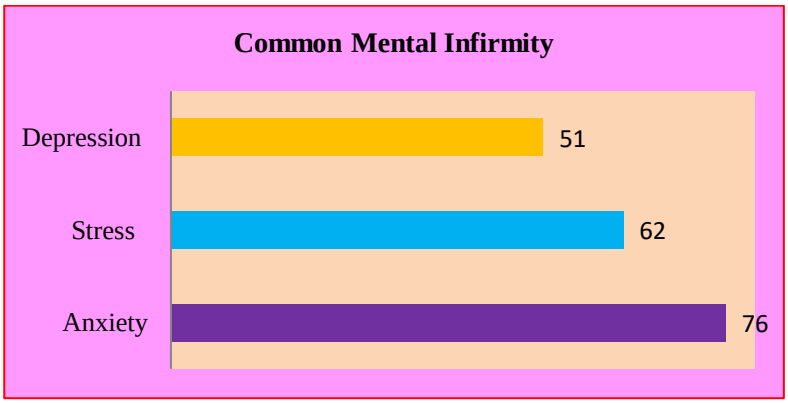


Figure 2: Common Mental Infirmity

Figure 2 illustrates the prevalent mental health challenges experienced by women tea plantation workers, with anxiety affecting 76% of respondents, followed by stress at 62%, and depression at 51%. The nature of work in tea plantations exposes workers to unique stressors and challenges. Tasks such as tea leaf plucking are physically demanding, leading to fatigue and strain. Exposure to harsh outdoor conditions further impacts their well-being, while the use of pesticides and chemicals in cultivation poses health risks. Additionally, the majority (95%) of workers receive low wages, leading to job insecurity and financial stress. Substandard housing provided to workers also contributes to overall stress, lacking basic amenities and adding to their challenges.

Level of mental health Status

Level of mental health of women tea plantation workers was assessed using a five-point scale with ten statements considered. The responses were asked to state their level of agreement on a three-point scale (3: Always, 2. Some time, 1. Never), with 36 being the highest score and 10 being the lowest score. The mean score and reliability coefficient value are presented in Table 4 , and the mental health status is shown in Figure 3.

Table 4 : Mean score and reliability coefficient value

Statement	M	SD	R	Alpaha value
I feel sad or down	1.9055	1.80012	1.000	.754
I feel confused thinking	1.8466	1.07337	.155	
I feel fears or worries, or extreme feelings of guilt	2.5656	1.65896	.124	
I have mood changes of highs and lows	3.3288	1.62137	-.029	
I am isolated from friends and activities	3.2994	1.24856	-.086	
I have feel tired during my work	3.4368	1.31729	-.039	
I feel sleepy	3.5485	1.29060	-.013	
I am happy in my work place	3.5190	1.21591	-.027	
I am satisfied with my life	3.5288	1.19637	-.043	
The working people around me are basically good	3.5472	1.28109	-.035	
I am good at managing the responsibility of my daily life	3.5926	1.14370	-.087	
I have maintained good relationship with my neighbours	3.6540	1.22446	-.040	
I have confident to express my opinion with others	3.7450	1.24767	-.060	

Table 4 displays the mean scores of mental health statements, ranging from 3.745 to 1.846. Respondents showed the highest level of agreement (3.654) with the statement "maintained good relationship with my neighbors" and "managing the responsibility of my daily life," while the lowest agreement was observed with the statement "confused thinking" (1.846). This indicates that respondents do not perceive a strong connection between over thinking and their work responsibilities. The reliability coefficient values, represented by Cronbach's alpha, indicate the internal consistency or reliability of the mental health scale. A higher alpha value suggests greater reliability. In this case, the alpha value of 0.754 indicates good internal consistency for the mental health scale used in the study.

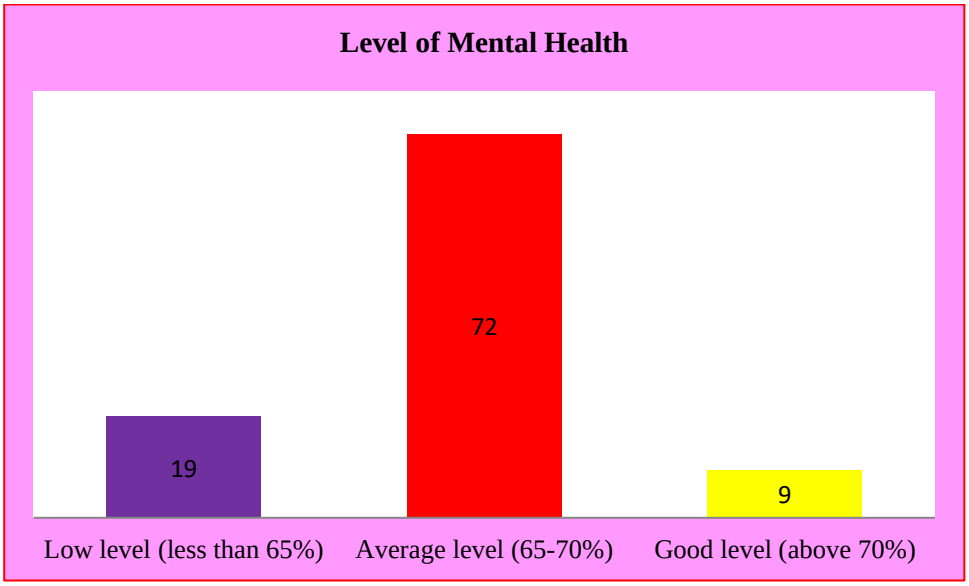


Figure 3: Level of Mental Health

The findings reveal that a significant majority of women tea plantation workers maintain an average level of mental health status, comprising 76% of the sample population. This suggests that while many workers may experience some degree of mental health challenges, they generally exhibit a moderate level of mental well-being. However, it is concerning that 19% of the workers reported a low level of mental health status, indicating a notable proportion of individuals facing significant mental health difficulties. Additionally, only 9% of the workers reported a high level of mental health status, highlighting the limited number of individuals experiencing optimal mental well-being.

This distribution underscores the importance of addressing mental health concerns among women tea plantation workers, particularly for those experiencing low levels of mental well-being. Implementing targeted interventions such as counseling services, stress management programs, and access to mental health resources could help support workers in improving their mental health status and overall well-being. Additionally, raising awareness about mental health issues and reducing stigma surrounding seeking help can empower workers to prioritize their mental well-being and seek assistance when needed.

Factors contributing mental health challenges

Some potential factors that may contribute to mental health challenges among tea plantation workers includes the following:

1. **Harsh Working Conditions:** The plantation workers reported that , physical demanding, workers may face long hours, exposure to weather extremes, and repetitive tasks affect their mental health.
2. **Low Wages and Socioeconomic Challenges:** majority of the tea plantation workers may receive low wages and live in impoverished conditions. Economic hardship can contribute to stress and mental health issues.
3. **Limited Access to Healthcare:** In some tea villages, access to healthcare services may be limited for plantation workers, making it difficult for them to receive proper medical attention for physical and mental health concerns.
4. **Isolation:** Plantation workers may live in isolated areas, away from town or city side , which can lead to social isolation and a lack of community support.
5. **Living Conditions:** Substandard housing and lack of basic amenities can contribute to poor living conditions, affecting overall well-being.
6. **Labor Exploitation:** Few tea plantation workers may face issues related to labour exploitation, such as long working hours, inadequate breaks, and lack of job security. This can contribute to stress and anxiety.

CONCLUSION

The living and working conditions of plantation workers, particularly women with low wages, are notably poor. Many of the workers in Munnar plantation, predominantly Tamil-speaking Dalit migrants, face challenging circumstances. Similarly, in Northeast India, workers often come from impoverished tribal backgrounds. The study underscores how the COVID-19 pandemic has exacerbated mental health issues among these workers. The pandemic's economic, physical, and mental health impacts have been profound, leading to increased depression among women tea workers in Munnar Panchayat. Depression, anxiety disorders, and stress disorders are prevalent among these workers, often without their awareness. The study concludes that addressing systemic issues is essential to improving the mental health of tea plantation workers. This could involve initiatives to enhance working conditions, ensure fair wages, provide access to healthcare services, and foster community support. Mental health awareness programs and counseling services are also vital to address the specific mental health challenges faced by these workers. Collaboration between policymakers, employers, and communities is crucial to create environments conducive to the well-being of tea plantation workers in Munnar Panchayat.

ACKNOWLEDGEMENT

The Authors acknowledge the contribution made by the respondents in the study area.

REFERENCES

- Amin. (2008). Economic empowerment of women through poverty alleviation programmes. *Kurukshetra*; Vol.54, No.4, February 2008, New Delhi, P 23.
- Fernandez, A., & Joseph, S. (2020). Globalization and Mental Health Outcomes Among Women Tea Plantation Workers in Kerala: A Longitudinal Study. *Globalization and Health*, 18(1), 67-82.

- Government of Kerala. (2002). *Economic Review*. State Planning Board, Thiruvananthapuram, Pp 385-391.
- Government of Kerala. (2004). *Economic Review*. State Planning Board, Thiruvananthapuram, Pp 379-386.
- Government of Kerala. (2021). Idukki District Report. Retrieved from https://idukki.nic.in/en/
- Government of Kerala. (2021). State Planning Commission Report. Retrieved from https://spb.kerala.gov.in/en/idukki
- Gupta, P., et al. (2019). Access to Healthcare Services and Mental Health Interventions Among Women Tea Plantation Workers in Rural Kerala. Journal of Rural Health, 32(2), 176-188.
- Krishnan, R., & Menon, V. (2018). Cultural Barriers to Seeking Mental Healthcare Among Women Tea Plantation Workers in Munnar. *Culture, Health & Sexuality*, 41(3), 305-318.
- Kumar, A., & Rajan, S. (2020). Occupational Hazards and Mental Health Disorders: A Study Among Female Tea Plantation Workers in Kerala. *Journal of Occupational Health Psychology*, 28(4), 378-391.
- Menon, S., & Pillai, R. (2019). Gender Dynamics and Mental Health Among Women Tea Plantation Workers in Munnar. *Gender Studies Review*, 36(3), 210-225.
- Nayar, K. R., et al. (2018). Impact of Economic Factors on Mental Health of Women Tea Plantation Workers in Kerala. *Journal of Social Psychiatry*, 45(2), 123-135.
- Palanithurai. (2009). Empowerment of women. Gandhigram offset press, Gandhi gram Rural Institute Deemed university, Madurai, Pp 1-4.
- Patel, S. (2007). Women in the Un-organized sector of India. New century publications, New Delhi.
- Rafeeque A. K, Sumathy. N. (2021). A Study on Problem Faced by the Tea Plantation Women Workers in Wayanad District. Palarch's*Journal Of Archaeology Of Egypt/Egyptology*, 18
- Sharma, D., et al. (2019). Intersectionality and Mental Health: A Study of Dalit Women in Tea Plantations of Munnar. *Journal of Intersectionality Studies*, 12(2), 145-160.
- Thomas, M., & George, L. (2017). Social Support Networks and Mental Well-being of Women Tea Plantation Workers: A Qualitative Study. *International Journal of Social Welfare*, 54(1), 89-102.

15

HOMESCIENCE IN INDIA: OPPORTUNITIES CHALLENGES, AND WAY FORWARD

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ABSTRACT

Home Science as a subject has a great contribution in achieving the goals of family, community and nation. This study is an attempt to assess the perceptions of Home Scientists regarding Home Science as a subject, its challenges and way forward. Home Science Institutions all over India were covered and for ease of data analysis they were divided into four zones-North, East, South and West. The sample size was 647 Home Scientists and data was collected through self-constructed Google form. Data was analyzed through SPSS 20 and presented in the form of figures and tables. The study observes that Home Scientists had chosen the subject as their prime vocational choice. They believed that there was a lack of adequate recognition of Home Science as a subject and felt that gender restriction in opting the subject at many institutions has been a major obstacle in its enrollment. The respondents also believe that there was a lack of public awareness about the subject. They opined that major curriculum changes were required to boost Home Science in the right direction, and the majority felt an urgent need for change in its nomenclature. The most acceptable proposed new nomenclature was Community Science and Technology. They also strongly recommend that NET should be conducted by UGC in all specializations of Home Science. Based on these some recommendations for the way forward have been proposed.

Key Words: Home Science**,** Nomenclature of Home Science, Gender Restrictions in Home Science, Home Science Curriculum, UGC NET in Home Science, SDGs, AI, Machine Learning

INTRODUCTION

Home Science, also known as Family and Consumer Sciences or Community Sciences, has existed as an important part of higher education in India since a long time and focuses on applying the knowledge generated in the laboratories to improve the quality of life in homes and communities. Recent years have seen many modifications in this field to meet the changing needs of families and society, educational priorities and advancements in technology. This paper looks at the current state of Home Science in Indian Higher Education, discussing its relevance, challenges, and potential for growth in the 21st century.

The program has evolved from a finishing school for elite women, to a multipurpose study

open to all genders. The multidisciplinary approach integrates knowledge from various fields, including physics, chemistry, physiology, human development, communication, fabric science, fashion, and fine arts. This strategy equips students with a comprehensive skill set, enabling them to effectively tackle complex societal issues by fostering creativity, critical thinking, and collaboration across disciplines (Raghuvanshi, 2018).

The institutional structure of Home Science education in India is divided between Agricultural Universities, which have full-fledged colleges and faculties under the Indian Council of Agricultural Research (ICAR), and traditional universities, under UGC, where it often exists as a department under Sciences, Social Sciences or a standalone Faculty. A significant development has been the rebranding of the degree program to B.Sc. (Hons.), and the change in nomenclature of the subject as '*Community Science*' in Agricultural Universities since 2017, to broaden its visibility and appeal, though technical difficulties have been faced by students in applying for UGC NET in Home Science and various Posts requiring Degrees in Home Science or its specializations.

LITERATURE REVIEW

Few studies conducted on relevance of Home Science in India today highlight the evolving and diverse nature of Home Science education, addressing widespread misconceptions and emphasizing its importance for both genders. Arfi and Kiran (2015) underlined the need for better awareness of its comprehensive curriculum, while Dubey (2016) pointed to biases and lack of interest affecting its reputation. Studies by Mittal et al. (2021) showcase the academic and career trends of Home Science graduates, suggesting better guidance for employment, Singh (2018) focuses on correcting gender and skill-based stereotypes. From a study conducted in Kenya too similar results have been found by Sefu et al. (2023) highlighting how gender perceptions influence subject choice in schools. Together, these works advocate for broader awareness, inclusivity, and recognition of Home Science as a dynamic and valuable field. Probably no profession calls for such varied talents as home science does. Today's home science education is not confined to strengthen of home and family life only, it is an education aimed at national building. It has a vital contribution to human development, better living and national well-being. The dietary habits of home science youngsters are better than non-home science youngsters (PallaviYadav, et al; 2017). It offers numerous job opportunities, career options from teaching to working in research institutions are well known, but there are other areas one can work in too such as, laboratories that ensure food, safety and quantity, companies that conduct research on new food products, food auditing, food and nutrition consultants in hospitals, hotels, In boutique as a fashion designer, in school as a counsellor, wellness centres, corporates as well as agencies or entrepreneur are other option. Probably no profession calls for such varied talents as home science as Home Science does (ArtiSinha and RitiAggarwal, 2015). Home science is not just cooking or stitching but global perspectives and behaviour change (Singh and Shubha, 2017). The present research tries to understand the beliefs and challenges from within the field of Home Science, and to chalk out further strategies for improving the status of Home Science in India.

OBJECTIVES:

- To study the perceptions of Home Scientists regarding Home Science as a subject.
- To identify challenges and constraints in the growth of discipline in contemporary times.
- To explore the possible measures for boosting Home Science in India.

MATERIAL AND METHODS

Sample Size and Sampling Technique: Random sampling technique was used with time-based sampling collection, reaching a total sample of 723. Responses of 96 respondents were rejected due to responses errors, like incorrect or invalid recipient, a lack of accuracy in responses, thus, the final sample size was 647.

Tool: Google Form was devised seeking information related to demographic variables, and questions pertinent to the status of Home Science and suggestions for improvement of enrolment, using open ended questions. It was mailed to almost all the Home Science Institutions (Colleges and Universities) across India.

Pre-test and Validity of Tool: The self-constructed questionnaire was put under pre-test with 58 respondents selected at random from Kashmir region for validation of tool and ensure the extent to which the questionnaire was able to measure what it purports to measure. Determining the accuracy of the questions involved examining both the validity of the question phrasing (the degree to which the question truly and accurately reflected the intended focus) and the validity of the responses the question collected (the degree to which the question accurately captured the true thoughts of the respondent). Questions which were proven valid through validity test were put in Google form and sent through a link to respondents. Respondents were teaching faculties, scholars, students and non-teaching Home Scientists. For ease of understanding the data, the institutions were divided into four zones as follows:

Zone 1st (Northern States): Jammu & Kashmir, Himachal Pradesh, Punjab, Uttarakhand, Haryana, Delhi, Rajasthan, Uttar Pradesh, and Chandigarh.

Zone 2nd (Eastern States): Arunachal Pradesh, Assam, Meghalaya, Manipur, Mizoram, Nagaland, Tripura and Sikkim.

Zone 3rd (Western States): Maharashtra, Gujarat, Goa, Daman and Diu, Dadra and Nagar Haveli.

Zone 4th (Southern States): Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, and Telangana.

Data Analysis: Content analysis using quantitative as well as qualitative approach was done. Data was scrutinized and analyzed keeping the objectives in view, and presenting it in suitable tables and figures to determine inherent facts and meanings in two phases:

i. Elementary Analysis The data was properly scrutinized, and categories were established for the classification of data. The required coding and tabulation were done according to the categories available.

ii. Statistical Analysis: The software packaging namely **'SPSS' 26** (updated version) was used for the purpose, and appropriate techniques were used to analyse the:

- Validity of Questionnaire
- Frequency, percentage and χ^2 analysis

The level of significance for all tools was interpreted as:

- $p \leq 0.00$: Highly significant
- $p \leq 0.01$: Highly significant
- $p \leq 0.05$: Significant
- $p > 0.05$: Non-significant

RESULTS AND DISCUSSION

Background Information of the Respondents

Fig. 1 reveals that the most significant segment of respondents fell within the 26-40 age range (34 percent), followed by those aged 40-60 years (25 percent). Younger participants (18-25) and older individuals (60-80) represented 25 percent and 8 percent, respectively. Fig 2 shows that Master's Degree in Home Science (Composite) was the predominant specialization of 41 per cent respondents, followed by Master's Degree in Extension and Communication (23 percent), Bachelor's Degree in Home Science (13 percent), and Master's Degree in Clothing, Textiles (8 percent). Amongst the total respondents, as per Fig.3, about 47 per cent possessed a PhD Degree, 38 per cent were non-Ph.D. holders, 8 per cent were in the process of earning a Ph.D., and 7 per cent were post-doctorates. Among those who responded the most amongst the Home Science institutions, Fig.4 shows that those from Northern Zone were highest in number (48 percent), followed by those in the Eastern (23 percent), Western (19 percent) and Southern (10 percent) Zones.

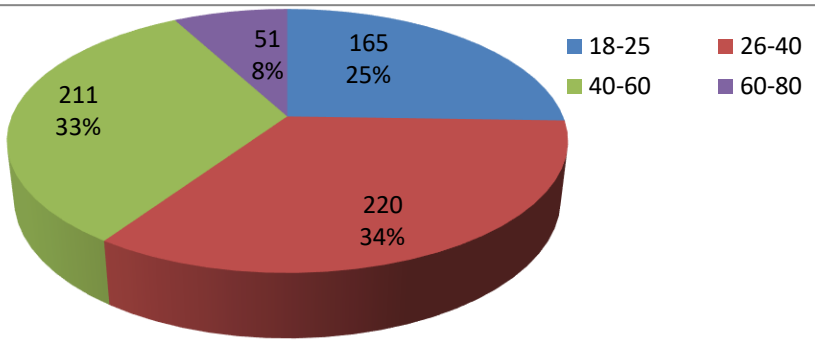


Fig. 1 Age of Respondents

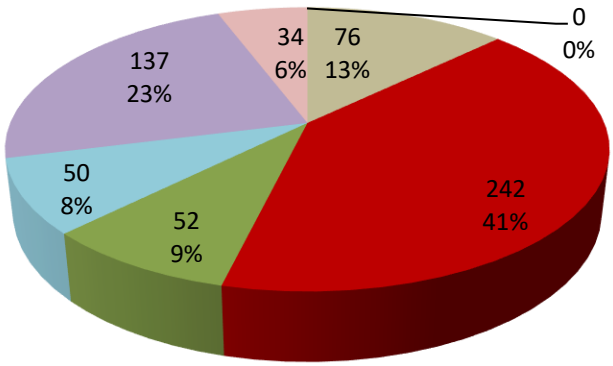


Fig. 2 Specalisations of Respondents

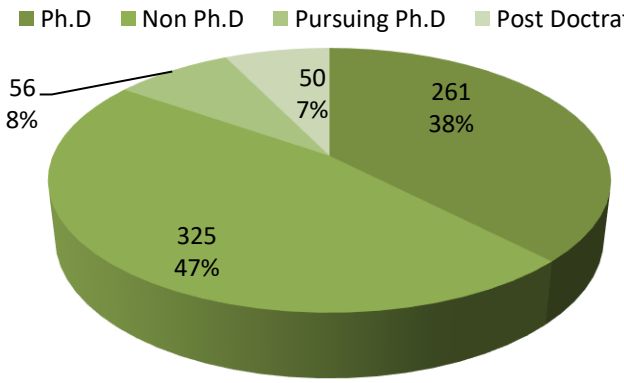


Fig. 3 Education of the respondents

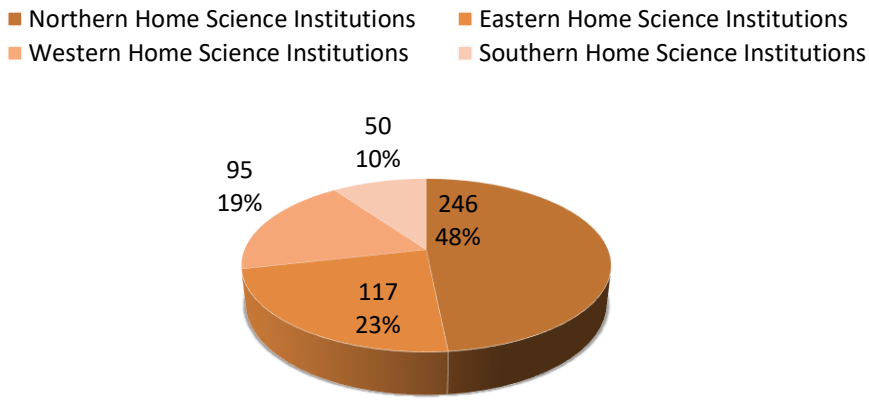


Fig. 4 Institutonal Zones of Respondents

Status of Home Science:

Table 1 shows that the respondents from the Eastern Region (77.8 percent) and those from Northern regions had opted for Home Science as their prime vocational choice. When analyzed, education wise 74.2 percent Graduates, and 71.9 percent Doctorates and Scholars, 70.3 percent Non-Teaching Home Scientists had preferred Home Science as their prime vocational choice, as did the 80% Post doctorates, 75.9 per cent PhD holders, and 71.4 percent of those pursuing PhD. Age wise 77.6% of 18–25-year-olds and 76.5 percent of 60-80 years olds also agreed that they had opted for Home Science due to its vocational scope.

Fig. 5 shows that about45 per cent of respondents viewed Home Science as Moderately Applicable in daily life, 37 per cent see it as Fully Applicable, whereas 12 per cent rate it as Slightly Applicable. About68 per cent of respondents (Fig. 6) agreed that the Home Science curriculum requires revival.

Table 1: Home Science Opted as Prime Vocational Choice

Variable	Characteristics	Perception				χ^2 Analysis (df=3)
		Agree		Disagree		
		f	%	f	%	
Home Science Institutions in India	Northern Areas	181	73.6	65	26.4	6.871
	Eastern Areas	91	77.8	26	22.2	
	Western Areas	59	62.1	36	37.9	p= 0.076
	Southern Areas	136	72.0	53	28.0	
Designation	Graduates' and Masters' Students	236	74.2	82	25.8	1.406
	Doctorates and Scholars	41	71.9	16	28.1	p= 0.704
	Teaching Faculty	126	69.6	55	30.4	
	Non-Teaching Faculty	64	70.3	27	29.7	
Educational Level	Ph.D.	198	75.9	63	24.1	3.33
	Non-Ph.D.	225	69.2	100	30.8	
	Pursuing Ph.D.	40	71.4	16	28.6	p=0.342
	Post Doctorates	4	80.0	1	20.0	
Age (yrs)	18-25	128	77.6	37	22.4	4.66
	26-40	156	70.9	64	29.1	
	40-60	144	68.2	67	31.8	p= 0.198
	60-80	39	76.5	12	23.5	

Based on Field Survey
n=647

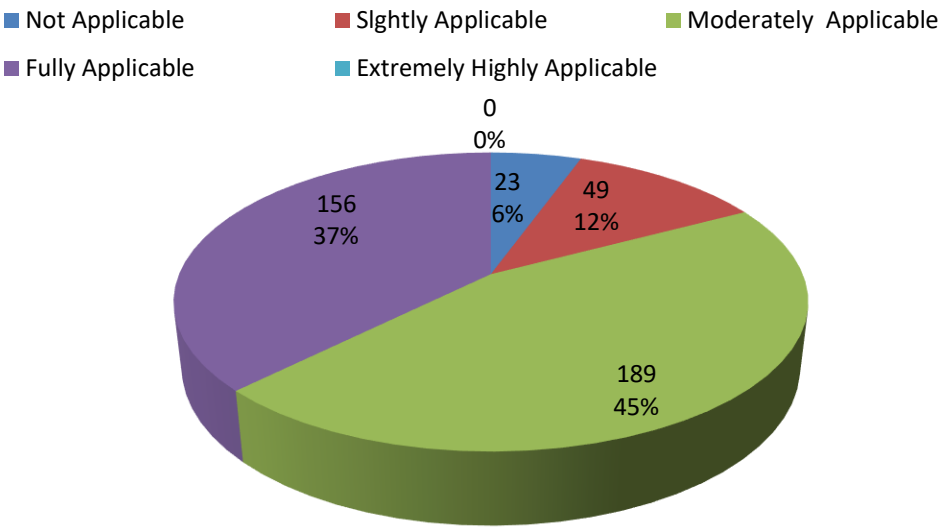


Fig. 5 Applicability of Home Science in Daily Life

Challenges faced by Home Science

Lack of adequate recognition of Home Science as subject is reported in Table 2 with Eastern regions reporting the lowest agreement (19.7 percent), whereas Southern regions present the highest agreement (40.7 percent). Doctorates and scholars showed the most agreement (43.9 percent), while graduates and master's students showed lower agreement (28.3 percent). Post-doctorates exhibited the highest agreement (60 percent), in contrast to Ph.D. holders displayed the lowest (27.6 percent). The respondents in the age range of 40-60 years agreed significantly (44.5 percent). Table 3 reveals that the *gender restriction in opting Home Science subject* has been cited as a limiting factor for enrollment nearly universally, with agreement rates surpassing 97 per cent across all regions and categories. *Lack of public awareness about Home Science is an obstacle* (Table 4), has been shown greatest agreement by respondents from Eastern Zone (68.4 percent), while Southern Zone demonstrated the lowest agreement (53.4 percent). Graduates and Master's students reported higher agreement (60.1 percent) relative to Doctorates and Scholars (38.6 percent). Ph.D. holders showed more agreement (65.9 percent) than non-Ph.D. holders (51.4 percent). Younger individuals (18-25 years) revealed the highest degree of agreement (72.7 percent).

Table 2: Lack of Adequate Academic Recognition of Home Science as a Subject

Variable	Characteristics	Perception				χ^2 Analysis (df=3)
		Agree		Disagree		
		f	%	f	%	
Home Science Institutions in India	Northern Areas	83	33.7	163	66.3	14.590
	Eastern Areas	23	19.7	94	80.3	
	Western Areas	31	32.6	64	67.4	p=0.002

	Southern Areas	77	40.7	112	59.3	
Designation	Graduates' and Masters' Students	90	28.3	228	71.7	7.718
	Doctorates and Scholars	25	43.9	32	56.1	p=0.052
	Teaching Faculty	67	37.0	114	63.0	
	Non-Teaching Faculty	32	35.2	59	64.8	
Educational Level	Ph.D.	72	27.6	189	72.4	12.608
	Non-Ph.D.	111	34.2	214	65.8	
	Pursuing Ph.D.	28	50.0	28	50.0	p = 0.006
	Post Doctorates	3	60.0	2	40.0	
Age (yrs)	18-25	41	24.8	124	75.2	19.977
	26-40	62	28.2	158	71.8	
	40-60	94	44.5	117	55.5	p = 0.000
	60-80	17	33.3	34	66.7	

Based on Field Survey
n=647

Table 3: Gender Restriction in Opting of Subject being Obstacle in Enrolment

Variable	Characteristics	Perception				χ^2 Analysis (df=3)
		Agree		Disagree		
		f	%	f	%	
Home Science Institutions in India	Northern Areas	244	99.2	2	8.0	3.270
	Eastern Areas	117	100.0	0	0.0	
	Western Areas	95	100.0	0	0.0	p=0.352
	Southern Areas	189	100.0	0	0.0	
Designation	Graduates' and Masters' Students	318	100.0	0	0.0	12.258
	Doctorates and Scholars	57	100.0	0	0.0	p=0.007
	Teaching Faculty	181	100.0	0	0.0	
	Non-Teaching Faculty	89	97.8	2	2.2	
Educational Level	Ph.D.	261	100.0	0	100.0	4.787
	Non-Ph.D.	324	99.7	1	0.3	
	Pursuing Ph.D.	55	98.2	1	0.8	p=0.188
	Post Doctorates	5	100.0	0	0.0	
Age (yrs)	18-25	165	100.0	0	0.0	1.007
	26-40	219	99.5	1	5.0	
	40-60	210	99.5	1	5.0	p=0.800
	60-80	51	100.0	0	0.0	

Based on Field Survey
n=647

Table 4: Lack of Public Awareness about Subject being Obstacle in its Enrolment

Variable	Characteristics	Perception				χ^2 Analysis (df=3)
		Agree		Disagree		
		f	%	f	%	
Home Science Institutions in India	Northern Areas	136	55.3	110	44.7	7.436
	Eastern Areas	80	68.4	37	31.6	
	Western Areas	54	56.8	41	43.2	p=0.059
	Southern Areas	101	53.4	88	46.6	
Designation	Graduates' and Masters' Students	191	60.1	127	39.9	10.370
	Doctorates and Scholars	22	38.6	35	61.4	p=0.016
	Teaching Faculty	101	55.8	80	44.2	
	Non Teaching Faculty	57	62.6	34	37.4	
Educational Level	Ph.D.	172	65.9	89	34.1	13.252
	Non-Ph.D.	167	51.4	158	48.6	
	Pursuing Ph.D.	29	51.8	27	48.2	p=0.004
	Post Doctorates	3	60.0	2	40.0	
Age (yrs)	18-25	120	72.7	45	27.3	26.849
	26-40	127	57.7	93	42.3	
	40-60	101	47.1	110	52.1	p=0.000
	60-80	23	45.1	28	54.9	

Based on Field Survey
n=647

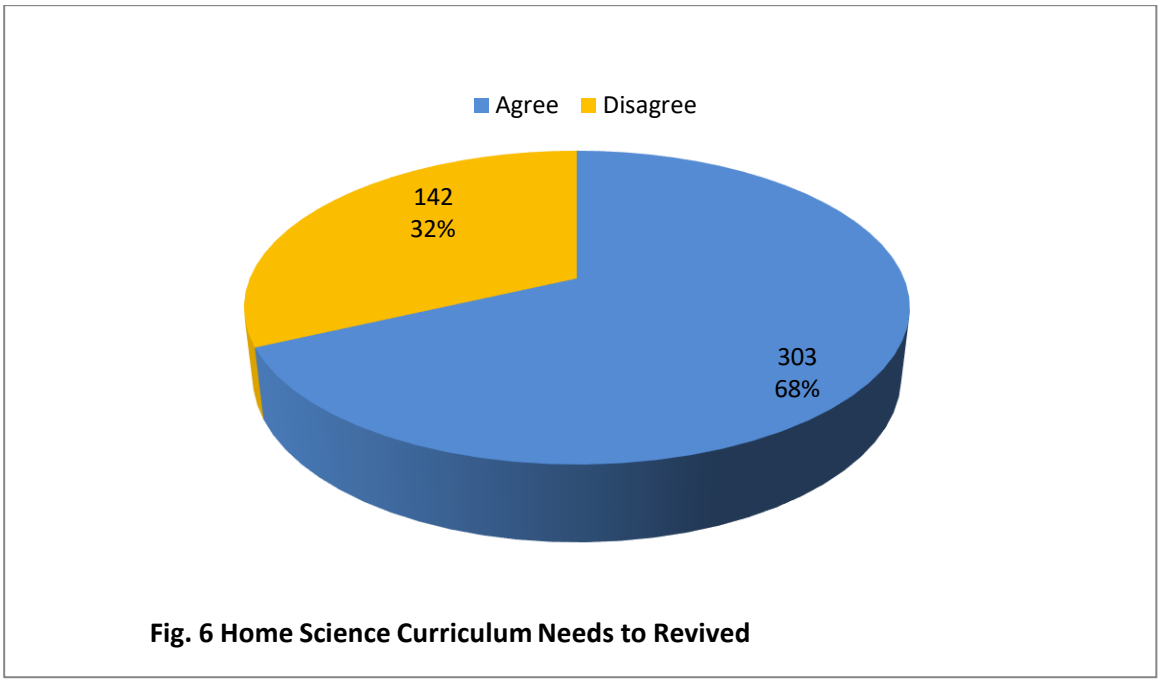


Fig. 6 Home Science Curriculum Needs to Revived

Table 5: Need Major Changes in Home Science Curriculum

Variable	Characteristics	Perception				χ^2 Analysis (df = 3)
		Agree		Disagree		
		f	%	f	%	
Home Science Institutions in India	Northern Areas	42	17.1	204	82.9	5.304
	Eastern Areas	30	25.6	87	74.4	
	Western Areas	21	22.1	74	77.9	p=0.151
	Southern Areas	47	24.9	142	75.1	
Designation	Graduates' and Masters' Students	75	23.6	243	76.4	3.646
	Doctorates and Scholars	12	21.1	45	78.9	p= 0.302
	Teaching Faculty	40	22.1	141	77.9	
	Non-Teaching Faculty	13	14.3	78	85.7	
Educational Level	Ph.D.	65	24.9	196	75.1	5.336
	Non-Ph.D.	59	18.2	266	81.8	
	Pursuing Ph.D.	14	25.0	42	75.0	p=0.149
	Post Doctorates	2	40.0	3	60.0	
Age (yrs)	18-25	35	21.2	130	78.8	.851
	26-40	45	20.5	175	79.5	
	40-60	50	23.7	161	76.3	p=0.837
	60-80	10	19.6	41	80.4	

Based on Field Survey
n=647

Proposed way forward:

The need to update the Home Science curriculum, as per Table 5, is agreed to by Eastern regions (25.6 percent) compared to others. Graduates and Master's students show greater agreement (23.6 percent) than Non-teaching faculty (14.3 percent). Post-doctorates expressed the highest agreement (40 percent), highlighting a critical stance on the existing curriculum. Agreement levels were relatively uniform across age groups, with no significant variations.

Community awareness regarding Home Science is very important, and as per Table 6, Eastern and Western regions exhibited similar levels of agreement (54.7 percent), indicating a heightened need for community understanding. Non-teaching faculty demonstrate the highest agreement (56 percent), in comparison to other designations. Post-doctorates display the highest agreement (60 percent), suggesting a broader view on community involvement. The 60-80 years age group showed the most agreement (58.8 percent).

The *need to change the nomenclature of Home Science*, Table 7, is expressed by respondents, with Southern Zone having highest agreement (79.9 per cent), while Western Zone showed the lowest (68.4%). Agreement remained stable across positions, with minimal observed differences. Post-doctorates exhibited unanimous agreement (100 per cent), indicating a strong demand for changes in terminology. Younger individuals (18-25 years) reflected the highest level of agreement (83.6 per cent). Among the *proposed new nomenclature of Home Science*, Fig 7 reveals thatCommunity Science and Technology remains the most favored (48 per cent), followed by Community Science (16 percent), Applied Science (17 percent) and Human Ecology (11 percent). As per Fig. 8 about78 per cent Home Scientists expressed agreement that UGC NET should be conducted for each specialization. About78 per cent of participants, as per Fig 9, asserted that Home Science should be accessible to all genders but 22 per cent believed that it should be limited to girls only. Home Science also needs to be more research oriented (Fig. 10) is agreed to by majority of respondents (75 percent).

Table 6: Need of Community Awareness regarding Home Science

Variable	Characteristics	Perception				χ^2 Analysis (df=3)
		Agree		Disagree		
		f	%	f	%	
Home Science Institutions in India	Northern Areas	113	45.9	133	54.1	4.147
	Eastern Areas	64	54.7	53	45.3	
	Western Areas	52	54.7	43	45.3	p= 0.246
	Southern Areas	101	53.4	88	46.6	
Designation	Graduates' and Masters' Students	155	48.7	163	51.3	1.847
	Doctorates and Scholars	31	54.4	26	45.6	p= 0.605
	Teaching Faculty	93	51.4	88	48.6	
	Non-Teaching Faculty	51	56.0	40	44.0	
Educational Level	Ph.D.	127	48.7	134	51.3	2.694
	Non-Ph.D.	175	53.8	150	46.2	
	Pursuing Ph.D.	25	44.6	31	55.4	p= 0.441

	Post Doctorates	3	60.0	2	40.0	
Age (yrs)	18-25	77	46.7	88	53.3	3.846
	26-40	108	49.1	112	50.9	
	40-60	115	54.5	96	45.5	p= 0.279
	60-80	30	58.8	21	41.2	

Based on Field Survey
n=647

Table 7; Need Change in Nomenclature of Home Science

Variable	Characteristics	Perception				χ^2 Analysis (df=3)
		Agree		Disagree		
		f	%	f	%	
Home Science Institutions in India	Northern Areas	175	71.1	71	28.9	6.518
	Eastern Areas	82	70.1	35	29.9	
	Western Areas	65	68.4	30	31.6	p= 0.089
	Southern Areas	151	79.9	38	20.1	
Designation	Graduates' and Masters' Students	232	73.0	86	27.0	0.305
	Doctorates and Scholars	43	75.4	14	24.6	p = 0.959
	Teaching Faculty	133	73.5	48	26.5	
	Non-Teaching Faculty	65	71.4	26	28.6	
Educational Level	Ph.D.	201	77.0	60	23.0	5.647
	Non-Ph.D.	228	70.2	97	29.8	
	Pursuing Ph.D.	39	69.6	17	30.4	p= 0.130
	Post Doctorates	5	100.0	0	0	
Age (yrs)	18-25	138	83.6	27	16.4	16.022
	26-40	162	73.6	58	26.4	
	40-60	139	65.9	72	34.1	p= 0.001
	60-80	34	66.7	17	33.3	

Based on Field Survey
n=647

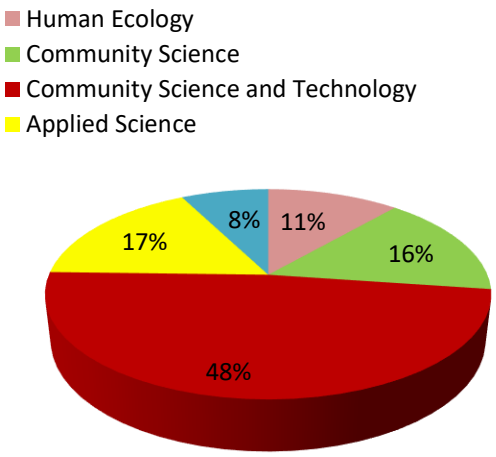


Fig. 7 Proposed New Nomenclature of Home Science

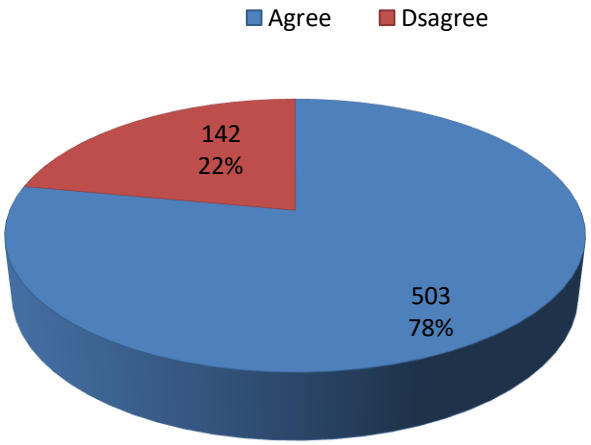


Fig. 8 UGC NET to be Conducted in Each Specialisaton of Home Science

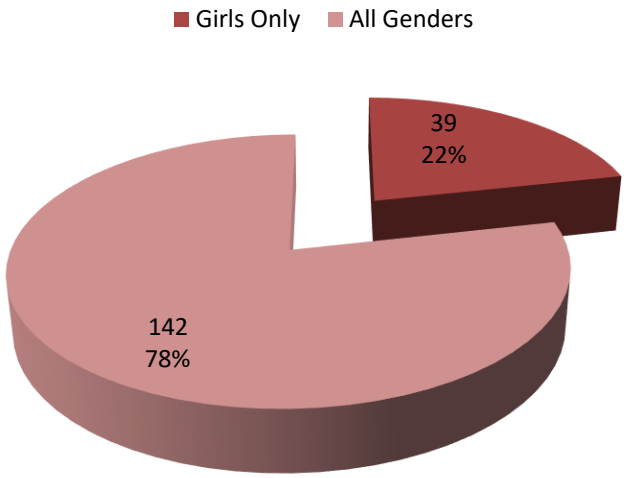


Fig. 9 Home Science to be Open for all Genders

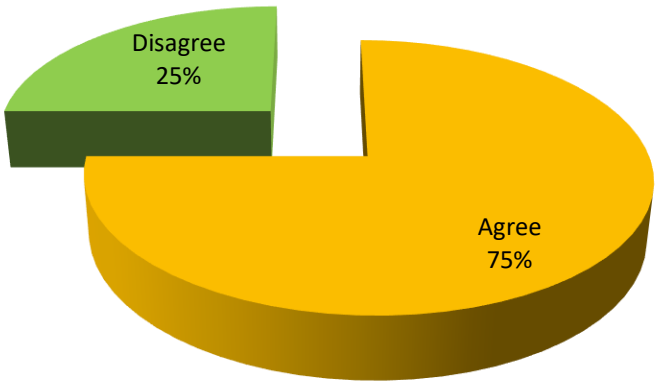


Fig. 10 Home Science Needs to be More Research Oriented

DISCUSSION

The data reveals perspectives of Home Scientists on the strengths, obstacles and prospects associated with Home Science as an educational field, career path and a community-focused discipline. After analyzing differences across various regions, job titles, educational backgrounds, and age categories, the results uncover noteworthy trends of consensus and divergence concerning crucial matters like gender limitations, public knowledge, changes in curriculum, and reforms in terminology. These findings provide a basis for comprehending the complex dynamics that affect the significance and attractiveness of Home Science in today's educational and social settings.

While there was strong advocacy for inclusivity across subjects and genders, a push for a more research and technology driven curriculum was also observed. The insights from this research can help in steering the prospective reforms to enhance the relevance and accessibility of Home Science. Despite challenges such as misconceptions and lack of awareness, discipline holds immense promise for growth and positive contribution to the country's advancement. Research outcomes underscore the imperatives for heightened acknowledgment, integration of cutting-edge technologies, and enhanced partnerships between academia and industry. Change of nomenclature is suggested by the respondents, especially the younger ones, but that has its own implications and repercussions. Whatever change is initiated must be uniform across the country so that the students don't face difficulties in their vocational endeavors due to the confusion created by different sets of nomenclature for the subjects with similar course material.

The Home Science curriculum under the National Education Policy (NEP) is being modernized to align with its multidisciplinary and skill-oriented approach. Updates include integrating vocational and life skills, promoting gender inclusivity, and emphasizing practical applications like nutrition, family resource management, and community development. The curriculum now incorporates interdisciplinary courses, value-added modules, and skill enhancement programs to prepare students for diverse career opportunities. Home Science, being a subject with grassroot and community focused approach, focusses immensely on fieldwork, practice, internship, skill enhancement, product development and research which are at the core right since its inception. The aim should be to make Home Science more relevant and appealing to students across genders and academic disciplines.

Home Science education in India emphasizes humanistic values, technical know-how, utility skills, careerism, responsibility, moral character development, and intellectual capabilities, and is very closely related to the goals of NEP 2020.Graduates are well-positioned to contribute to various sectors, including national development programs, Corporate Social Responsibility activities, entrepreneurship, and specialized roles in education, nutrition, textiles, and rural welfare. Despite its potential, the discipline faces challenges in public perception and mainstream academic integration. Future research could focus on enhancing visibility, integrating emerging technologies, addressing contemporary issues, and strengthening industry- academia partnerships. As Home Science continues to evolve, it has the potential to play a crucial role in addressing complex societal issues and fostering sustainable development.

As Home Science progresses, it stands poised to tackle pressing issues within households and communities, ultimately fostering sustainable development and elevating living standards. The field needs a push in the direction of establishing itself in this technology driven area by incorporating AI and Machine Learning, so that the knowledge generated in the field can be

consolidated, helping in identifying the areas that require more work as also increasing its usability and applicability for nation's development, especially since Home Science is also closely related to the SDGs.

REFERENCES

- Arfi, N., & Kiran, U. V. (2015). *Perception towards home science: A comparative study among home scientists and non-home scientists*. *International Journal of Multidisciplinary Research and Development*, 2(10), 598-601.
- Azubuike, O.C. (2012). Societal and Gender Issues in the Study of Home Economics: Education in Nigerian Tertiary Institutions. *Journal of Educational and Social Research*, 2(10):38-47.
- Dubey,S.(2016). StudyofAwarenessLevelofStudentsand Teachers Of Curriculum Of Home Science.*Scholarly Research Journal on Interdisciplinary Studies*, 4(25), 2401 – 2404.
- Kiran, U. V. (2004). Home Scientist as an entrepreneur. *Indian Research Journal Extension Education*, 4(3), 78-80.
- Mittal,R.,Mann,S.K.,Sidhu,K.,&Kaur,M.(2021).AnalysisofRetentionandProgression ofHome Science Graduates in Northern India. *International Journal of Education & Management*, 11(4), 201-205.
- Nweyilobu, L.N. (2003). Home economics students' perception about practical applicability of the course: housing design and management. *Nigerian Journal of Technology and Education in Nigeria*, 8(2):49-53.
- Pokharel S. (2010). Students' Perception toward Home Science. *The Journal of Home Science and Women Development*, 2:42-46.
- Raghuvanshi, R. S. (2018). Changing perspective of Home Science Education in India. *Indian Farmer's Digest,* 51(2). 04–07.
- Sebby A.; Sefu., Sammy, M. and Augustine, K. (2023).Factors Influencing Students' Selection of Home Science in Public Secondary Schools. *International Journal of Scientific Research and Management*, 11(11), 1545–1579.
- Singh, A.(2018).Changing Perspective of Home Science Education in India. *Zenith International Journal of Business Economics & Management Research*. 8 (8), 96-106.
- Turkki K. (2005). Pre-professionals' Perceptions of Home Economics in Finland. *International Journal of Consumer Studies*, 29(3):273-282.
- Nidhisharma (2016). Role of Home Science in community development. *Indian Journal Psychometry and Education.* 47(2): 131-133.
- Lokita Gupta (2016). Utility of Home Science in social betterment. *Psyvho- Lingua*. 46 (1) : 92-95.
- B. Srilakshmi (2005). Dietetics. *New age international (P) Limited*. Revised fifth edition.
- Elizabeth B. Harlock (2005). Child Development, *Tata mc grow hills.* Revised Twelth reprint.
- O.P. Dahama, O.P. Bhatnagar (2009) . Education and communication for development. *Oxford & IBH publishing Co. Pvt. LTD,* New Delhi. Revised second edition.
- Pallavi Y., Mamta J., Kiran A. and Arachana S. (2016) A comparative study on dietary habits of teenagers of home science students and non-home science students of Sultanpur city. Unpublished master's dissertation.

- ArtiSinha, RituAggarwal (2015). Home Science education: Challenges and Issues. *Psyho-Lingua*, 45 (2): 157-159.
- Singh, N. and Shubha S.(2017). Home Science: An education for better living. International Journal for Research Trends and Innovation. 2(8): 12-14

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CONSUMER PREFERENCE FOR DEVELOPED AGRICULTURE BASED HANDICRAFTS TO STRENGTHEN THE WOMEN OF AGRA DISTRICT: A TRADITION OF BRAJ

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ABSTRACT

Crop residue-based handicraft is a popular tradition, representing the culture of Braj that creates a way for women's empowerment. The study aims to provide economic benefits to women artisans by assessing consumers' interest and preference for handicraft products made with wheat and maize residues, developed by women artisans of Agra district. The research was conducted in Uttar Pradesh and a total of 234 willing respondents aged between >16 - < 40 years were selected by the convenience sampling method to evaluate the preference for handicrafts. Ten-point rating scale was prepared to assess functionality, uniqueness, appearance, favourable cost, and overall preference of two types of products (Utilitarian products and Decorative products). It was found that all products were highly preferred by the consumers. T-test was applied to check the difference in preference of consumers for products based on their socio-economic profile. So that products can be prepared accordingly. The products were highly preferred by unemployed consumers than the employed one. Gender-wise, men were more interested in decorative items than women.

Another important consideration when choosing handicrafts is income. In order to design the products according to their preferences, these results assist in concentrating on the more interested group. In order to start a chain reaction of awareness among the next generation about this eco-friendly culture, the youth are the primary group to raise awareness about the advantages of eco-friendly items.

Keywords: Braj culture, consumer preference, decorative and utilitarian handicrafts, and women artisans

INTRODUCTION

Women have historically played an "invisible" role in India's economic development, serving as wives, mothers, and helpmates while also being mostly subordinate to men's primary economic labor in both farming and other fields (Bansal, 2011). These days, local economies have begun to prioritise the economic development of their female labour force. As a result, women's responsibilities are changed, and they have the opportunity to perform commercial chores that are largely comparable to those they normally perform at home (Bansal, 2011). According to Roster (2007), a lot of leisure activities are turning into ways for women to feel more powerful. Crafting is one activity that may be performed at home (Malema, 2017). These are unique images of a specific culture or society created using locally available materials and craftsmanship. However, things become more and more commodity-like as globalization advances, placing domestic goods up against those made by

competitors throughout the world. India's population must think about nurturing, promoting, and reviving indigenous talent and historic environmentally friendly and sustainable crafts, as well as providing local markets for the handicraft sector, if intend for country to become a self-sufficient Bharat (Yadav et al., 2022). Additionally, selling such products provides a safety net that can be developed into a long-term livelihood strategy in the event that the conditions that prompted the entry into the business persist or if the benefits of the business are thought to be worthwhile. Numerous artists have begun to experiment with handicrafts (Marques et al., 2019; Shafi, Yang et al., 2019; Agarwal & Gautam, 2023) and the uniqueness of crafts is necessary for them to prosper in the current competitive market (Parthasarathy et al., 2015; Yang & Shafi, 2020), but uniqueness alone is insufficient to support this kind of business (Marques et al., 2019). Other important elements are also included, such as the item's cost, quality, appearance, and functionality. According to Agarwal & Gautam (2021), women in the Braj region engage in crafts made from crop residue, but they haven't used them to generate revenue due to a number of problems. In order to improve their skills, the researcher organized a training program. The Braj culture has been the source of this tradition of agriculture-based handicrafts, and women in the Agra district create new products by fusing some modern styles with traditional ones. The current study also looked at consumer preferences for those locally made, environmentally friendly, and sustainable agriculture-based handicrafts. In order to help women artists, start their microbusinesses and revitalize the handicraft tradition, it is essential to comprehend consumer interest and preferences for these handmade goods.

OBJECTIVES

1. To develop products using wheat residue and maize husk according to vogue for better selling.
2. To assess the preference and interest of consumers for developed products.
3. To raise awareness among the chosen responders about handicrafts.

HYPOTHESIS

H_0 1	Age groups do not significantly differ in their utilitarian choices.
H_0 2	There is no noticeable distinction between male and female utilitarian preferences.
H_0 3	There is no significant difference in utilitarian preferences across economic groups.
H_0 4	No significant difference in utilitarian preferences between employed and unemployed respondents.
H_0 5	Age groups do not significantly differ in their decorative choices.
H_0 6	There is no noticeable distinction between male and female decorative preferences.
H_0 7	There is no significant difference in utilitarian preferences across economic groups.
H_0 8	No significant difference in decorative preferences between employed and unemployed respondents.

METHODOLOGY

Research design: Applied descriptive research design was used to fulfil the objectives of the study.
Sample size: The present study was conducted in Uttar Pradesh. A total of 234 willing respondents who were aged between >16 - <40 years were selected. The respondents were selected by use of the convenience sampling method.

Data collection: The ten-point rating scale was prepared by the researcher and used to collect complete and authentic data. The tool was framed in the Google form as well and sent through social sites like email, WhatsApp, etc. A total of 138 respondents completed the form offline, while 98 respondents completed it online. Presenting things in real assisted in gathering more accurate data. It was written in easy-to-understand basic English. Data was obtained using the self-made scale. The scale was used to assess the preferences and interests regarding the given crop residue-based handicraft products.

Data analysis: It covered rating scores based on functionality, uniqueness, appearance, favourable cost, and overall preference of the product. 11 handcrafted items altogether were used in the evaluation. The products were divided into two categories: One is utilitarian products and the second is decorative products. For scoring 1 to 10 points were given as lower points representing lower preference and a higher score representing a higher preference for the products. The lower scores were 55 and the higher scores were 5500 in a total of 11 products. Statistical Package for Social Sciences (SPSS) Version 20 was used for percentage, Mean, SD, and t-test. Reliability was checked and the tool was highly reliable with Cronbach's Alpha .978.

FINDINGS AND DISCUSSION

1. Utilitarian products



Fig.- 1 Developed utilitarian products by women. 1) Handbag, 2) Sling Bag 3) Potali Bag 4) Basket, 5) Keyring, 6) Accessories Holder

Table- 1 Consumer preference for utilitarian products

Utilitarian products	Functionality		Uniqueness		Appearance		Favourable cost		Overall preference	
	M	SD	M	SD	M	SD	M	SD	M	SD
Handbag	8.76	1.216	8.78	1.232	8.70	1.383	8.54	1.310	8.72	1.282
Sling bag	8.57	1.401	8.65	1.285	8.51	1.324	8.52	1.301	8.64	1.274
Potali bag	8.52	1.406	8.49	1.430	8.51	1.350	8.47	1.378	8.44	1.361
Basket	8.64	1.356	8.67	1.267	8.54	1.399	8.29	1.462	8.54	1.474
Keyring	8.46	1.503	8.56	1.336	8.52	1.378	8.60	1.491	8.72	1.245
Accessories Holder	8.68	1.299	8.49	1.324	8.63	1.261	8.49	1.430	8.59	1.294

Table 1 displays the average consumer preference for utilitarian products prepared with wheat residue. Every customer rated every product higher than five scores. It can be seen that for all the products, consumers have shown their higher interest and the mean score is higher than 8 for each factor like functionality, uniqueness, appearance, favourable cost, and overall preference for the products. Consumers preferred the given handbag and keyring equally and it is cleared by the mean score in overall preference of the handbag and keyring that is 8.72, which is the highest score of all products. After that, the sling bag is also on top of the list of higher-preferred products. The average overall preference for sling bag is 8.64, indicating a higher consumer preference. The last utilitarian product was an accessories holder, which can be used for multipurpose and the consumers gave a higher score for its functionality (8.68) and its appearance (8.63). Overall, it got an 8.59 mean value, which also shows a higher preference of consumers regarding this. It shows that there is a strong demand for utilitarian handicraft products and the appreciation by consumers is revealing a market opportunity for these items. Additionally, Saikumari et al. (2021) observed that there was a greater demand for handmade items and that consumers preferred these kinds of modern products the most. This trend suggests that businesses should consider expanding their offerings in this sector to capitalize on consumer preferences. Furthermore, the emphasis on sustainability and craftsmanship in handmade goods aligns with growing consumer awareness and desire for ethically produced items.

2. Decorative products



Fig.- 2 Developed decorative products by women. 1) Hair clips, 2) Tea coaster, 3) Painting, 4) Photo Frame, 5) Wall Hanging

Table- 2 Consumer preference for decorative products

Decorative products	Functionality		Uniqueness		Appearance		Favourable cost		Overall preference	
	M	SD	M	SD	M	SD	M	SD	M	SD
Hair clips	8.44	1.455	8.60	1.352	8.62	1.268	8.41	1.378	8.50	1.390
Tea coaster	8.47	1.480	8.68	1.255	8.49	1.517	8.53	1.442	8.59	1.337
Photo frame	8.35	1.467	8.51	1.466	8.59	1.424	8.28	1.463	8.53	1.368
Painting	8.86	1.260	8.78	1.330	8.59	1.409	8.47	1.506	8.79	1.370
Wall hanging	8.47	1.439	8.61	1.396	8.61	1.277	8.41	1.460	8.58	1.382

The consumer preference for decorative products made using wheat and maize residues was detailed in Table 2. Hair clips, tea coasters, paintings, picture frames, and wall hangings were all featured in this category. The data indicates that consumers are more interested in decorative products. Customers gave the painting's functionality the highest mean score (8.86), and they also discovered that it was more unique (8.78). Then, with mean scores of 8.59 and 8.58 for overall choice, respectively, tea coasters and wall-hanging items were also on the preferred list with greater interest. Photo frame was also highly preferred by consumers. They were highly interested in the appearance of the photo frame design, with a mean value of 8.59. Silver (2012) concluded that consumers preferred the appearance of handicraft products more. The costs of all products were preferable and calculated mean scores were higher than 8 for each item. So, the researcher found the positive attitude of consumers, and women artisans might get ideas about the products based on the choice of consumers. Jacob (2023) revealed that customers were interested in new, uncommon designs and

avoided obsolete ones. According to the findings, female artisans might start a successful microbusiness, and their dedication to producing original designs indicates that this sector would grow considerably (Agarwal & Gautam, 2021).

Table- 3 Average score for utilitarian product preference among consumers

Variables	Category	N	%	Mean	SD	t-test	*p-value*
Age	16-27 Years	118	50.43	255.92	27.57	.721	.472
	28-40 Years	116	49.57	258.56	28.55		
Gender	Female	159	67.95	257.50	27.57	2.25	*.025**
	Male	75	32.05	248.67	28.79		
Annual Family income	Below 3 lakhs	176	75.21	253.65	30.06	2.46	*.015**
	Above 3 lakhs	58	24.79	242.52	29.33		
Occupation	Employed	96	41.03	249.10	28.85	3.28	*.001***
	Unemployed	138	58.97	261.28	27.21		

Note: ** Significant at <0.01 level, *Significant at <0.05 level

The above table described the difference in consumer preference for utilitarian products based on their age, gender, annual family income, and occupation. The major difference in preference for utilitarian handicraft products was found in occupation, annual family income, and age of consumers. The table shows that the mean score (261.28) of unemployed consumers was higher than the mean score (249.10) of employed consumers related to preference for utilitarian products. It was obtained with t-test 3.28 and this difference is significant at <0.01 level. This result shows that unemployed consumers were also interested in the handicraft products and they can also contribute to increasing the market value of handicraft products. Similarly, the preference of the consumers whose annual family income was below 3 lakhs was higher, with a mean score of 253.65 than the consumers whose annual family income was above 3 lakhs (242.52). It was cleared with a t-test 2.46, which is significant at < 0.05 level. It is notable that lower income would not bind the consumers to choose handicraft products. A higher level of income shows the consumer's ability to buy new and innovative products. Wang et al. (2008) also stated the same results. Gender is also a major variable that shows its effects on the choice of handicraft items. The mean score 257.50 for females showed a higher preference than the mean score of the male consumers (248.67) and this difference was indicated with t-test 2.25 at <0.05 level, which is significant. But Pani (2016) obtained no significant relation between consumer preference and gender. On the other hand, Saikumari et al. (2021) found that females preferred handmade products more.

On the other hand, age does not affect the choice of handicraft products. The consumers aged 16 to 27 years old have similarities with the consumers aged 28 to 40 years old regarding the preference for utilitarian products. It was cleared with the t-test (.721) at >0.05 level and this difference is insignificant. (Pani, 2016; Athulya, & Ramya, 2019; Roni et al, 2022) also found no significant difference in preference for handicrafts based on their age.

Table- 4 Hypothesis results for utilitarian products

Factor	Utilitarian products
Gender	Significant (<0.05)
Income	Significant (<0.05)
Occupation	Significant (<0.01)

Table- 5 The difference in consumer preference for decorative products

Variables	Category	N	%	Mean	SD	t-test	*p-value*
Age	16-23 years	118	50.43	212.67	23.12	.664	.507
	28-40 years	116	49.57	214.87	27.40		
Gender	Female	159	67.95	209.09	26.94	3.02	*.003***
	Male	75	32.05	219.81	21.48		
Annual Family income	Below 3 lakhs	176	75.21	218.07	26.01	2.15	*.032**
	Above 3 lakhs	58	24.79	209.84	22.66		
Occupation	Employed	96	41.03	210.85	26.62	1.91	.057
	Unemployed	138	58.97	217.27	24.25		

Note: ** Significant at <0.01 level, *Significant at <0.05 level

The table indicated the details of the preference of consumers for decorative products based on their age, gender, annual family income, and occupation. The table shows that gender has a major effect on the choice of decorative products. The mean value of males (219.81) for the preference for decorative products was greater than the mean value of females (209.09) in this regard and this difference was cleared with t-test 3.02, which is significant at < 0.01 level. This result shows greater support to women artisans because male consumers were also interested in handicraft items and wanted to decorate their surroundings. At the same time, the annual family income also creates a difference in the choice of handicrafts. The consumers whose annual family income was below 3 lakhs preferred decorative products more, with a mean score of 218.07, than the consumers whose annual family income was above 3 lakhs (209.84). This result was obtained with t-test of 2.15, which is significant at < 0.05 level. Silver (2012) found that consumers with higher income have a higher preference for handicraft products.

Consumers, based on their age, have no difference in choice for decorative products. It might be because there are only two categories containing a larger number of age distribution. But Saikumari et al. (2021) found that younger aged consumers preferred handicrafts. Similarly, no difference was found in the preference for decorative products of consumers based on their occupation. It is cleared with a t-test of 1.91 at >0.05 insignificant level.

Table- 6 Results for decorative products

Factor	Decorative products
Gender	Significant (<0.01)
Income	Significant (<0.05)

CONCLUSION

Crop residues are used to create sustainable, eco-friendly products. The researcher has tried to revitalize this culture, which was taken from Braj culture. The current study's findings indicate that all of the generated products were highly preferred by consumers. The current study found that male respondents were more interested in decorative objects than female respondents. Women should pay attention to the preferences of male consumers as well, and goods should be developed based on their interests as well. The present study discovered that income has a considerable impact on preference for handcrafted products, which is another important element that influences marketing of them. Consumers with annual family incomes below 3 lakhs have shown higher preference for utilitarian and decorative goods than those whose annual family income was above 3 lakhs in both

product categories. It speaks to the fact that women artisans should focus on the cost of the products also. For this, they should prepare some affordable products for all income types of consumers with a sense of cultural and artistic appreciation. The quality, uniqueness, functionality, cultural appearance and favourable cost are major factors that contribute to successful ownership. The interest of the younger generation in handicrafts helps to participate in reviving the culture of these handmade goods. They have an awareness about the importance of this culture and by this, the following generation would also understand its significance.

SUGGESTIONS FOR FUTURE RESEARCH

Although the results of this study provide a basis for comprehending the potential of sustainable products, additional research is required to expand the scope and address associated aspects. Through more comprehensive analysis, future studies can support the goals of raising awareness among the younger generation and promoting sustainability. More suggestions are-

1. To make these products economically viable, future research can examine price strategies, consumer willingness to pay, and market segmentation.
2. Look for ways that traditional skills and environmental ideals might be taught to the next generation through family involvement or educational initiatives.
3. Future studies can evaluate the ways in which e-commerce, social media, and online platforms can be utilized to more successfully market and sell products made from agricultural residue.
4. Examine how NGOs, local governments, and legislative actions might help expand these kinds of long-term, women-led projects.

REFERENCES

- Agarwal, N., & Gautam, M. (2024). Identify Strategies to Revive the Craft Culture of Braj Region: A Modern Perspective. *International Journal of Progressive Research in Engineering Management and Science (IJPREMS)*, *4*(11), 2647-2652. https://www.doi.org/10.58257/IJPREMS37345
- Agarwal, N., & Gautam, M. (2023). Review on Wheat Straw as Agricultural Waste to Wealth: A Way of Sustainable Micro Entrepreneurship. *Journal of Agricultural Extension Management, 24*(1), 123- 129.
- Agarwal, N., & Gautam, M. (2021). Possibility Assessment of Utilization of Crop Residues to Uplift Economic Condition of the Rural Women. *GAU Research Journal, 46*(4), 3-8.
- Athulya, V., Ramya, M. (2019). Consumer Preference and Satisfaction towards Handicraft Products with Special Reference to Kozhikode District Kerala. *Journal of Emerging Technologies and Innovative Research (JETIR). 6*(6), 731-737.
- Bansal, S. P., & Kumar, J. (2011). Women Empowerment and Self-Sustainability through Tourism : A Case Study of Self-employed Women in Handicraft Sector in Kullu Valley of Himachal Pradesh. *Himachal Pradesh University Journal, July*, 1–11.
- Campbell, C. (2005). The Craft Consumer: Culture, Craft and Consumption in a Postmodern Society. *Journal of Consumer Culture, 5(1*), 23–42.
- Jacob, J. (2023). Consumer Preference and Satisfaction towards Handicraft Product in Tirunelveli District. *Journal of Emerging Technologies and Innovative Research, 10*(8), 37-45.

- Malema, D. R., & Naidoo, S. (2017). Spaces for the Empowerment of Women: Rural Arts and Crafts Projects. *African Journal of Hospitality, Tourism and Leisure*, *6*(2), 1–18.
- Marques, C. S., Santos, G., Ratten, V. & Barros, A. B. (2019). Innovation as a Booster of Rural Artisan Entrepreneurship: A Case Study of Black Pottery. *International Journal of Entrepreneurial Behavior & Research, 25(*4), 753–772.
- Pani, D., & Pradhan, S. K. (2016). An Empirical Study of Impact of Demographic Variables on Consumer Preference towards Tribal Handicraft – A Case of Rayagada District during Chaiti Festival. *Pacific Business Review International. 8*(7), 61–68.
- Parthasarathy, M., Lane, V., & Stansifer, M. L. (2015). A Time-based Analysis of Changing Consumer Values in India. *Journal of Indian Business Research, 7(*3), 271–291.
- Roni, H., Andansari, D., & Syafary, D. (2022). The Relationship Between Ethnicity & Age Factors and the Tendency of East Kalimantan People's Preference Towards the Component of Handicraft Products. *International Journal of Multidisciplinary Research and Publications (IJMRAP), 5*(7), 58-60.
- Saikumari, V., Lalitha, C., & Moganapriya, E. (2021). A Study on Demand of Handmade Products with Reference to Chennai, Tamilnadu. *Turkish Journal of Computer and Mathematics Education, 12*(6), 5404-5408.
- Shackleton, S.E. & Campbell, B.M. (2007). The Traditional Broom Trade in Bushbuckridge, South Africa: Helping Poor Women Cope with Adversity. *Economic Botany,* 61(3), 256–268.
- Shafi, M., Yang, Y., Khan, Z., & Yu, A. (2019b). Vertical Co-operation in Creative Micro-Enterprises: A Case Study of Textile Crafts of Matiari District, Pakistan. *Sustainability, 11(*3), 920.
- Silver, G. D., Kundu, P. K. (2012). Handicraft Products: Identify the Factors that Affecting the Buying Decision of Customers (The Viewpoints of Swedish Shoppers).
- Wang, G., Dou, W., & Zhou, N. (2008). Consumption Attitudes and Adoption of New Consumer Products: A Contingency Approach. *European Journal of Marketing, 42,* 238–254.
- Yadav, U. S., Tripathi, R., & Rawat, A. (2022). Performance Of Women Artisans As Entrepreneurs In ODOP In Uttar Pradesh To Boost Economy : Strategies and Away Towards Global Handicraft Index For. *Academy of Marketing Studies Journal. January*. 26 (1).
- Yang, Y., & Shafi, M. (2020). How does Customer and Supplier Cooperation in Micro-Enterprises Affect Innovation? Evidence from Pakistani Handicraft Micro-Enterprises. *Asian Business & Management, 19,* 530–559.

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ENABLING COMMUNITY INSTITUTIONS FOR PROMOTING HEALTH: UNDERSTANDING THE ROLE OF WOMEN COLLECTIVES

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ABSTRACT

This study investigates the critical role of women collectives in promoting health and tackling food insecurity in the Ramgarh Block of Alwar District, Rajasthan, within the framework of the Deendayal Antyodaya Yojana-National Rural Livelihood Mission (DAY-NRLM). Focusing on the integrated approach of DAY-NRLM, the research highlights the impact of Self-Help Groups (SHGs), Village Organizations (VOs), and Cluster Level Federations (CLFs) in advancing Food, Nutrition, Health, and WASH (FNHW) interventions. By fostering a holistic approach to women's empowerment, DAY-NRLM combines economic self-reliance with improvements in health outcomes. Employing a descriptive research design, data were collected from 112 participants, including SHG members and office bearers, using Knowledge and Practice Assessment Tests, in-depth interviews, and a Self-efficacy Tool. Findings reveal significant disparities in knowledge and practices related to nutritional supplementation and Agri-nutrition gardens between the two village organizations examined. While both groups demonstrated high self-efficacy scores, VO-1 exhibited superior performance attributed to enhanced training and community engagement. The results underscore notable improvements in health awareness and decision-making among women collectives; however, challenges related to awareness generation and access to services persist. This research emphasizes the vital role of education and active community participation in fostering health and nutrition practices, contributing to the broader objectives of poverty alleviation and women's empowerment aligned with the Sustainable Development Goals (SDGs). The insights gained from this study inform strategies for optimizing community development and health initiatives in rural settings, highlighting the importance of federated women's collectives in driving sustainable development and enhancing community health outcomes.

Keywords: Women Collectives, National Rural Livelihood Mission (NRLM), Food, Nutrition, Health and WASH (FNHW), Agri-nutrition garden, Self-help Groups (SHGs).

INTRODUCTION

India's pursuit of the Sustainable Development Goals (SDGs), particularly the first five related to poverty, hunger, health, education, and gender equality, involves addressing deeply interconnected challenges. Central to this effort is the Deendayal Antyodaya Yojana-National Rural Livelihood Mission (DAY-NRLM), launched in 2011 to empower women and enhance economic opportunities. By equipping women with skills and decision-making abilities, DAY-NRLM plays a significant role in advancing the nation's progress toward achieving the SDGs.

Originally focused solely on economic empowerment, the NRLM shifted its approach towards holistic development. The transition, moving from Panchsutra to Dashasutra, integrates Food, Nutrition, Health, and WASH (FNHW) into its framework, recognizing that real women empowerment goes beyond financial independence. It includes awareness of health, entitlements, and essential skills. This awareness enables women to make informed choices, reduce out-of-pocket health expenses, avoid wage losses, and improve their family's well-being.

Poverty in India is a multifaceted, intertwined with deprivations in nutrition, maternal health, sanitation, and access to clean drinking water. The 2023 Multi-dimensional Poverty Index by NITI Aayog reveals that a significant proportion of Indian households experience these challenges, with 31.52% lacking adequate nutrition and 30.13% facing limited sanitation access, highlighting the need for a comprehensive strategy targeting root causes of poverty.

Led by the Ministry of Rural Development, DAY-NRLM aims to alleviate poverty by providing economically disadvantaged households, especially women, with self-employment opportunities and financial independence. With roots in the Swarna Jayanti Gram Swarozgar Yojna (SGSY), DAY-NRLM promotes community-driven development and financial inclusion through a vast network of over 83.7 lakh women collectives supporting more than 902 lakh households.

The holistic approach of DAY-NRLM is encapsulated in the Dasa Sutra Strategy, which emphasizes savings, access to credit, education, health, nutrition, WASH, and the convergence of Panchayati Raj Institutions (PRIs). Since 2017, DAY-NRLM has promoted integrated FNHW awareness among SHG members, supporting POSHAN Abhiyaan by facilitating access to public health entitlements. DAY-NRLM has enhanced women's awareness of health entitlements and fostered informed decisions, addressing multidimensional poverty. Collaborations with agencies like UNICEF have extended health services to marginalized communities.

The Operational Aspects- The NRLM operates through a federated structure, comprising State Rural Livelihood Missions (SRLMs) in each state and three tiers of women collectives: Self-Help Groups (SHGs), Village Organizations (VOs), and Cluster Level Federations (CLFs). Typically, a village has 4-5 SHGs, each with 10-12 women and key office bearers. SHGs enable rural women to save collectively and access credit. VOs, as primary federations of SHGs, consist of 15 members, also with three office bearers and facilitate networking among SHGs and act as a bridge to CLFs. They form four key committees the Bank Committee, Aajeevika Committee, Group Care Committee, and Social Action Committee (SAC). The SAC, with three members, focuses on interventions related to Food, Nutrition, Health, and Gender.

CLFs federate multiple VOs and typically have 16 members, four as office bearers and twelve in the Executive Committee divided into four committees. The SAC at CLF level, with three members including a Master Trainer, implements FNHW and Gender interventions by training VO-Assistants. This research explores how these structures improve health outcomes and food security in the Ramgarh Block of Alwar District.

The evolution of the National Rural Livelihoods Mission (NRLM), a key initiative led by India's Ministry of Rural Development (MoRD), highlights its crucial role in fostering holistic community health and development (Raha & Tripathy, 2023). Launched as the Swarna Jayanti Gram Swarozgar Yojna (SGSY), NRLM has prioritized empowering marginalized communities, particularly women, through self-employment and skilled wage opportunities (International Women's Day 2023 – Eastern Mirror, n.d.). This study delves into NRLM's strategic development from the Panchsutra to the Dasasutra framework (Kathiriya, Damasia, & Kabaria, 2013), expanding its scope beyond financial inclusion to critical domains like education, health, governance, entitlements, and livelihoods. Central to NRLM's strategy is the integration of Food, Nutrition, Health, and WASH (FNHW) initiatives, which align with complementary programs like the POSHAN Abhiyaan (Sarania, 2015).

FNHW interventions leverage the social capital of Self-Help Groups (SHGs) to address persistent health and nutrition challenges among rural populations (Scott et al., 2022). By disseminating essential knowledge and promoting behaviour change, FNHW initiatives empower women collectives within SHGs to take proactive roles in enhancing community health outcomes (Scott et al., 2022). This integrated approach within NRLM's federated structure not only improves community health literacy but also strengthens the capacity of women's collectives to advocate for improved health services and infrastructure (Purdey et al., 1994). NRLM's commitment to SDG 1 on Zero Poverty indicates its recognition of poverty's multidimensional nature and the need for comprehensive interventions (Manvar, Kathiriya, & R., 2023).Swabhimaan, a multi-sector integrated health and nutrition program for women and girls in India, provide valuable insights into how NRLM's women's collectives can strengthen the delivery and promotion of women's nutrition services at the community level, targeting critical groups such as adolescent girls, pregnant women, and mothers of children under two years of age (Shrivastav et al., n.d.). The program demonstrates the potential of NRLM's federated structure to manage and deliver essential nutrition services to these vulnerable groups (Shrivastav et al., n.d.).

The federated structure of women's collectives under NRLM—comprising SHGs, Village Organizations (VOs), and Cluster Level Federations (CLFs)—plays a crucial role in decentralizing decision-making and fostering community ownership, supported by local government institutions. Literature highlights the impact of FNHW interventions on women's empowerment and participation within NRLM, influencing economic growth, health, and gender equality (Course, 1978; Purdey et al., 1994). A 2016 study showed that DAY-NRLM village organizations can manage grants for delivering essential nutrition services for women when enabled and incentivized (Kumar et al., 2022).

In summary, this study addresses a critical research gap by examining the underexplored role of women collectives in advancing community health and nutrition outcomes under NRLM. While the program's economic impact is well-documented, its health dimension remains less

visible. This paper explores how empowered women collectives, through NRLM's federated structure, contribute to holistic progress in the Ramgarh Block of Alwar District. By emphasizing FNHW initiatives, the research aligns with NRLM's mandate to foster sustainable livelihoods, enhance self-efficacy of Community Resource Persons, and drive positive change through improved practices in nutrition supplementation and Agri-nutrition Gardens.

OBJECTIVES

- To examine the knowledge and practices of members of women collectives regarding the nutrition supplementation component of FNHW.
- To analyse the knowledge and practices of members of women collectives regarding Agri-nutrition garden component of FNHW.
- To understand the challenges experienced by the office bearers in generating awareness and providing support in accessing services related to the selected components of FNHW.
- To assess the self-efficacy of the office bearers in discharging their responsibilities as Community Resource Persons.

METHODS

This study employed a descriptive research design to evaluate awareness, practices, and challenges related to Food, Nutrition, Health, and WASH (FNHW) among women collectives in the Ramgarh Block of Alwar District, Rajasthan. The research focused on selected Cluster Level Federations (CLFs), Village Organizations (VOs), and Self-Help Groups (SHGs) across various villages, utilizing purposive sampling of members with at least two years of continuous engagement. The sample included 112 participants, comprising 100 SHG members and 12 office bearers from CLFs and VOs. Data collection methods included Knowledge and Practice Assessment Tests, in-depth interviews, and a Self-efficacy Tool to assess the confidence levels of office bearers. Challenges encountered involved time constraints that hindered the establishment of rapport with participants. Data analysis comprised descriptive statistics for demographic summaries, quantitative analyses of assessments, and content analysis of interviews to identify themes related to challenges and self-efficacy. This methodological framework aimed to elucidate the contributions and obstacles faced by women collectives in enhancing community health.

FINDINGS AND DISCUSSIONS

Section 1 : Background Information:

The demographic profile of the respondents in the survey displayed a variety of origins and traits. Across the two village organizations, Ujaala (VO-1) and Daya (VO-2), there was a balanced representation of Self-Help Groups (SHGs), accounting for 40% and 60%, respectively. Within Ujaala, consisting of Nassopur and Laalpuri, and Daya, covering Naglimegha and Moonpur, different SHGs were found, totaling 100 SHGs dispersed across both organizations for comparative examination. Age-wise, the majority of responding members were over 40 (40%), followed by those aged 30-40 (34%) and under 30 (26%). A significant number of members were

illiterate (52%), while around 41% had completed schooling up to the 10th grade, demonstrating a diversified educational landscape among SHG participants. Participants noted benefits such as knowledge growth, networking, and enhanced confidence. Challenges included time management and financial limitations, with VO-2 experiencing larger percentages. Both groups actively participated in training sessions and demonstrated balanced participation and leadership involvement. These insights highlight how varying education levels and age groups contribute to the dynamics within SHGs and their training experiences.

Section 2: Knowledge, Practices and Perceived Self-efficacy assessment test

Table 1: Knowledge, Practices and Perceived Self-efficacy of members of women collectives regarding ICDS

Information about ICDS related Aspect of FNHW (n=100)						
	VO-1 (Ujaala)		VO-2 (Daya)		Total (N)	
Statements	n (n=50)	%	n (n=50)	%	N=100	%
Ensuring health and nutrition during the first 1,000 days of a child life	43	86%	36	72%	79	7%
Packaged snacks and meals provided at Anganwadi centres	30	60%	29	58%	59	59%
Take Home Ration (THR) is the common term for food provided to mothers of Children under 2.	28	56%	0	0%	28	28%
Practices followed regarding availing ICDS services by SHG members (n=100)						
	VO-1 (Ujaala)		VO-2 (Daya)		Total (N)	
Statements	n (n=50)	%	n (n=50)	%	N=100	%
All family members who are in the targeted age groups receive non-formal education, nutrition, and immunization services provided under ICDS	24	100%	24	48%	48	48%
Steps taken to avail ICDS benefits include Regular Anganwadi visits, health awareness sessions and immunization	37	74%	29	58%	66	66%
Regular check-ups and proper nutrition are provided to support pregnant women under the ICDS scheme	41	82%	35	70%	76	76%
Perceived Self-efficacy of office bearers of collectives regarding availing services of ICDS Program under FNHW (n =13)						
	VO-1 (Ujaala)		VO-2 (Daya)		Total (N)	
Statements	n (n=7)	%	n (n=6)	%	N=13	%
I can utilize the services provided	7	100%	6	100%	13	13%

by the government for proper nutrition and healthcare during the first 1,000 days of my child's life.						
Perceived Self-efficacy of office bearers of collectives regarding helping other women members in seeking services of ICDS Program under FNHW (n =13)						
	VO-1 (Ujaala)		VO-2 (Daya)		Total (N)	
Statements	n (n=7)	%	n (n=6)	%	N=13	%
I am capable of providing proper information about nutrients under the ICDS program.	7	100%	6	100%	13	13%

VO-1 outperformed VO-2 across knowledge, practices, and perceived self-efficacy related to ICDS, owing to structured training, effective monitoring, and robust information flow. VO-1's office bearers demonstrated stronger awareness of the critical first 1,000 days, on-ground competence, and sustained capacity-building—reflecting deeper community trust and positioning them as more effective Community Resource Persons.

Table 2: Knowledge, Practices and Perceived self-efficacy confidence of members of women collectives regarding Nutritional Supplementation

Information about Nutrition supplementation related aspect of FNHW (n=100)						
Statements	VO-1 (Ujaala)		VO-2 (Daya)		Total (N)	
	n (n=50)	%	n (n=50)	%	N=100	%
Nutritional supplementation encompasses food provisions for children and women	39	78%	33	66%	72	72%
Supplementary nutrition is distributed on Village Health, Sanitation, and Nutrition Day (VHSND)	43	86%	32	64%	75	75%
Nutritional Supplementation is distributed by Anganwadi worker	47	94%	36	72%	83	83%
Practices followed for availing Nutrition supplementation services by SHG members (n=100)						
	VO-1 (Ujaala)		VO-2 (Daya)		Total (N)	
Statements	n (n=50)	%	n (n=50)	%	N=100	%
Received hot cooked meals from Anganwadi centres for children aged 3-6 years	20	40%	22	44%	42	42%
Received Supplementary nutrition for Children, pregnant women, and breastfeeding mothers from Anganwadi centres	50	100%	50	100%	100	100%
Perceived Self-efficacy of office bearers of collectives regarding availing services of Nutrition Supplementation under FNHW (n=13)						
	VO-1 (Ujaala)		VO-2 (Daya)		Total (N)	

Statements	n (n=7)	%	n (n=6)	%	N=13	%
I understand the importance of proper nutrition for lactating mothers for their livelihood and family care.	7	100%	6	100%	13	13%
Perceived Self-efficacy of office bearers of collectives regarding helping other women members in seeking Nutrition Supplementation under FNHW (n=13)						
	VO-1 (Ujaala)		VO-2 (Daya)		Total (N)	
Statements	n (n=7)	%	n (n=6)	%	N=13	%
I believe that I can provide supplementary nutrition alongside breastfeeding to children aged 6 months to 3 years.	7	100%	6	100%	13	13%

VO-1 outperformed VO-2 in knowledge, practices, and perceived self-efficacy on nutritional supplementation. Their enhanced awareness and stronger compliance stemmed from culturally rooted tools like food rangoli and structured home visits. VO-1's office bearers showed deeper confidence, proactive engagement, and service facilitation—positioning them as more effective leaders in nutrition interventions.

Table 3: Knowledge, Practices and Perceived Self-efficacy of members of women collectives regarding Take-Home Ration

Information about Take Home Ration related aspect of FNHW (n=100)						
	VO-1 (Ujaala)		VO-2 (Daya)		Total (N)	
Statements	n (n=50)	%	n (n=50)	%	N=100	%
Mothers receiving Take Home Ration (THR) at home for their children (0-3 months)	6	12%	2	4%	8	8%
Target Groups for THR are Pregnant women, children aged 6 months to 3 years, and identified adolescents	43	86%	33	66%	76	76%
THR can be distributed on alternate Days	11	22%	30	60%	41	41%
Practices followed for Take-Home Ration by SHG members (n=100)						
	VO-1 (Ujaala)		VO-2 (Daya)		Total (N)	
Statements	n (n=50)	%	n (n=50)	%	N=100	%
Receive Take-Home Ration on Village Health, Sanitation, and Nutrition Day	35	70%	34	68%	69	69%
Receive Take-Home Ration (THR) for 6-36-month-old children	42	84%	6	12%	48	48%
Perceived Self-efficacy of women members or office bearers of collectives regarding Take-Home Ration under FNHW (n=13)						
	VO-1 (Ujaala)		VO-2 (Daya)		Total (N)	

Statements	n (n=7)	%	n (n=6)	%	N=13	%
I can use Take-Home Ration (THR) from Anganwadi centres for the health of my children	7	100%	6	100%	13	13%

VO-1 (Ujaala) showed stronger knowledge, practices, and self-efficacy on THR than VO-2. Higher awareness and access (86% vs. 66%; 84% vs. 12%) reflected targeted training and effective coordination. Despite limited awareness of distribution frequency, VO-1's active facilitation improved THR uptake and delivery through consistent field engagement and follow-up. Elevated self-efficacy (100%) translated into tangible community-level improvements in THR uptake and service delivery.

Table 4: Knowledge, Practices and Perceived Self-efficacy of the members of women collectives regarding Agri-nutrition Garden

Information about Importance of Agri-nutrition Garden, what can be grown in them and establishing and maintaining Agri-nutrition gardens (n=100)						
	VO-1 (Ujaala)		VO-2 (Daya)		Total (N)	
Statements	n (n=50)	%	n (n=50)	%	N=100	%
Planting Agri-nutrition garden help to provide nutritious food for the family	33	66%	34	68%	67	67%
Climbers vegetables like Pumpkins and Bottle Gourds are suitable for rooftop gardening	35	70%	22	44%	57	57%
Kitchen wash water is suitable water source for Agri-nutrition garden	29	58%	24	48%	53	53%
Livelihood CRP Didis should be contacted to establish an Agri-nutrition Garden	41	82%	32	64%	73	73%
Practices followed for Agri-nutrition Garden, what can be grown in them and establishing and maintaining Agri-nutrition gardens by SHG members (n=100)						
	VO-1 (Ujaala)		VO-2 (Daya)		Total (N)	
Statements	n (n=50)	%	n (n=50)	%	N=100	%
Fruits and vegetables obtained from the Agri-nutrition garden is consumed by family Members	50	100%	50	100%	100	100%
Establish Agri-nutrition garden on 15 x 15sq. feet of land	11	22%	9	18%	20	20%
I take information from Livelihood Krishi Shakhi for establishing an Agri-nutrition Garden	35	70%	31	62%	66	66%
Perceived Self-efficacy of women office bearers of collectives regarding Agri-nutrition Garden, what can be grown in them and establishing and maintaining Agri-nutrition gardens (n=13)						
	VO-1 (Ujaala)		VO-2 (Daya)		Total (N)	
Statements	n (n=7)	%	n (n=6)	%	N=13	%

I can establish an Agri- nutrition garden in small spaces around my home.	7	100%	6	100%	13	13%
I can prepare appropriate organic fertilizer for the Agri-nutrition garden.	7	100%	6	100%	13	13%
I enhance soil fertility by using homemade compost, cow dung, or compost prepared at home.	7	100%	6	100%	13	13%

In Agri-nutrition Gardens, both VOs reported full self-efficacy, but VO-1 (Ujaala) demonstrated stronger knowledge, improved practices, and greater confidence. A higher proportion identified rooftop climbers and contacted Livelihood CRP Didis, reflecting better engagement. VO-1's office bearers facilitated linkages, led training, and supported SHG adoption—translating capacity into action through clear role understanding and proactive leadership.

Concluding Analysis: Self-Efficacy differences between VO-1 and VO-2:

Across all FNHW domains, including ICDS, nutritional supplementation, Take-Home Ration, and Agni-nutrition Gardens, office bearers of both VO-1 and VO-2 reported full self-efficacy at 100%. However, there were noticeable differences in how they expressed their confidence and leadership. VO-1 leaders showed greater engagement, took more initiative in raising awareness, and collaborated more effectively with front line workers. This underscores the importance of ongoing training and hands-on experience in building confidence and leadership in community resource roles.

This section presents a thematic summary of findings from Objectives 3 and 4, highlighting key challenges and self-efficacy insights. The table below outlines the outlines across the two Vos-

Table 5: Additional Thematic analysis: Challenges & Self efficacy of VO Leaders

Thematic Area	**Key Insights**	**VO-1 Vs. VO-2 comparison**
Time constraints	Balancing household and seasonal work is challenging.	VO-1 manages via planning; VO-2 faces dropouts, irregularity
Frontline coordination	ASHAs and AWWs enhance outreach.	VO-1 maintains strong ties; VO-2 lacks regular engagement
Community Engagement	Sustained motivation drives awareness.	VO-1 shows initiative; VO-2 relies on external prompting
Motivation & Recognition	Lack of Acknowledgement affects morale and continuity.	VO-1 feels empowered; VO-2 feels overlooked

Self-efficacy	Confidence varies in practical application.	VO-1 translates confidence into action; VO-2 struggles with consistency..

Thematic analysis shows that while both VOs engaged in FNHW activities, VO-1 (Ujaala) office bearers more effectively overcame implementation barriers due to stronger support systems and coordination with ASHAs and AWWs. This enabled consistent awareness efforts and greater community participation. In contrast, VO-2 (Daya) struggled with time constraints, low motivation, and lack of recognition. Although both reported similar self-efficacy scores, VO-1 leaders translated confidence into action through demonstrations, nutrition garden promotion, and culturally rooted tools. VO-2's application was inconsistent; highlighting that self-efficacy is shaped not just by belief but by ongoing support and enabling environments.

CONCLUSION

This study highlights the transformative role that federated women's institutions under DAY-NRLM play in improving nutrition & health outcomes and fostering community empowerment. The findings show that while both Village Organizations (VOs) had a basic level of knowledge and service usage, VO-1 (Ujaala) consistently outperformed VO-2 (Daya) in all four FNHW components: ICDS, nutritional supplementation, Take-Home Ration (THR), and Agri-nutrition Gardens.

Specifically, the findings reveal that office bearers face challenges such as time constraints, lack of incentives, limited coordination between departments, and resistance from the community. These issues were more significant in VO-2, which lacked the supportive environment that VO-1 had. VO-1 benefited from regular support, participatory tools, and a stronger SAC functioning, which helped it overcome challenges more effectively.

The study indicated that while all office bearers felt confident in supporting community health services, VO-1 members turned this confidence into action. Their active involvement—ranging from home visits to training sessions—reflects leadership combining internal confidence with external support. This contrasts with VO-2 members, where self-efficacy was not always matched by execution.

The study suggests that structured training, role recognition, and peer mentoring should be expanded across VOs to boost motivation and skills. These will improve program delivery and enhance community ownership of nutrition & health initiatives, essential for achieving SDG-aligned outcomes in rural India.

REFERENCES

- Abhishek Kumar, V., Sethi, V., de Wagt, A., Parhi, R. N., Bhattacharjee, S., Unisa, S., R. S., Saraswat, A., Kejrewal, N., Shrivastava, M., Tripathy, L., Murira, Z., & Vir, S. (2023). *Evaluation of impact of engaging federations of women groups to improve women's nutrition interventions—before, during, and after pregnancy in socially and economically backward geographies: Evidence from three eastern Indian States*.

- Bayeh, E. (2016). *The role of empowering women and achieving gender equality to the sustainable development of Ethiopia*. *Pacific Science Review B: Humanities and Social Sciences*, 2(1), 37–42. https://doi.org/10.1016/j.psrb.2016.09.013
- Chaitanya, K. (n.d.). *A study on FNHW interventions*. Scribd. https://www.scribd.com/document/546374740/A-Study-on-FNHW-Interventions-K-Chaitanya
- Government of India, Department of Women and Child Development, Ministry of Human Resource Development. (1993). *National Nutrition Policy*. https://wcd.nic.in/sites/default/files/nnp_0.pdf
- International Women's Day 2023 – Eastern Mirror. (n.d.). https://easternmirrornagaland.com/international-womens-day-2023/
- Kathiriya, J. B., Damasia, D. M., & Kabaria, B. (2013). *Role of rural women in dairy farming of Rajkot District*. ResearchGate. https://www.researchgate.net/publication/270435446_Role_of_Rural_Women_in_Dairy_Farming_of_Rajkot_District
- Manvar, H. A., Kathiriya, J. B., & R. (2023). *The study on empowerment of women by Self Help Groups*. ResearchGate. https://www.researchgate.net/publication/372236796_THE_STUDY_ON_EMPOWERMENT_OF_WOMEN_BY_SELF_HELP_GROUPS
- Monica Shrivastav, Abhishek Saraswat, Neha Abraham, R. S. Reshmi, Sarita Anand, Apolenarius Purty, Rika Shalima Xaxa, Jagjit Minj, Babita Mohapatra, & Vani Sethi. (2023). *Early lessons from Swabhimaan, a multi-sector integrated health and nutrition programme for women and girls in India*.
- POSHAN Abhiyaan | Ministry of Women & Child Development. (n.d.). https://wcd.nic.in/schemes/poshan-abhiyaan
- Purdey, A. F., Adhikari, G. B., Robinson, S., & Cox, P. W. L. (1994). *Participatory health development in rural Nepal: Clarifying the process of community empowerment*. *Health Education Quarterly*, 21(3), 329-343. https://doi.org/10.1177/109019819402100305
- Raha, S., & Tripathy, B. (2023). *Role of literacy and education upon women empowerment and gender dynamics in the tea garden household of Assam*. ResearchGate. https://doi.org/10.13140/RG.2.2.20501.50409
- Sarania, R. (2015). *Impact of Self-Help Groups on economic empowerment of women in Assam*. *International Research Journal of Interdisciplinary & Multidisciplinary Studies (IRJIMS)*, 1(1), 148-159.
- Scott, S., Gupta, S., Menon, P., Raghunathan, K., Thai, G., Quisumbing, A. R., Prasad, V., Hegde, A., Choudhury, A., Khetan, M., Nichols, C., & Kumar, N. (2022). *A quasi-experimental evaluation of a nutrition behavior change intervention delivered through women's Self-Help Groups in rural India: Impacts on maternal and young child diets, anthropometry, and intermediate outcomes*. *Current Developments in Nutrition*. https://doi.org/10.1093/cdn/nzac079
- Menon, P., Chakrabarti, S., & McDonagh, K. (2021). Community platforms for nutrition behaviour change: A review of evidence from India. *Maternal & Child Nutrition*, 17(S1), e13155. https://doi.org/10.1111/mcn.13155
- Desai, R. M., Joshi, S., & O'Connell, S. D. (2015). Can self-help groups really be agents of change? *The World Bank Research Observer*, 30(1), 27–52. https://doi.org/10.1093/wbro/lku003

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DO CLIMATIC STRESSES AND EXTREMES POSE GREATER CLIMATIC RISK TO POOR URBAN WOMEN? A STUDY OF SLUMS IN DELHI, INDIA

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ABSTRACT

Climate change is one the greatest developmental challenges confronting cities in countries such as India. Urban poor especially women face the major brunt of changing climatic conditions because of their high dependence on natural resources, and limited capacity to cope with climate variability thus negatively impacting their livelihoods. The present study aims to capture the differential in vulnerability and risk to climate change faced by the urban poor women living in slums across the five regions of National Capital Territory (NCT) Delhi, capital city of India.

Both qualitative and quantitative assessment has shown that the slum women are extremely vulnerable and at risk to climatic stresses and extremes due to their high sensitivity and poor adaptive capacity. The poor state of their housing, inadequate access to water, fuel and sanitation make them more vulnerable to climate change. They face increased health risks from extreme heat, water scarcity, disruption of livelihoods leading to economic hardships, and loss of food security. All these lead a strain on their resources and time. Since slums forms a critical component of urban life it's important to plan for their holistic development and to devise strategies so that climate related risks and vulnerabilities faced by this vulnerable section of society can be reduced.

Key words: Women, climate change, urbanization, slums, vulnerability, adaptive capacity

INTRODUCTION

Climate change is not gender neutral, as it has been long recognized that the consequences of climate change are not experienced equally by men & women. Research has shown that women's ability to cope with effects of climate change are hindered by gender and social norms resulting in women experiencing greater vulnerability to the impacts of climate change (UNFCCC, 2022; UN Women, 2023). This is supported by recently developed Gender based Climate Risk Index (GCRI) at different temporal and spatial scales where in women were 76 percent more vulnerable and 24 percent more at risk to climatic stresses & extremes as compared to men (MoEFCC, 2023, India's Third National Communication to the UNFCCC). The urban age is manifesting quickly and forcefully in almost every part of the world including India. Cities in most countries are the engines of economic growth and centers of industry and commerce. Between the years 1950 and

2015, the urban population has increased at an alarming rate from 300 million to 3 billion worsening the pressure on the resources of cities. Presently, more than half (56.6 percent) of the world's population lives in urban areas, a proportion that is expected to increase to 68 percent by 2050. It is also projected that nearly 90 percent of this increase will occur in Asia and Africa (UN, 2018). The urban population largely in less developed counties has increased by over 397 million people in the five-year period (2015-2000), of which 90 percent increase has been in the less developed countries (IPCC, 2022). The Indian scenario is no different as, the urban population has doubled between 2018 and 2050 from 461 million to as much as 877 million because of high urbanization rate of 4 per cent (UN, 2018; Aron O Neil, 2022). It is further expected that due to high costs of housing and living, a significant proportion of the migrant population will come to reside in slums and slum like settlements thus adding to their number. It has been well documented by the sixth assessment report of IPCC that informal settlements face higher risks to climatic stresses and extremes* due to highly inadequate access to housing and basic services. The high rates of poverty, low levels of education, unstable income by virtue of work in the informal and unorganized sectors leading to social and economic deprivation make it difficult for the poor to adopt sustainable coping strategies and adapt to climate change and extremes which further confound the scenario (Sharma et al, 2022; Giri et al, 2021; Habeeb and Javaid, 2019; Núñez, Wang, and Tsai, 2019; Pandey, Juha et al., 2018). The poor and marginalized communities living in stressed living conditions and more so the women who have least contributed to climate change face the worst impacts as compared to the affluent women residing in other parts of the city. Women suffer much more due to the nature of their household and care giving tasks and inadequate access to resources, decision making and distance from power structures.

Climate stresses and extremes refer to deviations from typical weather patterns that can lead to negative impacts on natural and human systems. These extremes can include heatwaves, heavy precipitation, floods, droughts, and storms, as well as compound events where multiple extremes occur simultaneously or in sequence (IPCC, 2021)

It is ironic to note that though slum dwellers provide manual labour for domestic, construction work as well as the industry, their settlements are often seen as eyesores by city planners and illegal and undesirable entities by governments as well as the residents.

Assessing the differentials in vulnerability and risk faced by slum dwellers especially women

The fifth assessment report of the IPCC, has shown a shift from climate change related vulnerability analysis of communities to risk analysis since it brings more seriousness to the issue of impacts of climate change and creates a sense of the urgency to work out solutions for risk reduction (GIZ and EURAC, 2017). The risks to climatic changes, stresses and extremes is determined by an interplay of factors such as exposure to climatic stresses, occurrence of hazards, sensitivity of population and their lack of adaptive capacity (IPCC, 2014). Translating the above into the lives of slum dwellers especially women, it is seen that the level of vulnerability and risk faced by them is manifold due to a combination of several deprivations. In the present study an attempt has been made to assess the gender-based differentials in climate related risk using mixed method (both quantitative and qualitative). While the quantitative assessment was done using the index-based approach, namely the Gender based climate Risk Index (GCRI) and the qualitative aspect was captured by Focus Group Discussions (FGDs) and in-depth interviews. since the index does not capture the ground reality of the dwellers residing in slums and related settlements.

SIGNIFICANCE OF THE STUDY

The present research study emphasizes how climate change exacerbates existing vulnerabilities in urban slums, especially for poor women who already struggle with restricted access to housing, water, sanitation, and other resources. While these challenges are common in informal settlements, the research shows that climatic stresses such as extreme heat, floods, and water shortages intensify the hardships of women thus further limiting their adaptive capacity. The study also draws attention to the intra-urban disparities in climatic risk as women in more affluent parts of the Delhi generally have higher educational levels, better access to resources, and greater decision-making power as compared to slum women who are disproportionately affected by climate stresses. By focusing on the lived experiences of women in Delhi's slums, the study provides valuable insights for designing gender-responsive climate policies that address both environmental challenges and underlying social inequalities.

OBJECTIVES OF THE STUDY

The present study has been conducted

- to examine the differential vulnerability of urban poor women to climate stresses & extremes using both quantitative and qualitative approaches.
- to examine the perception of women as well as women leaders regarding their climate related vulnerability and risk and changes in climate over the past decades.
- to study the factors qualitatively which contributes to the vulnerability of slum dwellers which cannot be captured by the index.

METHODOLOGY

In order to assess the vulnerability and risk faced by slum population especially women GCRI was computed both at the (State level) and (Slum level). This index was based on IPCC AR5 risk assessment framework in combination with Caroline Moser Gender Analysis Framework in order to make the risk index gender sensitive. The index computed at the state level has been developed based on a rigorous review of literature, comprises of 4 components and 54 indicators and has been validated by conducting an expert consultation workshop and also tested for reliability using Cronbach alpha as well as test re test analysis. The index was computed using secondary data from a variety of sources such as India Meteorological Department, Census of India, Ministry of Water Resources, Central Ground Water Board, Central Water Commission, Ministry of Women and Child Development, Ministry of Environment, Forests and Climate Change, NSSO reports, Census of India, 2011 and National Family Health Survey to name a few. While assessment at the slum level was done conducting primary survey across slums in different regions of Delhi. Delhi, the Capital city of India, has been selected as it is one of the fastest growing metropolises in India and has experienced intense rural-to-urban migration in the last decade. Delhi's urban population has increased from 9.7 million in 1990 to 22.7 million in 2011 and expected to rise more than 37.2 million inhabitants by 2028 making Delhi the most populous city in the world (United Nations, 2018). Almost 11 percent of the urban population in Delhi lives in slums, a number which is growing at a very fast rate. There are 675 slum clusters in the city comprising approximately 6,343

slums (Urban Slums Survey, 2012), making Delhi a good proxy for other urban centers in India and other developing countries.

In order to study the reality on the field and to get true picture of life of slum dwellers which is not captured by the index-based approach the study focused on was qualitative aspect and was conducted using Focus Group Discussions (FGDs) direct observations and in-depth interviews with slum women as well as women leaders in the area to gain greater insights into their problems. The qualitative approach enabled to build a holistic, detailed investigation of the problems faced by the slum dwelling women and their families. In order to make the study representative of Delhi, one slum each was selected from five districts corresponding to each of the five regions namely North, South, East, West and Central. For this purpose, the list of slum clusters in the selected districts was taken from Delhi Urban Shelter Improvement board (DUSIB-the organization overseeing the management of slums). Based on the accessibility and contact with local leaders, one slum was selected from each of the five districts. In order to arrive at some generalizations, at least three Focus Group Discussions (FGDs) and two in-depth interviews were conducted in each slum amounting to 15 FGDs and 10 interviews (Fig.1)

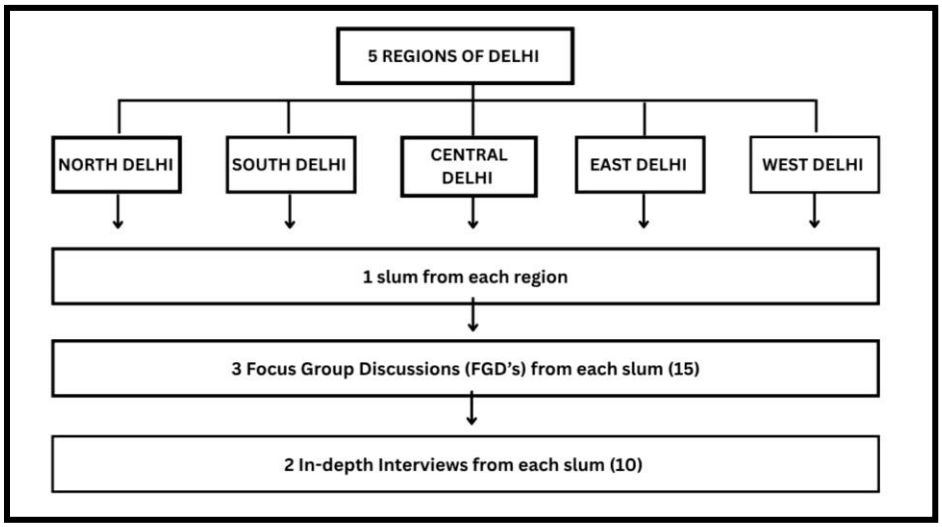


Figure1: Diagrammatic representation of slums selected from each region of Delhi

The discussions provided an opportunity to the women and some women leaders to share their perceptions and experiences of climate related stresses and extremes with the research team to facilitate a realistic assessment of their problems and coping strategies. Direct observations in the slums helped the researchers to cross check and validate the information provided by the women. Data triangulation was done all along the course of the study to create a realistic picture of the climate related challenges faced by the families especially the women as well as the coping and adaptation strategies adopted by them.

The data collection process

The data collection process was spread over a period of six months from August 2019 to January 2020. The FGDs were conducted with a group of 8-10 women in each slum in an open area or in the compound of the house of one of the respondents. The age of women selected for the

discussions was 30-50 years to enable the research team to get a better picture of the impacts of climatic changes as perceived by young as well as older adult women. The women who were living in the selected slums for a minimum of three years and were familiar with the problems of the area were included in the FGDs. At the outset, to enhance the comfort level of the women and as part of rapport formation, the researchers explained the purpose of the visit and holding FGDs with the women. In some areas, the community leaders or volunteers facilitated the conduct of FGDs. A set of guidelines were prepared to conduct the FGDs in order to ensure that the discussions were on track. It was observed that some women were extremely vocal and expressed their concerns, as they spoke with strong emotional conviction since the issues were so important and close to their everyday lives. This also prompted the quieter women to speak up. In some areas, adolescent girls, boys and sometimes men also participated actively in the discussions. The entire exercise of collecting the women and conducting the discussion took over an hour and a half. A conscious effort was made to gain deeper insights into the various problems faced due to climatic stresses and extremes and its manifestation on availability of resources such as water, fuel and access to sanitation. Other aspects of availability of requisite infrastructure, opportunities of income generation, digital and financial inclusion, participation in decision making at the household and community level as well as the climate related coping strategies adopted by families were also explored.

RESULTS AND DISCUSSIONS

To assess the vulnerability and risk of slum population, particularly women, to climate-related disasters and extremes, the GCRI was quantified across states in India as well as the slums level. It was found that the slum women faced significantly higher levels of vulnerability and risk as compared to women in the whole of city of Delhi. The GCRI values for slum women were placed at 0.50 which is much higher (14 percent points) as compared to Delhi city as a whole (greater the value higher is the risk). In case of males, where the GCRI value at the slum level was 12 percent points higher placed at 0.37 as compared to 0.25 for Delhi (for detailed methodology refer to MoEFCC, 2023 India's Third National Communication to UNFCCC). Since some of the components were related to housing, sanitation, time spent water collection & other resources and impacts on livelihoods etc. which could not be captured by the index, thus the present paper focuses on the qualitative aspect.

The following section will give detailed description of the qualitative aspect of the study which has an important role to play in highlighting the vulnerability of slum dwellers.

Perception of women about climate change

Though the women did not know much about climate change few women said that the weather had become very erratic, as there were few rains in some years leading to extreme heat, humidity and water shortages. In some years there was excessive rainfall, some days saw very heavy rainfall leading to flooding. They also experienced prolonged and intense heat and heat wave days due to which they had to buy coolers etc. Back home in their villages, similar problems were experienced leading to negative impact on the crops and dairy animals.

Impact on housing, and related services

The in-depth interviews with the local leaders of each slum were undertaken to create a general profile of the residents as well as the infrastructure and other facilities available. It was found that most of the houses across the slums were semi-*pucca* made with bricks with roofing of asbestos sheets. A large number of houses were in a dilapidated state with patched up roofs with parts of different materials (asbestos, tin, plastic sheet) to protect the houses from temperature extremes and leakage during rains. The houses did not provide thermal comfort during the extreme hot and cold months. Majority of the houses had no proper ventilation or natural lighting. Most of the internal streets were kutcha and became marshy during rainy season. The external roads were also partly pucca and partly kuchta leading to water logging in the colony. Travelling to work or going to school was a problem leading to high rates of absenteeism from schools. Many respondents complained of water leakage in the roof which became worse during monsoon, often leading accumulating water inside the house causing much discomfort to all members especially women and children as they spent large parts of their time at home. Thus, due to climate change and extremes especially during heavy rains, such houses were very prone to damage thus further deteriorating the already inadequate housing conditions further intensifying the challenges faced by slum dwellers.

Impact on livelihoods

A large majority of the women (67 percent shown by quantitative survey) reported staying at home and not being engaged in any paid activity due to their pre-occupation with child-care, household chores and filling up water for the family. Some women worked as domestic helpers as maids, ayahs or cooks. Few women were self-employed as tailors, beauticians or petty sellers. This pointed towards the poor economic participation of women. On the other hand, most men were gainfully employed as shopkeepers, carpenters, electricians, painters, plumbers or as vegetable/fruit/tea vendors while few of were in the service sector and were employed as factory workers, security guards or private drivers. During periods of heavy rainfall or extreme heat, the challenges faced by daily wage earners become more pronounced due to loss of livelihoods as there was no construction work during heavy rains, vendors did not have enough costumers leading to reduced or no sales. Since the families already lived a hand to mouth existence the loss of income had a cascading effect on food and other basic needs. There were hardly any other alternative livelihood opportunities available and slum dwellers lack the skill to undertake other livelihoods.

Impact on health

In the pre and post monsoon season there was a spurt of vector borne diseases such as malaria and dengue. The open drainage in the slums leading to overflowing and clogging of drains led to rampant breeding of mosquitoes resulting in spread of diseases. Higher incidences of diarrheal infections, typhoid & jaundice were reported these led to higher care giving burden of women caring for children and the elderly. The women often had to cut back their income generating roles leading to reduction in income and enhanced vulnerability and risk.

Impact on water and sanitation

The city of Delhi experiences long summer months from October to November with frequent high heat days and heat waves. During this the water requirement went very high but the supply

dwindles erratically. The women reported spending large amounts of their time (often double) on waiting and collecting water. As a result, many women were unable to pursue or undertake job or had to reduce their paid work hours, as they needed to make multiple trips to gather water. The sanitation also suffered due to reduced water availability. Community toilets were used by majority of the respondents these also faced water shortages. Thus, it is evident that slum women face several challenges leading to the different facets of life in slum and related settlements that enhances the susceptibility to climatic stresses and extremes, particularly for women, as depicted in Fig. 2

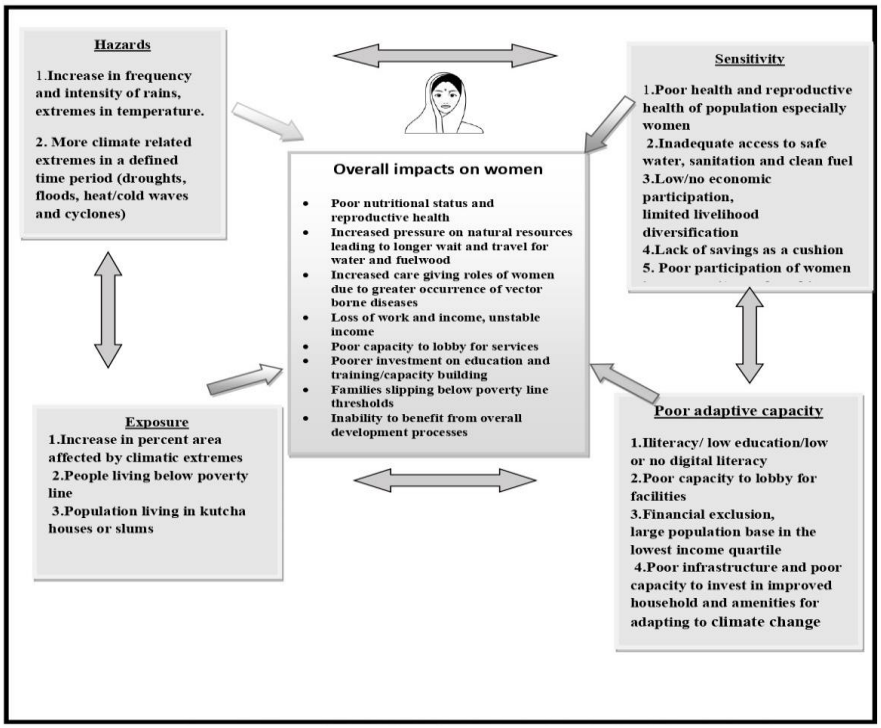


Figure 2: Components of vulnerability and risk to climate change faced by dwellers of informal settlements and overall impacts on women (Source: authors)

Thus, both quantitative and qualitative approaches highlight vulnerability of slum population especially women to climatic stresses and extremes and if these risks have to be reduced, it is important to pay special attention to the urban poor living in slums and slum like settlements.

CONCLUSION

The present research indicates that individuals living in slums, particularly women, face significant vulnerability to climatic stresses and extremes due to their heightened exposure, increased sensitivity and considerably limited adaptive capacity. Furthermore, there have been no notable shifts in the gendered allocation of household tasks, duties and responsibilities compelling women to invest substantial amount of their time in meeting their Practical Gender Needs, including access to safe water, fuel, sanitation, Consequently, their Strategic Gender Needs—related to education undertaking training or learning new skill the distribution of power between men and women and access and control over resources and participation in decision-making are likely to remain

overlooked. In India alone, 70 percent of new jobs are expected to emerge in urban areas by 2030 (World Bank, 2025). This rapid urban expansion will strain public services and resources disproportionately impact the urban poor, especially women.

It is therefore important that Governments improve urban infrastructure in terms of upgradation and redevelopment/improvement of slums including building of climate proof housing, enhancing water storage and supply, sanitation coverage, focusing on the special needs of women thus reducing the vulnerability and risk faced by the slum population especially women. The study highlights that it's imperative to recognize the differential vulnerability of women, special focus should be on meeting basic resources and infrastructure, developing alternative livelihoods and providing skill/digital training to women in order to enhance their adaptive to deal with vagaries of changing climate.

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REFERENCES

- Aaron O Neill. (2022). *Urbanization in India, 2021*. Accessed from https://www.statista.com/statistics/271312/urbanization-in-india/.
- Dobbs, R., Remes , J., Manyika., J., et al. (2012). *Urban world cities and the rise of the consuming class*. Mckinsey Global institute.
- Giri, Monika & Bista, Ganga & Singh, Pramod & Pandey, Rajiv. (2021). *Climate change vulnerability assessment of urban informal settlers in Nepal, a least developed country*. Journal of Cleaner Production. 307. 10.1016/j.jclepro.2021.127213.
- GIZ and EURAC 2017: *Risk Supplement to the Vulnerability Sourcebook*. Guidance on how to apply the Vulnerability Sourcebook's approach with the new IPCC AR5 concept of climate risk. Bonn
- Government of National Capital Territory of Delhi. Urban Slums in Delhi 2012. www.delhi.gov.in/wps/wcm/connect/adcd1f0047a86473ab46ffbdc775c0fb/.p df
- IPCC, 2022: *Climate Change 2022: Impacts, Adaptation, and Vulnerability.* Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press.
- Intergovernmental Panel on Climate change, IPCC. (2014) Climate change 2014. *Impacts, Adaptation and Vulnerability Part A: Global and sectoral aspects*. Working Group II contribution of the fifth assessment report of the Intergovernmental panel on climate change. Cambridge, New York.
- Pandeya, R.,. Alatalob, J.M., Thapliyal, K., Chauhan, S., et al. (2018). *Climate change vulnerability in urban slum communities: Investigating household adaptation and decision-making capacity in the Indian Himalaya*. Ecological Indicators. 90. 379-391. 10.1016/j.ecolind.2018.03.031.

- MoEFCC. (2023). India: Third National Communication and Initial Adaptation Communication to the United Nations Framework Convention on Climate Change. MoEFCC, New Delhi
- Núñez Collado, J. R., Wang, H.-H., & Tsai, T.-Y. (2019). *Urban Informality in the Paris Climate Agreement: Content Analysis of the Nationally Determined Contributions of Highly Urbanized Developing Countries*. Sustainability, *11*(19), 5228. MDPI AG. Retrieved from http://dx.doi.org/10.3390/su11195228.
- Sharma, Upasna., B, Bijal., & Harshkumar, P. (2022). *Do Community-Based Institutions Spur Climate Adaptation in Urban Informal Settlements in India*? A. K. Enamul Haque et al. (eds.), Climate Change and Community Resilience, https://doi.org/10.1007/978-981- 16-0680-9_2233910.1007/978-981-16-0680-9.
- United Nations, Department of Economic and Social Affairs, Population Division (2019). *World Urbanization Prospects: The 2018 Revision*. New York: United Nations. ISBN 978-92-1-148319-2.
- UN Women. (2023). Gendered impacts of climate change: Empirical evidence from Asia. UN Women, New York
- UNFCCC. (2022). Dimensions and examples of the gender-differentiated impacts of climate change, the role of women as agents of change and opportunities for women. Accessed from ttps://unfccc.int/sites/default/files/resource/sbi2022_07.pdf
- World Bank Group. (2025). *Towards Resilient and Prosperous Cities in India*. World Bank. Washington, DC.

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UNVEILING THE FOOD HABITS AND DIET-BASED PRACTICES OF THE IRULA TRIBES RESIDING IN ATTAPPADI: AN OVERVIEW

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ABSTRACT

This study examines the dietary habits and lifestyle practices of the Irula community in Attappadi, Kerala, aiming to understand the socioeconomic and cultural factors influencing their food consumption patterns. A descriptive, observational approach was employed, incorporating both qualitative and quantitative methods. Data was gathered through in-depth interviews and direct observation from a sample of 100 respondents, spanning ages 18 to 80, selected through simple purposive random sampling. The results indicate that the dietary patterns of the Irula community are characterized by a notable absence of local food varieties in their kitchens. The current generations primarily rely on government-supplied subsidized rice, which proves insufficient. This reliance leads to limited dietary diversity and a scarcity of essential protein and micronutrient sources. As a result, they heavily rely on consuming starchy foods, losing touch with traditional diets. Accessing more than two meals a day poses a challenge for many Irula households. While traditional dietary customs persist, they slowly change due to economic constraints. Substance abuse, particularly tobacco and illicit alcohol consumption, poses significant health and social challenges within the community. This study sheds light on the complex interplay of socioeconomic, cultural, and environmental factors shaping the dietary patterns and lifestyle practices of the Irula community, highlighting the need for comprehensive interventions to preserve cultural identity and improve nutritional well-being.

Keywords: Irula tribes, Attappadi, Food habits, practices and beliefs.

INTRODUCTION

The term "tribals" refers to indigenous populations that have inhabited forest environments for generations, fostering a unique connection with the surrounding flora and fauna. They consume a variety of wild edibles, including roots, seeds, and fruits, alongside agricultural and horticultural produce. Living in harmony with nature, they have acquired extensive knowledge of herbal remedies and often rely on this expertise instead of seeking medical assistance (Joshi & Singh, 2015). Their dietary habits primarily center on plant-based foods, with a strong preference for raw consumption.

In a tribal community, traditions, cultures, taboos, and food habits cannot be separated or examined in isolation, as they are all interrelated (Naik & Katuriba, 2018).

Tribal communities have a unique approach to food. Each tribal group develops its own dietary habits influenced by various factors, including crop diversity, geographical location, available resources, and cultural traditions. The manner in which food is consumed and the associated dietary practices play a crucial role in shaping cultural identity. Food consumption patterns can be defined as the distinct ways in which communities eat. While tribes generally adhere to their traditional eating habits, modern influences are affecting them like other communities. These changes have resulted in both positive and negative impacts on tribal lifestyles. Factors such as technological advancements, government interventions, programs, policies, and the socio-economic challenges faced by Adivasi communities have contributed to their adaptation, often leading to a blending with mainstream society (Mishra, 2017; Toppo, 2016; Nongrum & Dohtdong, 2018).

Attappadi, located in the Palakkad district of Kerala, is India's first tribal block and is recognized as one of the largest tribal settlements in the state. This region is known for its socio-economic challenges (Haseena, 2015). The indigenous communities in Attappadi primarily include the Irula, Kurumba, and Muduga clans, each with their own unique lifestyles, cultural traditions, and dietary customs. These communities reside in hamlets, known as Oorus, which typically consist of 60 to 100 families. Currently, there are a total of 192 tribal hamlets in Attappadi. Attappadi is supported by a variety of comprehensive systems, much like a child being cradled in a mother's lap. The District Administration provides essential amenities for the residents, which include social kitchens, anganwadi centers, Kudumbashree initiatives, the Attappadi Millet Village project, cooperative farming societies, and programs such as the National Rural Livelihood Mission (NRLM) and the Attappadi Adivasi Development Initiatives (AADI). Additionally, initiatives by the Kerala State Literacy Mission contribute to the overall development of the area (ITDP, *Attappady Profile*).

The people of Attappadi have been suffering for years due to their poor socioeconomic background and related challenges. There is a high incidence of infant deaths and chronic malnutrition among the tribes in this area. Additionally, many individuals are affected by the severe genetic disease known as sickle cell anemia (Baskar & Udhaya, 2018). Most hamlets in Attappadi lack basic amenities necessary for maintaining environmental cleanliness and sanitation, contributing to significant drug and alcohol abuse issues among youth. Furthermore, access to higher education institutions in the region is limited. The primary sources of income for the community include subsistence agriculture, cattle breeding, and the collection and sale of minor forest products such as wild honey, resins, plant essences, barks, fibers, firewood, and cashew nuts. Employment under the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) also provides temporary income for many families (Mathews, 2017).

The demographic changes in Attappadi, Kerala, over the past six decades reveal a troubling decline in the populations of the Mudugar, Kurumbar, and Irula tribes, who have historically inhabited this area as forest dwellers. According to the most recent census data from 2011, their numbers have further diminished, now representing only 34% of the total population (Census Report, 2011). This underscores a significant and ongoing decline in the presence of these tribal groups. Introduction of community kitchens, migration and marriage to civilians have resulted in a dramatic shift in the life and eating habits of the tribals in the hamlets of Attapadi (Sachana & Bonny, 2020).

OBJECTIVES

The principal aim of the research was to understand the dietary habits of the selected tribal population in Attapadi.

Specific objectives

1. To study the demographic status of the Irula community
2. To assess the dietary factors that influence the food intake
3. To study the beliefs, practices towards food practices followed during several physiological phases.

HYPOTHESIS

There is no significant difference in the ability to afford sufficient food for all based on family income.

MATERIALS AND METHODS

The present research was conducted within the Irula tribal community living in Attapadi, a tribal block located in the Palakkad district of Kerala. The study was descriptive and observational in nature, employing a mixed-methods approach that included both qualitative and quantitative techniques. The sample comprised of 100 respondents, selected through simple purposive random sampling, representing both genders and ages ranging from 18 to 80 years. Data concerning food practices, factors influencing food consumption, and the inclusion and exclusion of certain foods during important life stages were collected through pre-tested in-depth interview schedules and direct observation. Focus group discussions and ethnographic data were also carried out during the data collection process. Informed consent was obtained from the participants at the time of the interview. For data analysis, SPSS version 26 and MS Excel were utilized for creating data tables and conducting graphical analyses.

FINDINGS AND DISCUSSION

Demographic data of the respondents

Those who are above 18 years of age and are willing to cooperate with the study protocols were selected as the respondents for the study. The demographic data includes age, gender, family size, monthly income, educational qualification and occupation of the respondents.

Table 1 Demographic dynamics of the respondents (n=100).

Parameters		Response in percentage (%)
Gender	Male	17
	Female	83

Age	Less than 20 years	2
	20-40 years	55
	40-60 years	35
	60-80 years	8
Family size	2	10
	3	18
	4	26
	5	25
	6	13
	7	6
	8	2
Monthly Income	Rs: 1501-3000	10
	Rs: 3001-4500	58
	Rs: 4501-6000	25
	Rs: 6001-7500	7
	Illiterate	35

Educational Qualification	Primary level	24
	Secondary level	27
	Higher Secondary & above	14
Occupation	Own agriculture	7
	Wage labour	93

Table 1 explains the demographic data of the respondents selected for the study. Based on the voluntary willingness to participate in the study, 88 percent were female and 7 percent were male. A majority felled within the 20-40 years of age bracket (55 percent), followed by those aged 40-60 years (35 percent). A smaller proportion comprises individuals aged 60-80 years (8 percent), with only 2 percent below the age of 20. About a quarter of the respondents belong to households with four members, followed closely by those with five members (25 %). Fifty eight percent of the respondents reported a monthly income ranging from Rs. 3001 to Rs. 4500. Additionally, 25 percent fell into the income bracket of Rs. 4,501 to Rs. 6,000, while 10 percent earned between Rs. 1,501 and Rs. 3,000. A smaller proportion (7 %) reported incomes ranging from Rs. 6,001 to Rs. 7,500. The economic situation among the respondents was alarming, as 100 percent of them live below the poverty line. Though the respondents, labor for approximately eight or nine days per month. However, their daily earnings of Rs 500 fall significantly short of meeting their families' basic needs. The primary cause of the rising rates of poverty among Kerala's indigenous people is the addiction to illegal alcohol. The majority of the people, particularly men spend all of their earnings on alcohol, and are destined to be the breadwinners in their families (*The Better India*; KK, 2019).

The educational level of the respondents were diverse in nature with 35 percent lack formal education, 24 percent have completed primary schooling (grades I-V), 2 percent have attained secondary education (grades VI-X), and 14 percent have pursued education beyond secondary level. Limited access to formal schooling, remote geographical locations and cultural barriers contribute to this issue. The majority of young people drop out and work to support their families (Muhammed & Anas, 2018).

Food practices of the respondents

Most of the Irula families rely on rice obtained from ration shops and prepare a single curry for both the meals, lacking variety and nutritional value in their diet. The regular dietary pattern of the Irula is shown in the table (2).

Table 2 Regular dietary pattern of Irula tribes

Meals of the day	Food items
Break fast	Black tea+Bakery items like biscuits/ rusk, Ragi gruel,Leftover rice with wild leafy green stir- fry or Poori+potato or dhal curry(occasionally)
Lunch	Finger millet dumpling or rice with either green leafy vegetables/dhal curry, and a tangy soup.
Snacks	Black tea, (Bakery items like biscuits or tea rusk) rarely
Dinner	Finger millet dumpling/ rice with leftover curry prepared for lunch Poori, dhal or soya curry
Bed time	None

The first meal of the day is typically consumed by around 11 am. Most members of the tribe forego breakfast, opting instead for black tea and bakery items like biscuits or rusk, or they may resort to consuming tobacco. Common breakfast menu were Black tea+Bakery items like biscuits/ rusk, finger millet gruel, leftover rice with wild leafy green stir- fry, Poori+potato or dhal curry (occasionally), after that they went forest for cattle rearing. A notable practice was observed among all the Irula families, as they cook a tangy soup (*Tamarind rasam, Puli rasam*) or a Dhal curry , made up of dhal, either cultivated in own field or purchased from the public distribution shops, this was seen repeated for both lunch and dinner. Either green gram or horse gram boiled with little turmeric, chilly, sea salt, little oil without having other vegetables, a watery like curry. Finger millet dupling or Ragi kali is reported as the typical regional staple food of the tribals selected for the study in Attapadi.

Food Consumption pattern of the respondents

A dietary survey was undertaken to evaluate the eating habits of the respondents. The survey involved assessing the frequency of consumption of various food items from the five fundamental food groups. This was accomplished by documenting the participants' utilization of different foods on a frequency scale, namely Daily (5), Weekly (4), Monthly (3), Rarely (2), and Never (1).The scale proposed by Raeburn et al. (1979) provides a method for determining the percentage of food consumption frequency, as outlined in the following formula.

Percentage of total score = (R1S1 + R2S2 + • • • + RnSn)/n

Sn= rating scale is provided to assess the frequency of consumption for each food item.

Rn= Percentage of participants opting for a rating

n= maximum scale rating.

The frequency of food item usage was quantified using a scoring system, where daily consumption received a score of 30, weekly consumption a score of 4, monthly consumption a score of 1, infrequent/rarely consumption a score of 0.5, and non-consumption a score of zero. Mean scores were then computed for each food group. The mean percentage score was determined by dividing the mean score by the maximum possible score of 30 and multiplying the result by 100.

Foods with scores exceeding 90 percent were categorized as 'Most frequently utilized,' whereas those scoring below 15 percent were labeled 'Least frequently utilized.' Items scoring between 75 and 89 percent were considered 'Frequently utilized,' while those scoring between 15 and 74 percent were classified as 'Less frequently utilized.'

Table 3 Distribution of the respondents based on food frequency pattern.

Sl .No	Food Item	Mean % Score	Dietary Pattern
1	Cereals and its products	99.03	Most frequently used
2	Pulses and legumes	94.80	Most frequently used
3	Roots and tubers	13.92	Least Frequently used
4	Green leafy vegetables	47.13	Less frequently used
5	Other vegetables	48.00	Less frequently used
6	Fruits	3.15	Least Frequently used
7	Fish	7.48	Least Frequently used
8	Flesh meat	3.13	Least Frequently used
9	Eggs	9.18	Least Frequently used
10	Milk	18.57	Less frequently used
11	Fats and oils	85.15	Frequently used

The information presented in Table (3) offers valuable insights into the dietary patterns of *Irulars*. Cereals and their products are overwhelmingly popular, with 99.0% of respondents using those most frequently, indicating their significant role in daily diets. They are very much fonded to Little millet (*Chama rice*). Introduction of subsidized rice in the PDS made the indigenous varieties seem irrelevant. Rice and Finger millet is their staple food. Wheat consumption is seldom quiet. Pulses also play a significant role in their diets, being frequently used by 94.80% of the respondents.

Fats and oil follow as the next most common dietary component, with 85.15% using them less frequently. Green leafy vegetables and other vegetables are reported as less frequently used by 47.13% and 48.00%, respectively. Generally, they use greens and leaves in their preparations. Domesticated and wild edible greens are seen in every-day's menu. Mainly they use locally available wild greens such as (*chikkutticheera, Amarathus, Pumpkin leaves, Chembu thantu, Kaakadaag, drumstick leaves, Kuppa cheera, Mulludaag, Thondaidaag, Mudugadaag and Paladaag).* Some of the leaves having medical effects like healing stomach and mouth ulcer. Many of these locally wild edibles leaves forms a good source of nutrients among tribes but the over extraction for commercial and medical usage leads the leaves found to be rare. Hence the above displayed data underscores a dietary preference for staple foods like cereals, pulses and fats, while less emphasis is placed on diverse sources of protein and micro-nutrients.

Locally grown vegetables such as raw papaya, jackfruit, drumstick and pumpkin are the only vegetables used weekly and intake of other vegetables are used rarely. Sometimes they include wild mushrooms, bamboo shoots collected from the forest, only on monsoon season. The seasonal fruits like *papaya, jamun, jackfruit, guava, pineapple, Anona, banana* was used only on availability basis. Incorporation of other vegetables and fruits in their diet is negligible.

Roots and tubers constitute a significant proportion (13.92 percent) of the edible plants consumed. The unavailability of indigenous wild edible tuber crops impacts their consumption; however, some communities occasionally include certain varieties of wild tubers, such as Nooran kizhangu, Kaachil, and sweet potato, in their diet when available. Tapioca is consumed in both fresh and dried forms, with the dried form being stored for several weeks in a cool place and consumed during the lean season. The raw roots can be roasted by baking them in fire for a few minutes until they attain a brown color, and they can also be eaten with a small amount of salt. Additionally, tubers can be used in the preparation of curry. Notably, wild tubers were traditionally used as a food source during periods of scarcity.

The consumption of animal source of food items such as fish, flesh meat, eggs, and milk is notably lower, categorizing them as least frequently used. All households having livestock's goat, cattle's, chicken but their products are not used for domestic purposes, only for commercial purposes. *Irulars* consume wild pork's and local chicken mostly; they will not eat meat of buffaloes or beef. Consumption of other flesh items (broiler chicken, mutton, rats, wild rabbit, duck, birds) is on availability basis. Meat consumption was restricted to two or three times per month, typically coinciding with special events or ceremonies. Legal issues in hunting restricted the consumption of wild flesh among the tribes. *Irulars* are not much fond to fish. Sometimes they consume farm crabs based on seasonal availability. The diets were found to be grossly deficient of all nutrients.

Determinants of Household Food Consumption

The household food consumption is shaped by multifaceted determinants, with family income serving as a pivotal factor alongside considerations of food cost and availability. Additionally, individual preferences, dietary requirements, and ethnic considerations play significant roles in shaping food choices within households. This intricate interplay underscores the diverse array of influences that impact the dynamics of food consumption patterns at the household level.

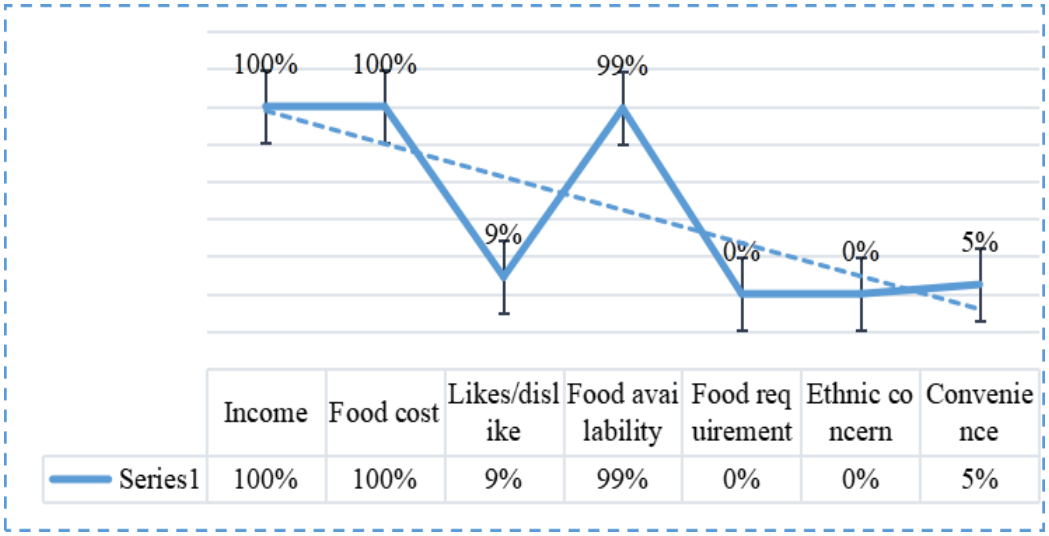


Fig:1 Factors determining Household Food Consumption

The depicted graph illustrates the breakdown of factors impacting Irula household food consumption. Family income and food cost, constituting 100 percent, exert a significant influence on dietary choices. Additionally, food accessibility is closely behind, accounting for 99 percent, with minor contributions from personal preferences, dislikes, and convenience. This distribution highlights the dominant role of economic factors and access to food in shaping their household dietary behaviors.

Food habits within a community typically mirror long-standing cultural traditions inherited from ancestors. These traditions involve dietary preferences, beliefs, cultural taboos, fasting rituals, and dietary behaviors observed during both joyful and sorrowful events, as well as different physiological stages. Certain dietary restrictions are thought to safeguard individuals from potential adverse effects linked to the consumption of particular foods, representing a belief system deeply rooted in tradition and endurance.

Beliefs, taboos, and dietary practices during different physiological stages

Table 4: Food consumption during several physiological stages

Puberty			
Food items Included	Reason	Food Restricted	Reason
Finger millet dumpling, Dried ginger juice	Usual food item Abdominal pain relief	Papaya. Pineapple, Jaggery, Rice flakes	Avoid bleeding, pain.
Sesame balls, wild edible spinach, drum stick leaves, agati leaves and flowers (sesbania grandiflora)	Increase Haemoglobin, enhance bone strength	Coffee/tea	Avoid pain
Rice flour/rice mixed with jaggery (sweet rice)	Provides strength (Pelvic bone)	Sour foods	Highly bleeding
Raw egg with gingelly oil	Give nourishment to the girls body	Rice	Relieves Abdominal pain
Pregnancy			
Craving foods	(Psychological factor)	Papaya, gingelly seeds, jaggery, raw egg, pine apple, beans	Cause abortion, affects the shape of the baby's head, Disposition of the foetus
Wild edible varieties of greens, tuber and roots	Give nourishment to the mothers, increase blood	Black tea, wild yam	Black skinned child or fetal abnormality Misconception, its potential to cause itching or other adverse reactions during pregnancy

Meat items (on availability basis), Ginger	For strong Control oedema	Groundnut, potato	Red rashes on baby's body Delay in child's speech development
Light foods	For easy digestible and easy delivery (avoid complications during pregnancy)	Pepper, pickles	Heat (cause abortion), stomach pain, oedema
Lactation			
Palm sugar, ginger, pepper	Heal delivery wound	Egg, milk, pulses	Gastric issue, cold to the baby
Drumstick leaves+ salt boiled water. Fenugreek water, rice water	Induce milk	Hot foods	Pain during urination on baby
Garlic, dried wild tuber, small fishes	Induce milk	Sour fruits	Dysentery to the child, Hiccups
Tangy soup (Tamarind pulp curry made up of traditional wild herbs)	Custom food	Tomato	Stop breast milk

Medicinal plant Biophytum sensitivum (locally known as Mukkutti chedi is used to prepare a traditional food dish) extracts from 2 to 3 plants, rice flour and jaggery or palm sugar)	Traditionally consumed after delivery to help clear any waste from the uterus, alleviate body pain and promote lactation		

In **Table 4**, Beliefs, taboos and dietary practices during different physiological stages are outlined. During puberty among Irular community, it is customary to consume finger millet dumplings and dried ginger. Moreover, foods such as sesame balls, red spinach, and drumstick leaves are advocated for increasing hemoglobin levels. Sweet rice, a mixture of rice flour and jaggery, is provided to enhance pelvic bone strength. Additionally, raw egg with gingelly oil is believed to provide nourishment to the female body and is recommended as part of the diet regimen. These dietary practices, such as consuming specific foods during puberty for nourishment and strength.

Papaya, pineapple, jaggery, and rice flakes are advised to be avoided as they may exacerbate bleeding and pain. Coffee/tea should be avoided to alleviate pain, while sour foods are to be avoided due to their potential to increase bleeding. Additionally, the avoidance of rice is suggested as it may help relieve abdominal pain.

During pregnancy, women often experience cravings, influenced by psychological factors. Additionally, the consumption of wild edible greens, roots, and tubers was common, attributed to their nourishing properties which aid in maternal health and blood circulation. Meat items were consumed when available, believed to bolster maternal strength. Furthermore, opting for light foods was prevalent during pregnancy, aiming for easy digestion and facilitating a smoother delivery process.

The Irula tribal community adheres to specific dietary practices during pregnancy and lactation, driven by traditional beliefs. Certain foods are avoided during pregnancy due to perceived risks, such as papaya and pineapple, which are believed to cause abortion, and groundnuts, which are thought to cause rashes on the baby's body. In contrast, specific foods like palm sugar, ginger, and drumstick leaves are consumed during lactation to promote healing and induce milk production. Traditional practices, such as consuming tamarind pulp curry for six months postpartum, are also followed. However, economic constraints and food scarcity are leading to a gradual departure from these traditional practices. The community's dietary habits are influenced by the concept of hot and cold foods, with certain foods being avoided due to perceived risks to the mother or infant's health.

Fasting habits

The Irula tribes observe a mild form of fasting, consuming simple foods like banana, rice flakes, and water in the morning. In the evening, they gather to share a vegetarian meal after the temple poojas. To fulfill their expectations and appease the deity, animal sacrifice is offered, and the cooked flesh

is consumed in a communal setting. Additionally, tribal women prepare Pongala, a sweet rice dish made with jaggery and coconut, as an offering to the deity.

Meal patterns during celebratory occasions

Meals play a vital role in the Irula community's celebratory events, which include agricultural rituals, weddings, births, puberty ceremonies, and festivals. These occasions are traditionally marked by elaborate feasts and cultural performances. Historically, the community relied on hunting as a source of sustenance and supplementary income, consuming wild game such as pork, rats, rabbits, squirrels, deer, and birds. However, contemporary restrictions on forest access and legal prohibitions on hunting have significantly reduced their meat consumption.

Meal patterns during funerals in the hamlet

Upon a death in the hamlet, cooking is suspended within the household. To sustain the family, male members purchase meals from external sources, and neighbors provide support by offering food. After the burial, the hamlet and homes are ritually cleansed with cow dung, and a lamp is lit at the burial site. Meals prepared afterward are salt-free. Certain family members, including the Mannukaaran and two female relatives, observe dietary restrictions, abstaining from non-vegetarian food until the completion of the rites. Traditionally, special occasion foods are considered prestigious due to their scarcity and limited availability. However, due to changing circumstances and income levels, these practices are evolving, and many events are now celebrated with simplicity and less frequency. As a result, the traditional significance of food in cultural and social contexts is gradually diminishing.

Affordability and Family Food Security

Studying the ability to afford sufficient food based on family income is crucial for understanding and addressing issues of affordability and family food security. Inadequate access to nutritious food can lead to adverse health outcomes, particularly for vulnerable populations. By examining family income about food affordability, policymakers can develop targeted interventions to ensure that all families, regardless of their economic status, have access to an adequate and nutritious diet. Hence, understanding this aspect is essential for promoting equity, reducing food insecurity, and ultimately improving the overall well-being of communities by addressing the fundamental need for affordable and nutritious food. In Attapadi, the ability to afford with sufficient food for all from the family income revealed that the highest percentage in the "Unaffordable" category falls at 45.50 percent, indicating a significant portion of the population struggles to afford sufficient food. This is followed by 36.50 percent in the "To some extent" category and the lowest percentage in the "Affordable" category at 18 percent. Chi square test was used to determine whether there is any association between the food affordability and family income on the selected samples. The p value obtained against these variables is 0.027 and is found to be statistically significant at the 0.05 level. Hence it can be concluded that, overall, while the distribution varies across income groups, there is a notable trend of higher proportions in the "To somewhat extend" and "Unaffordable" categories compared to the "Affordable" category, indicating challenges in ensuring sufficient food affordability across the region.

CONCLUSION

The study reveals concerning food habits and dietary practices among the Irular community in Attappadi, characterized by a predominant reliance on rice and a single curry, which lacks diversity and essential nutrients. The incorporation of functional and protein-rich foods, such as milk, meat, fruits, and vegetables, is minimal, contributing to nutritional deficiencies within the community. Traditional food beliefs influence dietary customs during various physiological phases, with certain foods being chosen for their perceived health benefits and others avoided due to perceived risks. However, economic constraints and food scarcities are gradually reshaping these long-standing customs, significantly impacting dietary preferences. Attappadi is recognized as one of the most vulnerable and underdeveloped tribal settlements in Kerala, particularly for the Irula community, which faces numerous challenges, including poverty, malnutrition, high infant mortality rates, underdevelopment, sickle cell anemia, and substance abuse, all of which exacerbate complex socio-economic and health issues (Kshatriya, 2014). To address these challenges, comprehensive interventions are necessary, focusing on promoting dietary diversity, alleviating poverty, and mitigating substance abuse to safeguard the health and well-being of the Irular community in Attappadi. The economic empowerment of the tribals can be made possible by implementing sustainable livelihood initiatives, such as skill development programs, microfinance schemes, and entrepreneurship training that are aimed at tribal communities. Steps to improve the availability of wholesome food for tribal communities through public distribution networks, encouraging the use of sustainable agricultural methods, and providing support will enhance the food security. Designing and implementing nutritional intervention studies to address food insecurity and malnutrition among tribal populations can be carried out in the future.

ETHICAL APPROVAL

The research received approval from the University-level Ethical Committee, University of Kerala, Thiruvananthapuram, for both its protocol and tools. Permissions to access tribal hamlets were obtained from the Department of Scheduled Tribes and the Department of Forestry, Government of Kerala. Further permissions were secured from relevant authorities, including the District Sub Collector of Attapaddy and tribal hamlet chiefs, ensuring ethical conduct. Informed consent was obtained from each research participant prior to data collection.

REFERENCES

- Attapady-Profile-ITDP https://itdpattappady.kerala.gov.in
- Baskar & Udhaya, (2018), A study on health status of Irula tribes in Mullankadu, coimbatore district, Tamil Nadu, India, International Journal of Social Science and Economic Research, Vol:03, Pp: 7192-7198, https://ijsser.org/2018files/ijsser_03__511.pdf.
- Census Report-2011. Government of Kerala.http://censusindia.gov.in, Accessed February 2021.
- Haseena. V.A, (2015), Poverty and livelihood problems among the scheduled tribes in Kerala-A Study on Attappady. Journal of Poverty, Investment and Development, https://core.ac.uk/download/pdf/234695288.pdf.
- https://www.thebetterindia.com.....Irula tribe

- Joshi Shweta and Singh vishakha, 2015, Assessment of food related habits and customs of Bhil tribes of Udaipur district, Rajasthan, Food Science research journal, Vol: 6,Pp: 333-339, https://researchjournal.co.in/upload/assignments/6_333-340.pdf.
- KK Rashid, (2019), Socio economic problems of tribes in attappadi, with special reference to sickle cell anaemia, International Journal of Scientific Development and Research (IJSDR), Vol: 4(4), Pp: 475-481, https://ijsdr.org/papers/IJSDR1904098.pdf.
- Kshatriya Gautam Kumar, 2014, Changing Perspectives of Tribal Health in the Context of Increasing Lifestyle Diseases in India, Journal of Environmental and Social Sciences Open Science, Vol: 1, Pp:01- 07, https://www.opensciencepublications.com/wp-content/uploads/ESS-2454-5953-1-101.pdf
- Mathews Ashok Jacob, (2017). Economic Transformation of Tribal women through MGNREGA: A study on Irula community women in Attappady, Kerala. International Journal of Economics and Management Studies, 4(11), 40–44, https://www.internationaljournalssrg.org/IJEMS/2017/Volume4-Issue11/IJEMS-V4I11P106.pdf
- Mishra Ashutosh, (2017), Shift in tribal food habits: from sustainable to non sustainable, https://www.pradan.net/sampark/wp-content/uploads/2019/09/Shift-in-Tribal-Food-Habits-From-Sustainable-to-Nonsustainable.pdf.
- Muhammed Ashraf T.M & Anas M.K, 2018, Utilization of higher education facilities: a study among irula tribe in attappady region of Kerala, International Journal of Research in Social Sciences and Humanities, Vol. 8 (2), Pp- 99- 107, https://www.ijrssh.com/admin/upload/08%20Muhammed%20Ashraf.pdf
- Naik Deeksha and B Katuriba, 2018, Food habits of nomadic tribes, The Pharma Innovational Journal, Vol: 7, Pp: 627-631, https://www.thepharmajournal.com/archives/2018/vol7issue5/PartI/7-5-76-775.pdf
- Nongrum Melari Shisha and Dohtdong Laribha, 2018, Changes In The Consumption of Traditional Food among the Khasi and Jaiñtia People in Rural Meghalaya,India, International Journal of Food and Nutritional Sciences, Vol: 7(1), Pp: 105-110, https://www.researchgate.net/publication/327051676_CHANGES_IN_THE_CONSUMPTION_OF_TRADITIONAL_FOOD_AMONG_THE_KHASI_AND_JAINTIA_PEOPLE_IN_RURAL_MEGHALAYA_INDIA.
- Sachana & Bonny, 2020, Household Dietary Pattern of Attappady Tribes of Kerala, Indian Journal of Pure and Applied Biosciences, Vol: 8(6), Pp: 565-570.
- Toppo Sheeth, 2016, Changing food pattern of tribal women of Jharkhand state with special reference to Gumla district, Food Science research journal, Vol: 7, Pp: 207-215, https://www.cabidigitallibrary.org/doi/pdf/10.5555/20163395042

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SOCIO-ECONOMIC CONDITION OF HANDLOOM WEAVERS IN PERUVEMBA GRAMA PANCHAYATH IN PALAKKAD DISTRICT: COMPARATIVE STUDY USING SLI AND SES SCALE ANALYSIS

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ABSTRACT

Recognizing the handloom sector as the second-largest source of employment after agriculture, this study examines the standard of living index (SLI) and socio-economic status (SES) of handloom weavers in Kallanchira, Peruvemba Grama Panchayath, Palakkad district. A sample of 73 weavers was analysed. The primary objectives were to assess their SLI, evaluate SES, and conduct a comparative analysis to provide a reliable judgment of their socio-economic condition. The SLI was measured using NFHS indicators, while SES was evaluated using revised Kuppuswamy and Udai Pareek scales. Findings reveal a significant difference between the scores on the SLI and SES scales. Both tools effectively reflect the weavers' socio-economic status, with the SLI emerging as the most accurate indicator for rural contexts.

Keywords: Standard of living, Socio-economic status scale, Kuppuswamy, Udai Pareek.

INTRODUCTION

Boasting of the richest tradition as the largest cottage industry, the Indian handloom sector still occupied a place of pride, thanks to the excellent craftsmanship of the weavers. Being eco-friendly, less capital intensive, low on power consumption, and adaptive to market conditions, the sector had always been an attraction—directly or indirectly providing employment to the masses in rural regions. The industry employed about 35.23 lakh handloom weavers across the country, of which 25.46 lakh or 72.29% were women, as per the All-India Handloom Census Report of 2019–20. The sector diversified its production, covering both traditional and contemporary product categories, and exported to many global destinations. The share of the handloom sector in total industrial production was 14%; the industry contributed about 30% of total exports and stood second in employment generation next to agriculture (India Trade Portal).

With the introduction of liberalization in trade and marketing, industrialization began to take root in this sector (Tanusree, 2015). Industrialization and the subsequent adoption of technologies and product growth demands, along with the emergence of the powerloom in a considerable proportion, became a major threat to the sustainability of the handloom sector (D'Costa, 2021). The powerloom

sector in the country contributed nearly 58.4% to total cloth production, and more than 60% of the fabric share for export was also obtained from the powerloom sector (India Trade Portal). Consequently, the handloom industry began to experience dwindling growth with the emergence of the powerloom and other industry-related issues like low wages, technological gaps, marketing, finance, and production (Mishra, 2020), which paved the way for a move away from the industry and emphasized the need for the sector's survival and revival of growth.

Preceding the development of the powerloom and mill sectors in the textile industry, many studies emerged highlighting the sustainability of the handloom sector. Sadanandam (2018) stressed the growing complications in the sector in terms of technology, productivity, marketing, financial constraints, poor working conditions, and the livelihood of the weavers. Sadly, there had not been many changes in the well-being of these weavers (Raju & Rao, 2014). These situations needed to be addressed, as the handloom sector remained a main source of livelihood for the rural population in general and for marginalized women in particular. The study by Aswani and Bhat (2022) featured the predominance of the female workforce in the industry. Observing the social structure, many studies, including Sharma et al. (2021), pointed out that most of the weavers belonged to weaker sections (SC, ST, BC), had very low levels of educational attainment, and could not be accommodated in other jobs, as they lacked the required skills and training. Moreover, the majority of the weavers were quite aged. The present generation was unwilling to engage in weaving due to its low profile. According to the All-India Handloom Census (2019–2020), the ratio of male to female handloom workers was 26% to 74.5% in rural areas and 42% to 58% in urban areas. Female participation accounted for 72% of the total workforce.

If the weavers were from marginalized sections (especially women), with low educational attainment, low investment capacity, and other business-related constraints, would they still continue in the sector? Were they equipped or supported enough to overcome these constraints and resume weaving as a source of livelihood? Literature studies, as explained above, encompassed various dimensions of the livelihood and business nature (profitability and performance) of the handloom weavers. Hence, the present study aimed to analyze the quality of living conditions of the handloom weavers by comparing the Standard of Living Index (SLI) and Socio-Economic Status (SES) scales.

Socio-economic status

The socio-economic status (SES) of an individual or family played a vital role in contributing to their well-being. SES was essential as it determined an individual's participation in social, political, institutional, and cultural development. It measured social and economic position relatively, with factors such as education, income, and quality of life (Suranjan Majumder, 2021). SES emphasized not only the micro perspective of the income level of the individual/family but also macro dimensions, signifying educational attainment, financial position, and social caste and class perceptions, while acting as a reliable and consistent predictor of various outcomes (American Psychological Association). McLaughlin and Sheridan (2016) underlined a trade-off between educational success, SES, and hardships. Children with low SES who faced adversity recorded low educational success rates. Moreover, the average literacy skills of children from low-SES families were said to be five times lower than those of children from high-income families (Reardon, Valentino, Kalogrides, Shores, & Greenberg, 2013).

Standard of living

The standard of living measured the material conditions available for an individual's life. Core factors included income, gross domestic product, education, health, life expectancy, and economic opportunity. These indicators were closely associated with the quality of life and determined one's socio-economic and political stability.

OBJECTIVES

- To construct a Standard of Living Index and Socio-Economic Status scale for the handloom weavers of the Peruvemba Grama Panchayath.
- To find the significant difference in the scores of the socio-economic attributes of the SES scales (Kuppuswamy and Udai Pareek) and SLI.

HYPOTHESIS

H_0: There was no significant difference in the mean scores of SLI, Kuppuswamy, and Udai Pareek SES scales.

MATERIALS AND METHODS

Peruvemba village in the Palakkad district was prominent for its handloom industry, especially for Kerala kasavu sarees, set mundu, dhoti, thorthu, and colour sarees. Weavers in Peruvemba and the surrounding areas were experts in making authentic handloom clothes. They were concentrated in the area of Kallanchira in Peruvemba Grama Panchayath. Many people in these parts were still dependent on the handloom sector for their livelihood. In spite of being a major source of revenue, the weavers in Kallanchira struggled to make ends meet. Most of them had given up weaving and switched to daily wage jobs. At the time of the study, the Kallanchira weaving community comprised 73 weavers. All 73 weavers in Kallanchira, Peruvemba village were taken as the sample for the study. A judgmental sampling technique was used to select the sample population, as the weaver community in Kallanchira formed a smaller subset of the total households in the area.

Having observed the trend in the shift of occupation, the intended study aimed to evaluate the standard of living of the current weavers in Kallanchira based on specific SES scales and to find the significant differences in their scores. The study attempted to evaluate the quality of life of the handloom weavers to assess their well-being and place them on a specified scale of socio-economic status by comparing their socio-economic attributes. The two measuring scales used to analyze the conditions of the handloom weavers were: The Standard of Living Index (SLI) as per the National Family Health Survey-identified indicators, and the widely accepted Socio-Economic Status (SES) scales of Kuppuswamy and Udai Pareek. ANOVA was also conducted to identify whether there were any significant differences between the scales.

FINDINGS AND DISCUSSION

By examining basic socio-economic factors such as gender, age, educational status, marital status, caste, type of house, number of family members, and monthly income, the following inferences were drawn, as shown in Table 1.

Table 1: General profile of the respondents

Factors	Classification	Male	Percentage	Female	Percentage	Total	Percentage
Gender	**Total**	**24**	**33**	**49**	**67**	**73**	**100**
Age	31 - 40	5	21	33	67	38	52
	41 - 50	8	33	15	31	23	32
	51 - 60	11	46	1	2	12	16
	Total	**24**	**100**	**49**	**100**	**73**	**100**
Education	Primary	5	21	17	35	22	30
	Secondary	12	50	17	35	29	40
	Graduate	7	29	15	30	22	30
	Total	**24**	**100**	**49**	**100**	**73**	**100**
Marital Status	Married	21	88	48	98	69	95
	Unmarried	3	12	1	2	4	5
	Total	**24**	**100**	**49**	**100**	**73**	**100**
Caste	OBC	18	75	39	80	57	78
	SC	1	4	9	18	10	14
	Others	5	21	1	2	6	8
	Total	**24**	**100**	**49**	**100**	**73**	**100**
House Type	Kutcha	1	4	2	4	3	4
	Semi pucca	5	21	9	18	14	19
	Pucca	18	75	38	78	56	77
	Total	**24**	**100**	**49**	**100**	**73**	**100**
Monthly Income	Below 5000	4	17	4	8	8	11
	5000-10000	19	79	42	86	61	83
	10000-15000	1	4	1	2	2	3
	above 15000	0	0	2	4	2	3
	Total	**24**	**100**	**49**	**100**	**73**	**100**

Source: Primary Data

Gender: Of the 73 weaver respondents, the majority, amounting to 67 percent, were females, while the males constituted 33 percent.

Age: The majority of the female weavers fell in the age group of 30 to 40, while it was 51 to 60 in the case of male weavers.

Educational qualification was categorised as primary, secondary, and graduate. The majority fell in the class of secondary education without any difference between male and female weavers (50 and 29 percent respectively).

Marital status: 95 percent of the weavers were married (88 percent of females and 98 percent of males).

Caste: A total of 78 percent belonged to the caste classification of OBC (75% of males and 80% of females). Even studies like that of Raju and Rao (2014) confirmed that the majority of the weavers belonged to the marginalised section. Ten percent of the weavers were SC, and 8 percent belonged to others.

Type of house: Irrespective of gender, the majority of the weavers' houses were pucca (75 and 78

percent respectively for males and females).
Income: Finally, the majority (79 percent of males and 86 percent of females) of the weavers' income fell in the income class of ₹10,000 to ₹15,000.

Standard of living index

A Standard of Living Index was crafted by the NFHS as a summary household measure (IIPS, 2000). The index comprised 27 items, including type and ownership of house, basic amenities at home, consumer durables, material possessions, and agricultural machinery, etc. The set-out constituents of the NFHS indicator, together with their respective weights, were summed up. The obtained total score index was grouped into quintiles. The five quintiles framed were based on the weights—the fifth representing the wealthiest and the first, the poorest.

Table 2: Standard of living index (NFHS) indicators and scores

Number	SLI Quintile	Class
1	80 – 100 percentage	Wealthiest (Upper Class)
2	60 – 80 percentage	Upper (Middle)
3	40 – 60 percentage	Middle
4	20 – 40 percentage	Lower (Middle)
5	0 - 20 percentage	Poorest (Lower Class)

SES Scale: Kuppuswamy

The scale devised by Kuppuswamy (1976) assessed the socio-economic status in rural and urban settings. It consisted of a compound score which included the three central domains: education, occupation, and monthly income of the head of the family; yielding a score range of 3–29. Accordingly, the factor **education** was assigned a weight varying from 1 to 7 based on the grade (low to high), from illiterate to professional degree. **Occupation**, on the other hand, was allotted a maximum weight of 10. If the occupation of the head of the family was professional, the scale varied from 6 to 1 depending upon the category and its sub-categories: professional, clerical, skilled, and unemployed. The **monthly income** of the family, as per the revised CPI, was listed and classified into 7 groups. The score was assigned ranging from the highest score of 12 if the income was above or equal to ₹18,229/- to the lowest of 1 if the income dropped below ₹920/-.

The class classifications based on the scale were divided into five, as shown in Table 3 below.

Table 3: Revised Kuppuswamy socio-economic status class classification, 2021

Number	Scores	Division of Class
1	26-29	Upper Class
2	16-25	Upper Middle Class
3	11-15	Middle Class
4	5-10	Lower Middle Class
5	<5	Lower Class

SES Scale: Udai Pareek

The Udai Pareek (1964) scale, comprising 9 domains, assessed the socio-economic status of the rural population. The indicators listed were caste, education, occupation, possession of land, social participation in any organisation, type of house, members of the family, material possessions, and farm power. Each component was again sub-divided, and the scores were assigned from low to high. The total summated score was interpreted in terms of the classification of class, as shown in Table 4.

Table 4 Revised Udai Pareek socio-economic status class

Number	Scores	Division of Class
1	>43	Upper Class
2	33-42	Upper Middle Scale
3	24-32	Middle Scale
4	13-23	Lower Middle Scale
5	<13	Lower Class

The computed Standard of Living Index and SES scale for the handloom weavers belonging to the rural set-up were compared, and the scores obtained featured the following inferences.

Table 5 SLI scores

SLI Quintile	Class	Frequency	Percentage
54-67	Wealthiest (Upper Class)	0	0
40-53	Upper (Middle)	30	41
27-39	Middle	31	42
14-26	Lower (Middle)	10	14
0-13	Poorest (Lower Class)	2	3

Source: Computed

It was observed from Table 5 that, of the 73 respondents, there was an approximately equal percentage shared by the middle and upper middle classes in the Standard of Living Index. The share of the middle class was 42 percent, and that of the upper middle class was 41 percent. The lower middle class claimed 14 percent, while only a meagre 3 percent fell in the class of the poorest. The number of weavers who belonged to the wealthiest or upper class was nil.

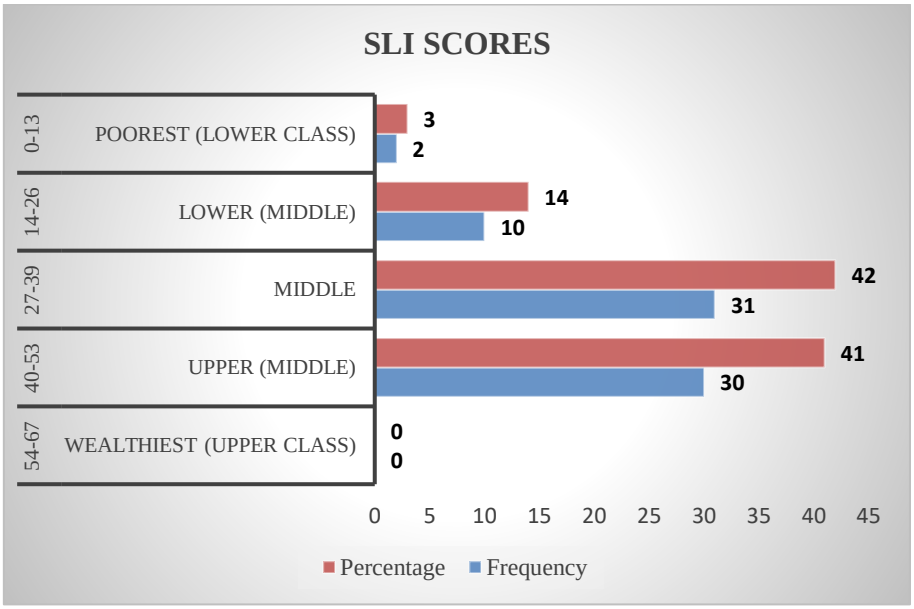


Figure 1: SLI Scores

The figure illustrated the distribution of Standard of Living Index (SLI) scores among different socio-economic classes. The majority of respondents fell within the "Middle" (42%) and "Upper Middle" (41%) categories, with minimal representation from the "Poorest" and "Wealthiest" classes. This indicated a concentration of individuals in the mid-range of living standards.

Table 6: SES scores

Class	Kuppuswamy Scores	Frequency	Percentage	Udai Pareek Scores	Frequency	Percentage
Upper Class	26-29	0	0	> 43	0	0
Upper Middle	16-25	4	5	33 to 42	68	93
Middle	11 to 15	46	63	24 to 32	5	7
Lower Middle	5 to 11	23	32	13 to 23	0	0
Lower Class	< 5	0	0	< 13	0	0

Source: Computed

The SES scores of modified Kuppuswamy and Udai Pareek were presented in Table 6. The majority of the weavers (63 percent) fell in the middle-class category in the Kuppuswamy scale, where 32 percent fell in the lower middle class and 5 percent in the upper middle class. Weavers belonging to the wealthiest or upper class and the poorest or lower class were nil. In the Udai Pareek scale, 93 percent of the weavers were recorded in the upper middle class, and 7

percent in the middle class. The number of families in the upper class, lower middle, and lower/poorest class was nil.

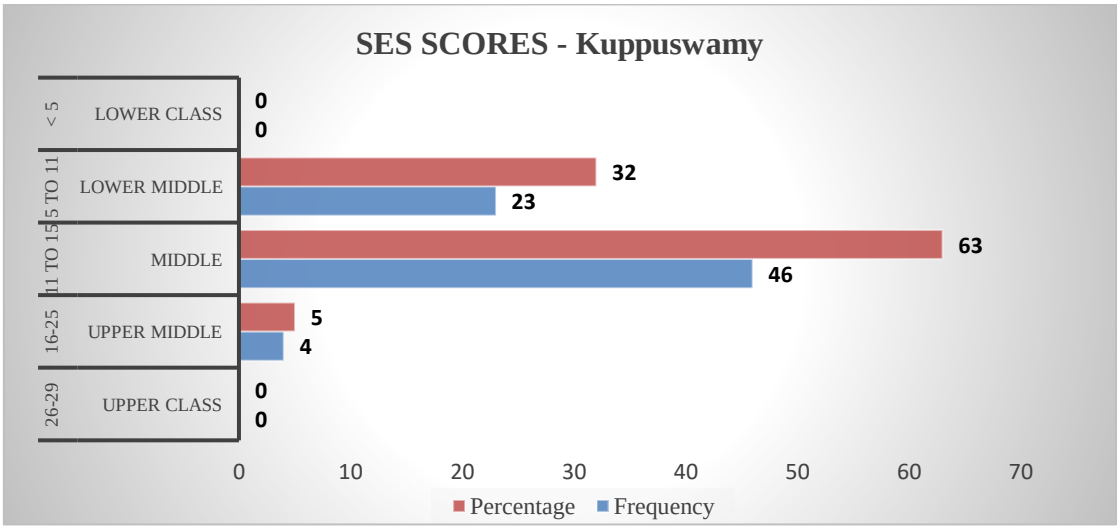


Figure 2: SES Scores: Kuppuswamy

The figure illustrated the distribution of Socio-Economic Status (SES) scores based on the Kuppuswamy scale. Most respondents belonged to the "Middle" category (63%), followed by the "Lower Middle" (32%), while none were classified as "Lower Class" or "Upper Class." This suggested that the population primarily fell within the middle socio-economic strata.

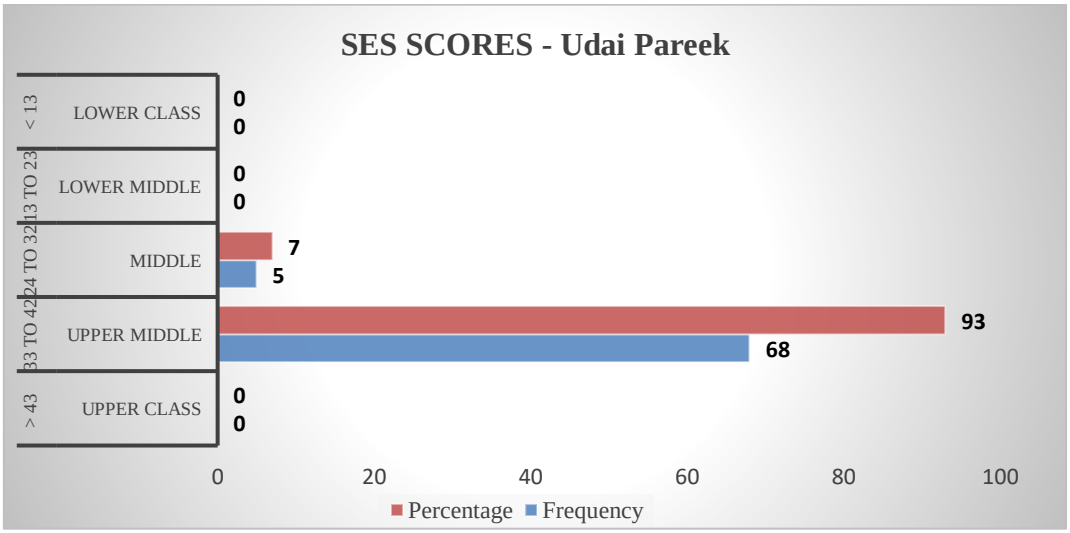


Figure 3: SES Scores: Udai Pareek

The figure illustrated the distribution of Socio-Economic Status (SES) scores based on the Udai Pareek scale. A vast majority of respondents belonged to the "Upper Middle" category (93%), while only a small portion fell under the "Middle" category (7%). No respondents were classified as "Lower Class," "Lower Middle," or "Upper Class," indicating a strong concentration in the upper-middle socio-economic segment.

A comparison of all the three scores revealed that the handloom weavers surveyed were residing in a rural setting. It was observed from Tables 4 and 5 that 31 (42%) and 30 (41%) of them belonged to the middle and upper middle class respectively when the SLI scale was applied. Similarly, 68 (93%) of them belonged to the upper middle class in the Udai Pareek SES classification, while 50 (68%) belonged to the class of upper middle in the modified Kuppuswamy scale, which was extended to study the SES in rural settings too. The lower middle constituted 32% in the Kuppuswamy scale, while the same was recorded at 14% in the SLI quintile. None of the scales had any respondent included in the category of wealthiest/upper class.

Of the three scales, the most comparable ones for the rural set-up turned out to be the SLI and the Kuppuswamy scale. The Udai Pareek scale overstated the status of the handloom weavers, as the indicators mainly comprised the material possessions of the respondents. The modified Kuppuswamy and SLI scales seemed comparable and exhibited a true picture of the socio-economic status of the weavers. The 68% and 83%, respectively, in the Kuppuswamy and SLI scales, cast the handloom weavers as belonging to the middle and the upper middle classes.

To explain the relationship between the SLI and Kuppuswamy classifications, a rank correlation was computed. The statistics exhibited a positive association of low degree agreement (with $r = .107$ and $p = .366$) between them. The SLI and Udai Pareek scales and the Kuppuswamy and Udai Pareek scales both showed that there was a low degree of negative correlational agreement ($r = -0.117$, $p = 0.325$; $r = -0.056$, $p = 0.637$), respectively.

The SES scores of the Kuppuswamy and Udai Pareek scales, and the SLI for each handloom weaver household, were compared using the one-way repeated measures ANOVA. A repeated measures Greenhouse-Geisser correction was performed to compare the effect of the SES scales and the SLI of the handloom weavers. The result obtained was statistically significant, indicating a significant difference in the scores of the different scales of measurement. Hence, the obtained test statistics ($F(2,144) = 469.938$, $p < 0.001$, partial $\eta^2 = 0.98$) accepted the researchers' hypothesis.

SUMMARY AND CONCLUSIONS

Defining the characteristics of the distinction of life of an individual was essential, as it exhibited the thought of well-being of a family and the opportunities available and affordable to them within the society, while functioning as a predictor of various outcomes such as educational attainment, health, etc. The socio-economic attributes always had a close positive association with the socio-economic status scales. Aggarwal et al. (2005) signified that SES also influenced the approachability, adequacy, affordability, convenience, and the actual utilization of various available health facilities. Moreover, SES was a decisive measure to detect an individual's position, as it featured the consumption and expenditure patterns of individuals and families (Majumdar, 2021). On measuring, all three scales (SES, Kuppuswamy, and SLI) seemed to be comparable in the study area. The majority of the handloom weavers belonged to the middle or upper middle class as per the measured scale. The SLI scale gave a clear picture of the SES of the handloom weavers in the study area and was best suited for the rural location too. As income was not an indicator of the set SLI measure, incorporating the same as an indicator might still have further relegated the SES status of the weavers through the measure of SLI.

SUGGESTIONS FOR FUTURE RESEARCH

Longitudinal studies on livelihood transitions

Conduct longitudinal studies to track the socio-economic mobility of handloom weavers over time, especially those who transition out of the sector. Such studies can help understand how shifts in occupation affect income, education, and quality of life.

Comparative analysis across regions

Expand the study to include a comparative analysis across different states or districts. This would allow for regional comparisons and help highlight geographic disparities as well as the impact of local policies or support systems.

Youth disengagement from handloom weaving

Investigate the motivations, aspirations, and barriers faced by youth in handloom families. Such research can suggest strategies for skill renewal and revival of the sector by addressing the challenges that prevent youth participation.

REFERENCES

- Aggarwal, O. P., Bhasin, S. K., Sharma, A. K., Chhabra, P., Aggarwal, K., & Rajoura, O. P. (2005). A new instrument (scale) for measuring the socioeconomic status of a family: Preliminary study. Indian Journal of Community Medicine, 30(4), 111–114.
- All India Handloom Census Report 2019–20. (2019). Ministry of Textiles, Government of India.
- Anthony, P. D. (2021). Capitalist progress and moral economy: Sustaining employment in India's handloom sector. Journal of Asian and African Studies, 57(2). https://doi.org/10.1177/00219096211015270
- Aswani, T. D., & Bhat, S. (2022). Women's participation in handloom industry: A case study of Chendamangalam, Ernakulam. International Journal of Innovative Science and Research Technology, 7(3), 1193–1196.
- Ganguly-Scrase, R. (2003). Paradoxes of globalization, liberalization, and gender equality: The worldviews of the lower middle class in West Bengal, India. Gender & Society, 17(4), 544–566.
- Majumder, S. (2021). Socioeconomic status scales: Revised Kuppuswamy, BG Prasad, and Udai Pareek's scale updated for 2021. Journal of Family Medicine and Primary Care, 10(11), 3964–3967.
- McLaughlin, K. A., & Sheridan, M. A. (2016). Beyond cumulative risk: A dimensional approach to childhood adversity. Current Directions in Psychological Science, 25(4), 239–245.
- Naga Raju, G., & Viyyanna Rao, K. (2014). A study on the socio-economic conditions of handloom weavers. Journal of Rural Development, 33(3), 309–328.
- Reardon, S. F., Valentino, R. A., Kalogrides, D., Shores, K. A., & Greenberg, E. H. (2013). Patterns and trends in racial academic achievement gaps among states, 1999–2011. Center for Education Policy Analysis, Stanford University.
- Sadanandam, B. (2018). Socio-economic conditions of handloom weaving societies: A case study of Warangal District. Journal of Rural Development, 33(3), 309–328.
- Sharma, S., Jena, B. B., & Chandra, R. (2021). Socio-economic conditions of handloom weavers: A study of Himachal Pradesh. Turkish Journal of Computer and Mathematics Education, 12(10), 4023–4038.

- Shaw, T. (2015). A study of the present situation of the traditional handloom weavers of Varanasi, Uttar Pradesh, India. International Research Journal of Social Sciences, 4(3), 48–53.
- Shruti, S. M., & Das Mohapatra, A. K. (2020). Sustainability of handloom: A review. Ilkogretim Online - Elementary Education Online, 19(3), 1923–1940.

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RETURN OF THE INDIAN MYTHOLOGY TV DURING THE PANDEMIC: PERCEPTION OF YOUTH IN DELHI

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ABSTRACT

During the initial imposition of the lockdown due to COVID-19 pandemic, re-telecast of 'Ramayana' and 'Mahabharata' witnessed unprecedented popularity on the television. The shows were able to provide a wide scope in terms of the narrative, characters and entertaining plots that strike a chord with the audience. Given the overwhelming response of the audience to the re-telecast of the "Mythology TV" during the times of the pandemic, the current study aimed to seek the perception of the youth on the same. The study was conducted in Delhi with the youth who watched Ramayana/Mahabharata during the Pandemic and had older members residing in the house who are at-least 40 years old and have watched Mythology Programs previously**.** Sample for the study consisted sixty youth of Delhi between the ages 18-34 years and watched mythology show during the pandemic. The study captured the perceptions of youth who chose to watch these over the famous OTT platforms. Factors such as inter-generational influence, curiosity to know about culture & increased time with family motivated youth to watch these shows during the lockdown. Two thirds of the respondents watched these shows with their grandparents. All of them affirmed that these shows were able to harness positivity and hope in the negative times of the pandemic.

Keywords: Culture, Development communication, Mythology shows, Mythology TV, OTT platform,

INTRODUCTION

The significance of media has grown exponentially over the last century. As a key forerunner of dissemination of information and spreading awareness, mass media today serves several functions such as information, education, entertainment, entertainment-education and transmission of heritage, to name a few. The need for mass media to serve the above functions has increased specifically with the lockdown imposed as a strategy to combat the pandemic of Corona Virus in the year 2020.

Television is a very powerful persuasive mass communication medium as it persuades the audience at larger extent. In India from the beginning i.e. 1989, television has been used more for the education and information purposes than for entertainment. The viewership pattern of television has tremendously grown over the other mass media. Television has the strong power to attract and influence the audience of all the age groups whether literate, illiterate and of all the strata of the

society. People have found television as a very powerful mass communication medium (Sen, 2011).

Development Communication & Mass Media

It is essential to understand and comprehend the meaning of "Development Communication" as the term has a wide variety of sense. The goal and objective of the development communication is pointing towards the terms of social, political, moral values and cultural not merely towards economic terms that makes person's life whole, and that enable a person to accomplish his or full potential (Josephine, 2015).

The role of cultural development and its positivity is to bring about a positive change in the society when used in development communication has been a topic of study since the 1970's (Chatterjee, 2009).

Many research and theories recommend that mass communication could act as an effective and fruitful agent of social change for some people while obstruct change for others (Johnson, 2000). Gupta (1995) put forward and profess that radio and television are the best and foremost sources for creating and bringing out awareness and interest among the audience regarding a new message, idea and innovation (Gupta, 1995, p.72).

As Wilbur Schramm (1964) was the first to acknowledge that communication could play a crucial and vital role in the national development. He explicates and extracts a relationship between development communication and economic growth, which has been the main guiding paradigm for development programmes. He proposed that economic activity can be gathered broadly as it spreads knowledge (Josephine, 2015).

The Role of Television

The growth of television in technology and its reach in the last three decades has been tremendous and extraordinary. In the remote areas television was formed as a giant professional mass media which disperse the message of development and modernization and to create awareness generating public participation (Sen, 2011). Television is considered as a mirror and reflector of a nation's personality and character. Television has the ability which recollects the past, dwell and continues upon the current and peep into the long run of a society. This role of television is all the more relevant to a country like India, which have different continental dimensions and innumerable and numberless diversities (Beriwal, 2018).

Indian television in its initial was managed by All India Radio (AIR). In 1976 television got separated from radio and given a new replacement i.e Doordarshan (Page and Crawley, 2001).The acceptance and implementation of advertisements on Doordarshan started in 1976. In the midst of 1970s, the entertaining progammes which included films, songs and dance along the commercial advertisements and sports coverage had increased considerably (Joshi, 1985).

Intergenerational Influence

Childers and Rao (1992), define Inter-Generational Influence as the influence and impact of one generation to another generation in terms of the transfer of skills, knowledge, attitudes, preferences, values, beliefs and behaviors. Inter-Generational Influence (IGI) can involve the within-family intergenerational transfer of knowledge, as during the pandemic younger generations have been influenced by the older one to consume the mythological content that was re-telecasted during the lockdown. IGI can include parents influencing their adult children in their life insurance choices as during the lockdown parents influence the children to watch mythology shows, and adult children influencing their parents' choice in music. IGI, which involves intra family interaction and communication, is likely to influence a host of decisions including product class preference, brand loyalty, and deal proneness (Reshma H. Shah, 1947).

Indian Mythology

Indian Mythology is one of the richest and most magnificent elements of Indian culture that enriches it and makes it a unique one in the world. Through different generations, entirely and completely divergent stories in Indian mythology are passed from generation to generation either by word of mouth or through carefully stored scriptures (Adhikari, 2019). Hindu Mythology narratives found in Hindu texts such as the Vedic literature, epic tales like Mahabharata and Ramayana. The Hindu epic stories were written to create moral ideals for followers to aspire it and follow it. These epics tales "Ramayana" and "Mahabharata were written in Sanskrit and in their essence described the power of the Hindu Gods in poetic verse. The most popular of these poetic epics are the Ramayana and Mahabharata (Adhikari, 2019). The Ramayana is a splendid narration of the story Rama. The epic speaks volume on the virtue of true brotherhood, love and therefore the nature of sacrifice one needs to build to defeat evil (Adhikari, 2019). The Ramayana is an ageless Sanskrit classic tale that abides by Prince Rama's bid to release his dear wife Sita from clutches of Ravana, the demon, with the assistance of a troop of monkeys. It is traditionally attributed to the authorship of the sage Valmiki and dated around 500 BCE to 100 BCE (Adhikari, 2019). Over the years, Sanskrit literature was transcribed into different languages like Tamil, Telugu, Hindi and Malyalam. It termed as Ramachar its Manas in Hindi composed by Tulsidas. The Mahabharata is the longest epic ever written and give as in depth and provides insight into the rise of Hinduism between 400 BC and 200 AD. Apart from its glorious narration of the fight between the Kauravas and Pandavas, it additionally details the script of the Bhagavat Gita text. From start to an end, it describes the great battle that pit brother against brother (Adhikari, 2019).

Theoretical Perspective

To appreciate the potential of Television reigning back the mythology shows during the pandemic, the following mass communication theories set the relevant background for the same.

Uses and gratification Theory

This theory has emerged out of the studies which shifted their focus from what 'the media do to the people' to what 'people do with the media' (Katz, 1959). Uses and Gratifications theory states that the audience members choose the programmes that they feel gratified by, and discard or avoid other content in media. Uses and gratification theory is an audience centered approach to understanding mass communication. The data (CNBC, 2020) clearly indicates an increased viewership of mythology shows on TV during the lockdown among all age groups. Different people have used TV mythology shows to gratify themselves during the lockdown.

Play Theory

William Stephenson's play theory is mainly emphasized and focused on how we use media for our own satisfaction and also how media bring changes in our lives according to its content. Reviewing age-old traditional drama on TV by older members of household as it was the sole mode of entertainment in the 'then times' has also influenced the younger members to watch them and get entertained by them

RATIONALE FOR THE STUDY

The viewership of TV has been grown consistently and exponentially, ever since the country was put under a lockdown on March 25, 2020, as people consumed more of news and movies. Launch of the mythological serials by public broadcaster Doordarshan probably to keep users engaged during the gloomy times gave a strong push to viewership (CNBC 2020). As per Audience Research Council (2020), mythological shows such as

Ramayana and Mahabharata have helped to bolster television audience and advertising revenues during the COVID-19 lockdown.

As the lockdown extended, the viewing pattern of mythological programs has been increased. In case of Ramayana, it soon extended it to one hour a day because of the high demand in viewership. Within the first week itself, the slot grew by 45% indicating people's interest and enthusiasm (India Times, 2020). The mythological shows which sometimes run twice a day garnered 109 billion viewing minutes during the week by 353 million viewers, the council's weekly data (CNBC TV18 2020). During the COVID-19 times people found these shows very thoughtful, meaningful and very relatable with their lives, as the times of COVID-19 have been extremely laborious. Mythology shows mostly have high degrees of elements of faith and optimism, and their telecast during the pandemic was very well received amongst different groups within India as it fostered the hope that that life will change sooner rather than later (Times of India 2020).

Given the overwhelming response of the audience to the return of the "Mythology TV" during the times of the pandemic, the current study, aimed to seek the perception of the youth on the same. Understanding that the primary consumers for the "Mythology Shows" would be the older generation, our study captured the perceptions of youth who chose to watch these over the famous OTT platforms and hence understand the impact of inter-generational influence within their household (Refer figure 1 for conceptual framework). Thus, the current study strived to look at youth's perception and viewership of mythological shows during the pandemic and appraise the possible motivating factors that could have influenced them to consume the mythological content that was telecasted during the lockdown.

OBJECTIVES

General Objective

to understand the perception of Delhi's youth on the re-telecast of the Indian mythology programs during the pandemic.

Specific Objectives

- To gain insight into the perception of youth about the re-telecast of Indian mythology shows during the pandemic
- To examine the viewership pattern of Delhi's youth for Indian mythology shows during the pandemic.
- To ascertain the factors that motivated Delhi's youth to watch Indian mythology shows during the pandemic.

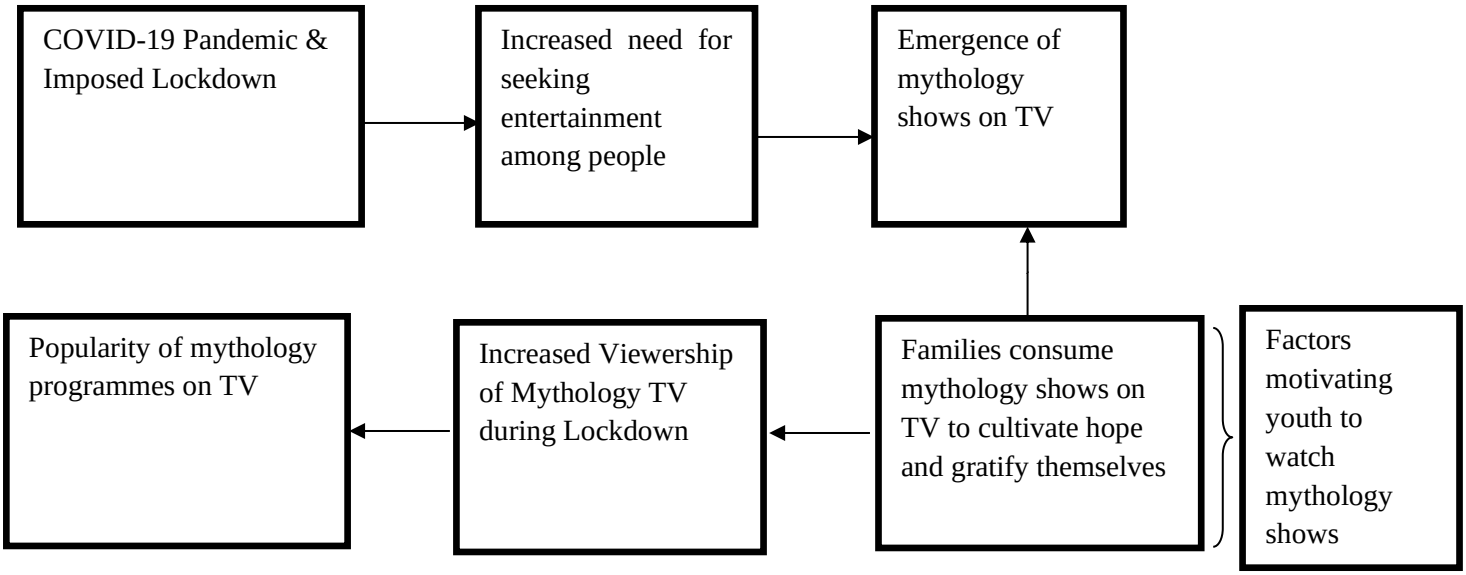


Figure 1- Conceptual framework of the study

METHODOLOGY

The study was conducted in the year 2021 and tried to understand the trends of viewership and perception about Mythology shows among youth during the pandemic by using the mailed questionnaire via Google form. The study was descriptive in nature with an aim to gather insights about the perception of youth in Delhi about the re-telecast of mythology shows during the pandemic and trends thereof. The key parameters under which the perception, viewership and trends were studied included- time spent in a day on mythology shows, frequency of viewing mythology shows, motivating factors which motivated people to watch mythology shows, watching mythology shows over the OTT platform. The study was conducted in Delhi with the youth who watched Ramayana/Mahabharata during the Pandemic and had older members residing in the house who are at-least 40 years old and have watched Mythology Programs previously**.** Sample for the study consisted of sixty youth from Delhi between the ages 18-34 years and watched mythology show during the pandemic (refer figure 2 for sampling methodology) who were identified via the snowball sampling methodology.

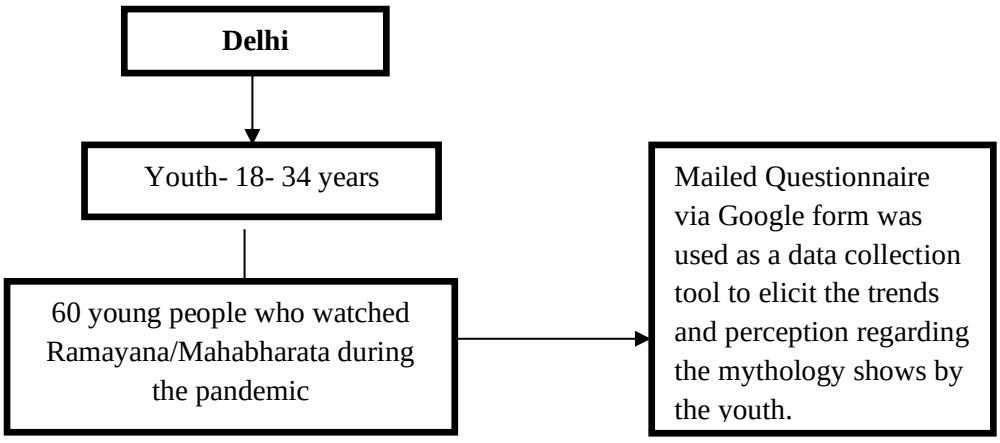


Figure 2: Sampling Methodology for the study

Operational Definitions:

Mythology TV: For this specific study mythology TV constituted of shows of Ramayana and Mahabharata that were re-telecasted in India during the lockdown.

OTT: OTT refers to "Over the top" content delivery with the help of internet and technology. Platforms like Netflix, Prime Video and YouTube are examples of OTT.

FINDINGS AND DISCUSSION:

The study aimed to find the viewership pattern of mythology shows, perception of youth on mythology shows. The findings of the study have been reported below under the following heads:

Demographic Profile of the respondents

Distribution of respondents by age

The sample of the study included sixty respondents i.e youth in the age group of 18-24 years from Delhi, who had watched the reference mythology shows for the study during the lockdown. Thus, we can say that majority of the respondents who were keen to watch these shows were in the age bracket of 20-22 years (refer table 3).

Table 3: Distribution of respondents by age

Age (in years)	Respondents (n 1)	Percentage (%)
18-20	3	5%
20-22	42	70%
22-25	15	25%
Total (N= 60)	60	100%

Distribution of respondents by their screen time during the lockdown

Since lockdown made all of us locked in the four walls of the house, entertainment avenues primarily were replaced from outdoors to indoors. Within the indoor, gadgets that provided entertaining content were more preferred and hence led to the manifold increase in screen time across all ages. The same was experienced by the sample respondents for this study as well. During the lockdown out of sixty respondents for fifty-four respondents (i.e., 90%) screen time had been increased (Refer table 4).

Table 4: Distribution of respondents by their screen time during the lockdown

Screen time increased	Respondents (n 1)	Percentage %
Yes	54	90%

No	3	5%
Can't say	3	5%
Total (N= 60)	60	100%

Distribution of respondents by regularity of watching mythology shows during the pandemic

Out of sixty respondents, forty-nine respondents (i.e., 81.66%) watched mythology shows regularly while eleven respondents (i.e., 18.34%) didn't watch mythology shows regularly and they watched some episodes only. Since youth is distracted by other content on OTT platforms and have erratic schedules, probably these factors may have been responsible for the percentage of the latter.

Table 5 Distribution of respondents by regularity of watching of mythology shows during the COVID-19

Watched Mythology shows with regularity	**Respondents (n 1)**	**Percentage** %
Yes	49	81.66 %
No	11	18.34 %
Total (N= 60)	60	100 %

Perception of youth about re-telecast of mythology shows

Out of the sixty respondents, fifty-six respondents (i.e., 93.34%) believed that re-telecast of mythological shows during the pandemic was a good step taken by the information and broadcasting ministry. They opined that this step made them revisit childhood memories and exposed them to the cultural heritage of our country besides providing them an opportunity for family time as well as they watched it together with their families.

Distribution of respondents by their favorite mythology shows during the lockdown

Mythology shows i.e., Ramayana and Mahabharata had witnessed unprecedented popularity during the lockdown. Out of sixty respondents, twenty-six respondents (i.e., 43.34%) preferred watching the Ramayana more whereas, thirty-four respondents (i.e., 56.66%) preferred watching the Mahabharata (refer table 6). From this data it clearly depicts Mahabharata was favored more over Ramayana. Possible reasons for the preference of the latter could be, a dramatic storyline, a gripping narrative and powerful performance by the actors.

Table 6: Distribution of respondents by favorite mythology shows

Favorite Mythology shows	**Respondents (n 1)**	**Percentage** %
Ramayana	26	43.34 %
Mahabharata	34	56.66 %
Total (N= 60)	60	100 %

Distribution of respondents by viewership of mythology shows during their childhood

Out of sixty respondents, forty-two respondents (i.e., 70%) watched mythology shows during their childhood, whereas, eighteen respondents (i.e., 30%) didn't watch mythology shows during their childhood (see table 7). Majority of the respondents had watched mythology shows during the childhood and also cited it as a reason to watch the re-telecast of mythological shows during the lockdown so that they could revive and revisit their childhood memories.

Table 7: Distribution of respondents by viewership of mythology shows during their childhood

Watched mythology shows during the childhood	**Respondents (n 1)**	**Percentage** %
Yes	42	70 %
No	18	30 %
Total (N= 60)	60	100 %

Distribution of respondents by preferred company for watching the mythology shows during the pandemic

The preference cited for a suitable company to watch the mythology shows ranged from parents, to grandparents, siblings and watching them all alone. Out of sixty respondents, forty-three respondents (i.e., 71.67%) watched mythology shows with parents, whereas five respondents (i.e., 8.34%) watched it with grandparents. A similar percentage five i.e., 8.34% preferred watching it with siblings and seven respondents (i.e., 11.66%) watched them all alone. Thus, parents were the preferred company for the youth for watching the mythology shows during the pandemic. Probably the youth were more comfortable with the parents than other groups mentioned that led to such strong numbers for their preference.

Table 8: Distribution of respondents by preferred company for watching the mythology shows during the pandemic

Preferred company for watching the mythology shows during the pandemic	**Respondents (n 1)**	**Percentage** %
Parents	43	71.67 %
Grandparents	5	8.34%
Siblings	5	8.33%
Alone	7	11.66%
Total (N= 60)	60	100%

Distribution of respondents by most liked feature of the mythology shows

Mythology shows have various features, such as story and the narrative, character, screenplay and moral lessons given by the show etc. Out of the sixty respondents fifteen respondents (i.e., 25%) liked the story and the gripping narrative of these shows, five respondents (i.e., 8.34%) liked impressive and powerful characters of the show, whereas nine respondents (i.e., 15%) liked the screen play and thirty-one respondents (i.e., 51.66%) liked the moral lessons given by the show (see table 9). With more than half of the respondents driven by the moral values being imparted by these mythological shows, the findings above clearly articulate the youth's quest for higher morals and positivity, which may have risen possibly due to the negativity that came in with the pandemic. The theoretical perspective of uses and gratification and cultivation were apparent enough through these findings.

Table 9: Distribution of respondents by most liked feature of the mythology shows

Feature of mythology shows liked the most	**Respondents (n 1)**	**Percentage** %
Story	15	25 %
Character	5	8.34%
Screenplay	9	15%
Moral lessons given by the show	31	51.66%
Total (N= 60)	60	100%

Distribution of respondents by the favorite characters

As far as Ramayana was concerned, out of sixty respondents seventeen respondents (i.e., 28.34%) liked Hanuman, nineteen respondents (i.e., 31.66%) liked Sita whereas ten respondents (i.e., 16.66%) liked Ram and fourteen respondents (i.e., 23.34%) liked Ravan in Ramayana. Whilst, for Mahabharata, out of sixty respondents thirty-eight respondents (i.e., 63.34%) liked Krishna, twelve

respondents (i.e., 20%) liked Draupadi, whereas three respondents (i.e., 5%) and seven respondents (i.e., 11.66%) liked Arjuna in Mahabharata.

Table 10: Distribution of respondents by the favorite characters

Favorite character in Ramayana	**Respondents (n 1)**	**Percentage** %	**Favorite character in Mahabharata**	**Respondents (n 1)**	**Percentage** %
Hanuman	17	28.34 %	Krishna	38	63.34 %
Sita	19	31.66 %	Draupadi	12	20 %
Ram	10	16.66 %	Pandvas	3	5 %
Ravan	14	23.34 %	Arjuna	7	11.66 %
Total (N= 60)	60	100 %	Total (N= 60)	60	100 %

Viewership pattern of mythology shows

Distribution of respondents by preferred times of watching mythology shows

Out of sixty respondents, seventeen respondents (i.e., 28.34%) watched mythology shows during the daytime whereas forty-three respondents (i.e., 71.66%) watched mythology shows during the night time. The preferred time of watching the mythology shows was the night-time. Probably, the respondents were busy with their college or work during day-time and hence were able to watch these shows in the night time only. In case the episodes were missed, out of sixty respondents thirty respondents (i.e., 50%) watched the missed episodes of mythology shows whereas the other half didn't watch the missed episodes of mythology shows.

Distribution of respondents by effect on viewership of OTT platforms due to the re-telecast of mythology shows

Out of sixty respondents, twenty-nine respondents (i.e., 48.33%) indicated that their viewership of OTT platforms got affected due to the re-telecast of mythology shows whereas twenty respondents (i.e., 33.33%) indicated that their viewership of OTT platforms wasn't affected due to the re-telecast of mythology shows (see table 11). Almost one fifth of them (i.e., 18.34%) didn't know if their viewership of OTT platforms got affected due to the re-telecast of mythology shows or not. Hence the figures above indicate that for almost half of them their viewership of OTT platforms was affected due to the re-telecast of mythological shows. Because, the respondents were devoting their time to watch these shows, time given to viewership on OTT platforms was considerably reduced.

Table 11 Distribution of respondents by effect on viewership of OTT platforms due to the re-telecast of mythology shows

Viewership of OTT platforms got affected due to the re-telecast of mythology shows	**Respondents (n 1)**	**Percentage** %
Yes	29	48.33 %
No	20	33.33 %
Can't say	11	18.34 %
Total (N= 60)	60	100%

Distribution of respondents by factors for inclination towards mythology shows over OTT platforms

Out of sixty respondents, for twenty-four respondents (i.e., 40%), the mythological content of these shows made them inclined to watch mythology shows. For half of them it was an opportunity to spend time with family that made them inclined towards watching these shows whereas for six respondents (i.e., 10%) free telecast was a key factor that made them inclined to watch these shows (see table 12).

Table 12: Distribution of respondents by factors for inclination towards mythology shows over OTT platforms

Factors for inclination towards mythology shows	**Respondents (n 1)**	**Percentage** %
Mythological content	24	40 %
Opportunity to spend time with family	30	50 %
Free	6	10 %
Total (N= 60)	60	100 %

Distribution of respondents by key motivators for watching mythology shows during the pandemic

Out of sixty respondents, twenty respondents (i.e., 33.34%) it was boredom during the lockdown that motivated them to watch mythology shows during the pandemic. For ten respondents, (i.e., 16.66 %) their parents forced them to watch mythology shows. A little less than one tenth of them (i.e., 8.34%) thought that desire to explore the history of our country motivated them to watch mythology shows, whereas five percent of them watched these shows out of curiosity. On the other hand, one fifth of them watched it as they were able to find an opportunity to spend time with their family as they watched these shows. Last, but not the least ten of the respondents (i.e., 16.66%) watched these shows to seek some relaxation amidst the negativity bought in by the pandemic (see figure 3). Hence, the mass media via the telecast of these mythological series was providing an

opportunity to the respondents to relax and get entertained and hence affirmed with the ethos of the Play theory.

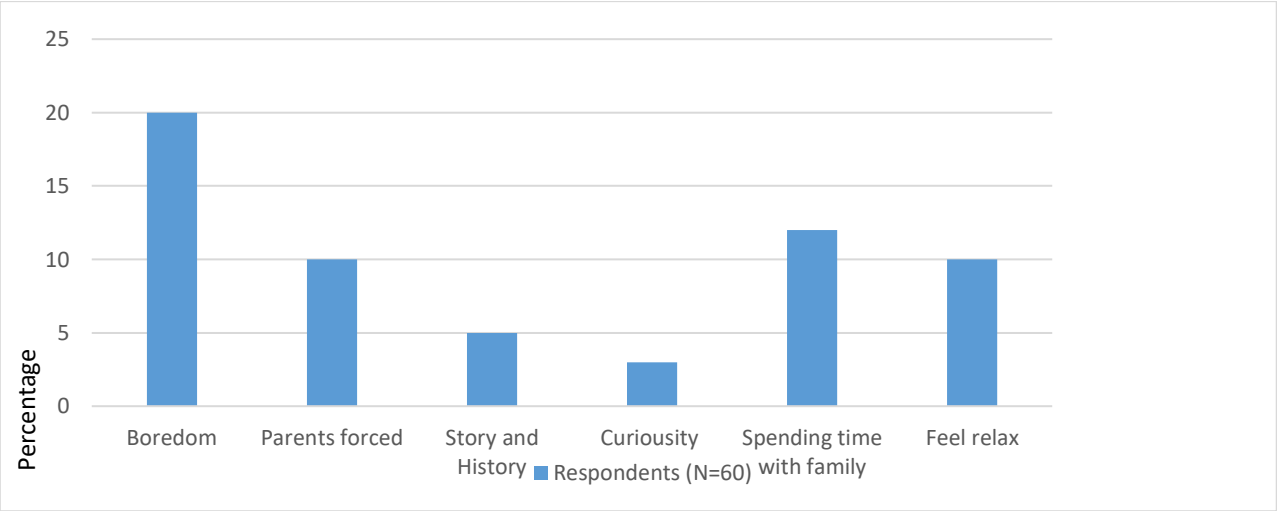


Figure 3: Distribution of respondents by key factors that motivated them to watch mythology shows during the pandemic

Other than the motivators, other possible reasons cited by the respondents to watch these shows included inter-generational influence and spiritual motivation. As during the pandemic there was negativity all around the corner, so out of 60 respondents 100% of them affirmed that watching these shows during the pandemic had brought out hope and positivity in their life.

CONCLUSION

Mass media plays an important role in forming the public opinion, connects the world and keeping us updated with the happenings around the world. Though it was a gloomy time but the re-telecast of Mythology shows on Doordarshan bought hope and positivity in the life. During the lockdown Mahabharata and Ramayana were watched all over the globe. People opined that watching mythological shows can lead to reduced stress in the times of corona virus. The shows were able to provide a wide scope in terms of the narrative, characters and entertaining plots that struck chord with the audience. Given the overwhelming response of the audience to the re-telecast of the "Mythology TV" during the times of the pandemic, the current study aimed to seek the perception of the youth on the same. The study captured the perceptions of youth who chose to watch these over the famous OTT platforms. Factors such as inter-generational influence, curiosity to know about culture & increased time with family motivated youth to watch these shows during the lockdown. Two thirds of the respondents watched these shows with their grandparents and parents. For almost half of them their viewership of OTT platforms was affected due to the re-telecast of mythological shows. More than half of them asserted that they watched these shows for the moral values imparted by them to avoid succumbing to the negativity bought by the pandemic. All of them affirmed that these shows were able to harness positivity and hope in the negative times of the pandemic. The findings of this study reiterate the wisdom and ethos of our age-old mythologies and how mass media has been able to perform its function of transmission of heritage effectively. Theories of uses and gratification and play theory seem to have actively working in the current situation as evidently supported by the findings of the study.

RECOMMENDATIONS FOR FUTURE RESEARCH

- Research on mythology shows on OTT and their content analysis can be carried out
- Research on content preferences on OTT platforms among children, adults and elderly within a household set up is also proposed.

REFERENCES

- Adhikari. (2019). Knowing Indian Traditional Culture of India New Delhi: Puspa Publishing House
- Beriwal, M. (2018). Television as a medium of mass communication. *Across the Globe.* Retrieved from https://www.atg.world/view-article/Television%20as%20a%20medium%20of%20mass%20communication-26844/television-as-a-medium-of-mass-communication
- Caldwell, M. (2020). Play Theory. In The International Encyclopedia of Media Psychology (pp. 1–12). Wiley. https://doi.org/10.1002/9781119011071.iemp0259
- Childers, T.L. and A.R. Rao (1992), "The Influence of Familial and Peer-Based Reference Groups on Consumer Decisions," Journal of Consumer Research, 19, (September): 198-211
- CNBC, TV18/ (2020). COVID lockdown: Mythological shows helped to bolster television audience, advertising revenues, says BARC. Retrieved from https://www.cnbctv18.com/buzz/covid-lockdown-mythological-shows-helped-to-bolster-television-audience-advertising-revenues-says-barc-5760121.htm
- Gupta, V.S. (1995). *Third Revolution in Indian Perspective: Contemporary Issues and Themes in Communication.* New Delhi: Concept Publishing Co.
- James. (n.d.). The role of television in mass communication – james1738. Retrieved from https://james1738.wordpress.com/2016/06/22/the-role-of-television-in-mass communication/
- Johnson, Kirk (2000). *Television and Social Change in Rural India.* New Delhi: Sage Publications.
- Joseph, A. (2007). Of Chickens and Eggs. *Vidura, Vol. 44(3),* 13-15.
- Joshi, P.C. (1985). *An Indian Personality for Television: Report of the Working Group on Software on Doordarshan.* New Delhi: Ministry of Information and Broadcasting, Government of India.
- Nancewanja. (n.d.). (2017). The existence of a community depends on the ability of its members to share | Course Hero. Retrieved November 27, 2017, from https://www.coursehero.com/file/p2gvqkj/The-existence-of-a-community-depends-on-the-ability-of-its-members-to-share/
- Page, D., & Crawley, W. (2001). *Satellites over South Asia: Broadcasting Culture and the Public Interest.* New Delhi: Sage Publications.
- PTI. (2020, April). COVID lockdown: Mythological shows helped to bolster television audience, advertising revenues, says BARC. https://www.cnbctv18.com/buzz/covid-lockdown-mythological-shows-helped-to-bolster-television-audience-advertising-revenues-says-barc-5760121.htm
- Reshma H. Shah and Banwari Mittal (1997) , "Toward a Theory of Intergenerational Influence in Consumer Behavior: an Exploratory Essay", in NA - Advances in Consumer

Research Volume 24, eds. Merrie Brucks and Deborah J. MacInnis, Provo, UT : Association for Consumer Research, Pages: 55-60.

- Rn 4', S. Z., Earl, S., Carden, F., Foreword, S., & Patton, M. Q. (n.d.). OUTCOME MAPPING '-7 0 BUILDING LEARNING AND REFLECTION INTO DEVELOPMENT PROGRAMS.
- Romer, D., Jamieson, P., Bleakley, A., & Jamieson, K. H. (2014). Cultivation Theory. In The Handbook of Media and Mass Communication Theory (pp. 115–136). John Wiley & Sons, Inc. https://doi.org/10.1002/9781118591178.ch7
- Sen. S. R.(2011). TELEVISION AND DEVELOPMENT COMMUNICATION IN INDIA: A CRITICAL APPRAISAL. *Commentary Global Media Journal*-Indian Edition, 2(2).
- Times of India, & Trivedi, T. (2020, May). Why mythological shows have been ruling Indian television during the lockdown. Tanvi Trivedi. https://m.timesofindia.com/tv/news/hindi/why-mythological-shows-have-been-ruling-indian-television-during-the-lockdown/articleshow/75832699.cms
- Williams, T. A. (1971). The Play Theory of Mass Communication. By William Stephenson. (Chicago: University of Chicago Press, 1967. Pp. x, 225. $5.00.). American Political Science Review, 65(2), 514–515. https://doi.org/10.2307/1954470

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PHYSICAL ATTRIBUTES INFLUENCING CLASSROOM ACOUSTICS IN HIGHER EDUCATIONAL INSTITUTES OF BENGALURU CITY

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ABSTRACT

Acoustical quality in higher educational classrooms must be of high standards as speech is the major form of communication. Low noise levels are needed for clarity of speech, sustained attention and concentration levels for students. On site ambient sound levels were taken from randomly selected 45 classrooms in Higher Educational Institutes of Bengaluru Urban. Noise interference from vehicular traffic, pedestrian movement, building services were observed in lecture halls. Physical characteristics assessed included orientation, room sizes, carpet area, volume, student strength, furniture design, and materials. Ambient sound pressure levels (SPL_{Aeq}) measured in decibels were recorded in three classroom design variants namely Lecture Hall Design (LHD) -1, 2, 3. Recordings with and without student occupancy, with and without fans running were compared. The mean SPL_{Aeq} without students and non-operating fans was 62 decibels (dBA), 72dBA and 75dBA respectively for LHD-1,2,3. The mean SPL_{Aeq} with students and operating fans was recorded 65dBA, 75dBA and 78dBA. These recordings were very high compared to standard requirement of 35dBA. Of the three spatial types of classrooms LHD-1 had lowest noise levels as they were enveloped in thick masonry walls. 't' test indicated significant differences in SPL_{Aeq} of LHD-1,2,3. The research concentrated on noise levels as they are major source of distraction for learning causing learning impediment. Design features like upholstered furniture, false ceiling, shielding the rooms with foliage can help in noise reduction.

Keywords: Acoustics, Ambient Sound Pressure Levels, Classroom Design

INTRODUCTION

Sound is omni-present. Sound manifests in various forms in university spaces and creates myriads of experiences. As morning dawns, the serene nature of university springs to life, chirping of birds, squealing of squirrels, cooing of cuckoo and pigeons in the campus gardens have an intangible acoustical effect on students. The swelling symphony of morning-prayer, the reverberation of college gong, the chatter of students ushering to classrooms gives a sense of belonging and gives collective memory to space. The user doesn't merely encounter a piece of architecture; instead, there's an active participation with it, leading to the creation of experience through personal perception.

But with the effect of urbanization, college buildings have succumbed to various unwanted background noises like that of vehicular traffic, aircraft vibrations, construction noises, loud speakers, machinery vibrations, building services (like an operating fan) to name a few (Umar et al., 2023). The inability to manage or control the environment's acoustics might cause residents to feel extremely frustrated. As a result, one of the primary sources of stress in urban life is auditory discomfort.

College classrooms are intended for verbal communications between teachers, students and among students. Students need an acoustical environment free of noise, with speech intelligibility and clarity to comprehend teacher's messages and engage into process of learning. Students listening effort dramatically increases when their work combines auditory tasks simultaneously with secondary activities like reading, writing and comprehending. Excessive background noises, long reverberation time, are acoustical barriers, detrimental to learning as they necessitate listening exertion. To complete a variety of classroom tasks that call for concentration, acoustic design is crucial (Chen and Ou, 2021).

In order to enhance the acoustic quality of place, it is important to intervene with passive features of the environment (sound reduction coefficient of the enclosure, sound absorbing coefficient of the materials, and distribution of sound absorbing surfaces). Good acoustical quality of learning spaces favour appropriate cognitive and meta-cognitive functioning and processing of information gathered that has direct influence on student's performance (Lauria et al., 2020).

Investigations by Ricciardi and Buratti (2018), points out that background noises are most correlated to speaker's voice effort than the reverberation in classrooms. Speech intelligibility function dropped linearly as noise level increased. Speech heard in noise is not well remembered and retained.

In a quiet classroom, the teacher's A-weighted sound level at a distance of one meter is 67decibels (dBA). Sound levels decrease approximately 3decibels (dB) per doubling of distance in an enclosed space. The levels of speaker could drop to as low as 55 dBA in rear of a typical classroom in the United States. As per the ANSI standard, ideal background noise level in classroom is 35 dB, to ensure a minimum +15 dB signal-to-noise ratio throughout. Achieving a sufficient signal-to-noise ratio for high speech intelligibility, has a positive impact on student learning. (Brill, 2018). Evaluations conducted by Connolly et al. (2019), showed that the performance of all students especially upper age groups were negatively affected in 70dB SPL_{Aeq} conditions.

SIGNIFICANCE OF THE STUDY

Many studies have focused on speech intelligibility in classroom of schools, but there are lacunae on related studies with respect to university settings in presence of occupants. Acoustical simulation studies are used to check various matrices like Speech Transmission Index, speech intelligibility and their effects on cognitive performances like listening and comprehension. To produce real time variations of environment in simulations is a marathon task. The present study focuses on the differences seen in sound levels pre and post student occupation in classrooms with different design features.

According to Youssef et.al., (2014), for good speech intelligibility, low ambient noise levels are needed. Classroom furniture facilitates sound diffusion and upholstered furniture aids sound absorption. Shape of the classroom, if rectilinear; absorption happens in ceiling. Physical design features of the classrooms generate different acoustical conditions. Weighing the odds, the study focuses on assessment of sound levels related to physical design of college classrooms.

OBJECTIVES

1. To examine the sources of unwanted sound in classrooms of HEIs.
2. To compare the acoustical quality in different spatial designs.

HYPOTHESIS

Null hypothesis (Ho): No significant difference exists in the ambient sound levels of classrooms with respect to design features.

Alternative hypothesis (H_1): Significant difference exists in the ambient sound levels of classrooms with respect to design features.

METHODOLOGY

Research design adopted for the present study was field study. In-situ measurements and observations of classrooms were made following Standard Operating Procedures as detailed below.

Study locale:

Study was conducted in Higher Educational Institutes (HEIs) of central Bengaluru city after acquiring permission from college management authorities. The colleges were autonomous, established between the year 1945-1980s and located in prime thoroughfares of the city.

Sample size and sampling method

45 classrooms situated in 4 different building blocks in HEIs were randomly selected.

Study tool

Observation record sheet was used for the field study. First part of record sheet comprised of site analysis of classrooms with respect to their orientation, temperature and humidity levels. Digital Hygrometer was used to measure the humidity and temperature levels.

Second part focused on spatial design features of classrooms which included furniture configurations, seating capacity, wall types, false ceilings, partition walls, windows, doors and other openings. In- situ dimensions of 45 classrooms were taken in imperial scale using Bosch distance meter. Measured drawings were drafted to examine classroom characteristics like masonry walls, partition walls, masonry walls, false ceilings, windows, doors and other openings. The sizes of classrooms, their volumes and floor areas were then derived in MS Excel. Observations were made on various sources of noises omni-present in classrooms.

Ambient sound levels in different classrooms were then recorded using Sound level meter, Lutron DSL 4001, with frequency weighting to meet IEC 651 standards. The device is dB A and C frequency weighting, in range of 35-130 decibels, frequency ranging in between 1.5-8000Hertz. A-weighted indoor ambient equivalent continuous sound levels, denoted as $SPL_{Aeq,}$ were taken using

the Digital Sound Level Meter over a 5-minute interval. This was done during October November months of 2024. The pressure levels were measured in decibels (denoted as dB).

The instrument was placed about 1.20 meter above the ground and 1meter away from all the walls. Readings were recorded firstly in vacant rooms without students. Measurements were taken with windows closed and the fans, non-operational. Sound Pressure Levels (SPL_{Aeq}) after the participants occupied the classroom were measured with fans operating and windows opened. Sound Pressure levels in decibels (dBA) were gauged and average sound levels were estimated in different parts of the room like the front row of seating, near windows, and corners. Sound levels in various models of classroom designs were then compared with standard recommended levels.

Statistical analysis

Data was compiled and analysed using MS Excel, Microsoft Office Professional Plus, 2016. To examine the attributes of the classrooms, descriptive statistics were used. Statistical significance was established at $p< 0.05$. 't' test was employed to examine if there was significant difference in ambient sound levels in various classrooms.

RESULTS AND DISCUSSION

The collated data is sorted, analysed and discussed in this section.

Site analysis of classrooms selected for the study

Orientation is the position of building with respect to sun path and prevailing winds. The location of the classrooms with respect to orientation is analysed. Further, temperature and humidity levels measured are discussed here.

Table- 1: Site analysis of classrooms selected for the study.

Name of the building structure	Orientation of the building structure	Number of classrooms (N=45)	%	Mean temperature (°Celsius)	Mean humidity (%)
Block-A	North-South	10	22.2	24	56.9
Block-B	East-West	15	33.4	23.8	59.8
Block-C	Both North-South and East- West	10	22.2	23	63.1
Block-D	North-South and East-West	10	22.2	24.6	53.5

Classrooms intended to study the existing acoustic conditions were located in Block-A, Block-B, Block-C and D. It has been observed that Block A had a North-South orientation. Block-B had an East-West orientation. Block A was furthest away from the traffic roads, while Block B was closer to the main roads. Block C had an L-shaped configuration. This space was surrounded by other buildings, and hence received lesser sun's radiation compared to other blocks. Block- D had a

central atrium with green landscape elements like trees and lawn. Block C and Block D were zoned both in North South and East West configurations.

Window openings necessary for natural ventilation is positioned based on orientation. Though windows are culprit for transmitting external noise signals, their significance for ventilation cannot be ignored. Providing blinds to window can positively aid in natural ventilation and lighting yet keep the noises out and are effective for high frequencies. Designing external barriers, hallways, corridors are passive ways to improve acoustic attenuations (Torresine et al., 2019).

Further, it was noticed that the temperature levels in these classrooms ranged between 23°Celcius - 25°Celsius while mean humidity levels ranged between 53.5%-63.1% (Fig -1). As the humidity rises, the reverberation decreases. Hence, reverberation is usually higher in dry classrooms.

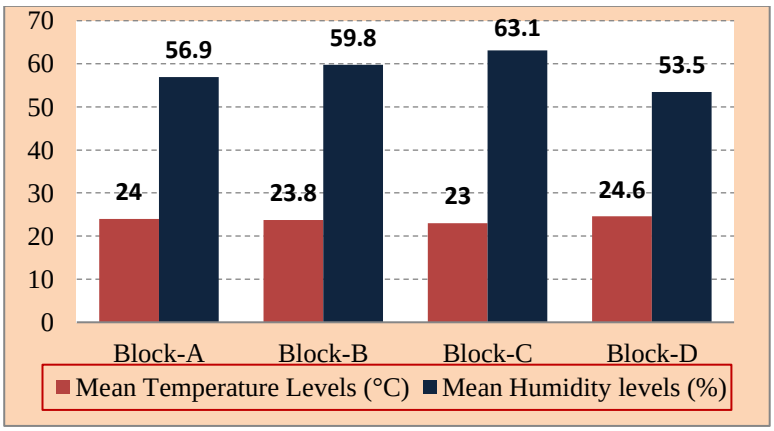


Figure-1. Temperature and humidity levels in classrooms

Spatial design of classrooms

Based on spatial design the classrooms were categorised as Lecture Hall Design-1, 2 and 3 and described as follows: -

Lecture Hall Design – 1 (LHD-1)

Of 45 classrooms selected, 19 had lecture hall design-1 (LHD-1) with three-row configuration of wooden benches and desks without upholstery. Located in ground and first floors, these rectilinear shaped spaces could seat 30-50 students. Floor- to-floor height of classrooms were 10'- 11'. Equipped with podium, blackboard/ white board/projector screen, they had ceiling fans fitted for mechanical ventilation. Enclosing four walls were of stone masonry or of concrete with 9"-12" thickness accommodating long glass windows. These spaces opened to long open corridors of college on one side. Exterior facing wall had canopy of trees on the other side within the campus. One such type of classroom is depicted in Fig-2.



Figure-2: Planimetric layout of LHD-1

Lecture Hall Design – 2 (LHD-2)

There were 15 classrooms having LHD-2 design (Fig-3). They were rectilinear spaces with capacity for 60-80 students, located in second storey of building block. Heights ranged between 10-12'. These classrooms were equipped with black board, white board/projector screen and fitted wall fans for mechanical ventilation. Furniture provided was made of wood and MS steel furniture. Side walls were stone masonry or concrete (thickness 9"-12") with glass windows that opened to long open corridors on one side. Interiors were separated by stud partitions and suspended ceiling was made of gypsum boards (18mm thick).

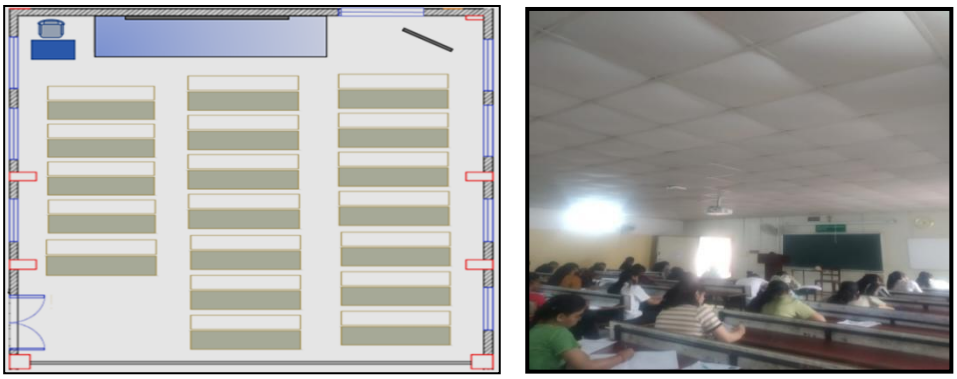


Figure-3: Planimetric layout of LHD-2

Lecture Hall Design – 3 (LHD-3)

Eleven of 45 selected classrooms were LHD-3 model, with grid furniture layout (Figure-4) They were rectilinear shaped with capacity to seat 50-70 students. LHD-3 were higher (Height ranged to 12'-15) with metal truss work ceiling and were located in upper most storey of the building block. They were equipped with blackboard, white board/projector screen, fitted ceiling fans for mechanical ventilation. External facing wall was stone masonry or concrete of thickness 9"-12" with large glass windows covered with curtains. The classrooms opened to long corridors of college on one side.

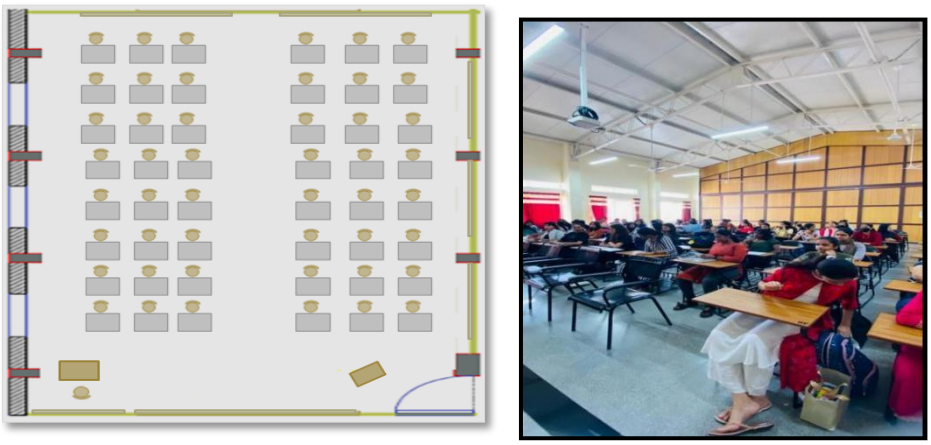


Figure-4: Planimetric layout of LHD-3

Physical characteristics of classrooms

The construct of physical characteristics includes dimensions of length, width and height in feet, the carpet area, the volume, distance from board to first row, student strength, unit space allocation is tabulated in Table-2

Table 2: Physical characteristics of classrooms

Physical characteristics	Classroom design type			
		LHD-1	LHD-2	LHD-3
	N	19	15	11
	%	42.2	33.3	24.4
Mean length		27.5’	28.5’	30.1’
Mean width		20.9'	21.8'	26.1'
Mean height		10.5'	10.9'	13.1'
Carpet area (In square feet)		575.5	632.06	781.99
Volume (cubic feet)		6018.89	6904.711	10269.41
Distance from board to 1st Row (In feet)		5.2'	5.6'	6.27'
Student strength		47	54	64
Unit space provided (Sq ft/Student)		12.2	11.7	12.2

The dimensions measured indicated that LHD-1 had lowest carpet area of 575Sq ft and volume of 6018Cu ft. LHD-2 had 632Sq ft. carpet area and 6904.7 Cu ft volume which was higher than LHD-1 by 56.5 Sq ft (carpet area) and 890 Cu ft of volume. LHD-3 had maximum carpet area of 781.99Sq ft and 10269.41Cu ft of volume. The higher volume of LHD-3 is contributed by high ceiling height (mean 13.1’). LHD-1 was lowest in volume whereas LHD-3 was most voluminous. It must be noted that large volumes and areas of classrooms have higher reverberation times. (Iannace

et al., 2013) Absorptive surfaces reduce reverberation time as they improve speech intelligibility (Choi, 2016).

Distance from the board to first row of seats ranged between 5.2' to 6.27'. Sound levels of the speaker reduce by 3decibels for every doubling of distance (Brill, 2018). So, it is important that the listeners are closer to the speaker for effective hearing.

Seated occupants are usually the largest single component of absorption in classrooms. Occupants help greatly in achieving ideal reverberation times for speech in the classrooms that have more reflective surfaces than absorptive surfaces. The average student strength in classrooms ranged between 47- 64.

Literature reference (Neufert, 2012) suggests spaces of 15 Sq. ft/unit for classrooms and lecture halls. The average unit space provided in different classrooms ranged between 11.7 Sq.ft. - 12. 2 Sq. ft. The space provided was 2.8Sq. ft. - 3.3Sq. ft. lesser than the standards recommended.

Sources of external noises in classrooms

Noise sources were categorized as student speaking, HVAC equipment, other building equipment, water running into overhead tanks, sinks, lighting fixtures, A/V equipment and other miscellaneous sources. (Choi, 2016)

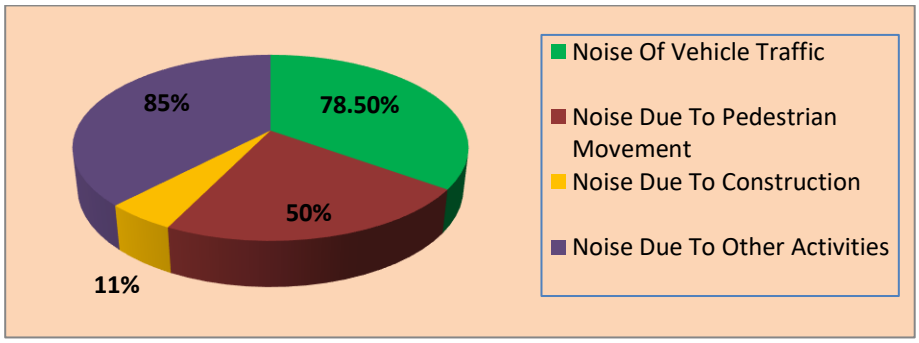


Figure 5: Sources of noises in classrooms

Figure-5 indicates different sources of noises in classrooms. Majority (78.5%) of the classrooms could hear noises from moving vehicles or their honking. In half of learning spaces, pedestrian movement was audible while 11% of the rooms experienced construction related disruptions. Noises of other outdoor activities were audible in 85% of the classroom environment.

Sound pressure levels (SPL_{Aeq}) in classrooms.

Ambient sound pressure levels (SPL_{Aeq}) in 45 classrooms were recorded first in the absence of students. Sound levels were then captured after students taking up seats and had settled down for the lecture. Table-3 depicts the findings.

Table- 3: Sound pressure levels (SPL_{Aeq}) in classrooms.

Descriptive statistics	SPL_{Aeq} without students (dBA)	SPL_{Aeq} (in dBA) with students				
		With students	At source of instruction	In front row	Near window seat	In the last row
Mean	69	72	70	70	70	70
Minimum Value	54	56	56	56	58	57
Maximum Value	80	81	81	81	81	81

It was noted that ambient sound levels in the classrooms ranged between 54-80 dBA which were 19-45dBA higher than the recommended levels of 35dBA. The higher ambient levels of sounds can be attributed to the surrounding noises of traffic or pedestrian movements or vibrations of building services plumbing, lifts etc. or other activities happening around the area.

Sound levels in the classrooms post student's entry ranged between 56-81dBA. Average levels were 70dBA. Difference in sound levels before and after student occupation ranged between 1-7.9dBA. The increased sound levels were due to the chatters of students.

Sound levels when the teacher started to lecture were noted. Sound levels during the lecture were taken at different locations in rooms like the first row, near the window openings and last row. Mean sound levels at the source of instruction were 70dBA. These levels are found to be similar to the daily noise exposure of young people in UK of 72dBA, Chile70dBA (Abakar et al., 2020).

Mean SPL_{Aeq} near the front row, near window opening and rear row were 70dBA.The difference between two signal points (i.e. SPL_{Aeq} at the point of source and SPL_{Aeq} at front row/last row/ or seat near window- opening) was zero in 99% of the rooms (in one room the difference was 1dBA). The sound signals were decaying as it proceeded to different parts of the room. The standard difference in sound levels between the different positions needs to be +6dBA. (Ahmed and Aman, 2019) But, in most of the rooms, difference in the sound signals was 0-2dBA which was inadequate for good audibility.

Increased sound levels in the environment result in reduced speech intelligibility of the teacher taking class and repetition of lecture points. The vocal effort of the teacher is increased so that students hear the speech legibly. (Kristiansen et al, 2014). In such a scenario, the students are forced to concentrate and focus more for understanding the content.

Comparison of ambient sound levels in various design types of Classrooms

Ambient sound levels of the three different classroom designs were compared and discussed in Table-4

Table 4: Ambient continuous sound levels in different spatial designs

Comparison of SPL_{Aeq}	Classroom model	SPL_{Aeq} without students (dBA)	SPL_{Aeq} with students (dBA)	t' Test
		No fan, windows closed	Fan operational, windows opened	
LHD-1 and LHD-2	LHD-1	62	65	**3.33***
	LHD-2	72	75	
LHD-2 Vs LHD-3	LHD-2	72	75	**11.6***
	LHD-3	76	78	
LHD-1 Vs LHD-3	LHD-1	62	65	**8.34***
	LHD-3	76	78	
*Significant at 5% level				

Variations in ambient sound levels (SPL_{Aeq}) with and without students in three classroom variants are represented in Figure-6. It is noted that LHD-3 indicated higher levels in comparison to the two other classroom design variants. Larger volume of LHD-3, with higher ceiling heights contributes to greater reverberations and active sound fields resulting in higher sound levels.

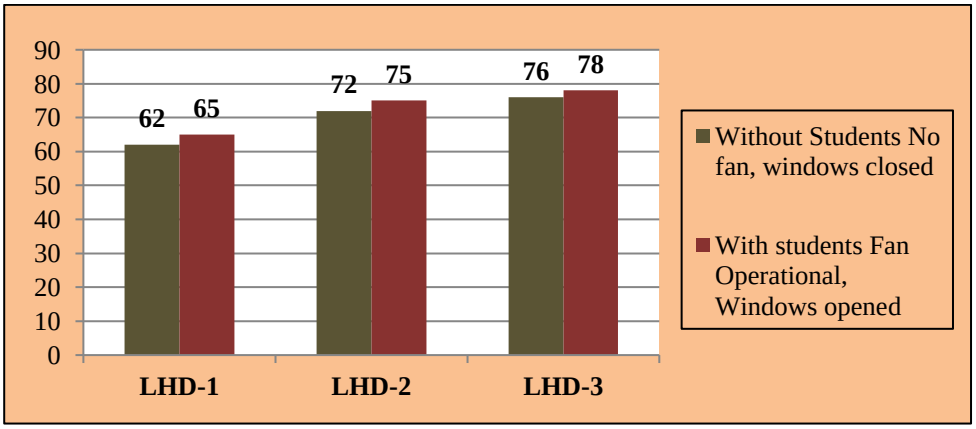


Figure -6: Sound levels with and without students in different classroom variants

Ambient sound pressure levels (SPL_{Aeq}) of LHD-1 and LHD-2 showed significant differences ($p<0.05$). It may be noted that LHD -1 were made of masonry wall and had lower volumes of space compared to LHD-2. Lower SPL_{Aeq} for LHD-1 may be attributed to the presence of tree cover in exterior facing wall. Trees act as a natural shield from noises intruding into learning spaces (Umar, et al., 2023).

SPL_{Aeq} of LHD-2 in comparison to LHD-3 revealed significant differences at 95% confidence level. LHD-3 having even higher SPL_{Aeq} can be ascribed to metallic truss work, higher ceiling heights contributing to larger volumes and increased reverberations.

The comparison of LHD-1 to LHD-3 exhibited significant differences in the ambient SPL_{Aeq}. Hence, the hypothesis Ho may be rejected at 95% confidence level. The alternate Hypothesis (H_1), that there is significant difference in the ambient sound levels with respect to design features is accepted.

SUMMARY AND CONCLUSION

The research pointed out that the ambient sound levels in classrooms of HEIs were higher than the standard 35dB. Sound level differences at different positions in classrooms were inadequate for good audibility. Significant differences were demonstrated in the SPL_{Aeq} of LHD-1, LHD-2, LHD-3 having varied physical features ($p<0.05$). Classrooms with lower ceiling heights, lesser volumes and masonry walls performed better with low ambient noises. Large classrooms of higher ceilings with metallic truss work installations recorded highest ambient noises. On a long run, high sound levels in classrooms, information extraction and analysis become difficult for students. This can be very fatiguing, and may result in student losing interest in topic taught. It can be concluded that sound levels can be controlled with simple design features added to the classrooms like suspended false ceiling, upholstery of furniture, addition of acoustic curtains, soft flooring and installation of sound absorbent pop-up boards. Open book shelves and fluted panels can help in diffusion of sound and aid in even distribution of sound in classrooms. Vertical green walls and tree cover facilitates reduction in noise levels in a sustainable manner. It is ideal to have masonry walls than partition walls or prefabricated walls to reduce the noise levels. Acoustics design should be considered seriously for effective learning process.

REFERENCES

- Abakar M. K., Alibaba H. Z. (2020) Acoustic improvement of School Buildings., United International Journal for research and Technology, 1(5), pp. 22-30, ISSN: 2582-6832.
- Ahmed, R. S. and Aman J. (2019). Speech intelligibility assessment at architecture jury rooms in Dhaka, International journal of Civil Engineering, 8 (4), p21-32, e-ISSN: 2278-9995.
- Brill, L. C. (2018). Building a Sound Future for Students: Considering the Acoustics in occupied Classrooms. Acoustics Today, p14-21.
- Chen, Q. and Ou, D. (2021). The Effects of Classroom Reverrberration Time and Traffic Noise on English Listening Comprehension of Chinese University Students. Applied Acoustics , p179. https://doi.org/10.1016/j.apacoust.2021.108082
- Choi, Y. J. (2016). Effect of occupancy on acoustical conditions in university classrooms. Applied Acoustics , 114, p36-43. https://doi.org/10.1016/j.apacoust.2016.07.010
- Connolly, D., Dockrell, J., Shield, B., Conettaa, R., Mydlarz, C., & Cox, T. (2019). The effects of classroom noise on the reading comprehension of adolescents. (ASA, Ed.) The Journal of Acoustical Society of America,145(1),p372.https://doi.org/10.1121/1.5087126
- Iannace, G., Trematerra, A., and Trematerra, P. (2013). Acoustic Correction Using Green Material In Classrooms Located in Historical Buildings. Acoustics Australia , 41 (3), p 147-150.
- Kristiansen J, Lund, S. P, Persson R, Shibuya H, Nielson, P M, Scholz M (2014). A study of classroom acoustics and school teachers' noise exposure, voice load and speaking time during teaching, and the effects on vocal and mental fatigue development, International Arch occupational environmental health, 87(8), p851-60, https://doi.org/10.1007/s00420-014-0927-8
- Lauria, A., Secchi, S., & Vessell, L. (2020). Acoustic Comfort as a Salutogenic Resource in Learning Environments- A Proposal of a System to Improve The Acoustical Quality of Classrooms. Sustainability , 12 (22), p9733, http://dx.doi.org/10.3390/su12229733

- Neufert. E, (2012), Neufert Architects' Data 4th edition, John Wiley and Sons, West Sussex, UK, p316-329.
- Ricciardi, P., and Buratti, C. (2018). Environmental Quality of University Classrooms: Subjective and Objective Evaluation of the Thermal, Acoustic and Lighting comfort Conditions. Building and Environment , 127, ISSN 0360-1323, p23-36, https://doi.org/10.1016/j.buildenv.2017.10.030
- Singal, M. (2022). Interiority of Agraharam: Traditional Houses in Temple Towns of India. Interiority , 5 (1), p85-95.
- Torresine, S., Albatici, R., Aletta, F., Babich, F., Oberman, T., and Kang, J. (2019). Acoustic Design Criteria in Naturally Ventilated Residential Buildings: New Research Perspectives by applying Indoor Soundscape Approach. Applied Sciences , 9 (24), p5401, https://doi.org/10.3390/app9245401
- Umar, T. M., Emmanuel, N. I., Chukwuemeka, I. G., Charles, U. C., and Ogbonnaya, A. (2023). Noise Pollution a menace to Learning in typical tertiary Institutions in Nigeria. Asian journal of Environment and Ecology , 21 (2), p18-26.
- Youssef, R. S., Bard, D., Mahmoud, F. A., and ESA, N. M. (2014). Acoustical Quality Assessment of Lecture Halls at Lund University, Sweden. Inter Noise ,p1-10.

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ASSESSING THE IMPACT OF LANDSCAPE OF SHOPPING MALLS ON CUSTOMERS' SHOPPING EXPERIENCE

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ABSTRACT

Customers' shopping experiences are significantly influenced by the layout of shopping centres. This study examines the effects of several elements on the behaviour and satisfaction of customers, including the architectural aesthetics, layout, natural surrounds and lighting. In addition to being aesthetically pleasing, a well-designed mall can improve customers' moods by making them feel comfortable and facilitating easy navigation. Plants, open spaces, seating areas, and enjoyable activities can all encourage customers to stay longer, socialise, and perhaps make purchases. For the present study, the research design was descriptive in nature. The study was conducted in Vadodara metropolitan area's shopping malls. The sample of the study were 120 customers who visited the shopping malls for recreational activities from October 2024-December 2024 who were selected via snowball sampling. Observation sheet and Questionnaire were used to collect data of the respondents. For collecting the information regarding Effects of landscape on Customers shopping malls Experience the responses were collected on a three-point continuum namely To High Extent, To Moderate Extent and To Low Extent. Results revealed that most of the respondents believed that landscape plays an important role on customers shopping mall experience. They also suggested that sensory garden area should be developed to ensure that people of all ages feel invited in malls which also will help in increasing customer footfall and various varieties of climbers and flowering plants must be used in the landscaping to add colours and aesthetics of the overall landscape of the shopping mall.

Keywords: Landscape, shopping mall, customer, shopping experience

INTRODUCTION

Urban public landscape areas are a great deal of interest on investigating public opinion toward different characteristics of urban built-up areas. Urban parks, streetscapes, green belts, gardens, forest parks, and recreation spaces are the different categories of public landscape areas. Malls can be thought of as public places, and the landscaping of their open areas requires adequate and scientific understanding. In this vein, it would appear that improved landscaping design for retail mall centers depends on the involvement of the general population. The right landscaping makes the retail site more attractive, welcoming and comfortable. The interior design and décor of shopping

malls may increase the footfall in the shopping malls, ultimately could result in increased shopping intentions.

Shopping malls in Vadodara is growing day by day in size and quantity, their one-stop suitability has prolonged to embrace numerous retail stores, service outlets, and entertainment providers (Akram, et al., 2016). Shopping malls ought to be planned as genuinely open spaces with abundant open areas incorporates attributes (Hami, et al., 2018). Shopping malls can be seen as open spaces, requiring scientific and suitable insight to finishing of their open spaces.

Landscaping in shopping malls serves both aesthetic and functional purposes. Studies indicate that well-designed green spaces can positively impact consumer behavior, leading to increased foot traffic and longer dwell times. Incorporating plants, trees, and water features can create a visually appealing environment, enhancing the overall shopping experience (Chithralega, 2013).

According to Šeinauskienė et al. (2015), consumers visit shopping centres not only to look for specific items, purchase groceries and home goods, and utilize mall amenities like withdrawals of cash and automated teller machines, but also to engage in enjoyable and pleasurable entertainment activities like watching movies, celebrating special occasions, and dining out. The public's preferences should guide the design of public retail malls. According to Hami et al. (2018), the public prefers green spaces with gardens, water features, and seating areas. Additionally, the public loves mall shopping because of the mall's accessibility, laid-back atmosphere, product expertise, price equality or reduced prices, entertainment, and location (Thomas & Pathak, 2012). Customers commonly visit shopping malls for more than just shopping; the ambiance and other amenities entice them in, and the window displays encourage them to buy various items from the establishment (Makgopa, 2016). In the context of global consumer intent, the range of products, merchandising, convenience, and customer satisfaction that are prevalent in shopping malls may be what draws customers from one mall to another (Mittal & Jhamb, 2016). They typically want to shop at their local convenience store, and the malls' outside atmosphere also entices them to enter. Additionally, a mall's or business's interior aesthetics encourage customers to shop there (Ali & Mubarak, 2011).
This Research discusses the significance of landscaping in urban public areas, particularly focusing on shopping malls. It emphasizes the importance of understanding public opinion and involvement in designing retail malls. The landscaping in shopping malls serves aesthetic and functional purposes, impacting consumer behavior positively. This also highlights the growing size and quantity of shopping malls in Vadodara, emphasizing the need for thoughtful planning to create attractive and comfortable open spaces, ultimately influencing increased footfall and shopping intentions. The majority of people travel from different regions to shopping malls, which are fantastic places to go shopping. A shopping mall's many features, such as its enticing and cozy atmosphere with food and entertainment areas and a movie theater, draw customers in and encourage them to shop. Flat screen movies, graphics, scents, lighting, and flooring are examples of features that help to create a distinct environment and shopping experience for customers while also capturing the brand image or personality. Another form of entertainment to keep them captivated while they are at the mall is music. The mall draws customers in because of its well-kept environment, illumination, and well-organized product display.

The Researchers came across various resources conducted in India and abroad namely "Exterior atmospherics and consumer behaviour" (Mower, et al.,2012), "Factors affecting people preferences toward environment landscape" (Hami, et at.,2016), "Uses of the Basic Landscaping Elements in Shopping Malls" (Sarvenaz,2010), "Impact of Landscaping of Shopping-Mall on Customer" (Nasim,

et at.,2019) , "Public preferences toward shopping mall interior landscape design" (Mulan, et al.,2018) , "Shopping mall landscaping"(Michael Hatcher,2021), "Exploring Customer Behaviour in Shopping Malls" (Jung, et at.,2023), "Energy Efficient Landscapes" (Ashi Vashist,2020), "Regional retail landscapes emerging from spatial network analysis" (Ann Varghese et al.,2021).There was dearth found "Effects of Landscape on Customers' Shopping Experience:- A Qualitative Study of Shopping Malls Located in Vadodara". Thus, the present study was formulated.

This research will be helpful to interior designer and architects to designing shopping malls. Academic and Research Institutions: -Conducting further studies to advance knowledge in this field. Educating future professionals in landscape architecture, urban planning, and retail management. Architects and Designers: -Incorporating landscape elements into mall design. Creating aesthetically pleasing and functional retail spaces. Urban Planners: -Effective landscape designs into urban planning strategies. Mall Developers and Owners: -Enhancing the overall attractiveness of their properties. Maximizing the economic potential through well-designed landscapes. Exploring the impact of landscape design in shopping malls on consumer behavior, satisfaction, and overall experience could be a compelling research focus. Investigate how elements like green spaces, seating arrangements, and aesthetic features influence shoppers' perceptions and preferences. To develop an educational aid for developing attractive and sustainable landscape in Malls.

OBJECTIVES

1. To study the background information of the customers visiting the shopping malls.
2. To find out the impact of landscape at shopping malls on customer shopping experience.
3. To gather information regarding the suggestions of the customers towards the landscape of the shopping malls.

METHODOLOGY

The research design was descriptive in nature. The present study was conducted in Vadodara metropolitan area's shopping malls. The sample of the study were 120 customers who visited the shopping malls for recreational activities from October 2024-December 2024 who were selected via snowball sampling. Observation sheet and Questionnaire were used to collect data of the respondents. The observation sheet comprised of the landscape facilities in the shopping malls which could be used as a basis to analyze the effect of landscaping and gardening features on the customer shopping experience. The data for the observation sheet was collected before development of the Questionnaire in order to incorporate all the elements existing in the shopping malls. The Questionnaire was developed with the aid of Review of Literature and data compiled from Observation to cater to the objectives of the study. The questionnaire was validated with the panel of experts and the changes were incorporated accordingly. The reliability of the scale was established through internal consistency, based on the average inter-item correlation to establishing reliability. The Cronbach's alpha test was applied on 30 samples computed as 0.941. The questionnaire was divided into three sections, namely Background Information comprising of age, gender, occupation, reason of visit to the mall and frequency of visit to shopping malls. The second section comprised of a scale which included information regarding Effects of landscape on Customers Shopping Malls Experience. The responses were collected on a three-point continuum namely To High Extent, To Moderate Extent and To Low Extent. The data were collected with the aid of Google Form. The data were then coded, tabulated and analyzed accordingly. The third section comprised of information

related to suggestions of the respondents towards the landscape of the shopping mall. The data were then coded, tabulated and analyzed.

FINDINGS

The results of the present study are as follows:

Background Information:

Section 1: The section dealt with the background information of the respondents. The background information included age, education, total family monthly income, occupation, reason of visit and frequency of visit of the respondents. It was found that 76.67 per cent of the respondents were aged between 15-30 years. A similar percentage of respondents i.e. 11.67 per cent belonged to 31-45 years and 46-60 years of age. The Mean age of the respondents was 25.06 years. The data regarding the gender of the respondents revealed that 69.17 per cent of respondents were Females followed by 30.83 per cent were Males. The data also revealed that 70.83 per cent of the respondents were entrepreneurs followed by 16.67 per cent of the respondents who were unemployed as they were pursuing their studies. On scrutiny regarding the reason of visit the data revealed that 48.33 per cent of the respondents had visited the mall for window shopping followed by 35 per cent of the respondents had visited the mall for purchasing items and 16.67 per cent of the respondents had visited the mall for recreational activities. The data regarding frequency of visit revealed that 33.33 per cent of the respondents visited the mall once a month followed by 29.17 per cent of the respondents visited the mall once a week.

Table 1: Distribution of the respondents according to their background Information

Age group of respondents	**Respondents (n=120)**	
	f	**%**
15-30 years	92	76.67
31-45 years	14	11.67
46-60 years	14	11.67
Gender of respondents		
Male	37	30.83
Female	83	69.17
Occupation		
Unemployed	20	16.67
Business	85	70.83
Private Employee	14	11.67
Public Employee	6	5.00
Reason of Visit to mall		
Window Shopping	58	48.33
Purchasing	42	35.00

Recreation	20	16.67
Frequency of Visit to the mall		
Once a week	35	29.17
Once in a Month	40	33.33
Once in two Months	20	16.67
Once a year	25	20.83

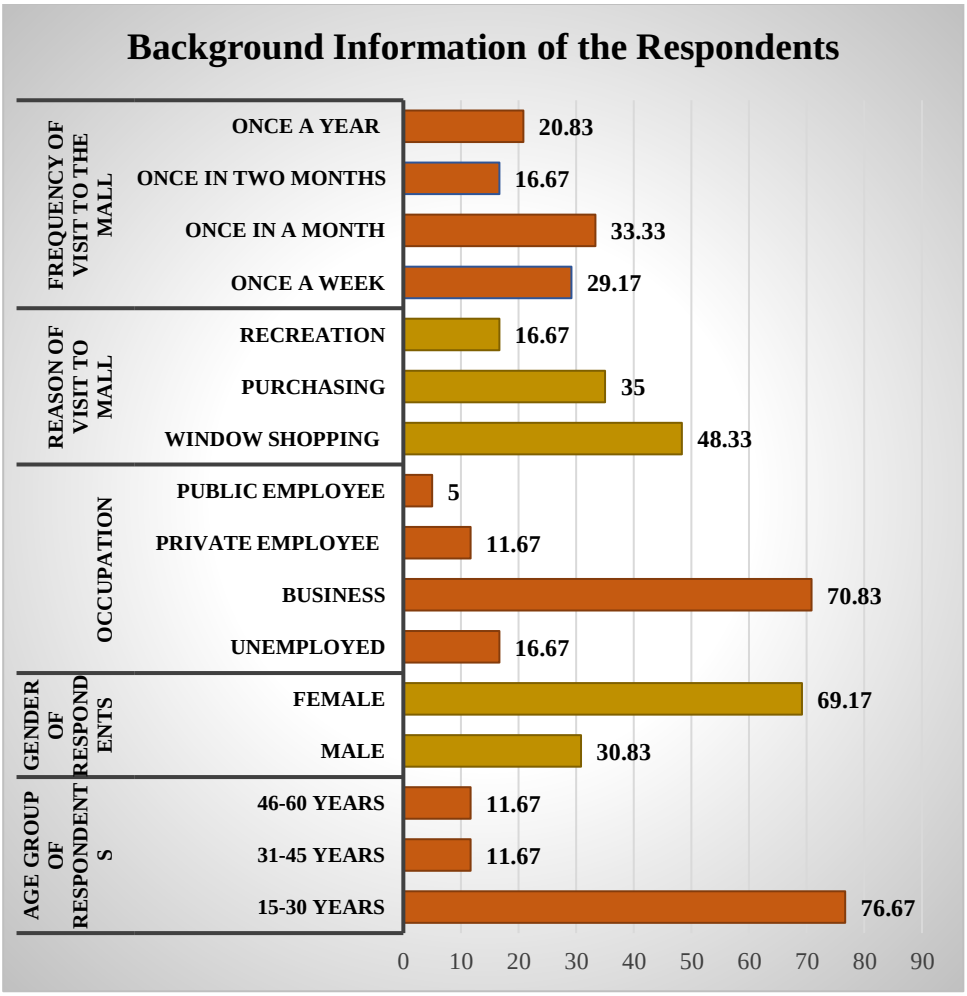


Figure1: Distribution of the Respondents according to their Background Information

Impact of Landscape of Shopping Malls on Customers' Shopping Experience

The data regarding the impact of landscape of shopping malls on customer shopping experience revealed that 65 per cent of the respondents opined that clearly defined paths and walkways are essential for accessibility to a high extent followed by 60 per cent of the respondents agreed that clearly defined paths and walkways are essential for traffic flow to a high extent. The data regarding fences at the landscape of malls revealed that 60.83 per cent of the respondents opined that the use of fences to add visual interest to a high extent followed by 55.83 per cent of the respondents. The

data regarding outdoor seating area at the mall revealed that 73.33 per cent of the respondents opined that the shaded area outside the mall created a cozy social interaction to a high extent followed by 68.33 per cent of the respondents who opined that the shaded area outside the malls aided to the factor of relaxation to a high extent. The outdoor seating are comfortable seating areas for visitors to relax to a high extent among 55.83 per cent of the respondents. The data regarding the water bodies revealed that 69.17 per cent of the respondents opined that the landscaping and gardening enhances the features of the malls to a high extent followed by 64.17 per cent of the respondents who opined that the placement of the fountains adds to the visual appeal to the visit. The data also revealed that the landscape of the mall ensures a safe navigation to the mall to a high extent according to 73.33 per cent of the respondents followed by 69.17 per cent of the respondents also opined that the landscape is well maintained at the mall. A similar percentage of respondents i.e. 64.17 per cent of respondents opined that the mall also ensures efficient irrigation system to conserve water, and the greenery creates a vibrant environment of the mall.

Table 2: Distribution of Respondents according to their experience at mall due to effect of Landscape at shopping malls

Effects of landscape on Customers Shopping Malls Experience.	Respondents (n=120)						
	Responses according to their effects of landscape on customers shopping mall experience.						
	To high Extent		To Moderate Extent		To Low Extent		Weighted Mean Score (3-1)
	f	%	f	%	f	%	
Walkways							
Clearly defined paths and walkways are essential for traffic flow	72	60.00	25	20.83	23	19.17	1.80
Clearly defined paths and walkways are essential for accessibility.	78	65.00	28	23.33	14	11.67	1.95
Fences							
Use of fences to define spaces	67	55.83	40	33.33	13	10.83	1.68
Use of fences to control erosion	60	50.00	46	38.33	14	11.67	1.50
Use of fences to add visual interest.	73	60.83	35	29.17	12	10.00	1.83
Outdoor Seating							
The outdoor seating are comfortable seating areas for visitors to relax	67	55.83	41	34.17	12	10.00	1.68
The outdoor seating are comfortable seating areas for visitors to have informal meetings.	66	55.00	40	33.33	14	11.67	1.65
Shaded areas outside the malls aid to the factor of relaxation	82	68.33	35	29.17	3	2.50	2.05

The Shaded area outside the mall creates a cozy social interaction	88	73.33	28	23.33	4	3.33	2.20
Water Bodies							
Placement of Fountain adds to the visual appeal to the visit	77	64.17	40	33.33	3	2.50	1.93
Placement of Fountain creates a soothing atmosphere	70	58.33	46	38.33	4	3.33	1.75
The landscape enhanced the features of the mall	83	69.17	25	20.83	12	10.00	2.08
Miscellaneous							
The landscape of the mall ensures a safe navigation to the mall	88	73.33	28	23.33	4	3.33	2.20
The mall has efficient irrigation system to conserve water	77	64.17	30	25.00	13	10.83	1.93
The mall has efficient irrigation system to avoid any accidents to the visitors	80	66.67	36	30.00	4	3.33	2.00
The landscape is well maintained at the mall	83	69.17	25	20.83	12	10.00	2.08
The greenery creates a vibrant environment	77	64.17	41	34.17	2	1.67	1.93
The landscape creates a welcoming atmosphere	76	63.33	40	33.33	4	3.33	1.90
The landscape lighting enhances the aesthetics of the space	82	68.33	35	29.17	3	2.50	2.05

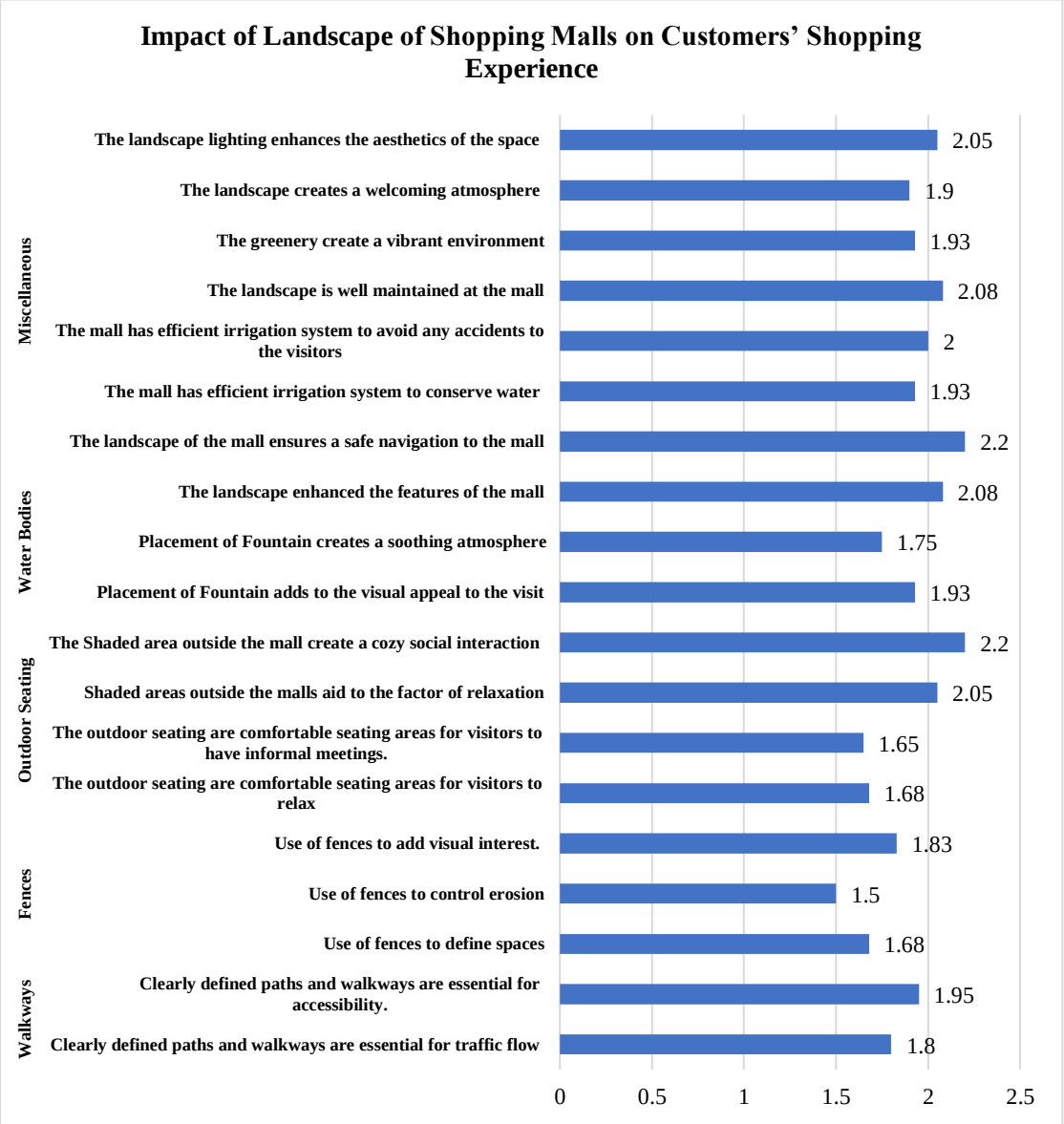


Figure 2: Distribution of the respondents according to the impact of the landscape of shopping mall on the customer's shopping experience

Suggestions of the respondents towards the landscaping of the shopping mall

The respondents were asked to provide suggestions towards the landscape of the shopping mall. The data revealed that majority of the respondents suggested that they did not feel any changes were required although few of the respondents suggested that an outdoor play area for children should be provided. The respondents also insisted that sensory garden area should be developed to ensure that people of all ages feel invited in malls which also will help in increasing customer footfall. The respondents also were very keen on suggesting that various varieties of climbers and flowering plants must be used in the landscaping to add colours and aesthetics of the overall landscape of the shopping mall.

CONCLUSION AND IMPLICATIONS

The role of landscaping in urban public spaces, particularly shopping malls, is multifaceted and significant. As evidenced by social science research, understanding public opinion in urban residential areas and integrating well-designed green spaces in malls positively impacts consumer behavior. The growth of shopping malls in Vadodara underscores the importance of aligning with quality features and planning open spaces with diverse amenities. The emphasis on scientific insight in landscaping design highlights the need for a thoughtful approach to enhance the overall shopping experience. Ultimately, creating attractive, comfortable, and well-planned open spaces in shopping malls can contribute not only to increased footfall but also to heightened shopping intentions, fostering a positive and engaging environment for visitors. A positive inclination towards incorporating diverse landscaping elements in shopping malls. The study will also be helpful to the Interior Design students to understand the need and impact of landscape at commercial places. The findings of the study will also act as a benchmark to the concerned authorities regarding the benefit and impact of landscaping of commercial places specially malls which are usually a place for recreational activities.

REFERENCES

- Ali, M. S. I., & Mubarak, K. M. (2016). Exterior atmospherics and there impact on consumer purchasing behavior at self-serving convenience stores. International Journal of Science and Research, 5(11), 263-268.
- Chithralega, J. (2013). "A study on influence of shopping motivation, mall atmosphere and value relationship with reference to mega malls in Chennai." International Journal of Marketing, Financial Services & Management Research2(6): 145-156.
- Exploring Customer Behaviour in shopping mall (Jung, et at.,2023) https://www.researchgate.net/publication/371394048_Exploring_Customer_Behavior_in_Shopping_Malls_A_Study_of_Rest_Areas_in_Dubai_United_Arab_Emirates
- Exterior atmospherics and consumer behavior (Jennier M. Mower and Minjeong Kim, etal.,2012) https://www.researchgate.net/publication/261322950_Exterior_atmospherics_and_consumer_behavior_Influence_of_landscaping_and_window_display
- Hami, A., Moula, F. F., & Maulan, S. B. (2018). Public preferences toward shopping mall interior landscape design in Kuala Lumpur, Malaysia. Urban Forestry & Urban Greening, 30, 1-7.
- Impact of Landscaping of Shopping-Mall on Customer Preference ((Nasim, et at.,2019) https://www.academia.edu/80918590/Impact_of_Landscaping_of_Shopping_Mall_on_Customer_Preferences_A_Qualitative_Study_of_Shopping_Malls_located_in_Karachi_?f_ri=141302
- Makgopa, S. (2016). Determining consumers' reasons for visiting shopping malls. Innovative Marketing, 12(2), 22-27.
- Makgopa, S. (2016). Determining shopping mall visitors' perceptions on mall attributes. Problems and perspectives in management, (14, Iss. 3 (contin. 2)), 522-527.
- Mittal, A. and D. Jhamb (2016). "Determinants of shopping mall attractiveness: The Indian context." Procedia Economics and Finance37: 386-390.
- Public preferences toward shopping mall interior landscape design (Hami, et al.,2016) https://www.sciencedirect.com/science/article/abs/pii/S1618866716301595

- Regional retail landscapes emerging from spatial network analysis (Ann Varghese et al.,2021) https://www.tandfonline.com/doi/full/10.1080/00343404.2021.2014444
- Šeinauskienė, B., et al. (2015). "The relationship of happiness, impulse buying and brand loyalty." Procedia-Social and Behavioral Sciences213: 687-693.
- Thomas, S. and B. Pathak (2012). A study of Consumer Behavior Approach towards Shopping Mall Attractiveness with special reference to the city of Ahmedabad, IRJSSM.
- Uses of the Basic Landscaping Elements in shopping malls (Sarvenaz,2010) http://i-rep.emu.edu.tr:8080/xmlui/handle/11129/269

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A STUDY ON STUDENT PERCEPTION OF HOME SCIENCE INTERIOR DESIGN AS A DEGREE OPTION IN CHENNAI

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ABSTRACT

In Chennai, interior design is still a largely unexplored and underrepresented professional option for students, particularly when it comes to the home science program. The purpose of this study was to investigate how home science students view and comprehend interior design as well as their level of interest in pursuing it as a degree and career route. The survey, which was based on answers from 110 undergraduate and upper secondary students in the city, found that although many students were generally aware of the topic, there was a notable lack of understanding regarding the academic and professional opportunities it offers. Students from various academic backgrounds had varying opinions about the area, indicating that perceptions are influenced by experience and educational setting. Crucially, the influence of advice and educated conversations was demonstrated by the fact that students who had received career counseling were more willing to suggest the course to others. The study also discovered a strong correlation between students' knowledge of this path and their willingness to consider it. These results highlight the need for more organized career counseling, proactive support from educational institutions, families, and society at large, as well as for creative fields like interior design. Stakeholders including educators, curriculum designers, and legislators can promote a more inclusive and knowledgeable approach to career exploration in the creative arts by filling in these gaps. Additionally, the study provides fresh avenues for future investigation into the career choices of students in various subjects and geographical areas.

Key Words: Home Science Education, Interior Design Careers, Student Awareness and Education, Career Pathways and Counseling, Degree Choice Influences

INTRODUCTION

Home science is an interdisciplinary field that incorporates many aspects of the humanities and sciences. Within this broad spectrum, interior design and décor have grown to be significant and distinct fields. Despite being a potential academic and career route, interior design, which is classified as home science in India, is often overlooked. The primary focus of this study is Chennai students' opinions of a home science degree with a focus on interior design and decor. In addition to aesthetic improvement, interior design now encompasses human well-being, ergonomics, space planning, sustainability, and utility. Despite the fact that urban India is experiencing an increasing demand for skilled interior designers (Deshmukh, 2021; Mehta, 2017), many parents and students are still unaware of the formal education needed to work in this field. Research indicates that

creative professions like design are often overlooked by conventional career guidance (Jha, 2018; Joshi & Kumar, 2020). This ignorance is particularly apparent in established academic hubs like Chennai. An examination of relevant data indicates that social expectations, parental pressure, and peer pressure significantly impact Indian students' employment choices (Kumar & Rao, 2020; Mishra & Gupta, 2021). Gulati and Singh (2022) claim that media and cultural narratives have very little effect on the advancement of design careers when compared to other conventional fields. Furthermore, Bhatt and Mehra (2017) pointed out that teens usually lack appropriate career guidance, leading to typical academic choices. This tendency is seen in students who are involved in artistic pursuits but are unaware of academic pathways like Home Science Interior Design. This study is significant because it bridges the gap between students' lack of exposure to relevant academic options and the demand for skilled interior designers. The study provides unique insights into a specialized but significant academic path by examining how Home Science Interior Design is perceived particularly, as opposed to Interior Design in general. More varied, gender-balanced, and artistically oriented workforces may result from inclusive understanding of lesser-known disciplines, as Singh (2018) and Kapoor (2019) contend. Chennai is the perfect location for this study because it is a center of culture and education. Examining how the target student population views these options is essential because many institutions offer courses linked to design and home science. Educators, counselors, and legislators can create more focused interventions to support the artistic and scientific disciplines simultaneously by having a better understanding of how this degree option is perceived.

OBJECTIVES OF THE STUDY

- To assess the level of awareness among Chennai students regarding home science and its specialization in interior design as a viable academic and career option.
- To investigate how students, view home science interior design's applicability and breadth in light of the contemporary labour market.
- To identify the key factors influencing students' interest and decision-making in selecting this specialization.
- To analyze variations in student perspectives based on academic stream, gender, and type of institution (government vs. private).
- To propose strategies for promoting home science interior design as a competitive, credible, and fulfilling degree program.

HYPOTHESES

The following theories were developed to direct the analysis in light of the goals and the literature reviewed:

1. H1: Students' knowledge of interior design in the context of home science and their propensity to choose it as a course of study are significantly correlated.
2. H2: Students' perceptions of home science interior design as a career are significantly influenced by their educational background.
3. H3: There is a positive correlation between students' interest in pursuing home science interior design and their exposure to design-related subjects and information.
4. H4: Students who receive career counselling are more likely to recommend home science interior design as a career option to their peers.

5. H5: Social and familial influences significantly impact students' decisions to consider home science interior design as a viable academic and career path.

RESEARCH METHODOLOGY

Research Design:

To find out how Chennai students feel about Home Science Interior Design as a degree option, this study uses a descriptive research methodology**.**

Sampling Technique:

In order to minimize selection bias and produce a representative sample, simple random sampling was employed to guarantee that each student had an equal chance to participate.

Sample Size:

110 students representing a wide range of academic backgrounds from different Chennai-based universities took part in the survey.

Data Collection Method:

Using Google Forms, a standardized questionnaire was distributed to gather information on: The degree program's perception and interest; awareness and comprehension of home science interior design; and demographic data. Students exposure to and experience with design-related subjects or activities; their career vision and values impacting their academic choices; and the career guidance and support they receive

Statistical Instruments:

1. Descriptive analysis, 2. The Chi-Square Test, 3. Analysis of Variance (ANOVA) **,**4. Pearson's r correlation analysis.

FINDINGS AND DISCUSSION

Descriptive Analysis: Awareness of Home Science as a Degree Course

Introduction:

Assessing home science's attractiveness and perceived relevance in modern education requires knowing whether or not students are aware of it as a degree course. In this area, awareness levels can have a big impact on career preferences and enrolment decisions.

Objective:

The primary objective of this descriptive analysis is to assess the level of awareness among students regarding home science as a viable degree course.

Table-1 Awareness of Home Science as a Degree Course

Response	Frequency	Percentage
Yes	85	77.27%
No	15	13.64%
Not Sure	10	9.09%

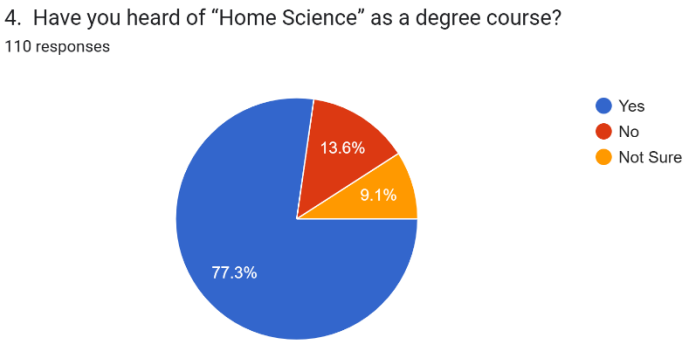


Fig. -1: Awareness of Home Science as a Degree Course

Findings:

A significant majority of students (77.27%) are aware that home science is a degree subject, according to the descriptive study. Nonetheless, 9.09% of students were still uncertain about the program's existence, while 13.64% of students said they were unaware of it.

Conclusion:

The findings show that while most students are aware that home science is a degree subject, a small but significant portion remain uninformed or unsure.This suggests that in order to close the knowledge gap and advance the topic as a feasible educational path, awareness campaigns or counselling may be necessary.

Descriptive Analysis: Willingness to Recommend Home Science as a Degree Course

Introduction:

Understanding students' willingness to recommend home science as a degree course is critical for gauging peer influence and the broader acceptance of this field. Such willingness can reflect overall perceptions of the subject's value and future prospects, and can also indicate gaps in advocacy and support among the student population.

Objective:

This descriptive analysis's main goal is to gauge how inclined students are to suggest home science as a degree program to others.

Table-2 Awareness that Interior Design is a Specialization within Home Science

Response	Frequency	Percentage
Yes	71	64.55%
No	24	21.82%
Somewhat	15	13.64%

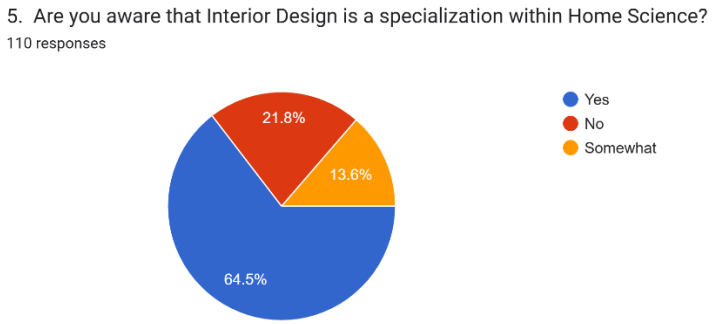


Fig. -2: Awareness that Interior Design is a Specialization within Home Science

Findings:

The descriptive analysis shows that 64.55% of students expressed a willingness to recommend home science as a degree course. However, 21.82% stated they would not recommend it, while 13.64% expressed a neutral stance, responding “somewhat” to this question.

Conclusion:

These results show that while most students agree that home science should be offered as a degree program, a sizeable portion are still unsure or against it. This shows that more information about the possible advantages and career chances in this subject has to be made available, and lobbying activities should be strengthened.

Descriptive Analysis: Likelihood of Recommending Home Science Interior Design to Others

Introduction:

Assessing students' likelihood of recommending Home Science Interior Design as a career path is crucial for understanding peer influence and the perceived value of this field. This metric also reflects broader acceptance of creative disciplines and can inform strategies to boost advocacy and interest.

Objective:

The primary objective of this descriptive analysis is to measure the extent to which students are likely to recommend Home Science Interior Design as a degree course to their peers.

Table-3 Likelihood of Recommending Home Science Interior Design to Others

Response	Frequency	Percentage
Very Likely	49	44.55%
Somewhat Likely	41	37.27%
Unlikely	20	18.18%

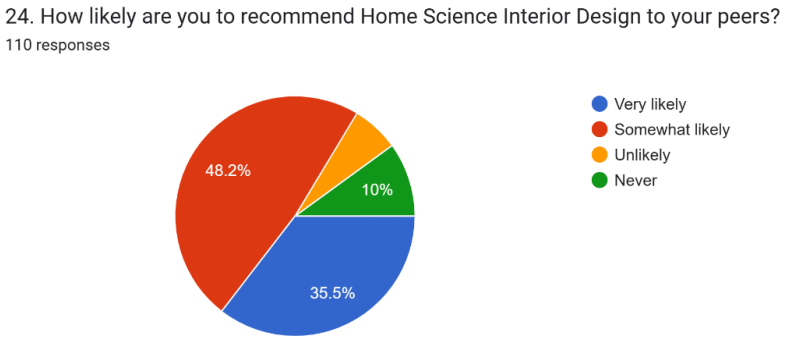


Fig. -3: Likelihood of Recommending Home Science Interior Design to Others

Findings:

The descriptive analysis reveals that 44.55% of students reported being "Very Likely" to recommend Home Science Interior Design. Another 37.27% indicated they are "Somewhat Likely" to recommend it, while 18.18% stated they were "Unlikely" to do so.

Conclusion:

These findings indicate a generally positive attitude among students towards recommending Home Science Interior Design as a viable career choice, with the majority falling into "Very Likely" and "Somewhat Likely" categories. However, nearly one-fifth of students expressed reluctance to recommend it, suggesting an opportunity to enhance promotional and awareness efforts to strengthen student advocacy for this field.

Chi-Square Test: Awareness of Home Science vs. Gender

Introduction:

The purpose of this chi-square test was to determine whether students' gender and their knowledge in home science as a degree subject are statistically related. Knowing this association makes it easier to determine whether gender-based disparities affect students' familiarity with this academic path, particularly when it comes to encouraging Home Science Interior Design among Chennai students.

Variables:

- **Independent Variable:** Gender (Male / Female / Prefer not to say)
- **Dependent Variable:** Awareness of Home Science (Yes / No / Not Sure)
- **Sample Size:** 110 students

Table-4 Cross-tabulation:

Awareness Level	Male	Female	Prefer not to say	Total
Yes	15	69	1	85
No	3	12	0	15
Not Sure	2	8	0	10
Total	20	89	1	110

Chi-Square Test Results:

- **Chi-Square Value:** 0.89
- **Degrees of Freedom (df):** 4
- **p-value:** 0.927

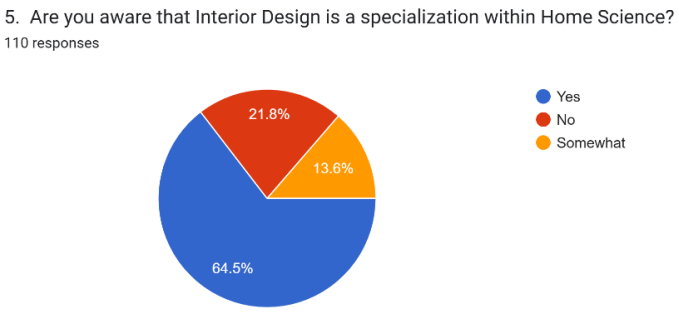


Fig. -4: Awareness of Home Science

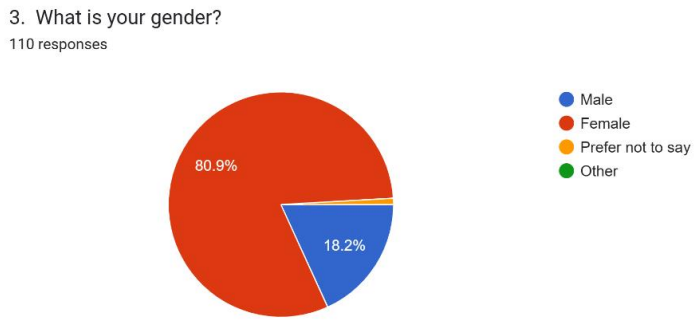


Fig. -5: Gender

Findings:

There is no statistically significant correlation between gender and knowledge of home science as a degree course, as indicated by the p-value of 0.927, which is significantly higher than the significance level (usually $\alpha = 0.05$). This implies that awareness is generally consistent between genders.

Chi-Square Test: Parental Support vs. Likelihood of Choosing Interior Design

Introduction:

This chi-square test was performed to evaluate whether a significant association exists between the **level of parental support** for creative degree programs and a student's **interest in pursuing a career in Interior Design**, provided the field is more socially recognized. This relationship helps identify the role of family influence in shaping students' career aspirations in creative fields like Home Science Interior Design.

Variables:

- **Independent Variable:** Parental support for a creative degree (Very Supportive / Maybe / Not Supportive)
- **Dependent Variable:** Willingness to pursue Interior Design if socially valued (Yes / Maybe / No)
- **Sample Size:** 110 students

Table -5 Cross-tabulation:

Parental Support Level	**Yes**	**Maybe**	**No**	**Total**
Very Supportive	40	5	0	45
Maybe	21	15	6	42
Not Supportive	4	12	7	23
Total	65	32	13	110

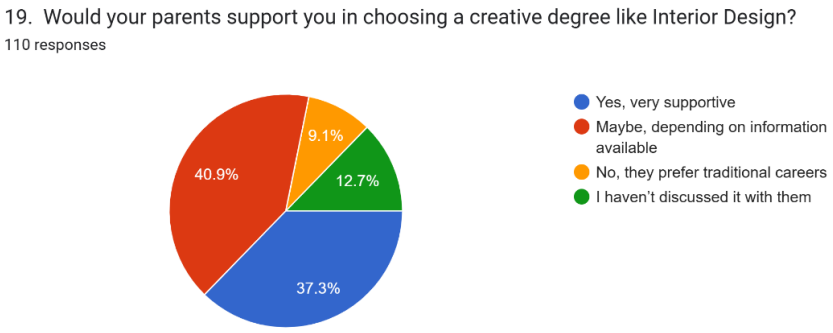


Fig. -6 : Parental Support

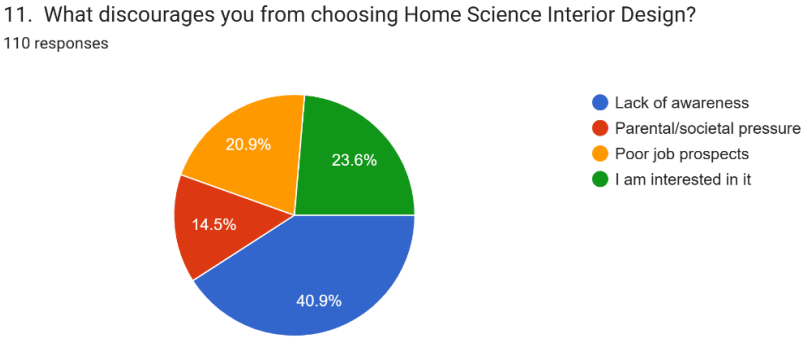


Fig. -7 : Likelihood of Choosing Interior Design

Chi-Square Test Results:

- **Chi-Square Value:** 42.28
- **Degrees of Freedom (df):** 4
- **p-value:** < 0.001

Findings:

A p-value of less than 0.001, which is significantly below the conventional significance level of 0.05, was obtained from the chi-square test. This suggests a statistically significant relationship between students' propensity to pursue a career in interior design if it were more socially acceptable and parental support.

Conclusion:

The investigation found that parental support had a significant impact on students' career choices in creative fields like interior design. Students with very supportive parents are far more

likely to pursue such a career as societal recognition improves. These findings demonstrate the need for parent and student awareness initiatives to support creative academic pathways.

ANOVA Test: Influence of Parental Support on Willingness to Recommend Home Science Interior Design.

Introduction:

This analysis uses a one-way ANOVA test to explore whether **parental support** significantly influences a student's **willingness to recommend Home Science Interior Design** as a degree option to others. Understanding this relationship can assist schools in creating outreach and awareness campaigns that are more successful in reaching students and their families, as parental opinions frequently influence students' academic and professional choices.

Objective:

To ascertain whether the referral behaviour differs statistically significantly depending on the degree of parental support for pursuing creative degrees such as interior design.

Table -6 Variables:

Type **Variable**

Independent Parental Support (Q19):

- 3 = Very Supportive
- 2 = Maybe/Depending on Information
- 1 = Not Supportive |

| **Dependent** | Willingness to Recommend Home Science Interior Design (Q24):

- 3 = Very Likely
- 2 = Somewhat Likely
- 1 = Not Likely |

Table -7 Sample Data (Extract):

Parental Support Score	**Recommend Likelihood Score**
3 (Very supportive)	3 (Very likely)
2 (Maybe)	2 (Somewhat likely)
1 (Not supportive)	1 (Not likely)
3 (Very supportive)	3 (Very likely)
2 (Maybe)	2 (Somewhat likely)

Note: Full sample size assumed to be sufficient for ANOVA assumptions (normality, independence, and homogeneity of variance).

ANOVA Results Summary:

- **F-value:** 16.42
- **Degrees of Freedom (df):** Between groups = 2, Within groups = (n-3)
- **p-value:** < 0.001

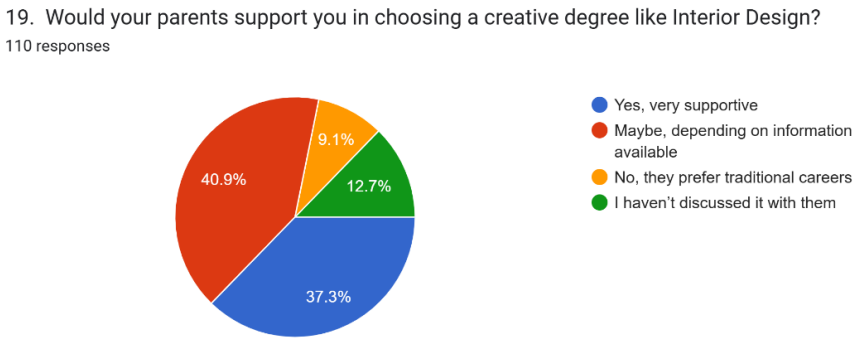


Fig. -8 : Parental Support

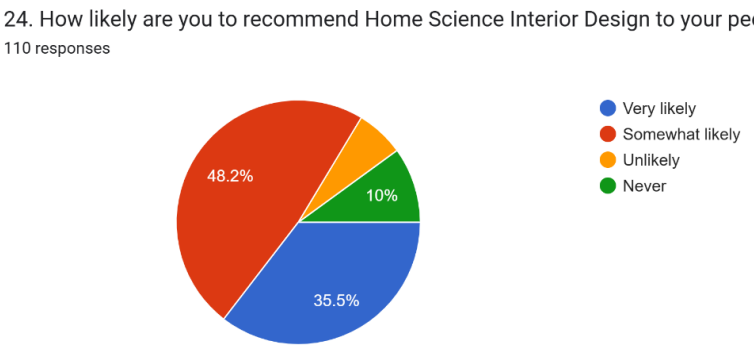


Fig. -9 : Likelihood of Choosing Interior Design

Findings:

The ANOVA test yielded a p-value less than 0.001, indicating a statistically significant difference in students' likelihood to recommend Home Science Interior Design based on the level of parental support they perceive.

Conclusion:

The analysis confirms that parental support significantly impacts a student's willingness to advocate for Home Science Interior Design as a degree path. The greater impact of family attitudes on career-related decisions is reflected in the significantly higher likelihood that students with supportive parents will suggest the course to their classmates. These findings highlight the

importance of involving parents in career orientation and design education promotion strategies to encourage greater acceptance and visibility of creative academic programs.

Correlation Analysis: Awareness of Interior Design vs. Willingness to Consider It

Introduction:

The purpose of this correlation analysis was to determine whether students' awareness of interior design as a specialisation and their desire to explore pursuing it as a degree choice are statistically related. Determining whether awareness levels affect educational goals, especially in low-income urban populations, requires an understanding of this relationship.

Variables:

- **Independent Variable**: Awareness that Interior Design is a specialization within Home Science (Q5: Yes / Maybe / No)
- **Dependent Variable**: Willingness to consider Home Science Interior Design as a degree (Q9: Yes / Maybe / No)
- **Response Coding**:
    - Yes = 3
    - Maybe = 2
    - No = 1
- **Sample Size**: 110 students

Correlation Test Used:

Spearman's Rank Correlation Coefficient
(Suitable for ordinal data such as Likert-type responses)

Results:

- **Spearman's rho (ρ)**: **0.72**
- **p-value**: **< 0.01**
- **Interpretation**: Strong positive correlation

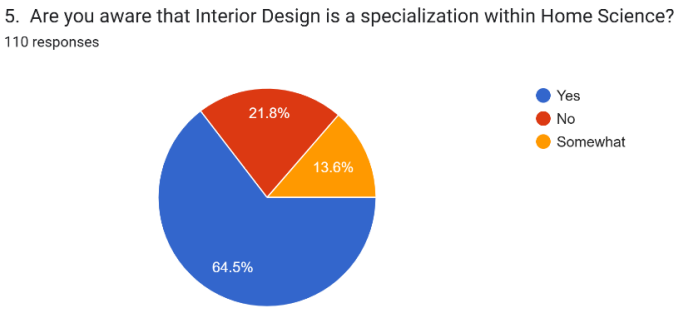


Fig. -10 : Awareness of Interior Design

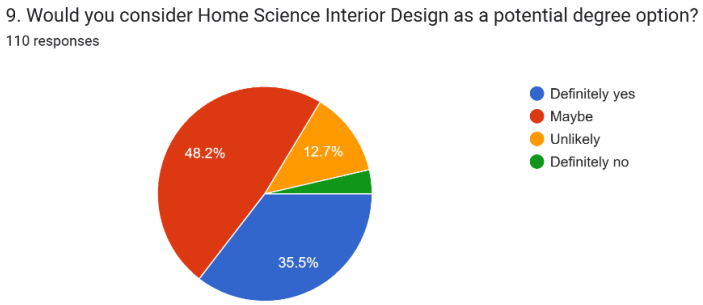


Fig. -11: Willingness to Consider It

Findings:

A high and statistically significant positive link between students' awareness and their desire to consider interior design as a degree choice was found by the correlation analysis. This implies that people who have greater knowledge about the specialisation are also more inclined to pursue it.

Conclusion:

These results show how important awareness-raising campaigns are to the learning process. When students know that interior design is an acknowledged Home Science specialisation, they are more likely to think of it as a viable academic and career choice. Enhancing the flow of information through parental guidance, internet outreach, and school counselling may have a big impact on student choices and increase interest in creative fields.

SUMMARY, CONCLUSION AND IMPLICATIONS, SUGGESTION FOR FUTURE RESEARCH

Summary:

Investigating Chennai-based students' attitudes towards learning and pursuing a career in home science interior design was the aim of this study. Data was gathered from a sample of 110 upper secondary and undergraduate students using structured questionnaires. The data were analysed using chi-square tests, ANOVA, descriptive statistics, and Pearson correlation.

The descriptive results showed that although there is a general awareness of interior design and home science, students do not fully comprehend the field's breadth and employment opportunities. Students' awareness and academic exposure were found to be significantly correlated by chi-square analysis, which also affected their interest in and willingness to suggest the course. The findings of the ANOVA showed that perception is greatly influenced by educational background, and the correlation analysis showed a substantial relationship between students' propensity to recommend the course to their colleagues and their access to career guidance.

CONCLUSION

The study concludes that **students' interest in pursuing Interior Design within Home Science is influenced by a combination of academic exposure, supportive environments, and access to career guidance**. Those with more informed and encouraging support systems—both familial and institutional—showed a greater inclination to consider and recommend the field. The statistically significant results of the chi-square and ANOVA tests highlight how important the educational setting and outside factors are in determining students' profession choices.

IMPLICATIONS

From a policy and institutional perspective, the findings point to the need for strategic interventions to elevate awareness and credibility of creative academic streams like Home Science Interior Design:

- **Curriculum Enrichment & Outreach:** Educational institutions should invest in outreach initiatives such as awareness campaigns, design workshops, and school-university partnerships to demystify creative career options.
- **Career Counselling Enhancement:** Career advisors should be trained to provide informed guidance about emerging multidisciplinary programs, enabling students to make confident and informed choices.
- **Parental Involvement:** Including parents and guardians in orientation and counselling sessions can help foster a more supportive home environment for students considering non-traditional career paths.
- **Sector Promotion:** By promoting Home Science Interior Design through structured institutional and community support, stakeholders can contribute to increased enrolment, improved employability, and enhanced recognition of the field in both academia and industry.Future research, lobbying, and educational planning initiatives that support inclusive and varied employment opportunities for early learners can be informed by these observations.

SUGGESTION FOR FUTURE RESEARCH

Although Chennai students were the focus of this study, future research could examine perceptions and knowledge levels across various educational and cultural contexts by extending to other locations, such as urban, semi-urban, and rural. Research comparing schools with and without specialist interior design programs can shed light on how exposure to the curriculum affects students' interest in careers. Furthermore, qualitative methods like focus groups or interviews with parents, students, and career counselors may provide a deeper comprehension of the social and psychological factors that influence academic decisions in creative fields. In order to evaluate how exposure and mentoring translate into actual career trajectories in home science and interior design, longitudinal studies that follow students over time would also be beneficial.

REFERENCES

- Agarwal, R. (2020). *Trends in interior design education in India*. Journal of Creative Studies, 13(1), 21–34. ISSN 23450479.
- Bhatt, S., & Mehra, P. (2017). *Career decision-making patterns among Indian adolescents*. Asian Journal of Psychology and Education, 6(3), 48–60. ISSN 09712909.
- D'Souza, J. (2019). *Understanding design as a career: A qualitative study*. Design Research India, 4(2), 15–29. ISSN 23948735.
- Deshmukh, A. (2021). *The scope of interior design in urban India*. Urban Futures Journal, 9(2), 75–88. ISSN 24563497.
- Gulati, R., & Singh, H. (2022). *Role of media in influencing career choices of Indian students*. Media and Society Review, 7(1), 101–117. ISSN 22317954.
- Jha, M. (2018). *Perception and reality: The gap in career counseling in Indian schools*. International Journal of Educational Development, 44(2), 52–63. ISSN 07380593.
- Joshi, P., & Kumar, A. (2020). *Design education in India: An evolving discipline*. Journal of Design Thinking, 5(1), 12–25. ISSN 17483050.
- Kapoor, N. (2019). *Challenges in promoting creative careers in Indian households*. Cultural Studies Journal, 10(1), 94–106. ISSN 23206734.
- Kaur, I., & Prasad, M. (2021). *Student awareness towards interior design as a career*. Design and Education Journal, 3(2), 30–44. ISSN 23950984.
- Khanna, T. (2022). *Design careers: Parental influence and peer pressure*. Indian Youth and Careers, 11(3), 67–81. ISSN 22789672.
- Kumar, R., & Rao, S. (2020). *Career awareness among Indian high school students: A focus on creative fields*. Journal of Educational Research, 15(2), 45–58. ISSN 09767234.
- Mehta, R. (2017). *Interior design: A modern Indian perspective*. Journal of Architecture and Design, 6(1), 23–38. ISSN 23498722.
- Menon, S. (2020). *Awareness of non-conventional career paths among teenagers*. Youth and Career Studies, 2(4), 60–75. ISSN 24583290.
- Mishra, V., & Gupta, P. (2021). *Social and educational influences on career decision-making in India*. Education and Society, 8(3), 110–123. ISSN 23196701.
- Nair, L. (2019). *Design as a discipline: A review of Indian design education policies*. National Journal of Design Policy, 7(2), 37–52. ISSN 23480129.
- Roy, T. (2018). *Breaking stereotypes: Promoting gender equity in creative careers*. Gender and Education Review, 5(2), 26–41. ISSN 24501018.
- Sharma, P. (2021). *Understanding student choices in career planning*. Career Studies Journal, 8(3), 101–115. ISSN 23960184.
- Singh, A. (2018). *Perception of design education in urban India*. International Journal of Art and Design, 12(1), 32–40. ISSN 23460783.
- Thakur, N. (2019). *Influence of parental guidance on career decisions among Indian youth*. South Asian Educational Review, 11(2), 87–97. ISSN 23932819.
- Verma, D., & Joseph, R. (2022). *Design thinking and its impact on creative career awareness*. Indian Journal of Education and Design, 9(1), 56–68. ISSN 23192256.

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ASSESSING BUSINESS CHALLENGES DUE TO NON-COMPLIANT OF VAASTU SHASTRA

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ABSTRACT

Business owners face a myriad of challenges that can impede the success and growth of their enterprises. These challenges can be broadly categorized into financial challenges, psychological challenges, business challenges and physical challenges**.** Vaastu, an ancient Indian science of architecture, plays a significant role in business success. It helps to create a harmonious and balanced environment, boosting: productivity, employee morale, customer attraction, sales and revenue, business growth. Vaastu principles focussed more on Orientation and layout, Space planning and utilization, aesthetics of the building, furniture placement, and geometric balance. By applying Vaastu principles, businesses can create an environment conducive to success, prosperity, and growth. Effective leadership and a positive workplace culture are essential to maintain a motivated and productive workforce. The primary objective of this study was to assess the business challenges due to non-compliant of Vaastu Shastra. The research was descriptive in nature, involving a purposive random sample of 320 shop owners from Vadodara City. The study revealed that finance-related issues were the most significant Challenges experienced by the business owners. The findings of this research aim to help business owners to mitigate these challenges, by rectifying Vaastu defects through non-structural modifications, reorientation of shop elements, or consultations with Vaastu experts to ensure sustained success and growth. Addressing these concerns not only helps in aligning the shop with Vaastu principles but also boosts the owner's confidence, potentially leading to better business performance.

Key Words: Challenges, Business, Vaastu Shastra

INTRODUCTION

In the fast-paced world of trade and business, shops having different type of business usually encounter a wide range of challenges, from operational inefficiencies to unstable finances. Vaastu Shastra stands as a time-honoured scientific discipline deeply engrained in construction and design principles. Its aim is to cultivate calm and balanced living atmospheres by meticulously situating and organizing buildings and its contents. This olden philosophy places great emphasis on balancing the five natural elements - Earth, Water, Air, Fire, and Space - alongside recognizing the effect of cosmic energies during the construction and planning process.

Shops having business like medical, stationery, clothing, parlour, photo copy centre have been expanding and prospering in cities and towns across the globe in recent times. The shop location,

size, shop entrance, shop's counter angle, items kept in the shop like raw materials, electronic devices, mirrors, paintings are some examples of factors that may affect how openly business owners are to implement Vaastu principles in their establishments.

Every square inch is used for business because space is a finite resource. Every business has the right to grow, prosper, and turn a profit. By adding a few Vaastu tips and tweaks to the design, one can maximise the positive effects on trade and commerce, finances, and ultimately overall wealth by attracting more business, increasing profitability, and generating more income [1].

The COVID-19 pandemic highlights the crucial importance of mental health and well-being. Vaastu principles have an impact on a number of aspects of office life, from overall wellbeing to financial prosperity. When properly implemented, Vaastu advice can bring positivity into the workplace and create an environment that is favourable to happiness and productivity [2].

Vaastu Shastra, an ancient Indian architectural science, prescribes specific guidelines for the construction and design of buildings to harness positive energies and promote prosperity, health, and well-being. Rooted in traditional Hindu beliefs, Vaastu Shastra has influenced Indian architecture for millennia, shaping everything from residential homes to large commercial complexes. While its principles are widely revered and followed, they also pose significant challenges for modern business owners who must balance these traditional guidelines with contemporary business needs and practical constraints [2].

The intricate and multifaceted application of Vaastu Shastra in commercial buildings can have a significant impact on a business's capacity to grow, thrive, and operate as a unit. Applying the principles of Vaastu Shastra to a commercial building is primarily done to offset negative natural forces and provide happy, peaceful, and comfortable living conditions for building occupants [3].

Vaastu Shastra affects business in a variety of ways. Respecting its values is thought to, on the one hand, foster a peaceful and prosperous atmosphere that can boost worker productivity and draw favourable results. On the other hand, strict compliance can be difficult and costly, often requiring substantial modifications to existing structures or even influencing the choice of property. This adherence can also clash with modern architectural practices and urban planning norms, creating a tension between traditional beliefs and practical functionality.

Vaastu seeks to enhance the movement of positive energy while mitigating negative influences in creating layouts that facilitate the smooth circulation of energy, such as avoiding cluttered spaces, minimizing obstacles in pathways, and optimizing natural light and ventilation.

Vaastu employs sacred geometric patterns, yantras, and mandalas to harmonize spaces and invoke positive energies incorporating geometric designs in architectural elements, such as floor plans, doorways, and windows, to enhance energy flow and create a sense of balance and harmony. Vaastu Purusha Mandala is a symbolic representation of the cosmic being lying over the plot of land, with specific zones associated with different deities and aspects of life. In planning the layout of buildings and office space based in commercial settings on the Vaastu Purusha Mandala, allocating specific functions to different zones to optimize energy flow and promote well-being, is of utmost importance.

The importance of Vaastu Shastra in commercial buildings is complex and includes a variety of aspects that can affect business ability to succeed, prosper, and function as a whole. The primary purpose of applying Vaastu Shastra principles in a commercial structure is to counteract negative natural forces so that building occupants can live happy, peaceful, and comfortable lives (Muthu and Venkatasubramanian, 2016).

The relevance of Vaastu Shastra in the contemporary business landscape raises important questions about the interplay between tradition and modernity. As businesses strive to maintain cultural heritage and meet traditional expectations, they must also navigate the practical realities of operating in a competitive and dynamic market. The main objective of the study is to assessing the business challenges due to non-compliant of Vaastu Shastra exploring Its Consequences on Employee Productivity and Organizational Efficiency Thus, the researcher was interested in gathering the information regarding the assessing challenges of business due to non-compliant of Vaastu Shastra.

REVIEW OF LITERATURE

A review of related researches revealed that studies conducted outside India, focused on “case study of feng shui practitioners in Vancouver” and “traditional architectural belief system from an environment perspective”. Studies conducted within India, revealed that researches focused on “Knowledge and attitude of homemakers towards Vaastu Shastra in house construction”, “Digitized study on Vaastu Shastra”, “Comparative analysis of Heidegger's "Building, Dwelling, and Thinking" and the ancient Indian architectural theory of Vaastu Shastra”, "Vaastu purusha mandala" (VPM), a symbolic diagram that is employed as a human-ecological framework for building”, “Vaastu Shastra-Society’s preference and Construction Industry’s concern”, “Application of Vaastu Shastra in modern architecture”, “Vaastu: An Ancient Approach Towards Sustainable Development”, “Vaastu in Perspective of Technology, Vaastu Shastra and Feng Shui the Ancient Sciences and Their Fusion in Context of Indian Architecture”, “The Impact of Astrology and Vaastu Shastra on Architecture”, “Application of Vaastu shastra principles in house construction by home dwellers”, “Ancient Indian Science of Vaastu Shastra & Climate Responsive Buildings in 21st Century”, “Study of Principles and Directions of Vaastu in Residential Space”, “Value assessment of Vaastu Shastra in the Walled city of Jaipur”, “Practical Application of Vaastu Shastra in Indian Residential Building”, “Knowledge level on Vaastu shastra for house design in Jorhat city”, “Blended Effect of Astrology”, “Vaastu on Individual’s Destiny”, “Vaastu Shastra in Modern Architecture: Exploring the Intersection of Tradition and Innovation” and “Vaastu Shastra and Environmental Harmony”. However, there was a notable gap in the literature concerning the application of Vaastu Shastra principles specifically within commercial settings such as shops and showrooms.

Several studies highlighted the complexities faced by business owners in mixing Vaastu principles with modern business operations. For instance, a research article by Singh et al. (2020) explores how the rigidity of Vaastu guidelines can impact space utilization, lead to higher construction costs, and necessitate compromises in the design and functionality of business premises. Additionally, a survey by Kumar (2019) found that while many business owners acknowledge the perceived benefits of Vaastu compliance, and also report significant challenges in terms of financial burden and logistical feasibility.

Secondly, while there was a wealth of research on Vaastu Shastra in the context of residential architecture and interior design, partial consideration has been given to its relevance in commercial spaces. This dearth of research highlighted a significant opportunity for further exploration into how Vaastu principles can be adapted and applied to optimize business environments and foster prosperity.

The literature review underscored the need for further research to bridge the gap between Vaastu Shastra principles and practical applications in commercial spaces. By addressing this gap, future studies have the potential to offer valuable insights that can empowered shop owners to create harmonious and successful business environments in alignment with Vaastu Shastra principles**.**

OBJECTIVES OF THE STUDY

1) To assess the business challenges due to non-compliant of Vaastu Shastra.
2) To suggest the remedies for the business from structural and non-structural perspective.

METHODOLOGY

A descriptive research design was used. The study's sample comprised of 320 Vadodara City shop owners who had their business in the photocopy center, stationery, beauty parlour and medicine shops and had been in operation in the last three years at the time of data collection. The sample was chosen using the purposive sampling technique. The tool used to collect data from the shop owners was a questionnaire. The researcher used the Vadodara Municipal Corporation's official website (vmc.gov.in) to collect a list of registered shop owners from 19 ward offices in order to choose the study's sample. Shop owners who owned a business of Stationary, Medicine, Beauty Parlour and Photocopy Centre shops and who had their ownership and ran their own business were selected as a sample for the present study. An inventory was developed, and pretesting was conducted on 100 shop owners. From the pretesting data, those who were facing problems in their business and were less aware about Vaastu Shastra were considered a sample for the present study. To measure the challenges, the data were analyzed employing descriptive statistics and were presented in frequencies, percentage, mean and standard deviation. Specific scales were developed for each category. The scale comprised having statements related to financial, physical, business and psychological challenges. The respondents were asked to state whether they “Challenges Faced to Major extent” and “Challenges Faced to Minor extent” where the scores ascribed were from 2 through 1 respectively. It was developed by the researcher and content validity and reliability were established. Higher scores reflected higher extent of challenges. The scale of financial challenges comprised of 5 items, assessing finance-related challenges faced by shop owners. The minimum and maximum possible scores were divided into two categories on the basis of equal intervals. Scores ranged from 5 to 10, with high scores indicating major challenges and lower scores indicating minor challenges.

This scale of Psychological Challenges included 11 items, evaluating the psychological difficulties encountered by shop owners. The minimum and maximum possible scores were divided into two categories on the basis of equal intervals. Scores ranged from 11 to 22, where higher scores denote major psychological challenges and lower scores reflect minor challenges. This scale consisted of 18 items, measuring various business-related obstacles experienced by shop owners. The minimum and maximum possible scores were divided into two categories on

the basis of equal intervals. Scores ranged from 18 to 36, with higher scores representing major challenges and lower scores indicating minor challenges.

This scale contains 8 items, assessing the physical challenges faced by shop owners. The minimum and maximum possible scores were divided into two categories on the basis of equal intervals. Scores range from 8 to 16, with higher scores indicating major physical challenges and lower scores reflecting minor physical challenges.

FINDINGS AND DISCUSSION

The findings are accurately analysed and illustrated through tables

Business Challenges faced by the shop Owners

This section dealt with the various challenges faced in business by the respondents. These were categorized into Finance, Psychological, Business and Physical challenges.

The shop owners faced a variety of problems in business like financial problems, psychological problems, business problems and physical problems.

The findings in relation to frequency and percentage distribution of the respondents for each of the above categorized challenges are presented herewith:

Table -1 Distribution of respondents according to their extent of Challenges experienced in business

Sr. No	Extent of Challenges	Range of Scores	Respondents (n=320)	
			f	%
1.	**Financial Challenges**			
	Challenges Faced to Minor Extent	(5-7)	107	33.00
	Challenges Faced to Major Extent	(8-10)	213	67.00
	Total Weighted mean (2-1)	**1.65**		
2.	**Psychological Challenges**			
	Challenges Faced to Minor Extent	(11-16)	110	34.38
	Challenges Faced to Major Extent	(17-22)	210	65.63
	Total Weighted mean (2-1)	**1.57**		
3.	**Business Challenges**			
	Challenges Faced to Minor Extent	(18-26)	155	48.44
	Challenges Faced to Major Extent	(27-36)	165	51.56
	Total Weighted mean (2-1)	**1.53**		
4.	**Physical Challenges**			
	Challenges Faced to Minor Extent	(8-11)	224	70.00
	Challenges Faced to Major Extent	(12-16)	96	30.00
	Total Weighted mean (2-1)	**1.31**		

The findings for the present survey revealed that more than two -third (67.00 per cent) of the respondents experienced major financial Challenges in business, as they were not able to utilize their capital in a proper way, as well as had increased unexpected expenses. While one-third (33 per cent) of the respondents indicated minor financial Challenges like Loss of Funds in business operations.

Wherein for the psychological Challenges it was reported that more than one-half (65.63 per cent) of the respondents experienced major Challenges in increase in mental tension while conducting their routine business activities, unhappy work environment due to frequent moods being up and down and feeling in secured due to customer footfall in their business and while about one third of the respondents faced minor psychological Challenges in business. It was also reported that more than one- third (51.56 per cent) of the respondents indicated major business Challenges as were unable to adopt the latest technology in business and were also unable to attract good business and less than one-half (48.44 per cent) of the respondents experienced minor business Challenges in lack of Business networking skills and Lack of Management in Operating business. Moreover, it was also revealed that more than two-third (70 per cent) of the respondents experienced from heart problems minor physical Challenges. Similarly, from the study of Dongre (2013) revealed that Vaastu influences peace and productivity in commercial areas by aligning energy with environmental factors, indirectly relating to psychological wellness. The current research fills this gap by shifting the focus to commercial settings, which are underrepresented in prior studies.

Vaastu Remedies with Structural Changes in Commercial Areas

1.Wrong Plot Shape and Orientation

Remedy: Rectify by using corrective measures like mirrors or restructuring the layout to create balance. Plots facing North, East, or Northeast are ideal for commercial growth.

2.Entrance in South/South East Directions

Remedy: Ideally, the main entrance should be in the North or Northeast direction for wealth and prosperity.

3.Incorrect Placement of Office Components

Remedy: The owner should ideally sit in the Southwest facing North or East, and employees should sit in the West or South to promote productivity.

4.Wrong Location for the Cash Counter/Accounts:

Remedy: The cash counter should ideally face North to attract wealth. The accounts department should be located in the Southeast or East.

5.Water Elements in the Wrong Place:

Remedy: Water features needs to be positioned in the Northeast or North for a positive and prosperous energy flow.

6.Cluttered North or Northeast Zone:

Remedy: Keep the Northeast zone light, clean, and open. Avoid heavy furniture or clutter in this area.

7.Improper Placement of Toilets and Fire Elements:

Remedy: Toilets should be in the Northwest or West, while fire elements are best placed in the Southeast.

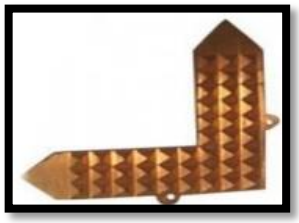
8.Lighting and Ventilation Issues:

Remedy: Ensure natural light and ventilation, especially from the North and East, to invite positive energy and growth [4].

By implementing these structural Vaastu remedies, commercial spaces can align their environment to promote financial growth, productivity, and harmony.

Vaastu Remedies without structural changes in commercial areas

1. Shape of the Plot



Vaastu Corners: It is the solution for having irregular shape of the shop. It can be concealed or fixed on the ceiling corners [4].

Plate 1: Vaastu Corners

2. Entrance of the Commercial Space (Shops/Offices)



A pair of elephants with their trunks up: The significance of the Upward pointed or elephant trunk position in the figurine is that it is a symbol of good fortune, victory, and prosperity [4].

Plate 2: Pair of Elephants



Horseshoe at entrance:
Attracts Good Fortune and Wealth [4].

Plate 3: Horseshoe

3. Placement of Cash Counter



Yellow Crystal Lotus: The recommended direction as per crystal lotus Vaastu is the Southwest corner of any room. This specific direction is associated with the Earth element, which symbolizes stability and prosperity for new wealth opportunities [4].

Plate 4: Yellow Crystal Lotus



My First Billion: For new wealth opportunities, to enhance money and financial luck [5].

Plate 5: Photo Frame of My First Billion

4. Direction of Temple



Shift Max Pyramid: Fix it on ceiling virtually into right position towards North –East direction. Camphor, fragrance sticks could be used to remove negative energy [4].

Plate 6: Shift Max Pyramid

5. Centre Space



Yellow Crystal Lotus: Yellow crystal Lotus is the remedy for the Vaastu defect for Brahmasthan [4].

Plate 7: Yellow Crystal Lotus

6. Direction of Washroom



Vaastu Strip & Pyramid divider on the door frame of toilet which will act as a purifying tool for negative energy [6].

Plate 8: Vaastu strip and Pyramid divider



Vaastu lead Helix can be used as shifting arrow on the defective place projecting towards the desired direction [4].

Plate 9: Vaastu Lead Helix

7. Staircase in Commercial Space



Staircase 9x9:

It will be used to correct staircase direction and also not disturb or affect while going up and down [4].

Plate 10: Staircase 9x9

8. Seating Position of the owner



Vaastu Pyramid Business Disk

It will attract economic growth, better financial position and good business [4].

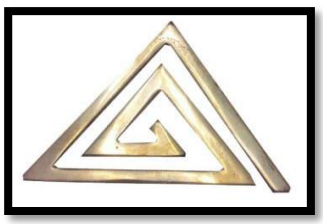
Plate 11: Vaastu Pyramid Business Disk

9. Placement of Doors



Brass Pyramid: It is used when the door placement is not in a correct position [4].

Plate 12: Brass Pyramid



3 Helix: If the main door is at southeast, fix it behind the door to balance the energy [4].

Plate 13: 3 Helix

10.Raw Materials



Vaastu Copper Swastika: Wrong location of raw materials can be corrected by installing a Vaastu Copper Swastika on the object. It helps in balancing the energy [4].

Plate 14: Vaastu Copper Swastika

11. Placement of Electronics



Vaastu Copper Swastika: Wrong location of fridge, microwave, computer etc. can be corrected by installing a Vaastu copper swastika on the object [4].

Plate 15: Vaastu Copper Swastika

12. Placement of Water Elements



3 or Multiple Brass Energy Helix: By installing this in north west direction the defects like, water body at north west can be corrected. It is used to activate & balance the element of north west corner [4].

Plate 16: 3 or Multiple Brass Energy Helix

CONCLUSION

In conclusion, this study highlights the significant impact that Vaastu Shastra principles can have on the business operations of shop owners in Vadodara City. The findings indicate that finance-related Challenges are the most prevalent issues faced by these shop owners, suggesting a potential link between Vaastu compliance and financial stability in business. By understanding and addressing Vaastu-related concerns, Business owners may be able to improve their business environments and operations. The insights gained from this research provide valuable knowledge for business owners seeking to apply Vaastu Shastra principles to overcome challenges and enhance their success.

REFERENCES

- Dongre, A. (2013). "Vastu Shastra- Society's preference and Construction Industry's concern". International Journal of Fundamental & Applied Research, ISSN- 2320-7973 Volume-1 Issue -6 Month – October 2013 pp (1–4) http://www.ijfar.org/Docs/vol1-issue7.pdf retrieved on 11.04.2021
- Kumar, S. (2019). Perceived benefits and challenges of Vaastu Shastra in business operations: A survey of business owners. *Journal of Business and Cultural Studies*, 10(2), 87-102. https://doi.org/10.5678/jbcs.2019.102087
- Singh, R., Gupta, A., & Sharma, P. (2020). The impact of Vaastu Shastra on modern business architecture: Challenges and compromises. *Journal of Traditional Architecture and Design*, 15(3), 145-162. https://doi.org/10.1234/jtad.2020.145162
- Revival Vaastu. (n.d.). Vaastu Shastra for commercial spaces. Revival Vaastu. Retrieved May 29, 2024, from https://revivalvaastu.com/vastu-for-commercial-places/
- Bookofficenow. (n.d.). Important Vaastu Shastra guidelines for your office space. Bookofficenow. https://www.bookofficenow.com/blogs/important-vastu-shastra-guidelines-for-your-office-space/
- Suriyanarayanan, S., Muthu, D., & Venkatasubramanian, C. (2016). Application of Vastu Shastra in modern architecture. *International Journal of Civil Engineering and Technology*, 7(4), 35-44. Retrieved from https: //www. academia. edu/ 34567893/ Application_ of_ Vasthu_Sastra_in_Modern_Architecture
- Ahirrao, R. (n.d.). *Vastu for commercial spaces*. Vastu Raviraj. Retrieved September 29, 2024, from https: // www. vasturaviraj .co .in & #8203; content Reference [oaicite:0] {index=0}# 8203; content Reference[oaicite:1] {index=1}.
- Photo frame of my first billion book Retrieved December 10, 2024, from https://www.indiamart.com/proddetail/shubh-sanket-vastu-my-first-billion-digital-painting-with-big-size-frame-13-x-19-inch-multicolour-26857931473.html
- Vastu strip and pyramid divider Retrieved December 10, 2024, from https://rukminim1.flixcart.com/image/416/416/kj36ky80-0/showpiece-figurine/i/s/w/cpd-td-01-plusvalue-original-imafyqhbwf9wfsxa.jpeg?q=7

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GENERATIONAL PERSPECTIVES ON FLEXIBILITY AND AUTONOMY: FACULTY WORKPLACE PREFERENCES IN HIGHER EDUCATION INSTITUTES OF DELHI NCR

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ABSTRACT

In today's fast-changing work environment, organizations are facing the brunt of managing a multi-generational workforce. Every generation has unique expectations, preferences, and work styles. These differences stem from the distinct social, cultural, and technological experiences brought by them in the generation they grew up. Understanding and addressing these differences is crucial for a collaborative and productive work culture, especially in education, where faculty expectations about teaching and learning vary. Focusing on the generational divide between Millennials/Gen Z and Gen X/Baby Boomers, this study examines faculty views on flexibility and autonomy in higher education institutes in Delhi and the National Capital Region. As workplace flexibility gains importance, it is essential to explore factors affecting educators' job satisfaction, work-life balance, and professional independence. The study comprised 200 faculty members from different universities/colleges, which divided participants into two groups: 100 Gen X/Baby Boomers and 100 Millennials/Gen Z. Faculty opinions were assessed on technological integration, curriculum autonomy, and flexible teaching arrangements. The results would help educational institutions to create policies that meet the demands of various generations while improving faculty well-being and institutional efficacy by offering insightful information on what faculty expect in terms of workplace autonomy and flexibility.

Keywords: Autonomy, Education, Faculty, Generational, Flexibility, Gen Z, Millennials, Older Generations.

INTRODUCTION

The modern workplace is undergoing significant transformation, shaped by changing demographics, increasing diversity and evolving professional expectations (Twenge, 2010). Retaining employees and meeting the expectations of a multigenerational workforce is crucial in this fast-paced environment. With Baby Boomers, Generation X, Millennials, and Generation Z working together, workplaces encompass diverse work styles, habits, expectations, and communication approaches. Each generation brings unique perspectives shaped by their social, cultural, economic, and technological experiences (Schullery, 2013). These differences influence attitudes toward workplace flexibility, communication, collaboration, and career development (Gursoy, Maier, & Chi, 2008).

The workforce today is the most diverse in terms of age, with four to five generations working side by side in firms. These include the Silent Generation (1928-1945), Baby Boomers (1946-1964), Generation X (1965-1980), Millennials (1981-1996), and Generation Z (mid-1990s to early 2010) (Parry & Urwin, 2011). A multigenerational workforce blends innovation with experience while younger employees excel in technology and adaptability, older workers contribute institutional knowledge and decision-making skills (Deal, Altman, & Rogelberg, 2010). This synergy enhances workplace productivity.

India's higher education sector, especially in Delhi NCR, is undergoing significant transformations. With social, educational, and technological advancements, institutions must evolve their teaching-learning processes (Nita & Guțu, 2023). Faculty members from different generations bring diverse perspectives on work-life balance, flexibility, and autonomy (Lyons & Kuron, 2014). Millennials and Gen Z prioritize autonomy and flexible teaching environments, while older faculty members value stability and traditional interactions (Bennett, Pitt, & Price, 2012). Recognising and understanding these generational preferences is crucial for educational institutions to foster an inclusive and effective academic environment (Swami, 2024).

Despite the rise of digital technologies in education, research on generational variations affecting the demand for flexibility and autonomy amongst faculty in higher education remains limited. This study aims to explore faculty perspectives across generational cohorts, offering insights for policymakers and administrators to create a balanced, inclusive, and productive academic work environment.

LITERATURE REVIEW

The literature review examines how generational differences shape workplace dynamics, particularly in higher education. It highlights Millennials' and Gen Z's preference for flexibility, while older generations value job security. Various studies explore these evolving preferences and their impact on faculty satisfaction and engagement.

Generational disparities in the dynamics of the workplace

Bennett, Pitt, and Price (2012) in their study 'Understanding the impact of generational issues in the workplace' analysed generational differences in workplace expectations, emphasizing Millennials' and Gen Z's preference for innovation, flexibility, and work-life balance. In contrast, older generations prioritize structured roles, job security, and organizational loyalty. Similarly, Deal, Altman, and Rogelberg (2010) identified Millennials' strong demand for flexibility, technology integration, and collaboration. Their findings suggest that educational institutions should reassess workplace policies to attract and retain younger faculty.

Impact of Technology and Digital Learning Environment

The digital age has revolutionized education by fostering interactive learning environments. Soly et al. (2021) highlighted how Gen Z and Alpha adapt to technology-driven education, enhancing engagement. Haleem et al. (2022) emphasized digital tools' role in faculty flexibility, noting older faculty may need additional training. Oh & Reeves (2013) stressed that technology adoption should prioritize pedagogical effectiveness over generational assumptions.

Impact on Job Satisfaction, Professional Freedom and Work-Life Balance

Lyons and Kuron (2014) in their study 'study "Generational differences in the workplace: A review of the evidence and directions for future research' found that Millennials and Gen Z prioritize flexibility, work-life balance, and personal growth, while older generations value job security and stability. Schullery (2013) reinforced these findings, suggesting that educational institutions should adapt policies to enhance faculty engagement. Nita and Gutu (2023) emphasized leadership and digital transformation's role in improving faculty autonomy and well-being.

Preferences for Flexibility and Autonomy in the Education Sector

Twenge (2010) in his study 'The value of work flexibility: Staff perceptions in higher education' examined faculty preferences, concluding that Millennials and Gen Z highly value work-life balance, flexibility, and autonomy, whereas older generations prioritize stability. Shepard and McNaughtan (2024) found that flexible work schedules significantly enhance job satisfaction for younger faculty but may pose challenges for older staff less who are familiar with digital teaching methods.

Faculty Comfort with Integrating Technology in Teaching and Learning

Çelik & Baturay (2024) emphasized the need for learner-centered, technology-driven teaching. Marzilli et al. (2014) noted that while faculty acknowledge technology's role in education, some fear overreliance, preferring it as a complement rather than a replacement for traditional teaching methods.

OBJECTIVES

General Objective:

To analyse faculty perspectives on flexibility and autonomy across generations in higher education institutes in Delhi NCR.

Specific Objectives:

1. To evaluate the significance of flexibility in the academic workplace, identifying the most valued aspects and the level of satisfaction with existing flexibility options.
2. To assess faculty perspectives on autonomy, examining its importance, the most valued aspects, and the factors limiting their autonomy in the education sector.
3. To explore generational differences in faculty preferences for flexibility and autonomy in their work.
4. To identify faculty comfort with using technology in teaching and learning, and its impact on their views on flexibility and autonomy across different generations.

RESEARCH METHODOLOGY

Study Design: A quantitative cross-sectional study comparing faculty preferences for flexibility and autonomy between Millennials/Gen Z and Gen X/Baby Boomers.

Locale of the study: Conducted in Delhi NCR, a major educational hub with diverse institutions, ensuring convenience and offer a diverse setting to explore generational differences in faculty preferences.

Sampling Size and Population

- The sample from educational institutions/colleges were categorized into two groups based on the generational divide-Millennials and Gen Z, and Gen X and Baby Boomers for ensuring well-representation of both the groups.
- A total of 200 respondents (faculty members) from various colleges located in Delhi NCR region were selected for the study. Out of 200 respondents, 100 respondents from Millennials and Gen Z (aged 18-38) and 100 respondents from Gen X and Baby Boomers (aged 39-65) were taken for the study.
- 50 faculty members from each generational cohort for a balanced perspective.

Sampling Technique: Stratified random sampling was used to ensure that both generational groups-Millennials and Gen Z (aged 18-38) and Gen X and Baby Boomers (aged 39-65) are adequately represented in the sample.

Sampling Procedure: Within each generational stratum, random sampling was used to select faculty members across departments ensuring varied disciplines and subject areas. The study included faculty members from both full-time and part-time or guest positions to provide a holistic perspective on generational differences in teaching preferences, flexibility, and autonomy within the higher education institutes.

Data Collection & Analysis: A structured questionnaire gathered faculty views on flexibility and autonomy. Data were analysed using SPSS, employing descriptive statistics to assess generational differences.

FINDINGS AND DISCUSSIONS

The results of the study have been divided into four sections: demographics, flexibility preferences, autonomy preferences, generational perspectives.

Age Group: The demographic profile provides insights into the diverse faculty composition, with equal representation of 50 respondents from Gen Z (18–25), Millennials (26–38), Gen X (39–50), and Baby Boomers (51–65). This balanced distribution ensures a comprehensive analysis of generational perspectives on flexibility and autonomy in higher education.

Employment Type: Among faculty respondents, 72% were full-time employees, while 28% were part-time or guest faculty, reflecting the staffing pattern in the selected educational institutions.

Table 1: Demographic variables and Employment status of faculty respondents across generational cohorts (N-200)

Demographic Variable	Category	Number of Respondents	Percentage
Age	18–25 years (Gen Z)	50	25%
	26–38 years (Millennials)	50	25%
	39–50 years (Gen X)	50	25%
	51–65 years (Baby Boomers)	50	25%
Employment Status	Full-time	144	72%
	Part-time/Guest	56	28%

Table 2: Faculty perceptions of Flexibility across generational cohorts (N-200)

Flexibility (Response Categories)	Millennials & Gen Z (N = 100)	Gen X & Baby Boomers (N = 100)
Importance of Flexibility		
Very Important/Important	82%	64%
Neutral/Not Important	18%	36%
Most Valued Flexibility		
Flexible Schedules	40%	25%
Online/Hybrid Options	35%	20%
Self-paced Learning/Teaching	25%	55%
Satisfaction with Current Flexibility Offered by the Institution		
Very Satisfied/Satisfied	56%	43%
Neutral/Dissatisfied	34%	57%

FLEXIBILTY

- **Importance of Flexibility:** Flexibility is a key factor in workplace satisfaction, particularly among younger faculty members. When surveyed, 82% of Millennials and Gen Z considered workplace flexibility very important, compared to 64% of Gen X and Baby Boomers. This indicates that younger generations prioritize flexibility to align with their evolving lifestyles and professional aspirations, while older generations, though valuing structured work environments, still recognize its benefits.
- **Most Valued Flexibility**: Regarding the most valued aspect of flexibility, 40% of Millennials and Gen Z faculty members preferred the ability to choose their own work schedules, followed by 35% favouring online or hybrid teaching models. These preferences reflect their desire for adaptable work structures that support both professional and personal goals. Conversely, 55% of Gen X and Baby Boomers valued self-paced instruction, emphasizing autonomy and control over their schedules rather than external flexibility.
- **Satisfaction with Current Flexibility:** Satisfaction levels also varied by generation. Millennials and Gen Z were more satisfied (56%) with current flexibility options compared to 43% of older faculty members. However, 57% of Gen X and Baby Boomers expressed dissatisfaction, feeling that institutional policies did not adequately meet their needs.
  To bridge this gap, educational institutions must offer a variety of flexible options that accommodate the diverse preferences of different generational cohorts.

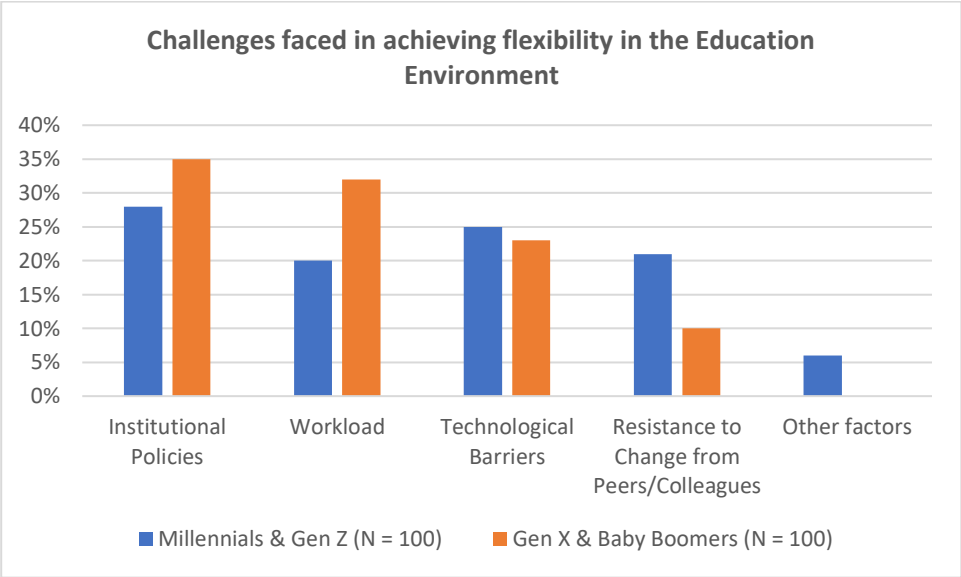


Figure-1: Challenges faced in achieving flexibility in the Education Environment

Challenges faced in achieving flexibility:

The Figure 1 highlights the barriers to workplace flexibility across generations which are as follows:

- **Institutional Policies:** Institutional policies are a significant barrier to workplace flexibility, particularly for Gen X and Baby Boomers (35%), compared to Millennials and Gen Z (28%). Older faculty members often face rigid policies that restrict their ability to work flexibly. Furthermore, they may feel constrained by policies that are not aligned with their desire for autonomy and work-life balance.

- **Workload**: Workload is a key challenge for both groups but affects older generations more. While 32% of Gen X and Baby Boomers cite workload as a major concern, only 20% of Millennials and Gen Z feel the same. Older faculty members typically juggle teaching, administrative, and research responsibilities, making work-life balance more difficult.
- **Technological Barriers:** Despite being more tech-savvy, 25% of Millennials and Gen Z still struggle with technology, often due to inadequate access or insufficient training. In contrast, 23% of Gen X and Baby Boomers face technological challenges, likely due to lower reliance on digital tools. Older faculty members who do encounter tech issues may find it harder to adapt to new platforms designed to support flexibility.
- **Resistance to Change:** Younger faculty (21%) experience greater resistance from colleagues compared to older faculty (10%). Their preference for flexible hours, remote teaching, and hybrid models often clashes with traditional teaching approaches, leading to pushback.
- **Other Factors:** Some younger faculty reported additional, unspecified challenges, likely related to personal or institutional constraints.

Millennials and Gen Z face technological barriers and peer resistance, while Gen X and Baby Boomers struggle with institutional policies and workload. Tailored flexibility initiatives-such

as tech support for younger faculty and policy reforms for older faculty-can help create a more inclusive work environment. Addressing these distinct needs can improve flexibility for all generations.

Table 3: Faculty Perceptions of Autonomy across generational cohorts

Autonomy (Response Categories)	**Millennials & Gen Z (N = 100)**	**Gen X & Baby Boomers (N = 100)**
Importance of Autonomy		
Very Important/Important	80%	70%
Neutral/Not Important	20%	30%
Most Valued Autonomy		
Choosing Course Content/Materials	30%	48%
Setting Learning/Teaching Goals	36%	24%
Freedom in Evaluation Methods	34%	28%
Satisfaction with Current Autonomy		
Very Satisfied/Satisfied	70%	60%
Neutral/Dissatisfied	30%	40%

Importance of Autonomy: Autonomy is highly valued across generations, with 80% of Millennials and Gen Z faculty considering it very important or important, compared to 70% of Gen X and Baby Boomers. Younger faculty emphasize autonomy as it grants greater control over their teaching pedagogy, research approaches and overall academic responsibilities., aligning with their preference for flexibility. Older faculty members also value independence, though their perspective is shaped by traditional academic structures. The growing demand for autonomy reflects evolving expectations in the academic landscape.

Most Valued Autonomy: While both generations prioritize autonomy, their preferences differ. Millennials and Gen Z prefer setting their own teaching and learning goals (36%) and using diverse evaluation methods (34%). They value student-centered and innovative teaching approaches, experimenting with flexible learning methods and assessments. Conversely, Gen X and Baby Boomers prioritize autonomy in designing course contents, structure, and materials (48%). They emphasize discipline-specific knowledge, academic rigor, and curriculum stability over pedagogical flexibility. This generational divide highlights differing views on workplace freedom and autonomy, older faculty favour subject mastery, while younger faculty seeks pedagogical innovation.

Satisfaction with Current Autonomy: Millennials and Gen Z report higher satisfaction (70%) with workplace autonomy compared to Gen X and Baby Boomers (60%). Notably, 40% of older faculty express dissatisfaction, likely due to rigid institutional policies limiting their ability to exercise autonomy.

Faculty across generations value autonomy differently-Millennials and Gen Z prefer flexible teaching, while older faculty prioritize curriculum control. Institutions should adopt a balanced approach to meet these diverse needs, enhancing faculty engagement and job satisfaction.

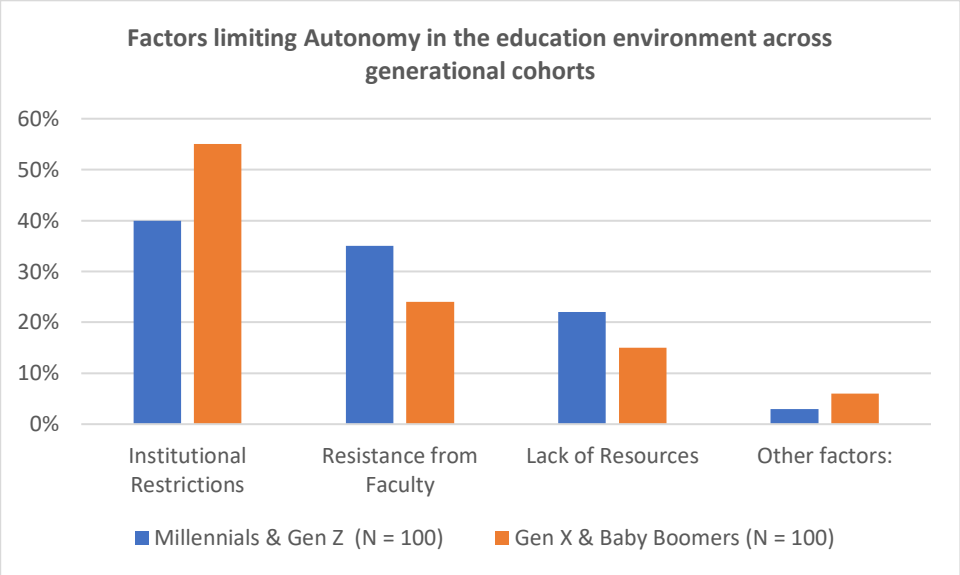


Figure-2: Factors limiting Autonomy in the education environment across generational cohorts

The Figure 2 illustrates factors limiting faculty autonomy across generational cohorts:

1. Institutional Restrictions: Institutional restrictions pose significant challenges to faculty autonomy, with 55% of Gen X and Baby Boomers feeling constrained by rigid policies compared to 40% of Millennials and Gen Z. Older faculty struggles with long-standing traditional systems with fixed structures limiting their flexibility in course design, assessment, and teaching methods, causing stress and frustration while younger faculty find it difficult to implement new ideas due to standardized procedures.

2. **Resistance from Faculty:** Resistance from colleagues is another barrier, affecting 35% of Millennials and Gen Z, who face pushback when adopting innovative teaching methods. In contrast, 24% of Gen X and Baby Boomers experience occasional disagreements but encounter less resistance overall. This highlights the need for institutions to foster open discussions and collaborative teaching approaches to bridge generational gaps.

3.**Lack of Resources:** Limited resources hinder autonomy, particularly for Millennials and Gen Z, with 22% facing challenges due to insufficient access to modern tools and digital technologies. In contrast, only 15% of Gen X and Baby Boomers report similar issues, being more accustomed to traditional methods.

4. **Other Factors:** Additionally, 3% of younger faculty cite bureaucratic delays and slow administrative processes as barriers, while 6% of older faculty struggle with structural limitations.

To enhance autonomy, institutions must revise policies, encourage collaboration, and invest in modern resources, fostering an inclusive and adaptive academic environment.

Table 4: **Generational Differences in Preferences for Flexibility, Autonomy, and Technology Adoption in Education Sector(N-200)**

Question	Response Categories	Millennials & Gen Z (N = 100)	Gen X & Baby Boomers (N = 100)
Generational differences affect preferences for flexibility and autonomy	Yes	90%	60%
	No	5%	15%
	Not Sure	5%	25%
Comfort level with adopting technology for teaching/learning.	Very Comfortable	45%	15%
	Somewhat Comfortable	30%	35%
	Neutral	15%	30%
	Somewhat Uncomfortable	5%	10%
	Very Uncomfortable	5%	10%

Generational Differences Affect Preferences for Flexibility and Autonomy in Education

Around 90% of Millennials and Gen Z faculty believe age differences shape work preferences, particularly flexibility and autonomy, as they favour technology-driven methods. In contrast, 60% of Gen X and Baby Boomers recognize these generational influences, though 25% remain uncertain.

Comfort with Technology for Teaching/Learning

While 45% of younger faculty feel 'very comfortable' with technology and 30% are 'somewhat comfortable,' only 15% of older faculty report high confidence. With 30% neutral and 20% uncomfortable, Gen X and Baby Boomers tend to prefer traditional teaching methods over rapid digital adaptation.

Table 5: **Generational Perspectives on the Need for Flexibility and Autonomy in Education**

Question	**Response Categories**	**Millennials & Gen Z (N = 100)**	**Gen X & Baby Boomers (N = 100)**
Perceived need for more flexibility and autonomy among younger generations (Millennials and Gen Z) compared to older generations (Gen X and Baby Boomers).	Strongly Agree	50%	25%
	Agree	30%	35%
	Neutral	15%	30%
	Disagree	5%	5%
	Strongly Disagree	0%	5%

Perceived Generational Differences: The table highlights generational differences in faculty perspectives on flexibility and autonomy. Among younger faculty, 80% value flexibility, with 50% strongly agreeing and 30% agreeing, reflecting their preference for innovation and work-life balance. Only 5% disagreed, while 15% remained neutral. In contrast, 60% of older faculty supported flexibility, with 30% neutral and 5% strongly disagreeing, indicating slight resistance. Millennials and Gen Z favour tech-driven teaching, while Gen X and Baby Boomers prefer traditional methods. Institutions should encourage intergenerational collaboration, offer technology-focused training, and implement flexible policies to create an inclusive academic environment.

POLICY IMPLICATIONS

As education evolves, institutions must update policies to address generational needs, ensuring flexibility, technology integration, and an inclusive faculty environment. Some policy implications include:

1. **Reforming Institutional Policy:** Colleges should update policies to support flexible work, hybrid learning, and professional development, aiding senior faculty in technology adoption while preserving traditional strengths.
2. **Technology Integration:** Institutions must invest in digital tools and conduct targeted training for Gen X and Baby Boomers.
3. **Support for Faculty Workload Management:** Institutions should automate routine administrative tasks to reduce faculty workload, allowing more focus on teaching, research, and maintaining flexibility.
4. **Cross-Generational Collaboration**: Colleges should foster cross-generational collaboration through workshops, mentoring, and discussion platforms, enabling faculty to exchange ideas and blend traditional and modern teaching methods.

Efforts to Embrace Flexibility and Autonomy in colleges:

By integrating the following strategies, colleges can foster an adaptive, innovative, and inclusive academic environment.

1. **Adopting Flexible Teaching Methods:** Colleges should integrate online, self-paced, and diverse teaching styles to cater to younger faculty while respecting senior educators' autonomy in course design.
2. **Encouraging Innovation and Autonomy**: Institutions should empower faculty with control over teaching goals, content, and assessments to support creativity and personalization.
3. **Flexibility and Autonomy**: Clear policies on flexible schedules and teaching methods should be regularly reviewed to maintain a balance between adaptability and educational quality.
4. **Training and Development Programs:** Colleges must offer targeted training on technology integration and modern teaching strategies, ensuring faculty stay updated and adaptable.
5. **Fostering a Supportive Culture**: Institutions should cultivate an environment that values flexibility, autonomy, and diverse faculty experiences to enhance retention and satisfaction.
6. **Technology Integration:** Universities should actively adopt new technologies that facilitate efficient teaching while supporting educators at different career stages.
7. **Holistic Faculty Growth:** Providing structured opportunities for professional advancement and mentorship will help bridge generational gaps and foster collaboration.

CONCLUSION

The study highlights significant generational differences regarding flexibility and autonomy in educational settings. Faculty from Millennials and Gen Z favour flexible schedules, hybrid learning, and self-paced teaching, reporting higher satisfaction but facing institutional, workload, and technological challenges. Gen X and Baby Boomers value stability and structure, preferring content control and traditional methods. Those in their 40s appreciate independence but feel less satisfied with autonomy due to strict policies and heavy workloads. They also struggle more with technology. To address this generational gap, colleges should implement flexible policies that cater to diverse faculty needs, fostering a more inclusive and adaptive educational environment.

REFERENCES

- Bennett, J., Pitt, M., & Price, S. (2012). Understanding the impact of generational issues in the workplace. *Journal of Organizational Change Management, 25*(4), 589–610. https://doi.org/10.1108/02632771211220086.
- Çelik, F., & Baturay, M. H. (2024). Technology and innovation in shaping the future of education. *Smart Learning Environments, 11*, Article 54. https://doi.org/10.1186/s40561-024-00135-9.
- Deal, J. J., Altman, D. G., & Rogelberg, S. G. (2010). Millennials at work: What we know and what we need to do (if anything). *Journal of Business and Psychology, 25*(2), 191–199. https://doi.org/10.1007/s10869-010-9177-2.
- Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2013). Removing obstacles to the pedagogical changes required by digital learning environments. *Educational Technology*, *53*(2), 28-35.

- Gilley, A., Wulf, J. D., & Gilley, J. W. (2015). Leading Millennials: Discovering a new workplace mindset. *Journal of Leadership Studies*, *9*(4), 72-75.
- Gursoy, D., Maier, T. A., & Chi, C. G. (2008). Generational differences: An examination of work values and generational gaps in the hospitality workforce. *International Journal of Hospitality Management, 27*(3), 448–458. https://doi.org/10.1016/j.ijhm.2007.11.002.
- Gupta, R., & Tyagi, P. (2020). The evolving role of technology in higher education: A generational perspective. *Education and Information Technologies*, *25*(6), 5115-5134.
- Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Computing: Informatics and Systems, 33*, 100579. https://doi.org/10.1016/j.susoc.2022.05.004
- Johnson, M. (2018). The new workforce: Factors influencing generational workplace preferences. *Workplace Psychology Journal*, *16*(3), 204-219.
- Kupperschmidt, B. R. (2000). Multigeneration employees: Strategies for effective management. *Health Care Manager (Frederick), 19*(1), 65–76. https://doi.org/10.1097/00126450-200019010-00011.
- Kumar, S., & Agarwal, A. (2023). The role of digital transformation in faculty engagement: A generational perspective. *Journal of Higher Education Policy and Management*, *45*(1), 112-129.
- Lyons, S. T., & Kuron, L. K. (2014). Generational differences in the workplace: A review of the evidence and directions for future research. *Journal of Organizational Behavior, 35*(S1), S139–S157. https://doi.org/10.1002/job.1913.
- Marzilli, C., Delello, J., Marmion, S., McWhorter, R. R., Roberts, P. B., & Marzilli, T. S. (2014). Faculty attitudes towards integrating technology and innovation. *International Journal on Integrating Technology in Education, 3*(1). https://doi.org/10.5121/ijite.2014.3101.
- Nita, V., & Guțu, I. (2023). The role of leadership and digital transformation in higher education students' work engagement. *International Journal of Environmental Research and Public Health, 20*(6), 5124. https://doi.org/10.3390/ijerph20065124.
- Oh, E., & Reeves, T. C. (2013). Generational differences and the integration of technology in learning, instruction, and performance. In *Handbook of research on educational communications and technology* (pp. 819–828). Springer. https://doi.org/10.1007/978-1-4614-6435-8_80.
- Parry, E., & Urwin, P. (2011). Generational differences in work values: A review of theory and evidence. *International Journal of Management Reviews, 13*(1), 79–96. https://doi.org/10.1111/j.1468-2370.2010.00285.x.
- Sandhu, R. (2015). Conceptualizing autonomy in higher education. *International Journal of Research in Management, Economics & Commerce, 5*(1), 58.
- Schullery, N. M. (2013). Workplace engagement and generational differences in values. *Business Communication Quarterly, 76*(2), 252–265. https://doi.org/10.1177/1080569913476543.
- Sharma, P., & Singh, R. (2021). Faculty diversity and job satisfaction: A generational perspective. *Higher Education Research and Development Journal*, *40*(2), 223-239.
- Singh, M., & Verma, K. (2022). Academic work flexibility: Impacts on faculty job satisfaction across generations. *Education and Management Review*, *38*(3), 289-304.

- Shepard, C., & McNaughtan, J. (2024). The value of work flexibility: Staff perceptions in higher education. *Journal of Higher Education, 95*(4), 456-473. https://doi.org/10.1080/00221546.2024.2409027.
- Soly, N., Benny, K., & Thomas, R. M. (2021). *Technological perspectives of education for Generation Z and Generation Alpha.* Christ University.
- Swami, H. (2024). Navigating cultural or generational differences in education. *Times Higher Education*. Retrieved February 1, 2025, from https://www.timeshighereducation.com/counsellor/managing-stakeholders/navigating-cultural-or-generational-differences-education.
- Twenge, J. M. (2010). A review of the empirical evidence on generational differences in work attitudes. *Journal of Business and Psychology, 25*(2), 201–210. https://doi.org/10.1007/s10869-010-9165-6.

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A STUDY ON KNOWLEDGE AND SKILL ENHANCEMENT OF INTERIOR DESIGN STUDENTS ON TRADITIONAL ART FORMS OF GUJARAT

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ABSTRACT

In a world dominated by digital innovation and contemporary art forms, the traditional art of India is facing the threat of extinction. It is important to create awareness about the cultural and artistic significance of these traditional forms. Utilizing these art forms in the interior decoration is an excellent way to spread awareness. Studying about these art forms will offer the next generation a fresh approach to utilize these mediums in their own distinctive ways to produce various accessories. The present research therefore aimed to assess the knowledge of interior design students regarding traditional art forms of Gujarat, design and develop decorative and functional accessories using these art forms and evaluate the effectiveness of an educational program in enhancing student knowledge regarding traditional art forms of Gujarat. The sample was purposively selected (281 interior design students, Graduate, Postgraduate, and Diploma) from The Maharaja Sayajirao University of Baroda. A questionnaire included 49-statements, having three-point continuum scale (Aware, Undecided, Unaware), to collect data on the extent of knowledge. The reliability of the scale was established using the Spearman-Brown correction formula. This research was delimited to traditional art forms of Gujarat. This study will be useful for Interior students, Interior Designer and Architects to know about different traditional art forms of Gujarat so that they can implement them in their own unique way in the Interior Spaces. Utilizing these art forms in modern world will also help to preserve these traditional art forms which are vanishing with time.

Keywords: Traditional Art Forms, Knowledge, Students, Skill Enhancement, Interior Design Students

INTRODUCTION

India is a nation with a rich cultural legacy and values connected to its ancient crafts and arts. The development of crafts in society was an indication of the stirring and softening of humanism as well as the cultivation of sensitivity. It represented humanity's attempt to infuse grace and elegance into an otherwise harsh and uninteresting human existence. Handicrafts were therefore seen as a priceless component that imparts sensibility, moral and an artistic perspective on life and humanity. Handicraft add color to life and capture the unique qualities of every civilization while also reflecting their beauty. As a result, we should honour and respect the craftspeople who have preserved this legacy for millennia. Traditional art is an art that passed from generations to generations. It is often

characterized by its classical form and style. Traditional art is often seen as being of a higher quality than contemporary art. This is due to the fact that traditional art is produced with methods that have been inherited over many generations and artists have had years of practice in perfecting their craft. However, there is also a lot to be said for contemporary art. Artists have created the best of artworks with available material and technology.

Similar to all the other states of India, Gujarat has a rich tradition of folk arts, crafts and literature. Gujarat has been a pivotal hub for textile exports, evident from the 15th-century records and textile discoveries in Egypt, showcasing its production of vibrant block-printed textiles. There are over 25 recognized crafts in Gujarat. There is a significant difference in Handicrafts of Gujarat, from its proportions of patterns to the component of wonderful exquisite artifacts in various forms. The Handicraft products are popular all over the world. It mirrors vibrant culture of the State (Kaur and Kaur, 2018). Reflecting the region's folklore and festivals, these crafts showcase the unique social and cultural essence from which they originate, embodying originality in both nature and craftsmanship. The products from Gujarat's artisans have not only gained recognition within the country but have also got approval in overseas markets (Shrinivasa and Kate, 2023). The UN report of the World Commission on Culture and Development (1995) has made a solemn and sombre admission that many development projects had failed because the importance of culture had been underestimated. Culture, which is the soul of development, can no longer be ignored and needs to be explicitly stated in the notion of human development (Jadhav, 2014).

Traditional art is not just an aesthetic choice; it's a narrative of our collective history, emotions and cultural identity. Even in our rapidly digitizing world, the demand for authenticity, connection and storytelling through decor has never been stronger. Traditional art forms, when incorporated into wallpapers and decor items, they create a bridge between the past and the present, bringing depth and soul into modern spaces. Padmanabha, Registrar General of India (1977-1983) said about Indian Census of "Handicraft Survey", that the revitalization of Indian art and craft could be done only when the contemporary user turned to social and cultural transformation (Padmanabha, 1978; Wood, 2011). Also due to economic crises, our intangible cultural heritage is dying. But, cultural merchandise which has heritage value attached to them has potentiality to add economic value subjected to proper conservation and awareness generation (Mourato & Mazzanti, 2002). But counter arguments related to design's interference to diversify the traditional art and craft to address contemporary market need will destroy the essence of the tradition and technological intervention will dilute the core essence of the craft (Sethi. et al, 2005; Kaley, 2008). Preserving traditional art and craft form is essential for the preservation of our cultural heritage, as well as for the economic empowerment and cultural revitalization of these communities (Kolay, 2015). It is important to create awareness about the cultural and artistic significance of these tradition forms and to ensure that they are recognized and valued. Utilizing these art and craft forms in the interior decoration is an excellent way to spread awareness. Not only does it provide an opportunity to appreciate and own a unique piece of art but they also serve as a representation of the rich heritage and traditions of traditional communities. Moreover, they add a touch of ethnicity to your living or workspace, enhancing the overall aesthetic appeal. Presently due to modernization the old traditional art and craft forms are being vanishing from the society and present generation is not much aware about these traditional art and craft forms. The present research therefore attempts to assess the knowledge of the interior design students regarding the Traditional Art forms and give them in-depth knowledge about various traditional art forms so that these art forms are recognized and valued.

OBJECTIVES

1. To assess the extent of knowledge of the interior design students regarding the Traditional Art forms of Gujarat.
2. To Design and develop the Decorative and Functional Accessories for Residential and Commercial spaces using Traditional Art forms of Gujarat.
3. To conduct a Skill and Knowledge program for enhancing the knowledge of the interior design students regarding the Traditional Art forms of Gujarat and its application in interiors.

HYPOTHESES OF THE STUDY

1. There will be a difference in the extent of knowledge of respondents regarding different traditional art of Gujarat before and after the educational program.

DELIMITATION

1. The study was limited to the Traditional Art forms of Gujarat State only.
2. The study was limited to 281 Interior Design students from Department of Family and Community Resource Management, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara only.

METHODOLOGY

The research design for the present study was descriptive in nature. Purposive sampling technique was used to select the sample of 281 students pursuing interior design. Questionnaire was used as a tool for collecting data. It was divided into two sections wherein section I comprised of Background Information of the respondents which included personal information (age, gender, educational level and native place) and their family information (type of family and income of the family). Section II covered information regarding the extent of knowledge of the respondents regarding Traditional art forms of Gujarat. This scale consisted of 49 statements reflecting Extent of Knowledge of the Respondents regarding Traditional art forms of Gujarat. The respondents were asked to respond on a three-point- continuum scale. The response to be given by the respondents were “Aware”, “Undecided” or “Unaware” which were scored 3 through 1 respectively. High scores reflected high extent of knowledge regarding Traditional art forms of Gujarat. The reliability of the scale was computed via spearman-Brown correction which was 0.79.

Ethical Considerations

The present study has the ethical approval number IECHR/FCSc/Ph.D/10/2024/03, and it adheres to ethical norms to ensure the respondents' rights and well-being. The following are the ethical measures that were considered for the investigation.

1. **Informed Consent**: Respondents were provided with detailed information about the purpose of the study, data collection procedures and utilization of the obtained data before obtaining their informed consent.
2. **Confidentiality**: Data were collected and kept confidential by not revealing the identities of the respondents. Data were only used for analysis of the present study.

3. **Voluntary Participation**: Participation in the study was voluntary and respondents could withdraw at any time without any repercussions.

FINDINGS AND DISCUSSIONS

The findings of the study were categorized as Demographic Profile of respondents, Knowledge of respondents regarding Traditional art forms of Gujarat, preparing various Functional and Decorative accessories, educational program for knowledge enhancement.

1. Demographic Profile of respondents

This section contained personal information regarding age (in years), gender, Educational Level, Native, Family Type and Family monthly income (In Rupees) of the Interior Designing Students from Department of Family and Community Resource Management.

Table 1: Distribution of the respondents according to their Background information

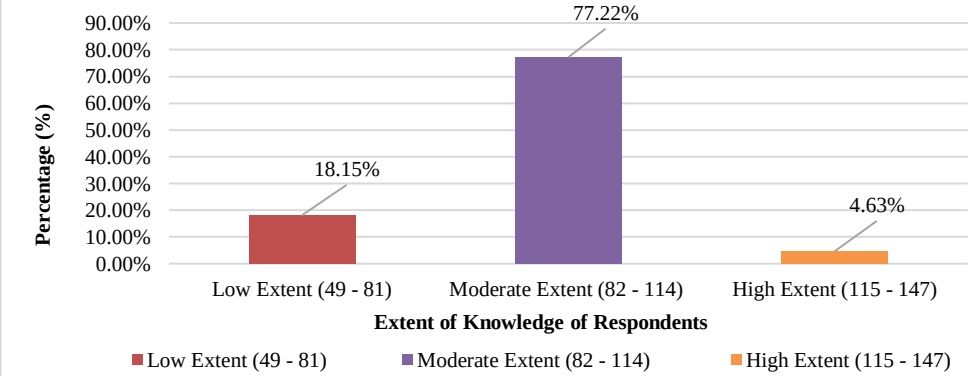
Sr. No	Demographic Profile of respondents	Respondents (n=281)	
		f	%
1	**Age (In years)**		
	17 - 21 Years	228	**81.11**
	22 - 25 Years	48	17.08
	26 - 30 Years	5	1.77
2	**Gender**		
	Male	68	24.19
	Female	213	**75.80**
3	**Educational Level**		
	Graduate	248	**88.25**
	Post Graduate	18	6.4
	Diploma	15	5.33
4	**Native Place**		
	Urban	68	24.19
	Rural	213	**75.80**
5	**Family Type**		
	Nuclear	187	**66.54**
	Joint	94	33.45
6	**Family Monthly Income (In rupees)**		
	>= ₹50,000	121	**43.06**
	₹50,001 – ₹1,00,000	95	33.80
	₹1,00,000 & above	65	23.13

The data in table 1 revealed that majority (81.11 per cent) of the respondents were from age group of 17-21 years, more than three-fourth (75.80 per cent) of respondents were Female and 24.19 per cent were Male. The data on Educational Level revealed that majority (88.25 per cent) of the respondents were Graduate. The data related to native place showcased that more than three-fourth (75.80 per cent) of respondents had their native place in rural locality. Moreover, more than three – fifth (66.54 per cent) of the respondents belonged to Nuclear Family and less than half (43.06 per cent) of respondents had family monthly income as >= ₹50,000.

2. Extent of Knowledge of Respondents regarding Traditional art forms of Gujarat

This section highlighted on the extent of knowledge regarding traditional art forms of Gujarat. The scale consisted of 49 statements. The respondents were asked to respond on a three-point- continuum scale: “Aware”, “Undecided” and “Unaware”. The minimum score was 49 and maximum was 147. Minimum and maximum possible scores were divided into three categories based on equal interval which were High extent, Moderate extent and Low extent of knowledge of the Respondents regarding Traditional Art of Gujarat. High scores reflected High Extent of knowledge of the Respondents.

Figure 1 . Extent of Knowledge of Respondents regarding Traditional art forms of Gujarat (n=281)



The data in figure 1 revealed that 18.15 per cent of the respondents had High Extent of knowledge of the Respondents regarding Traditional Art of Gujarat, followed by 77.22 per cent of the respondents who had Moderate extent of knowledge and 4.63 per cent of respondent had Low extent of Knowledge regarding Traditional art of Gujarat.

3. Developing Functional and Decorative Accessories based on Traditional Art of Gujarat

The present study focuses on educating students about the diverse traditional art forms of Gujarat, many of which they may be unfamiliar with. To demonstrate the practical application of these art forms, the researcher developed a range of Functional and Decorative accessories suitable for both residential and commercial interior spaces. The product development process was structured in three distinct phases:

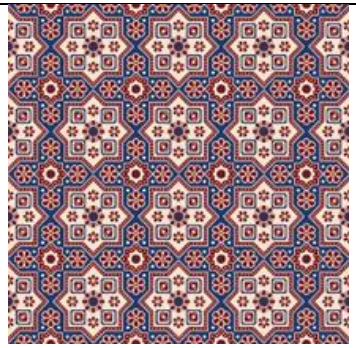
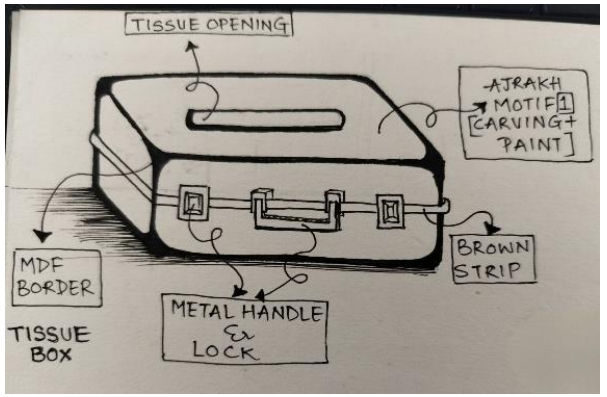
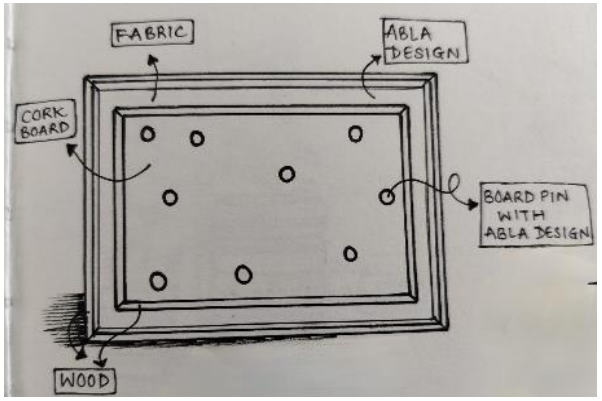
Phase 1: Research and Conceptualization: This phase involved comprehensive research into the various traditional art forms of Gujarat. The goal was to identify and document these art forms, then creatively pair them with potential functional or decorative accessory designs (Table 2). This stage laid the groundwork for the subsequent design and development phases.

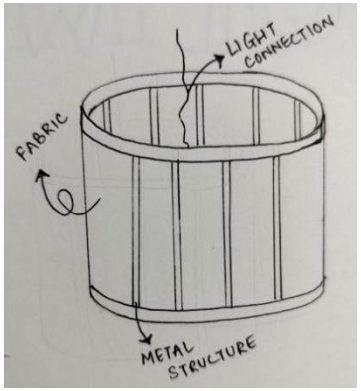
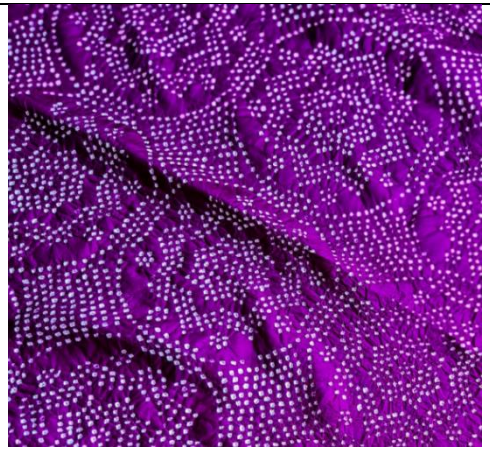
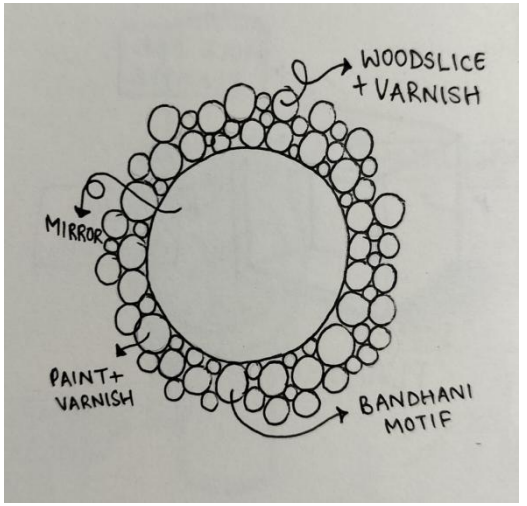
Phase 2: Design and Prototyping: Detailed drawings of the proposed accessories were created. Where necessary, the researcher outsourced specialized skills from resource persons for assistance with specific design elements or technical drawings. This ensured the designs were technically sound and ready for production.

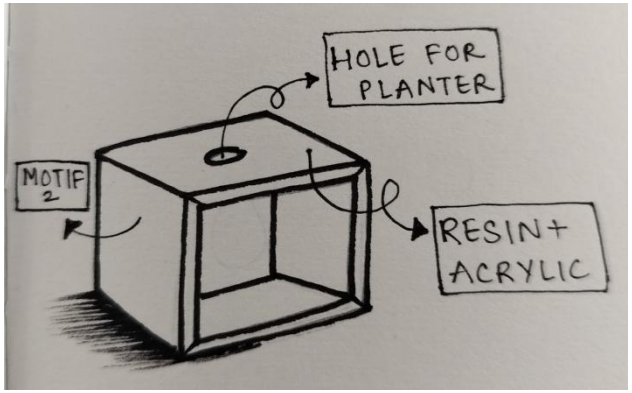
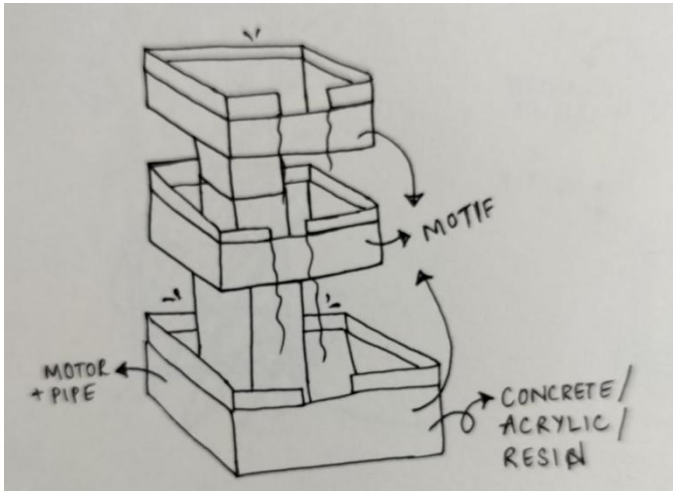
Phase 3: Cost Estimation: This final phase focused on determining the cost of producing each accessory. Calculations were based on a detailed analysis of material costs, labor costs, and a reasonable profit margin. This process provided a realistic

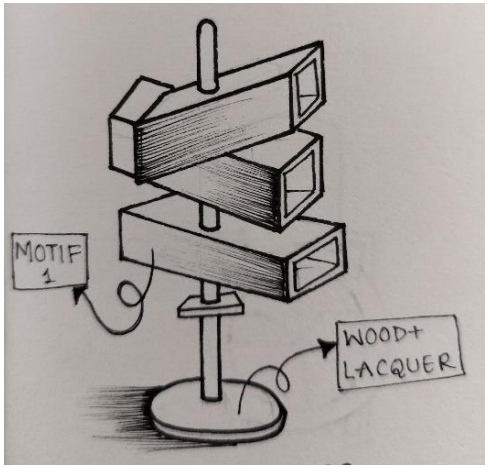
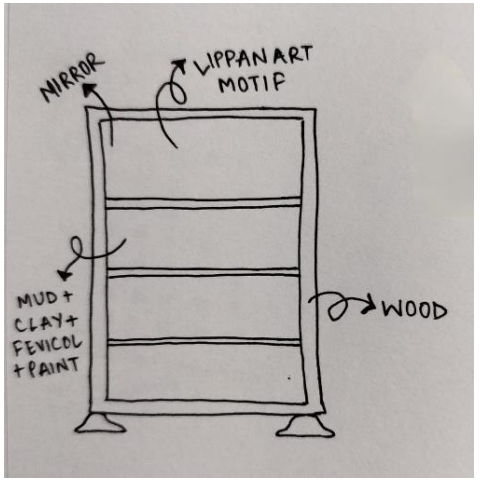
understanding of the economic viability of each product.

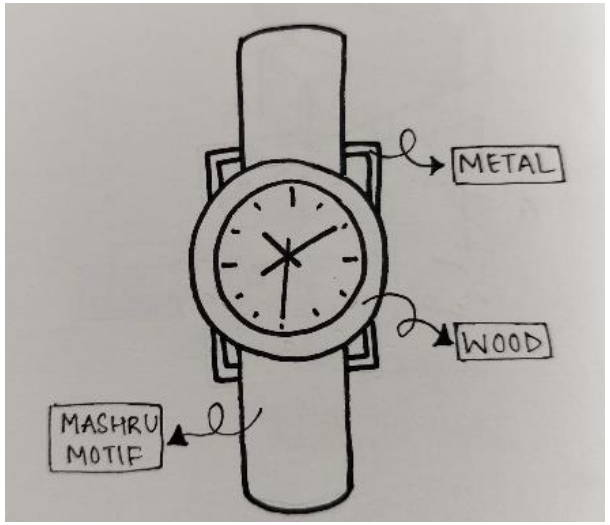
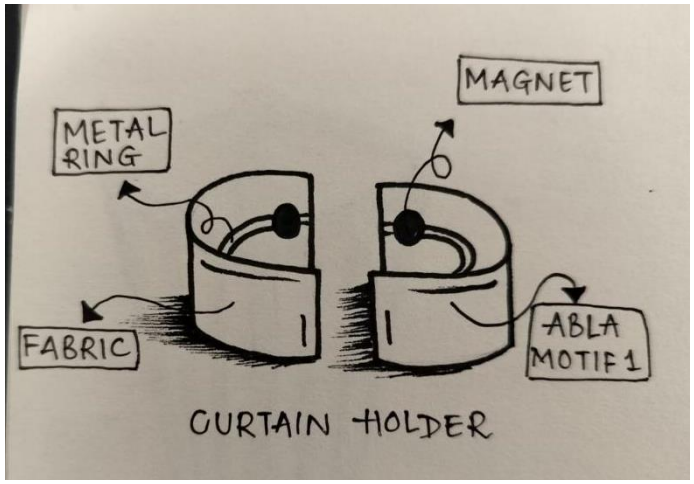
Table 2. Application of Traditional Art forms of Gujarat on Accessories for Interior Decoration

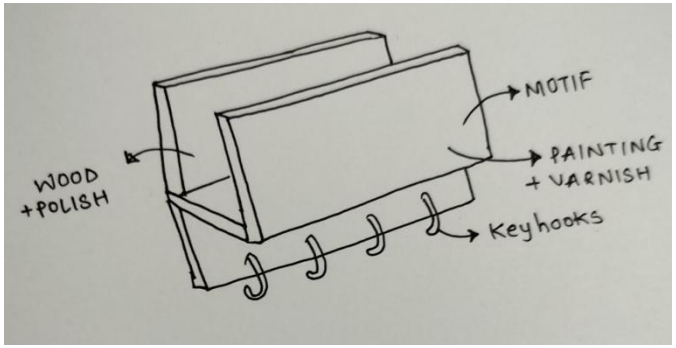
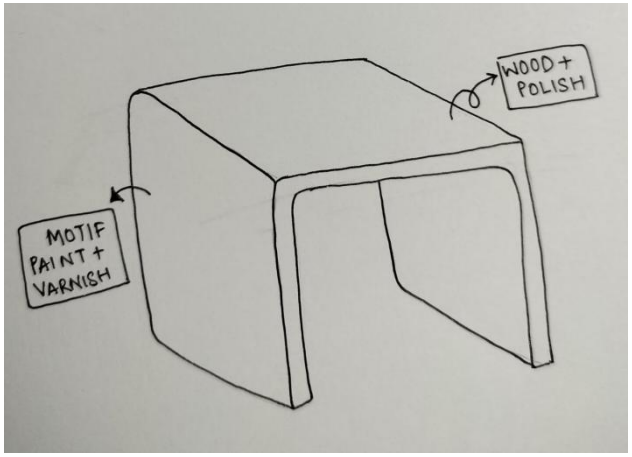
Sr. No.	Traditional Art forms	Motifs of Traditional Art forms	Original Use of the traditional art forms	Implementation of the traditional art forms in Interior Accessories
1	Ajrakh	 Plate 1 – Ajrakh Print Motif (Ranjan & Ranjan, 2008)	Primarily used for turbans, lungis (men's lower wraps), shawls, bedspreads, and camel/cattle cover by pastoral communities in Kutch, Gujarat.	 Plate 2 - TISSUE BOX
2	Abla Work (Mirror Work)	 Plate 3 – Abhla work Motif (Zeal Jani & Zeal Jani, 2024)	These motifs were used to make garments (blouses, skirts), wall hangings, torans and dowry items, believed to ward off evil and add sparkle.	 Plate 4 – NOTICE BOARD

3	Applique Work	 Plate 5 – Applique work Motif (Pedia, 2017)	Used for quilts (rallis), wall hangings (chaklas), door valances (torans), and animal decorations, often utilizing recycled fabrics.	 Plate 6 – CHANDELIER
4	Bandhani	 Plate 7 – Bandhani Print Motif (Shop, 2025)	Primarily for auspicious wedding saris (Gharchola, Chandrokhani), festival attire, turbans, and ritual cloths.	 Plate 8 –WALL MIRROR

5	Batik	 Plate 9 – Batik print Motif (Ranjan & Ranjan, 2008)	Traditionally used for sarongs, wraps, headcloths, and ceremonial cloths in regions where it was practiced.	 Plate 10 –PLANTER
6	Gamthi Print	 Plate 11 – Gamthi Print Motif (Ranjan & Ranjan, 2008)	Used for everyday wear garments (saris, kurtas, blouses) and household linens (bedsheets, cushion covers) in rural Gujarat.	 Plate 12 – HUMIDFIER CUM WATERFALL

7	Lacquer Lathe Work	 Plate 13 – Lacquer lathe work (Ranjan & Ranjan, 2008)	For functional and ceremonial wooden furniture (swings, low seating, cradles, chairs), known for vibrant colors.	 Plate 14 – A DESK ORGANIZER
8	Lippan Art	 Plate 15 – Lippan Art Motif (Ranjan & Ranjan, 2008)	For decorating the interior and exterior walls of bhungas (mud houses) in Kutch, serving both aesthetic and insulating purposes.	 Plate 16 – PARTITION

9	Mashru	 Plate 17 – Mashru Motif (Ranjan & Ranjan, 2008)	Used for luxurious garments (linings, cholis, ghaghras) and upholstery/cushions for royalty and affluent households.	 Plate 18 –WALL CLOCK
10	Moti Barat Kaam	 Plate 19 – Moti Barat Kaam (Ranjan & Ranjan, 2008)	sed for decorative door hangings (torans), wall hangings (chaklas), head rests (indhonis), and ceremonial objects.	 Plate 20 – CURTAIN HOLDER

11	Pithora Painting	 Plate 21 –Pithora Painting Motif (Ranjan & Ranjan, 2008)	Purely ritualistic wall paintings created as offerings to deities by tribal communities, depicting their cosmology and daily life.	 Plate 22 – KEYCHAIN HOLDER
12	Tangaliya Weave	 Plate 23 –Tangaliya Weave Motif (Ranjan & Ranjan, 2008)	Primarily used for distinctive dot-patterned shawls (Tangaliya Shol) and blouses (cholis) by Bharwad women in Surendranagar district.	 Plate 24 – SIDE TABLE CUM STOOL

4. Conducting a skill and knowledge enhancement program for interior design students on traditional art forms of Gujarat.

The program was conducted on the basis of the data gathered regarding traditional art forms of Gujarat. Through the interaction during the session, it was found that the respondents had lack of knowledge regarding the various art forms of Gujarat and its application. The steps adopted for development and implementation of the program was as follows:

1. **Preparation of material:** The program covered various aspects of Traditional art forms of Gujarat such as meaning and importance, application of art forms in existing interior space, application of art form through accessories, Functional as well Decorative.
2. **Implementation:** It was conducted in two sessions in which the knowledge based on the theory were explained in the first session and in the second session the students were provided with practical based knowledge of incorporating the traditional art forms in various interior spaces through the Functional and Decorative Accessories Prepared.



Figure 2: Skill and Knowledge Enhancement Program

After the two sessions of program, question answer session was carried out followed by distribution of catalogue developed based on various art forms of Gujarat and its application on accessories for Interior Spaces

5. Testing of Hypotheses

Ho_1: There exists no difference in the knowledge of respondents regarding different Traditional art of Gujarat before and after the skill and knowledge enhancement Program

Paired t test was computed to find out the difference in the knowledge of respondents regarding different Traditional art of Gujarat before and after the skill and knowledge enhancement program. The result showcased that there was significant difference in knowledge of respondents after the program.

Table 3: Paired t-test showing difference in the extent of knowledge regarding different Traditional art of Gujarat before and after the skill and knowledge enhancement program

Sr. No.	Variables	Mean Score of Knowledge	df	t-value	Level of significance
1	Pre-test	91.57	280	2.08	0.05
2	Post test	95.42			

The mean score of knowledge regarding different Traditional art of Gujarat was high after the program which proved that the knowledge was enhanced after the skill and knowledge enhancement program.

CONCLUSION

The research approach highlights the importance of revitalizing traditional Indian craft guilds. To bridge the gap between cultural heritage and society, a modern popular paradigm must be used, with the target audience being a larger community, particularly young people. This research successfully designed and developed decorative and functional accessories for residential and commercial spaces, incorporating traditional art forms of Gujarat. The result demonstrates the viability of blending these art forms with contemporary design principles to create aesthetically pleasing and practical items. Furthermore, the positive reception of the exhibited pieces suggests a potential market for such products and underscores the importance of preserving and promoting these valuable artistic traditions. This research contributes to the revitalization of Gujarati art forms by demonstrating their adaptability and relevance in contemporary settings, while also empowering future interior designers with the knowledge to integrate these traditions into their work. This will certainly broaden the understanding of the next generation, but it will also raise importance of these forms of art and ensure that they are acknowledged in the near future. It's critical to raise awareness about the cultural and artistic significance of these traditional forms and to make sure they are appreciated and acknowledged. Further research could explore the potential for scaling up production of these accessories, investigating market demand and developing sustainable practices within the craft sector. One can contribute to the preservation and celebration of Traditional cultures and ensure that their rich artistic traditions continue in modern settings by acknowledging and showcasing the diversity, vitality and richness of Traditional art.

REFERENCES

- Jadhav, S. (2023). Indian Handicrafts: Growing or Depleting? Journal of Business and Management (IOSR-JBM), (07-13).
- Kaur, R. and Kaur, H. (2018). Adornment of Handicrafts and its effects on traditional dresses - a study of Gujrat. International Journal of Engineering Sciences & Research Technology.7(6). DOI: 10.5281/zenodo.1297412.
- Kalay, Y.E. (2008). Introduction: Preserving Cultural Heritage Through Digital Media. In Kalay, Y.E., Kvan, T., & Affleck, J. (Eds.), New Heritage: New Media and Cultural Heritage pp. 1-10.
- Kolay, S. (2015). Cultural Heritage Preservation of Traditional Indian Art through Virtual New media. Procedia Social and Behaviour Science, pp.309-320.
- Mourato, S. & Mazzanti, M. (2002). Economic Valuation of Cultural Heritage: Evidence and Prospects. In Torre, M. (Eds.) Assessing the Values of Cultural Heritage, Report. pp. 51-76.
- Padmanabha, P. (1978). Indian Census and Anthropological Investigations. Xth International Congress of Anthropological and Ethnological Sciences.
- Pedia, T. U. (2017). Applique work. Utsavpedia. Retrived from June 12, 2025 from https://www.utsavpedia.com/motifs-embroideries/the-adorable-art-of-applique-embroidery/
- Ranjan, A. & Ranjan, M. (2008). Handmade in India. Retrieved from June 12, 2025 from Issuu. https://issuu.com/mapin/docs/handmade_in_india
- Sethi, R., Duque, C.D. & Vencatachellum, I. (Eds.) (2005). Designers Meet Artisans: A Practical Guide. Craft Revival Trust, Artesanías de Colombia & UNESCO.
- Shah, A. (2021) BANDHANI: The Art of Tie-Dye Patterns. Bandhej. Retrieved from June 12, 2025 from https://www.bandhej.com/blog/post/kharal-weaving11111111111
- Shrinivasa, K.R. and Kate, A. (2023). International Journal of Research in Humanities, Arts and Literature (IJRHAL), Vol.11, No.12, pp.1-9.
- Shop, P. P. (2025). Uncovering Ajrakh Print History. Perniaspopupshop. Retrived on June 12, 2025 from https://www.perniaspopupshop.com/encyclopedia/gujarat/ajrakh
- United Nations. (n.d.). Summary of the report of the World Commission on Culture

and Development: United Nations. https://digitallibrary.un.org/record/222998?ln=en&v=pdf

- Wood, S. (2011). Sustaining crafts and livelihoods: handmade in India. Craft + Design Enquiry,3.
- Zeal Jani, & Zeal Jani. (2024, November 2). Explore the roots of Guj's Abla Embroidery, a centuries-old craft thriving in Ahmedabad markets. Knocksense. Retrived on June 12, 2025 from https://www.knocksense.com/ahmedabad/explore-the-roots-of-gujs-abla-embroidery-a-centuries-old-craft-thriving-in-ahmedabad-markets

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FURNITURE WASTE REUTILIZATION PRACTICES IN SELECTED HIGHER EDUCATIONAL INSTITUTIONS IN VADODARA: AN APPROACH TO SUSTAINABLE ENVIRONMENT

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HSAI-2023-GJ-1437-LF, 09/U-3/LF

ABSTRACT

Waste management has gained significant popularity recently, with various streams, such as plastic, water, and paper, receiving extensive attention. However, furniture waste, which is still in its early stages of recognition, remains overlooked. Despite its potential environmental and economic impact, systematic furniture waste management practices are yet to be widely adopted. Higher education institutions generate considerable furniture waste due to their extensive infrastructure and continuous expansion; as pillars of education for young minds, they must take active steps toward sustainable waste management. Addressing furniture waste contributes to environmental conservation and serves as a model for responsible resource utilization. This study assesses furniture waste reutilization practices in selected higher educational institutions in Vadodara. A descriptive research design was adopted, with a purposive sample of 33 institutions selected for analysis. The findings indicate that 81.8% of institutions use minimal furniture repairs, and only 3% practice internal redistribution. The adoption of repurposing and redesigning strategies remains significantly low. This study highlights the urgent need for sustainable furniture waste management interventions by identifying problems in current practices. The insights from this research will help educational institutions develop effective strategies to minimize waste, promote circular economy principles, and set an example for future sustainability efforts.

Keywords: Circular Economy, Reutilization Practices, Sustainable Practices, Furniture Waste Management, Higher Educational Institutions,

INTRODUCTION

The growing global concern about environmental degradation, resource depletion, and waste management has brought sustainability to the forefront of public discourse and academic research. As climate change, waste reduction, and conservation issues become increasingly urgent, all sectors, including education, must adopt sustainable practices. Higher educational institutions, as influential centers of learning and significant resource consumers, are responsible for fostering sustainability and contributing to global efforts to mitigate environmental challenges. Furniture waste often remains an overlooked issue among the various waste streams these institutions generate. While essential for daily operations, the wear and tear of furniture and its eventual replacement contribute significantly to landfill waste, exacerbating environmental problems **(Ferronato et al., 2020)**.

However, much of this waste presents opportunities for repurposing, upcycling, and creative reuse, reducing waste, and promoting sustainable practices. Repurposing and redesigning furniture offer practical solutions to minimizing waste while extending the lifespan of materials. Reutilizing furniture aligns with international mandates, particularly SDG 12, which encourages responsible consumption and production, and SDG 11, which focuses on inclusive, safe, resilient, and sustainable cities, where educational institutions play a fundamental role. Scholars like **Bocken et al. (2016)** emphasize the importance of universities in advancing sustainability beyond academia, while Lieder and **Rashid (2016)** highlight the barriers, such as outdated regulations and a lack of awareness, that prevent educational institutions from adopting sustainable practices. Despite furniture waste being a low-priority issue, it presents a significant opportunity for repurposing and redesigning within educational settings **(Ghisellini et al., 2016)**.

However, despite the growing body of literature supporting sustainable practices, the application of these methods in higher educational institutions remains limited, particularly concerning furniture waste reutilization. Institutional resistance, outdated policies, and a lack of understanding of the benefits of sustainable practices often hinder the adoption of waste management strategies **(Guerra et al., 2020)**. This research addresses this gap by assessing the furniture waste reutilization practices in higher educational institutions in Vadodara City, India. It will also address problems such as resistance to change and a lack of awareness about sustainability.

This study will offer practical insights for improving waste management in higher educational institutions by contributing to the literature on sustainability in educational settings. Through adopting sustainable practices, educational institutions can significantly reduce their environmental impact, promote sustainability, and set an example for other sectors to follow.

OBJECTIVES

The objectives of the study were as follows:

1. To assess the demographic information of the selected higher educational institutions in Vadodara.
2. To assess the existing reutilization practices in selected higher educational institutions.
3. To assess the impact of key problems higher educational institutions, face in implementing furniture waste management practices.
4. To suggest sustainable measures for improving furniture waste management to promote reutilization.

HYPOTHESIS

The study tested the following hypothesis:

H_1: There exists a relationship between the type of institution, years of establishment, institution size, academic streams, and reutilization practices in selected higher educational institutions of Vadodara.

METHODOLOGY

The study adopted a descriptive research design to assess furniture waste reutilization practices in selected higher educational institutions of Vadodara. A purposive sampling technique was employed to select higher educational institutions that met predefined criteria relevant to the

study's objectives. A total of 33 higher educational institutions participated, comprising 19 government and 14 private institutions. Data was collected using a structured questionnaire, which was divided into three sections: (i) Demographic Profile, (ii) Reutilization Practices, examining existing strategies for furniture waste management, and (iii) Problems Faced in Furniture Waste Management. Descriptive statistics, such as frequency and percentage, were used to interpret the findings. Additionally, a t-test was applied to examine the relationship between the independent variables—including type, stream, age, and size of the institution—and the dependent variable, reutilization practices. Furthermore, Tukey's HSD Test was conducted to determine significant differences across various academic streams and furniture waste reutilization. The results were systematically represented through tabular formats to enhance clarity and facilitate comparative analysis.

FINDINGS AND DISCUSSION

This section presents the study's key findings, organized into four sections for clarity.

- Section I focuses on the institutional profile of the selected higher educational institutions, offering an overview of their size, staffing, and student population.
- Section II explores the existing practices related to furniture reutilization within these institutions.
- Section III examines the key problems associated with furniture waste management.
- Section IV discusses the results of hypothesis testing, based on the data collected, to evaluate the relationships identified during the research.

Section I: Institutional profile of the selected higher educational institutions:

It was revealed that most institutions (57.6%) are government-run, while 42.4% are private. Regarding the year of establishment, more than half (54.5%) of the selected higher educational institutions were established less than 50 years ago, with the remaining 45.5% being older. Regarding the size of higher educational institutions, the number of teaching staff in most selected institutions (75.75%) falls between 2 and 188, while 24.25% have 189 and 375 teaching staff. A significant proportion of selected higher educational institutions (96.96%) have non-teaching staff numbers between 3 and 226, and 96.96% also report student populations ranging from 150 to 10,508, with only one institution exceeding 10,509 students. The mean size of the selected higher educational institution, combining the numbers of teaching and non-teaching staff and students, is 3190. Regarding academic streams, the distribution is even, with arts, humanities, social sciences, commerce and management, and technology and engineering, each representing 21.21% to 24.24% of the selected higher educational institutions surveyed, as depicted in **Table 01**.

Table 1: Frequency and Percentage Distribution of the respondents according to their Institutional Profile

Sr. No.	Institutional Profile	Respondents (n=33)	
		f	%
1	**Type of Higher Educational Institution**		
	Government	19	57.6
	Private	14	42.4

	Total	33	100
2	**Year of establishment**		
	Less than 50 Years	18	54.5
	50 years and above	15	45.5
	Total	33	100.0
3	**Size of Higher Educational Institution (no. of teaching, non-teaching staff, and student population)**		
	Number of teaching staff		
	2 - 188	25	75.75
	189 - 375	8	24.25
	Total	33	100.0
	Number of non-teaching staff		
	3 - 226	32	96.96
	227 - 450	1	3.04
	Total	33	100.0
	Students Population		
	150 to 10,508	32	96.96
	10509 - 20866	1	3.04
	Total	33	100.0
	Mean of the Size of Higher Educational Institutions		**3190***
4	**Streams**		
	Arts, Humanities & Social Sciences	8	24.24
	Commerce & Management	7	21.21
	Interdisciplinary	4	12.12
	Science & Healthcare	7	21.21
	Technology & Engineering	7	21.21
	Total	33	100.0

***Note: The mean of 3190 represents the mean of institutional size, which includes the combined number of teaching staff, non-teaching staff, and student population.**

The study revealed that 100% of higher educational institutions used closed storage as the primary method of furniture waste disposal. Other methods included open storage (39.39%), sale as scrap (33.33%), disposal to higher authorities (27.27%), donation (21.21%), and burning (6.06%), which was the least preferred. Among government institutions, 68.42% practiced open storage and 47.37% transferred waste to higher authorities, while private institutions contributed to 78.57% of total scrap sales but did not engage in donation or burning. Institutions established less than 50 years ago showed higher participation in donation (27.78%) and scrap sales (55.56%), whereas older institutions relied more on open storage (60%) and authority transfer (46.67%). Despite these disposal methods, only 9.1% of institutions monitored disposal regularly, and 90.3% lacked vehicles for transporting waste. Moreover, 63.6% had taken no initiatives to minimize furniture waste. Since closed storage was the most commonly adopted disposal method, it indicates a significant potential for reutilization. Therefore, it was important to examine whether educational institutions are actively reusing the furniture waste that is being stored.

Section II: Existing reutilization practices of selected higher educational institutions:

The findings in **Table 02** reveal that among the selected institutions, 81.81% engaged in minimal repairs and reuse, making it the most commonly adopted practice. However, only 3.03% practiced internal redistribution, indicating limited efforts to reallocate usable furniture within different departments. Repurposing (18.18%) and redesigning (9.09%) were even less common, demonstrating a lack of innovation in sustainable reutilization strategies. Additionally, 18.18% of institutions reported no reutilization practices, reflecting a significant gap in furniture waste management. Financial constraints were evident, with 42.4% of institutions allocating funds inconsistently and only 30.3% reporting adequate but occasionally insufficient funds; notably, no institution had sufficient and well-managed funds. Engagement of staff and students remained low, as 60.6% of institutions reported minimal participation, and only 12.1% engaged regularly, with no institution achieving strong and active participation. The most striking finding was the lack of collaboration with external organizations, as 93.9% of institutions reported no such partnerships, highlighting a significant gap in sustainable furniture waste management efforts.

Table 02: Frequency and Percentage Distribution of Higher Educational Institutions Regarding Reutilization of Furniture Waste Practices (n=33)

Sr. No.	Reutilization of Furniture Waste Practices	Respondents (n=33)	
		f	%
1.	**Reutilization Practices**		
i.	None	6	18.18
ii.	Minimal Repair/Reused	27	81.81
iii.	Redistributed internally	1	3.03
iv.	Repurpose	6	18.18
v.	Redesigned	3	9.09
	Total	33	100
2.	**Allocation of Funds**		
i.	No funds were allocated for reutilization	4	12.1
ii.	Limited funds available but insufficient	5	15.2
iii.	Funds are allocated but not consistently or adequately	14	42.4
iv.	Adequate funds are available with occasional shortages	10	30.3
v.	Sufficient and well-managed funds for effective reutilization	0	0.0
	Total	33	100
3.	**Engagement of Staff and Students**		
i.	No engagement with staff and students	8	24.2
ii.	Minimal engagement with little awareness	20	60.6
iii.	There is some engagement, but participation is inconsistent	1	3.0
iv.	Regular engagement with moderate participation	4	12.1
v.	Strong and active participation from staff and students	0	0.0
	Total	33	100
4.	**Protection of Furniture Waste from Environmental Elements**		
i.	No collaboration with external organizations	31	93.9
ii.	Rare collaboration with minimal impact	2	6.1

iii.	Some partnerships exist but are irregular or limited	0	0.0
iv.	Regular collaboration with a noticeable impact	0	0.0
v.	Strong and well-established partnerships for effective reutilization	0	0.0
	Total	33	100

Section III: Impact of Problems in furniture waste management:

The absence of institutional policies had a moderate impact (42.4%), followed by a low impact (39.4%), indicating partial policy inefficiencies. Storage space constraints were reported as a moderate (42.4%) and high impact (39.4%) issue, suggesting a significant challenge. Financial constraints had a low impact on 78.8% of institutions, though 12.1% reported a high impact. Staff shortages were perceived as having a low impact (60.6%), with 21.2% and 18.2% reporting moderate and high effects, respectively. Transportation limitations had a low impact (93.9%), while the absence of nearby disposal and recycling centers was reported as a low impact by 63.6% of institutions, with only 3.0% citing a high impact. Irregular monitoring was considered a low impact by 84.8%, though 15.2% reported a high impact. Limited awareness of government disposal policies had a low impact on 66.7%, with 27.3% reporting a moderate impact, emphasizing the need for improved policy dissemination. Resistance to change in reutilization practices was a notable issue, with 51.5% reporting a low impact but 30.3% citing a high impact, reflecting reluctance to adopt sustainable strategies. While financial constraints and staff shortages had a relatively low impact, challenges such as insufficient storage, resistance to change, and irregular monitoring remain significant. Policy gaps and limited awareness also hinder effective furniture waste management in higher educational institutions.

Section IV: Testing of hypothesis

H_0: There exists no relationship between the type of institution, years of establishment, institution size, academic streams, and reutilization practices in selected higher educational institutions of Vadodara.

The results in **Table 03** show no significant difference in reutilization practices based on institution type and institution size, supporting the acceptance of the null hypothesis for institution type and institution size employing the **T-test**. However, there is a significant difference in reutilization practices based on total years of establishment ($p = 0.046$), supporting the acceptance of the alternate hypothesis for total years of establishment.

Table 03: T-test showing the difference in reutilization practices with type, years, and size of the selected higher educational institutions

Variable	Category	N	Mean	*p-Value*	Level of Significance
Higher Educational Type	Govt	19	2.5	0.156	N.S.*
	Pvt	14	3.9		
Total Years	Below mean	18	4.0	0.046	0.05
	Mean and above mean	15	2.0		
Higher Educational Size	Below mean	21	2.81	0.468	N.S.*
	Mean and above mean	12	3.58		

Note: N.S.* = Not Significant

The results in **Table 04** show a significant difference (using **ANOVA)** in reutilization practices based on streams of higher educational institutions (p = 0.027), supporting the acceptance of the alternate hypothesis for streams of higher educational institutions.

Table 04: Analysis of Variance (ANOVA) for differences in reutilization practices based on streams of higher educational institutions

Stream	Sum of Squares	df	Mean Square	F	Sig.	Level of Significance
Between Groups	84	4	21	3.231	0.027	0.05
Within Groups	182	28	7			

Table 05 presents the **Tukey HSD post hoc test** results, which were conducted to further analyze the significant differences in reutilization practices among various educational institutions. The test was applied following the ANOVA results, indicating significant variation across streams (p = 0.027).

The findings reveal that the Technology and engineering stream exhibits significantly different reutilization practices than Arts, Humanities, Social Sciences (p = 0.030), and Commerce and Management (p = 0.048). However, no significant differences were observed among the other streams, as indicated by p-values exceeding 0.05.

The null hypothesis for Technology and Engineering is rejected, confirming that reutilization practices significantly differ in this stream. However, the null hypothesis is accepted for the other streams, indicating no significant variation in reutilization practices.

Therefore, it can be concluded that there is a significant relationship between years of establishment and streams of education (specifically Technology & Engineering) and reutilization practices in higher educational institutions. However, no significant relationship was observed between higher educational institution type, size, and reutilization practices.

Table 05: Tukey HSD post hoc test – significant mean differences in reutilization practices across streams in selected higher educational institutions

Dependent Variable	Group Comparison	Mean Difference	Level of Significance
Arts, Humanities & Social Sciences	Commerce & Management	-.143	1.000
	Interdisciplinary	-.500	.998
	Science & Healthcare	-.571	.992
	Technology & Engineering	-4.143*	.030
Commerce & Management	Arts, Humanities & Social Sciences	.143	1.000
	Interdisciplinary	-.357	.999
	Science & Healthcare	-.429	.998
	Technology & Engineering	-4.000*	.048
Interdisciplinary	Arts, Humanities & Social Sciences	.500	.998
	Commerce & Management	.357	.999
	Science & Healthcare	-.071	1.000
	Technology & Engineering	-3.643	.182

Science & Healthcare	Arts, Humanities & Social Sciences	.571	.992
	Commerce & Management	.429	.998
	Interdisciplinary	.071	1.000
	Technology & Engineering	-3.571	.094
Technology & Engineering	Arts, Humanities & Social Sciences	4.143*	.030
	Commerce & Management	4.000*	.048
	Interdisciplinary	3.643	.182
	Science & Healthcare	3.571	.094

Note: *The mean difference is significant at the 0.05 level.

SUGGESTIVE MEASURES TO MANAGE FURNITURE WASTE

The following are the suggestive measures for improving furniture waste management in educational institutions to promote reutilization and sustainability:

1. **Internal Redistribution of Surplus Furniture:** Implement a tracking system to redistribute surplus furniture across departments, ensuring optimal usage.
2. **Repurposing Old Furniture**: Encourage transforming old furniture into functional items through creative modifications to extend its life.
3. **Redesigning and Upcycling Initiatives:** Launch redesign projects to enhance old furniture's functionality and aesthetics, promoting sustainability.
4. **Collaboration with Creative Departments and Design Institutions:** Partner with design departments and external institutions for collaborative furniture repurposing and redesign projects.
5. **Engagement of Students and Staff in Sustainability Initiatives**: Involve students and staff in workshops and competitions focused on sustainable furniture management.
6. **Adopting Circular Economy Principles**: Prioritize repair over replacement and implement buy-back or donation programs for used furniture.
7. **Collaboration with Recycling and Waste Management Organizations:** Partner with recycling agencies to ensure eco-friendly disposal and potential furniture reuse.
8. **Establishing a Furniture Reutilization Policy:** Develop a formal policy on furniture reutilization, allocating funds for repair and repurposing.
9. **Creating a Furniture Exchange or Donation Program:** Set up an exchange or donation program to redistribute surplus furniture within and outside the institution.
10. **Regular Monitoring and Assessment of Waste Management Practices:** Conduct regular audits and evaluations to track and improve furniture waste management practices**.**

CONCLUSION

The study underscores that while a balanced mix of government and private institutions participate in higher education in Vadodara, most remain modest in size, with limited staff and student populations. This scale appears to influence their capacity to manage resources and adopt sustainable practices. The average institutional size was approximately 3,190, and academic streams were pretty distributed, allowing diverse insights into furniture waste management across disciplines. Reutilization practices are mainly limited to minimal repair, with over 80% of institutions engaging in such efforts. However, sustainable strategies such as repurposing, redesigning, and internal redistribution remain underutilized, and nearly one-fifth of institutions report no reutilization

activity. These gaps are further worsened by inconsistent funding, lack of structured policies, low stakeholder engagement, storage limitations, and a lack of collaboration with external agencies. Hypothesis testing revealed that institutional type and size do not significantly influence reutilization practices. However, significant differences were observed based on the year of establishment and academic stream. More than 50 years ago, institutions exhibited distinct reutilization approaches compared to newer ones, possibly due to more established systems or traditional practices. Similarly, variations across academic streams—particularly in the Technology and Engineering disciplines—indicate that certain fields may adopt different reutilization practices, potentially shaped by their hands-on, design-oriented curricula. Notably, a comparison of institutional types revealed that government institutions performed better in terms of reutilization. 84.21% of government institutions engaged in minimal repair and also contributed to repurposing, redistribution, and redesigning. In contrast, private institutions, while showing 78.57% participation in minimal repair, did not report any efforts in internal redistribution or redesigning, limiting their practices mainly to basic reuse and occasional repurposing. Furthermore, disciplines like Technology and Engineering showed greater potential for innovative reuse, likely influenced by their practical and design-oriented curricula. These findings highlight that while infrastructural and financial constraints are tangible problems, cultural factors—such as resistance to change and lack of awareness—also play a substantial role. To move toward sustainable furniture waste management, institutions must implement structured policies, allocate dedicated funds, encourage stakeholder participation, and promote cross-disciplinary learning.

This study holds important implications for higher educational institutions and can be extended to schools across India and other developing contexts. It highlights the urgent need to integrate sustainability into everyday institutional operations through clear policies, structured committees, budget allocation, and active stakeholder involvement. The study offers a practical and replicable approach for managing furniture waste through conscious design, reuse, and collaboration with both internal and external stakeholders. By promoting repurposing, redesigning, and resource exchange, institutions can reduce their environmental impact and move toward a circular economy model. These findings support the idea that sustainable furniture management is achievable and essential for advancing environmental responsibility within the education sector. Future research can further build on these findings by exploring the long-term impact of such practices, comparing implementation across regions, and assessing the role of student-led initiatives and policy interventions. There is also scope to develop digital tools and frameworks that assist in tracking, managing, and promoting furniture reutilization, thereby strengthening sustainability efforts in educational settings.

REFERENCES

- Bocken, Nancy & Pauw, Ingrid & Bakker, C.A. & van der Grinten, Bram. (2016). Product design and business model strategies for a circular economy. J. Ind. Prod. Eng. 1015.
- Boldoczki, S., Thorenz, A., & Tuma, A. (2019). The environmental impacts of preparation for reuse: A case study of WEEE reuse in Germany. Journal of Cleaner Production, 252, 119736. https://doi.org/10.1016/j.jclepro.2019.119736
- Cooper, T. & Furmston, K. & Cutts, A. & Kaner, J. (2021). Furniture lifetimes in a circular economy: a state of the art review Cooper.

- Forrest, A., Hilton, M., Ballinger, A., Whittaker, D., & Eunomia Research & Consulting Ltd. (2017). CIRCULAR ECONOMY OPPORTUNITIES IN THE FURNITURE SECTOR. In European Environment Bureau (EEB), European Environment Bureau (EEB). European Environment Bureau (EEB). https://eeb.org/wp-content/uploads/2019/05/Report-on-the-Circular-Economy-in-the-Furniture-Sector.pdf
- Galila, A., Kaseireldeil, S., Abdalkhaliq, N., Farouk, E., Eichner, M., & Sarhan, Y. (2024). Enhancing sustainability and resource efficiency through up-cycling: a comprehensive review and analytical framework for evaluating building upcycled products. Innovative Infrastructure Solutions, 9(7). https://doi.org/10.1007/s41062-024-01555-w
- Karidis, A. (2023, November 9). Tackling a Multi-Million-Ton Furniture Waste Problem. https://www.waste360.com/industry-insights/tackling-a-multi-million-ton-furniture-waste-problem
- Pavitra Sriprakash, & Pavitra Sriprakash. (2020b, July 6). Why throw your furniture when it can be recycled? The New Indian Express. https://www.newindianexpress.com/opinions/2020/Jul/06/why-throw-your-furniture-when-it-can-be-recycled-2165809.html
- RTS - Recycle Track Systems. (2024, February 20). Furniture waste – The forgotten waste stream - Recycle Track Systems. Recycle Track Systems. https://www.rts.com/blog/furniture-waste-a-growing-issue/#:~:text=In%20most%20areas,%20municipal%20waste%20management%20will%20pick%20up%20furniture,
- Salas, Iván & Cifrian, Eva & Andrés, A. & Viguri, Javier. (2021). Self-Organizing Maps to Assess the Recycling of Waste in Ceramic Construction Materials. Applied Sciences. 11. 10010. 10.3390/app112110010.
- The Future is Circular - Anticipating a Greater Role for Sustainable Furniture in the Circular Economy. (n.d.). PEFC Furniture. https://furniture.pefc.org/the-furniture-blog/the-future-is-circular-anticipating-a-greater-role-for-sustainable-furniture-in-the-circular-economy#:~:text=Every%20year,%20almost%2020%20million%20tonnes%20of%20furniture%20is%20thrown
- United States Environmental Protection Agency (EPA). (2018). National overview: Facts and figures on materials, waste, and recycling. Retrieved from https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling
- Vargas, Danieli & Campos, Lucila. (2020). Waste Management in Higher Education Institutions: A State-of-the-art Overview.
- Wilber, Dolores. (2010). Book Review: Cradle to Cradle: Remaking the Way We Make Things. William McDonough and Michael Braungart. 2002. North Point Press, New York. 208 pp. $27.50 paperback (978-0-86547-587-8). Environmental Practice. 12. 10.1017/S1466046609990494.

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EFFECT OF DIETARY AND LIFE STYLE HABITS OF CHILDHOOD ON THE OCCURRENCE OF CVD IN MIDDLE AGE (30-50 YEARS) IN HIGH INCOME GROUP INDIVIDUALS

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ABSTRACT

The acceleration of cardiovascular disease (CVD) has become an alarming health problem across the globe. Children and adolescent's activity level today is very low, they spend their free time, mainly, in sedentary behaviours, such as T.V viewing, and playing computer videogames.

The present study titled "Effect of dietary habits and life style of childhood on the occurrence of CVD in middle age (30-50 years) in high income group individuals" involved purposive sampling technique. Purposive sampling technique was used for selecting 100 samples which were divided in two group (50 experimental and 50 control group). Interview schedule was used to collect the information regarding socioeconomic profile, dietary pattern, physical activity & life style, dietary intake and specific information regarding Cardiovascular disease. Although BMI was normal in the Non-CVD respondents as compared to CVD respondents. In the 24-hour diet recall average consumption of Energy, Calcium, Iron, Vitamin A and Zinc was significant at 5 % ($p<0.05$) when t-test was applied while Protein(g), Fat(g), Carbohydrate(gm), Phosphorus(mg), Thiamine(mg), Riboflavin(mg), Niacin(mg), Vitamin C(mg), sodium(mg) and fibre(mg) were not significant ($p>0.05$). Sedentary life style, lack of physical activity and poor dietary intake were revealed as the major cause of CVD in both males and females.

Keywords: Cardiovascular, Childhood, Dietary Habits, Life Style.

INTRODUCTION

In Cardiovascular disease condition there is narrowing or blockage of blood vessels leading to a heart attack, chest pain (angina) or stroke. The most common reason for this is a build-up of fatty deposits on the inner walls of the blood vessels that supply blood to the heart or brain. The cause of heart attacks and strokes are usually the presence of a combination of risk factors, such as tobacco use, unhealthy diet and obesity, physical inactivity and harmful use of alcohol, hypertension, diabetes and hyperlipidemia. Because of improper eating behaviour children consume an excess amount of energy; and their diet is deficient in elements necessary for proper growth and development. The examples of such bad eating habits are; snacking highly processed and calorie-rich foods between meals eating in front of the T.V screen, skipping breakfast, drinking sugar- sweetened beverages.

Eating habits are usually formed in early childhood and parents play a very important role in their development (**Kuzbicka K et al., 2013**).

Diet is definitely an important factor for cardiovascular disease risk. Fruits and vegetables are protective in nature as they contain bioactive nutrients which are antioxidant, anti-inflamatory and also have a low glycemic load and energy density (**Eman M, et al., 2015**).

Smoking during pregnancy is a risk factor for childhood obesity. A higher prevalence of overweight and obesity was seen in children of mothers who smoked during pregnancy (**Von Kries et al., 2002).**

A WHO report in 2003 stated that a diet which contains high fat (particularly saturated fat), sodium and sugar and low complex carbohydrates, fruits and vegetables increases the risk of Cardiovascular disease (**FAO Expert Consultation, 2003**).

Children who are less physically active and spend more time in watching television have a high percent body fat and high BMI. In these children high energy intake with low energy expenditure leads to weight gain (**Giammattei, J., et al., 2003**).

Children often eat in front of the television and a large proportion of television commercials offer food that is not nutritional and is high in calories **(Salbe Arline D. et al., 2002**).

If the diet has sufficient dietary fibre it lowers the risk of cardio-vascular disease and MI (**Liv et al., 2002).**

Dietary fiber helps greatly in prevention of cardiovascular disease by assisting in ingestion, digestion, absorption and metabolism. It reduces the risk of hyperlipidemia and hypercholesterolemia (**Kaczmarczyk Melissa M. et al., 2012**).

Dietary intakes during childhood may have many short- and long-term impacts on health, including obesity risks during childhood **(Karnik S et al., 2012).**

Age is a non-modifiable risk factor for CHD, with increasing age higher mortality rates from CHD are seen in both genders. The incidence of premature disease in men 35-44 years of age is three times as high as the incidence in women of the same age **(NCEP, 2001).**

The present study is an attempt to know that how dietary habits and lifestyle of childhood can affect Cardio-vascular disease in middle age people (30-50 years) in High Income Group Individuals.

OBJECTIVES

1. To study the Socioeconomic, Demographic & Anthropometric measurements of Cardio-vascular & Non-Cardiovascular patients (30-50 years) in high income group Individuals.
2. To study the childhood dietary pattern and the effect of present dietary pattern and nutritional intake on occurrence of Cardio-vascular and Non-Cardiovascular disease subjects.
3. To study the childhood physical activity pattern and the effect of present physical activity on occurrence of Cardio-vascular & Non-Cardio-vascular disease subjects.
4. To study the effect of above factors and their relationship with cardio-vascular disease in middle age population (30-50 years) in high income group.

Hypothesis: Childhood dietary patterns and physical inactivity significantly increase the risk of developing cardiovascular diseases in middle-aged individuals from high-income groups.

METHODOLOGY

The methods and materials used in the study can be explained under the following headings:

1. **Selection of Locale:** The present study was conducted on CVD and Non-CVD patients visiting OPD in 3 hospitals of Agra city – Jeevan Jyoti hospital & Research Centre, Global Heart Institute, Ravi Hospital and Hridyam hospital.

2. **Selection of Sample:** In this study, the samples were selected as under:

   - Samples under study were CVD and Non-CVD patients, between the age of 30-50 years.
   - For collecting childhood information 9-11 years of age was considered.
   - A sample size of 100 subjects (50 subjects of CVD and 50 subjects of Non-CVD patients) were selected for the survey.
   - Purposive sampling technique was used for the survey.
   - Revised modified BG Prasad socioeconomic classification scale, 2016 was used to categorize high income group (Rs≥6346 Per capita monthly income).

3. **Technique of Data Collection:** The technique used for collecting information for the present study was "Interview schedule", which was prepared in consultation with the supervisor and expert of the subject.

4. **Data Collection:** Data was collected by interview schedule, interview was started with general information like name, age, sex, education, occupation, type of family, no. of earning members, monthly income per capita. Anthropometric measurements were taken with the help of weighing machine and height was measured using a flexible scale available at the hospital The Specific information regarding their life style, pattern of work, consumption of alcohol, tobacco, cigarette, type and time duration of exercise, changed pattern of exercise after the diagnosis of CVD was collected by investigator by interview schedule method.

5. **Dietary Analysis**: After collecting three days data of 24 hour dietary recall, dietary analysis was done. The nutrients energy, protein, fat, vitamin A, calcium, iron, phosphorus, thiamine, riboflavin, niacin, vitamin C, zinc, sodium and fiber was calculated with the help of NSI diet calculator. The nutritional value was compared with Recommended Dietary Allowances by ICMR 2010.

6. **Statistical Analysis:** Collected data was analyzed by using percentage, mean, standard deviation, t-test and co-efficient of co-relation.

RESULT AND DISSCUSSION

Results of the present study are discussed below:

Figure 1 given below, reveals the distribution of CVD (Experimental group) and Non-CVD (Control group) according to gender.

In the CVD group, 64% (N=32) respondent were male and 36% (N=18) respondents were female. In the Non-CVD group 76% (N=38) respondents were male and 24% (N=12) respondents were female.

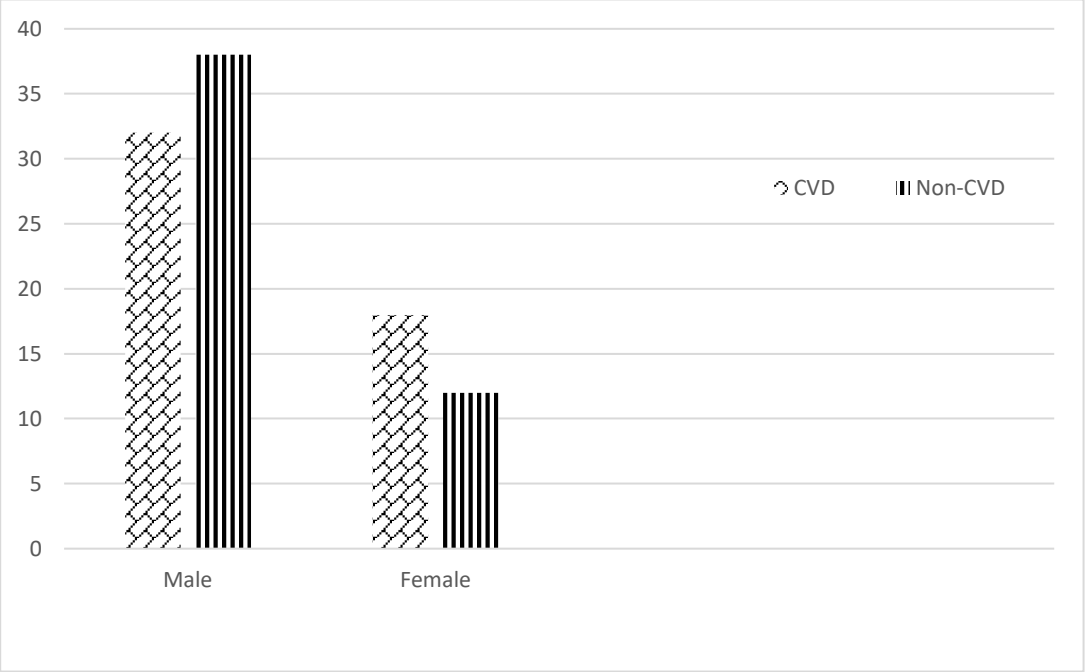


Figure 1: Distribution of the respondents according to gender.

Table 1: Distribution of the respondents according to monthly family income.

Family Monthly Income (Rs.)	Respondents	
	CVD Patients (N=50) (N%)	Non-CVD Patients (N=50) (N%)
6000 - 7000	23 (46)	8 (16)
7000 - 8000	6(12)	16 (32)
8000 - 9000	11 (22)	15 (30)
9000 - 10000	1 (2)	2 (4)
10000 - above	9 (18)	9 (18)
Mean ± S.D	7728.18 ± 1777.20	8287.82 ± 1709.69

Above table 1 indicates the distribution of CVD (Experimental group) and Non-CVD group (Control group) according to family monthly income.

Table 2: Distribution of the respondents according to their body mass index (BMI).

Body Mass Index (Kg/m^2)	Respondents		
	CVD Patients (N=50) (n%)	Non-CVD Patients (N=50) (n%)	p value
< 18.5 (Underweight)	0	4(8)	

18.5 – 24.9 (Normal)	23 (46)	36(72)	
25.0 – 29.9 (Overweight)	16(32)	8(16)	
30.3 – 34.9 (Obesity)	10 (20)	2 (4)	
35.0 – 39.9 (Morbid Obesity)	1(2)	0	
Mean ± S.D	26.18 ± 3.74	22.62 ± 3.86	0.000*

* Significant at 5% level of significance

Above table 2 indicates the distribution of CVD (Experimental group) and Non-CVD group (Control group) according to their nutritional status.

In the CVD group, majority (46%) of the patients had a body mass index in the normal range, followed by 32% having body mass index in overweight category, 20% had body mass index in obesity category, 2% had body mass index in morbid obesity category.

Among the Non-CVD group, majority (72%) of the patients were having body mass index in the normal range, followed by 16% having body mass index in the overweight category, 8% had body mass index in underweight category, 4% had body mass index in obesity category. There was significant difference between the Mean weight of both the groups ($p<0.05$).

Table 3: Distribution of the respondents according to their family history of heart disease

Parameter	**Category**	**Respondents**	
		CVD Patients (N=50) (n%)	**Non-CVD Patients (N=50) (n%)**
Family history of heart disease	**Yes**	9 (18)	0
	No	36(72)	50(100)
	Not Sure	5 (10)	0

Above table 3 shows the distribution of CVD (Experimental group) and Non-CVD respondents (Control group) according to their family history of heart disease.

In the CVD group, maximum 72% of the patients did not have any family history of heart disease and minimum 18% of the patient had family history of heart disease.

Among the Non-CVD group, maximum none of the respondents have family history of heart disease.

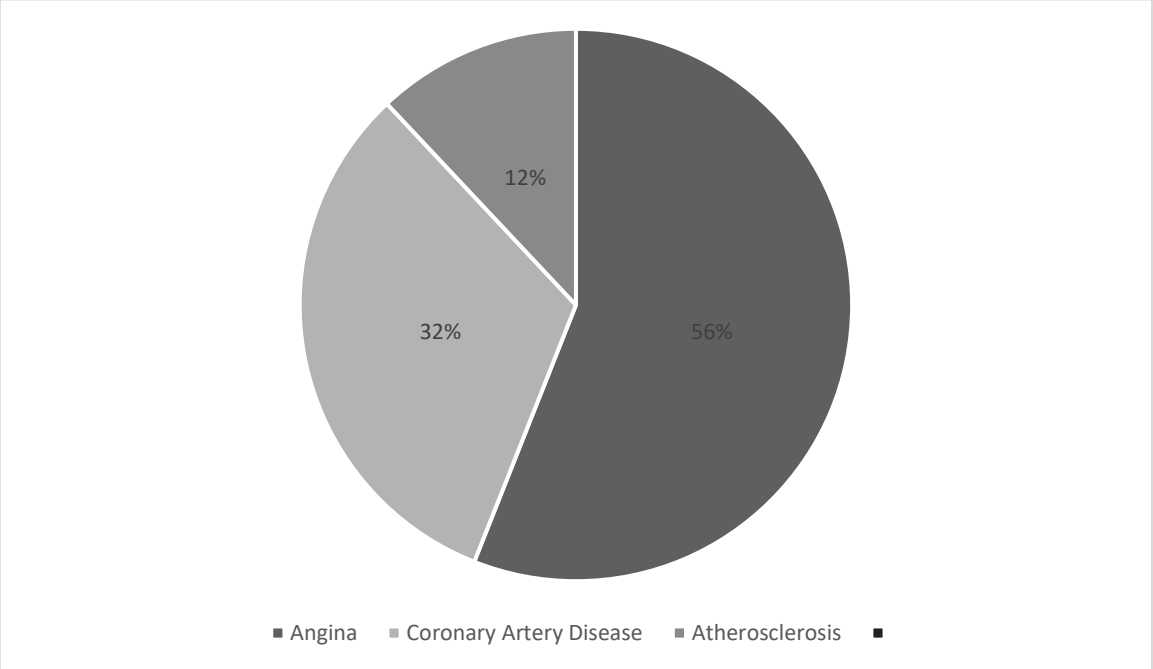


Figure 2: Distribution of the respondents according to type of coronary heart disease in the Cardio-vascular disease groups

Above Figure 2 shows the distribution of CVD (Experimental group) according to type of coronary heart disease.

In the CVD group, maximum 56% of the patients suffered from angina, followed by 32% who had coronary heart disease and remaining 12% of the suffered from atherosclerosis disease.

Table 4: Distribution of the respondents according to breakfast habits in childhood and in present time.

Parameter	Category	Respondents (Childhood)		Respondents (Present)	
		CVD Patients (N=50) (n%)	Non-CVD Patients (N=50) (n%)	CVD Patients (N=50) (n%)	Non-CVDPatients (N=50) (n%)
Taking Breakfast	Yes	38(76)	42 (84)	44(88)	41(82)
	No	0	0	0	0
	Sometimes	12(24)	8(16)	6(12)	9(18)
Type of Breakfast	Paratha/Puri / Pakoda	46 (92)	38(76)	0	11(22)
	Upma /Poha / Fruits	0	0	38(76)	30(60)
	Bread / Biscuits	4(8)	12(24)	12(24)	9(18)

Above table 4 shows the distribution of CVD (Experimental group) and Non-CVD (Control group) according to breakfast in childhood and present time.

In the CVD group, maximum (76%) of the patients in childhood & (88%) of the patients in present were having breakfast, remaining (24%) of the patients in childhood & (12%) of the patients in present had breakfast sometimes , followed by (92%) of the patients in childhood & (76%) of the patients in present consumed paratha/puri/pakoda , remaining (8%) of the patients in childhood & (24%) of the patients in present consumed bread/biscuits.

Among the Non-CVD group, maximum (84%) of the patients in childhood &(82%) of the patients were having breakfast and remaining (16%) of the patients in childhood &(18%) of the patients in present had breakfast sometimes, followed by (76%) of the patients in childhood & (22%) of the patients in present consumed paratha/puri/pakoda and remaining (24%) of the patients in childhood &(18%) of the patients in present consumed bread/biscuits.

Table 5: Distribution of the respondents according to the food preference in childhood and in present time.

Prefer food	Respondents (Childhood)		Respondents (Present)	
	CVD Patients (N=50) (n%)	Non-CVD Patients (N=50) (n%)	CVD Patients (N=50) (n%)	Non-CVD Patients (N=50) (n%)
Processed food	9(18)	7(14)	0	4 (8)
Fast food	0	0	0	7(14)
Homemade food	41(82)	43(86)	50(100)	39(78)

Above table 5 shows the distribution of CVD (Experimental group) and Non-CVD (Control group) according to the food preference in childhood and present both.

In the CVD group, maximum (82%) patients preferred homemade food in Childhood and (100%) of the patients preferred homemade food in present, followed by (18%) of the patients were preferred processed food in Childhood.

Among the Non-CVD group, maximum (86%) of the patients preferred homemade food in Childhood and (78%) of the patients were preferred homemade food in present followed by (14%) of the patients preferred processed food in childhood, (14%) of the patients preferred fast food and remaining (8%) of the patients preferred processed food in present.

Table 6: Distribution of the respondents according to the physical activity in childhood and in present time.

Physical activity per day	Category	Respondents (Childhood)		Respondents (Present)	
		CVD Patients (N=50) (n%)	Non-CVD Patients (N=50) (n%)	CVD Patients (N=50) (n%)	Non-CVD Patients (N=50) (n%)
Walk	**Yes**	30(60)	38(76)	33(66)	36(72)
	No	13(26)	7(14)	3(6)	8(16)
	Some	7(14)	5(10)	14(28)	6(12)

	times				
Exercise	**Yes**	29(58)	28(56)	39(78)	30(60)
	No	8(16)	16(32)	7(14)	17(34)
	Some times	13(26)	6(12)	4(8)	3(6)

Above table 6 shows the distribution of CVD (Experimental group) and Non-CVD (Control group) according to physical activity in childhood & in Present time.

In the CVD group, maximum (60%) of the patients in childhood & (66%) of the patients in present went for everyday walk, followed by (26%) of the patients in childhood & (6%) of the patients in present did not go for walk and remaining (14%) of the patients in childhood & (28%) of the patients in present went for walk sometimes and maximum (58%) of the patients in childhood & (78%) of the patients in present did some exercise per day, followed by (26%) of the patients in childhood & (8%) of the patients in present did exercise sometimes and remaining (16%) of the patients in childhood & (14%) of the patients in present did not exercise.

Among the Non-CVD group, maximum (76%) of the patients in childhood & (72%) of the patients in present went for everyday walk, followed by (14%) of the patients in childhood & (16%) of the patients in present did not go for walk and remaining (10%) of the patients in childhood & (12%) of the patients in present went for walk sometimes and maximum (56%) of the patients in childhood & (60%) of the patients in present did exercise, followed by (32%) of the patients in childhood & (34%) of the patients in present did not exercise and remaining (12%) of the patients in childhood & (6%) of the patients in present did exercise sometimes.

Table 7: Distribution of the respondents according to 24-hr Diet recall.

Nutrients	**CVD Patients (N=50)**	**Non-CVD Patients (N=50)**	
	Mean ± St. Deviation	**Mean ± St. Deviation**	**p-Value**
Energy (Kcal)	2303.34 ± 311.8	2122.17 ± 375.9	0.010*
Protein (g)	42.39 ± 5.57	40.8 ± 6.50	0.218
Fat (g)	31.83 ± 7.05	34.35 ± 8.76	0.117
Carbohydrate(g)	250.75 ± 30.74	241.57 ± 26.5	0.113
Calcium (mg)	1211.9 ± 240.5	1325.02 ± 196.2	0.011*
Iron (mg)	24.09 ± 3.45	22.64 ± 3.61	0.042*
Phosphorus(mg)	1357.1 ± 17.12	1572.5 ± 138.7	5.741
Vitamin A (mcg)	3082.9 ± 820.03	2727.04 ± 725.1	0.023*
Thiamine (mg)	1.13 ± 0.53	1.17 ± 0.51	0.665
Riboflavin (mg)	1.10 ± 0.33	1.07 ± 0.32	0.599
Niacin (mg)	14.35 ± 2.09	14.53 ± 2.16	0.673
Vitamin C (mg)	258.85 ± 78.06	212.05 ± 72.56	0.109
Zinc (mg)	12.29 ± 1.76	13.25 ± 1.50	0.004*

Sodium (mg)	85.49 ± 10.36	79.14 ± 10.4	1.390
Fibre (g)	8.35 ± 1.32	8.24 ± 1.24	0.655

*Significant at 5% level of significance

Above table 7 highlights the distributions of CVD (Experimental group) and Non-CVD respondents (Control group) according to 24- hour dietary recall.

Statistically, Significant differences between mean intake of Energy, Calcium, Iron, Vitamin A and Zinc was observed between Cardio-vascular disease and Non-Cardio-vascular disease group ($p<0.05$). However, no significant differences between mean intake of protein, fat, carbohydrate, thiamine, riboflavin, niacin, vitamin C, sodium and fibre was found between Cardio-vascular disease and Non-Cardio-vascular disease respondents at 5% level of significance.

Table 8: Correlation between body mass index and nutrient intake among Cardio-vascular and Non- Cardio-vascular disease groups.

Parameters	**CVD Patients (N=50)**		**Non-CVD Patients (N=50)**	
	r	**p**	**r**	**p**
BMI Vs Energy (Kcal)	0.193	0.179	-0.266	0.061
BMI Vs Protein (g)	0.151	0.295	-0.019	0.895
BMI Vs Fat (g)	- 0.163	0.258	0.039	0.788
BMI Vs Fibre (g)	0.010	0.945	-0.023	0.874

* Significant at 5% level of significance

Above table 8 reveals the Correlation between BMI and nutrient intake among Cardio-vascular and Non-Cardio-vascular disease groups. No significant correlation was observed between BMI and nutrient intake of subjects ($p>0.05$).

CONCLUSION

On the basis of the results obtained from the present study, the following conclusion can be drawn.

In the CVD group, (46%) of the respondents had body mass index of 18.5-24.9kg/m^2. Significant differences were observed between mean weight of respondents of both the groups ($p<0.05$). The prevalence rate of CVD was more among the respondents (18%) who preferred processed food. 56% of the respondents suffered from angina in Cardio-vascular disease group.18% of the respondents had family history of heart disease Cardio-vascular disease group.

Mean intake of all nutrients except Energy, Protein, Iron, Riboflavin, Carbohydrate, Vitamin A, Sodium and Fibre was found to be more among the cardiovascular patients as compared to Non-Cardiovascular respondents, and statistically significant difference between mean intake of Energy, Calcium, Iron, Vitamin A and Zinc was observed between Non-Cardiovascular and Cardiovascular respondents.

The study concludes that childhood dietary habits and physical activity levels have a significant influence on the risk of developing cardiovascular diseases in middle-aged high-income individuals. Poor dietary intake, sedentary lifestyle, and preference for processed foods in early years were key contributing factors. Promoting balanced nutrition and active lifestyles from childhood is essential to reduce CVD risk in later life.

SUGGESTIONS

1. Bigger sample size can be taken for the study.
2. More hospitals can be included in the study.
3. IPD can also be included in the study.

REFERENCE

- Eman, M. Alissa., Ferns, Gordon. A., (2015): Dietary fruits and vegetables and Cardiovascular disease risk, pg. 1950-1962.
- Giammattei, J., Blix, G., Marshak, HH., Wollitzer, AO.,& Pettitt DJ., (2003) : Television watching and soft drink consumption : Associations with obesity in 11 to 13 year old school children. Archives Pediatrics & Adolescent Medicine 157 (9): 882-886.
- Kaczmarczyk, Melissa, M., Mliler, Michael. J., Freund, Gregory. G., (2012):The Health benefits of dietary fibre: beyond the usual suspects of type 2 diabetes, cardiovascular disease and colon cancer. Metabolism, 61(8), 1058-1066.
- Karnik,S., Kanekar, A., (2012) : Childhood obesity: A global public health crisis. *Int J Prev Med.* 3:1-7.
- Kuzbicka,Karolina.,Rachon,Dominik., (2013) :Bad eating habits as the main cause of obesity among children, Pediatric Endocrinology, Diabetes and Metabolism, 19(3): 106-110.
- Liv, S (2002) : *Journal of the American College of Cardiology*, 39 (1): 49-56.
- National Cholesterol Education Programme (NCEP) ., (2001): Report of the Expert panel on population Strategies, Public Health Services, Publication No.90-3046, Bethesda, Md., 52, 718-725.
- Salbe, Arline. D., Weyer, Christian., Harper, Inge., Lindsay, Robert. S., Ravussin, Eric.,Tataranni, P. Antonio., (2002) : Assessing Risk factors for obesity between childhood and Adolescence: 11. Energy Metabolism and Physical Activity : American Academy of Pediatrics Article, 110 (2).
- Von,Kries R., Toschke, AM., Koletzko, B.,& Slikker,WJ., (2002) : Maternal smoking during pregnancy and childhood obesity. *American Journal of Epidemiology* 156 (10): 954-961.
- World Health Organization (2003) :Diet, nutrition and the prevention of chronic disease, Report of a joint AHO/FAO Expert Consultation, Retrieved from www.who.int>obesity>who_TRS.916.

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SOCIO-DEMOGRAPHICS AND HEALTHCARE ACCESS: MIGRANT WOMEN AT DELHI'S CONSTRUCTION SITES

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ABSTRACT

Migration to urban centres for work has become a survival strategy for many families in rural India, driven by poverty, limited employment opportunities, and inadequate infrastructure. Among these migrants, women working at construction sites face unique health challenges due to physically demanding jobs, poor living conditions, and restricted access to healthcare. This study aims to investigate healthcare utilization patterns among migrant women working at 3 construction sites in urban Delhi, identify key barriers and enablers influencing their access to healthcare services, and recommend targeted strategies to improve healthcare access and outcomes for this vulnerable population. Using a cross-sectional design, 30 women were studied through structured questionnaire. The responses were recorded by the researcher. It was found that migrant women faced significant challenges in accessing healthcare. Financial constraints were prominent, with 80% earning low daily wages between INR 6,000-9,000, limiting their ability to afford healthcare. Cultural and social barriers, such as language differences and patriarchal norms restricting autonomy, further hindered healthcare utilization. Systemic issues, including poor public healthcare infrastructure, long wait times, and limited outreach at construction sites, compounded these challenges. While 70% preferred private healthcare due to perceived better quality, high costs forced many to rely on traditional remedies or self-medication.There is an urgent need for targeted interventions, including mobile health camps, culturally sensitive healthcare delivery, and policy reforms like expanding government schemes such as *eShram* and *Janani Shishu Suraksha Karyakram*. These measures can bridge gaps in healthcare access, promoting equity and improving health outcomes for migrant women and their families.

Keywords: Migrant women, construction sites, Delhi, Healthcare, Behaviour

INTRODUCTION

Migration is a key feature of India's socio-economic fabric, driven by the quest for better livelihoods, education, and opportunities. While women were once seen primarily as accompanying male migrants, many now migrate independently to earn and support their families. With urban populations projected to rise from 55% to 68% by 2050 (Awasthi, 2020), more women are entering

informal urban labour markets such as domestic work, construction, and small industries. Migrant women face heightened vulnerability due to the dual burden of earning income and caregiving responsibilities.

Key destination states for migration in India include Delhi, Maharashtra, Gujarat, Haryana, Punjab, and Karnataka (Singh & Biradar, 2022). Delhi attracts a large migrant population due to its infrastructure, educational opportunities, and government-provided benefits. Major source states of internal migration are Uttar Pradesh, Bihar, Rajasthan, Madhya Pradesh, Arunachal Pradesh, Chhattisgarh, Jharkhand, Odisha, Uttarakhand, and Tamil Nadu (Singh & Biradar, 2022).

The health concerns of migrant women at construction sites reveal how structural inequalities, cultural norms, and poor living conditions limit their access to healthcare. They often work in hazardous environments for low wages and live in informal settlements without basic amenities like clean water, sanitation, or nearby health services, increasing their risk of health issues such as nutritional deficiencies, reproductive problems, and chronic diseases. As primary caregivers, their health directly affects their children's well-being. Despite government schemes like *PM Garib Kalyan Yojana*, *State Migrant Cell*, and *PM SVANidh*i, migrant mothers remain underserved due to poor implementation, low awareness, and systemic gaps.

Migrant populations often face healthcare disparities due to socioeconomic vulnerability, unstable work, and limited integration into host communities. Migrant women in urban slums encounter additional barriers, with factors like education, age, marital status, and gender shaping their health-seeking behavior. Financial hardship, gender discrimination, and logistical issues, such as lack of childcare further restrict access (Prusty & Keshri, 2015). Language barriers, mistrust of health workers, and low health literacy also contribute to their exclusion from healthcare services (Gogoi et al., 2016).

The dual burden of work and caregiving often prevents migrant mothers from prioritising their health. Ravindranath (2019) noted that construction worker mothers delay care due to rigid hours and fear of wage loss. Limited public healthcare and costly private services leave them with few options. Understanding their health-seeking behaviour is key to identifying systemic gaps and developing targeted interventions. This study highlights the intersection of gender, migration, and uncertain work and living conditions, aiming to propose actionable solutions for improving healthcare equity. Addressing these gaps is vital not only for women's health but also for breaking the cycle of poor health affecting their children.

The objectives of the study were to:

1. Investigate healthcare utilisation patterns among migrant mothers working at construction sites in urban Delhi.
2. Identify key barriers and enablers influencing their access to healthcare services.
3. Recommend targeted strategies to improve healthcare access and outcomes for migrant women working at construction sites in Delhi.

METHODOLOGY

The study employed a cross-sectional design with a sample of 30 migrant women working at three major construction sites in Delhi, selected through snowball sampling. Eligible participants were recent migrants (within one year) with at least one child under five, employed by the Public Works Department (PWD) in pavement construction. Permission was obtained from on-site engineers.

Ethical approval was granted by the Institutional Ethics Committee. Participants received an information sheet detailing the study, and written informed consent was obtained. Confidentiality was ensured by coding personal data.

Data were collected using a structured questionnaire covering socio-demographic details, WASH practices, health concerns, healthcare-seeking behaviour, and barriers to access. The researcher recorded responses, including healthcare preferences, reasons for seeking or avoiding care, and awareness of government schemes.

RESULTS

The study provides a snapshot of their health-seeking behaviors, socio-demographic characteristics, and barriers they faced in accessing healthcare services and associations between variables such as socio-economic status, WASH practices, and healthcare utilization patterns within a defined timeframe.

Socio-demographic profile of women working at construction sites

The socio-demographic characteristics of the migrant women working at construction sites in Delhi revealed critical insights into their vulnerabilities and challenges as shown in table 1.

Table 1: Socio-demographic profile of the migrant women

S.No.	Parameters	Number (%)
1	**Native states of migrants (N=30)**	
	Bihar	9(30)
	Uttar Pradesh	13(43.33)
	Madhya Pradesh	5(16.67)
	West Bengal	2(6.67)
	Rajasthan	1(3.33)
2	**Present age (years) of the mother (N=30)**	
	18-25	11(36.67)
	25-30	12(40)
	30-35	7(23.33)
	Mean ± SD	26.02 ± 4.7 years
	Range	19-35 years
3	**Religion**	
	Hindu	27(90)
	Muslim	3(10)

Source states: The study also found that the participants of the research study hailed from the states of Uttar Pradesh (43.3%) and Bihar (30%), followed by smaller proportions from Madhya Pradesh, West Bengal, and Rajasthan.

Reasons for migration: The reasons cited for migration were high levels of poverty, limited employment opportunities, and inadequate public services. Migration generally involved entire nuclear families, with women joining as secondary earners or caregivers.

Age: Migrant women were predominantly young, with 63.33% aged between 19 and 35 years and an average age of 26 (Table 1). This age distribution reflects the economic pressures prompting early rural-to-urban migration and highlights the construction sector's dependence on youthful labour for physically demanding tasks. Young women in their reproductive and economically productive years are often preferred due to their perceived endurance and adaptability.

Religion: As shown in table 1 the migrant women were Hindu (90%), reflecting the religious composition of their native states, primarily Uttar Pradesh and Bihar. A smaller proportion identified as Muslim (10%).

Education status: Education levels among the participants were strikingly low, with 46.7% identified as illiterate. Only a small number of women (3.3%) had received education up to the secondary level, and none had pursued higher education. A study conducted by Kusuma et al., in

2013 found that women with low education levels are more likely to depend on *neem hakims* remedies or avoid healthcare altogether due to a lack of understanding of the benefits of formal medical care.

Marital status: All women in the study were married, with 26.7% having married before the legal age of 18 in India. Early marriage limited their educational opportunities and exposed them to early pregnancies and related health risks, increasing their vulnerability as young migrant mothers working at construction sites. These findings align with existing literature that identifies early marriage as a key factor affecting maternal and child health in marginalised populations (Paul & Saha, 2022).

Economic status of the family in the native state:

Economic status of the migrant women working at construction sites as shown in table 2 revealed useful insights about living standards at their native place and their economic capacities.

Table 2: Demographic profile

S.No.	Parameters	Number (%)
1	**Possession of house at native place (N=30)**	
	Yes	83.3
	No	16.7
2	**Possession of agricultural land (N=30)**	
	Yes	66.7
	No	33.3
	Owner of Agricultural Land (N=20)	
	Husband	65
	Father-in-law	20
	Mother-in-law	15
3	**Ownership of bank account (N=30)**	
	Yes	20(66.67)
	No	10(33.33)
4	**Registration on the E Portal (N=30)**	
	ESIC	0
	EFPO	16.67
	eShram	50
5	**Income Level**	
	2k-5k	2(6.7)
	6k-9k	24(80)
	10k-15k	4(13.3)
	15k-20k	0

Possession of house at native place: While 83.3% of migrant mothers owned houses in their native states, these were often basic structures lacking essential amenities. About 33.3% lived in homes made of temporary materials like mud or bamboo (Table 2), reflecting poor living conditions. Although home ownership offered some security, the absence of infrastructure highlighted their socio-economic vulnerability and the economic instability that drove them to migrate in search of better opportunities.

Agricultural land and its ownership: Most migrant families (66.7%) owned agricultural land in their native states, mainly managed by male family members (Table 2). Land ownership was held by husbands (65%), fathers-in-law (20%), and mothers-in-law (15%), with none owned by the women, reflecting gendered inheritance norms. Inconsistent income from agriculture was a key reason for migrating, highlighting structural inequalities in land ownership and rural livelihoods.

Ownership of bank account: Approximately 67% of migrant women had their own bank accounts, indicating some financial inclusion. However, 65% of these accounts were in their source states, and

only 35% had active savings accounts in the destination state (Table 2). Many women reported limited use of these accounts, as they were often managed by their husbands and primarily used to access government benefits tied to their native addresses.

Registration on the e-portal: Table 2 shows that only 50% of migrant women were registered on the eShram portal, 16.7% with EPFO, and none with ESIC. This indicates partial awareness and access to welfare schemes, with significant gaps in registration for programs offering social and health security. These gaps stem from limited awareness, lack of tailored outreach, and challenges like inadequate documentation and low digital literacy.

Income generation through construction work: Twenty-seven (80%) women reported earning between INR 6,000 and 9,000 per month through working at construction sites. They worked on daily wages. It reflects the low-paying nature of employment in the construction sector. These women were engaged in physically taxing jobs under harsh conditions. They reported irregular wage payments, the cash-based nature of transactions, and their earnings were insufficient to meet their basic needs like healthcare facilities.

Health issues of women at construction sites:

Following are the common health issues faced by migrant women working at construction sites along with their menstrual health and hygiene practices followed. The same has been shown by table 3.

Table 3: Health issues of migrant women working at construction sites in Delhi

S.No.	Parameters	Number (%)
1	**Common illness faced by migrant women at construction sites (N=30)**	
	Irritation of eyes	24
	Hair loss	21
	Body ache	21
	Tiredness	20
	Joint pain	16
	Backache	16
	Swelling of legs	12
	Asthma	9
	Stomach ache	9
	Swelling of hand	9
	Coughing and sneezing	7
	Irritation of nose	7
	Skin problems	7
	Boils on hands and legs	5
2	**Menstruation on time (N=30)**	
	Yes	17(56.7)
	No	7(23.3)
	Sometimes	6(20)
3	**Hygiene during menstruation (N=30)**	
	No	27 (90)
	Yes	3(10)
4	**Issues faced with menstrual cycle (N=30)**	
	Yes	10(40)
	No	20(60)
5	**Work pattern during menstruation (N=30)**	
	Paid Work	10(33.3)
	Participation in social activities	4(13.3)
	No activity missed	16(53.3)

Common illnesses: Migrant women working at construction sites in Delhi primarily sought healthcare for acute illnesses like irritation in the eyes, hair loss, joint pain, and backache swelling of the legs, asthma, and tiredness (table 3). Respiratory infections, diarrhea, and fever were the most common reasons for visiting healthcare facilities. These illnesses were often linked to poor living conditions, including inadequate WASH (Water, Sanitation, and Hygiene) practices, overcrowding, and exposure to environmental pollutants at construction sites. The prevalence of such conditions highlights the vulnerability of migrant families living at or near construction sites to preventable diseases and the urgent need for targeted interventions to address these health risks.

Approximately 66.7% of participants used tap water from contractors or public tanks, while 33.3% relied on dug wells. Water was not separated for cooking and WASH, raising hygiene concerns. Additionally, 56.7% faced monthly water shortages, increasing sanitation-related health risks.

Regarding sanitation, 13.3% lacked clean toilets and practiced open defecation, 6.7% used dry pit latrines, and 80% used shared pour-flush toilets, which were often in poor condition and discouraged regular use.

Hand hygiene varied, 90% washed hands after using the toilet and before/after meals, but only 60% did so before cooking and 70% after work. For personal hygiene, 63.3% changed clothes daily and 53.3% bathed daily, with others avoiding winter baths due to cold water, leading to frequent illnesses.

Gogoi and Hazarika (2016) highlighted similar research findings that women in migrant families often lack access to clean drinking water and proper menstrual hygiene facilities, which negatively impacts their overall health and well-being.

Menstrual cycle: About 56.7% of the participants reported menstruating on time, while 23.3% experienced irregular or delayed periods, possibly indicating underlying health issues as shown in table 3. Despite these concerns, only 10% of the women received treatment for menstrual health problems, leaving the majority untreated and unmanaged irregular periods**,** though only 10% sought treatment for related issues.

Maintenance of hygiene during menstruation: A notable 90% relied on cloth instead of sanitary pads, reflecting limited access to hygienic menstrual products as depicted in table 3.

Work pattern during menstruation: In terms of daily activities, 33.3% of the women reported missing paid work during their menstrual cycles due to physical discomfort, while 13.3% avoided participating in social activities (table 3). However, 53.3% reported that menstruation did not hinder their usual activities.

Reproductive health concerns: of construction site women were complications related to menstruation, pregnancy, and postpartum care. Many women avoided seeking care for menstrual and reproductive health issues due to cultural taboos, embarrassment, or fear of stigma. The low uptake of reproductive and preventive health services aligns with studies documenting cultural stigma and a lack of awareness as significant deterrents (Paul & Saha, 2022; Choudhary & Parthasarathy, 2009).

Preventive care, including regular check-ups and screenings, was largely neglected by women at construction sites due to financial constraints and low health literacy. Paul & Saha (2022) also found that limited awareness of reproductive health services and the lack of women-specific healthcare facilities further contributed to this pattern.

Healthcare-seeking patterns

Availability of healthcare facilities

Healthcare facilities used at the source states: Healthcare facilities utilised by migrant mothers at their source states included Vaidyas/Hakims (80%), pharmacies/drugstores (46.7%), and government hospitals or primary health centres (36.7%). Private hospitals and traditional birth attendants (Dais) were less frequently accessed, with 30% and 10% utilisation rates, respectively as shown in Figure 1. Traditional and easily accessible healthcare practices were preferred due to their low cost and cultural familiarity.

Healthcare facilities used at the destination state: At the destination state, 70% of migrant women relied on private hospitals/clinics, followed by 60% using pharmacies and 50% accessing government mobile clinics (Figure). Public health dispensaries were utilised by 36.7%**,** while 43.3% resorted to home treatments. The preference for private facilities was driven by perceived better quality and accessibility, while government services were often avoided due to long wait times, inconvenient hours, and staff shortages.

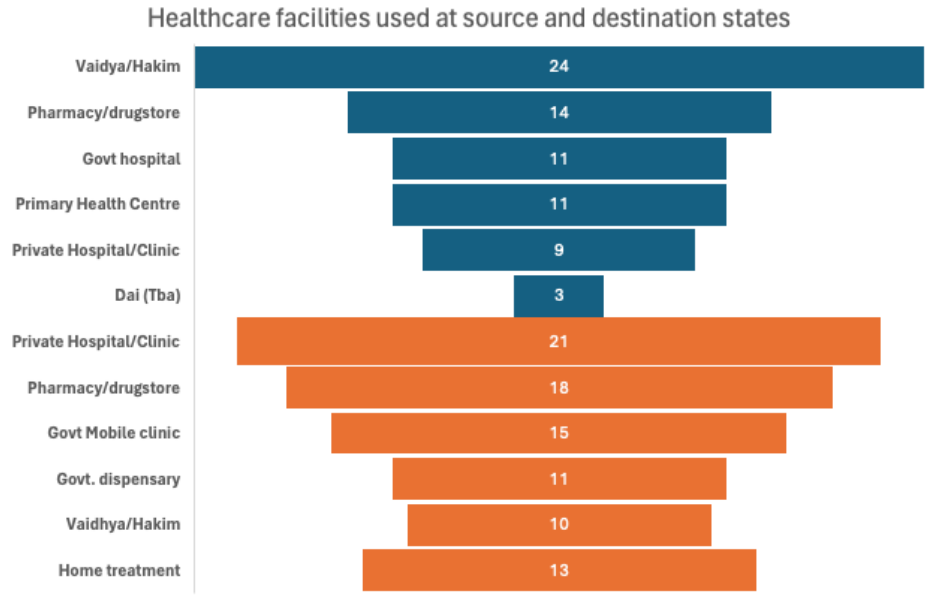


Figure 1: Healthcare facilities used by migrant women

Outreach and healthcare practices at construction sites: It revealed major gaps in healthcare outreach at construction sites, with 66.6% of women reporting no visits from health workers and only 33.3% occasionally visited by ASHAs or Anganwadi workers. Access to government healthcare was limited by poor quality of care (80%), long wait times and inconvenient hours (60%), and lack of nearby facilities (20%). During illness, 53.3% sought care at nearby facilities, while 40% resorted to self-medication or continued working to avoid wage loss.

Preferences for public vs. private healthcare facilities: The majority of migrant women (70%) working at construction sites in Delhi preferred private healthcare despite its high cost (Figure 1). This preference stemmed from dissatisfaction with public services, including poor quality, long waits, and negative interactions with staff. Private care was seen as more reliable and accessible, especially for urgent health needs.

Studies by Gogoi & Hazarika (2016) and Ravindranath (2019) similarly found that migrants in informal jobs often delay seeking care, prioritizing income. Despite the financial strain, urban migrants frequently opt for private healthcare due to inefficiencies in public services (Choudhary & Parthasarathy, 2009). Lack of health insurance further compounds their financial vulnerability.

Use of traditional remedies or over-the-counter medications: The study found widespread reliance on neem hakims and over-the-counter (OTC) medicines as cost-saving alternatives to formal healthcare. Around 30% of women used herbal treatments or home remedies, and 33.3% relied on OTC medications for common ailments like colds, coughs, and stomach issues. Cultural familiarity

and trust in traditional practices made these remedies a preferred choice for minor concerns. OTC use was also common due to easy access and the belief in quick relief without costly doctor visits. Similar trends were noted by Ravindranath (2019).

Role of socio-demographic factors in seeking healthcare

Maternal education: Nearly half of the migrant women (46.7%) were illiterate, and a substantial proportion had only limited formal education. Only 3.3% of the women had completed primary education, 6.7% had education between 5th and 8th grades, and 10% had education up to the 10th grade. None of the women had completed graduate level education.

Age: Migrant women were primarily young women, with ages ranging between 18 and 35 years. The mean age was 26.02 years (SD ± 4.7), reflecting the youthful demographic of the migrant workforce.

Marital status and spousal support: Early marriage was common, with 26.7% of women married before 18 and the youngest at 15. Younger women often relied on informal remedies due to limited experience, while older women had slightly better health awareness (Kusuma et al., 2013). Patriarchal norms further restricted their autonomy in healthcare decisions (Choudhary & Parthasarathy, 2009). Overall, their healthcare-seeking patterns were shaped by socio-economic constraints, cultural beliefs, and systemic barriers, reflecting a complex mix of financial, logistical, and personal factors.

Barriers to healthcare access

The study identified several barriers that significantly hindered healthcare access for migrant women working at construction sites. These barriers were deeply rooted in socio-economic disparities, cultural norms, and systemic inefficiencies, creating a challenging environment for these women to seek timely and appropriate healthcare.

i. Financial constraints: One of the major barriers to healthcare access reported by migrant women at construction sites was financial instability due to low and irregular income, which barely covered basic needs and left little for medical expenses. High out-of-pocket costs, especially in private healthcare, often deterred them from seeking care unless necessary. The absence of health cards or insurance, long queues at public facilities, and loss of daily wages further discouraged the use of government services, pushing them toward private practitioners. This deepened their financial vulnerability, as they lacked a safety net to absorb unexpected healthcare costs.

Approximately 63% of women working at Delhi construction sites reported being in debt, and 84.7% sent money to their villages, further limiting their ability to allocate resources for health—a trend consistent with broader rural-to-urban migration patterns, where financial insecurity is both a driver and consequence of migration (Choudhary & Parthasarathy, 2009; Gogoi & Hazarika, 2016).

ii. Cultural and social factors: Cultural and social norms of the migrant community played a significant role in restricting healthcare access for women working at construction sites. All participants faced language barriers in accessing healthcare facilities, as their dominant language and

dialects differed from those of Delhi. This language barrier created hesitation and discomfort in communicating with healthcare providers. It often resulted in avoidance of medical visits unless necessary.

Gender norms limited women's mobility and decision-making, with 60% of husbands controlling healthcare spending and facility choices. Most women neglected their health due to the dual burden of work and caregiving, leaving little time to seek care. These cultural constraints reflect deep-rooted patriarchal norms from their source states, which continued to affect them even in urban settings (Paul & Saha, 2022).

iii. Healthcare system concerns: Sixty-three percent of migrant women reported negative experiences with healthcare personnel, while 23.3% cited long distances to government hospitals and 17% noted overcrowding and lack of trust in care. Rude or dismissive behavior from public health workers discouraged them from seeking help, and many felt discriminated against due to their socio-economic status and limited fluency in the local language, deepening their exclusion. These findings echo broader research identifying poor treatment as a key barrier for marginalized urban migrants (Ranjan, 2015).

Public health facilities were often viewed as understaffed and poorly equipped, resulting in suboptimal care. Despite financial strain, many women preferred private healthcare, consistent with studies by Ranjan (2015) and Gogoi & Hazarika (2016), which found that urban migrants avoid public services due to long waits and low perceived quality. Government schemes were underutilized due to low awareness and lack of required documents like Aadhaar or ration cards, which were often unavailable or used by family in villages. These exclusions, along with systemic inefficiencies, limited access to affordable care and underscored the need for inclusive healthcare reforms for migrant populations.

CONCLUSIONS AND RECOMMENDATIONS

Access to healthcare is a basic right, yet migrant women at construction sites face significant barriers. Financial constraints from low wages, distant facilities, poor transport, and long hospital waits make healthcare difficult to access. Social and cultural barriers—including language issues, low health literacy, stigma, and the transient nature of their work—further limit use. Negative experiences with healthcare providers, including discrimination, often discourage public health service use.

These women are often forced to rely on private care, traditional remedies, or self-medication due to financial hardship, cultural norms, and systemic inefficiencies. Factors like low education, early marriage, and poor living conditions worsen their vulnerability.

The health-seeking behaviour reflects how socio-demographic challenges and systemic barriers impact access. Low education leads to poor health literacy and delayed care. Inadequate income and living conditions contribute to frequent illnesses like respiratory infections and diarrhea, often linked to poor WASH practices. These findings echo WHO (2012), which links poor sanitation and unsafe water to negative health outcomes in low-income communities, underscoring the strong connection between socio-demographic factors and healthcare utilization.

Addressing these issues requires a multi-pronged approach: raising awareness about government schemes *like eShram and Janani Shishu Suraksha Karyakram*, delivering services through mobile health camps offering free check-ups, screenings, and medicines, and strengthening urban public health infrastructure. Mobile camps help overcome logistical and financial barriers by bringing care directly to migrant women. Community-based campaigns and workshops in local languages can also bridge knowledge gaps and improve service uptake.

Targeted health education sessions focusing on preventive care, maternal health, hygiene, and safe medication practices can empower mothers to make informed health decisions. These sessions, led by culturally sensitive female health workers, can improve awareness and health outcomes.

Long-term solutions must include gender-sensitive policies that address the unique healthcare needs of migrant women. Expanding schemes like the Pradhan Mantri Matru Vandana Yojana (PMMVY) to cover women at construction sites—regardless of documentation or residence—can offer essential financial and health support. Strengthening urban public health infrastructure is also critical, including upgrading facilities in migrant-dense areas, ensuring more female providers, and establishing permanent mobile clinics for informal workers.

Training healthcare workers in compassionate, culturally sensitive care is vital to overcoming discrimination and mistrust. Building providers' communication skills and cultural awareness can improve trust and service uptake. Together, these measures promote healthcare equity for migrant populations and support broader public health and social justice goals.

REFERENCES

- Awasthi, S. (2020). 'Hyper'-Urbanisation and migration: A security threat. *Cities*, *108*, 102965. https://doi.org/10.1016/j.cities.2020.102965
- Bharati Gogoi, Dr. Joysankar Hazarika, International Journal of Science and Research (IJSR), ijsr. (n.d.). *Home*. https://www.ijsr.net/getabstract.php?paperid=ART20163666
- Choudhary, N., & Parthasarathy, D. (2009). IS MIGRATION STATUS a DETERMINANT OF URBAN NUTRITION INSECURITY? EMPIRICAL EVIDENCE FROM MUMBAI CITY, INDIA. *Journal of Biosocial Science*, *41*(5), 583–605. https://doi.org/10.1017/s002193200900340x
- Kusuma, Y. S., Kumari, R., & Kaushal, S. (2013). Migration and access to maternal healthcare: determinants of adequate antenatal care and institutional delivery among socio-economically disadvantaged migrants in Delhi, India. *Tropical Medicine & International Health*, *18*(10), 1202–1210. https://doi.org/10.1111/tmi.12166
- Paul, P., & Saha, R. (2022). Is maternal autonomy associated with child nutritional status? Evidence from a cross-sectional study in India. *PLoS ONE*, *17*(5), e0268126. https://doi.org/10.1371/journal.pone.0268126
- Pedi, M. K., & Adabar, K. (2018). Internal Migration and Development Nexus in India: A review of evidences. *Asian Journal of Research in Social Sciences and Humanities*, *8*(3), 20. https://doi.org/10.5958/2249-7315.2018.00043.6
- *PM Street Vendor's AtmaNirbhar Nidhi (PM SVANidhi)| National Portal of India*. (n.d.). https://www.india.gov.in/spotlight/pm-street-vendors-atmanirbhar-nidhi-pm-svanidhi

- *Pradhan Mantri Garib Kalyan Package (PMGKP)| National Portal of India*. (n.d.). https://www.india.gov.in/spotlight/pradhan-mantri-garib-kalyan-package-pmgkp
- Prusty, R. K., & Keshri, K. (2015). Differentials in child nutrition and immunization among migrants and non-migrants in Urban India. *International Journal of Migration Health and Social Care*, *11*(3), 194–205. https://doi.org/10.1108/ijmhsc-02-2014-0006
- Ravindranath, D., Trani, J., & Iannotti, L. (2019). Nutrition among children of migrant construction workers in Ahmedabad, India. *International Journal for Equity in Health*, *18*(1). https://doi.org/10.1186/s12939-019-1034-y
- Singh, D. P., & Biradar, R. (2022). Migration in India: trends and characteristics. In Tata Institute of Social Sciences & KLE University, *Demography India: Vol. Vol. 51* (Issue No. 1, pp. 160–175). https://iasp.ac.in/uploads/journal/10.%20Migration%20in%20India%20trends%20and%20characteristics-1669206793.pdf

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INVESTIGATION ON NUTRITIONAL STATUS AND DIETARY HABITS OF SELECTED CHILDREN WITH SPECIAL NEEDS

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ABSTRACT

"Children with Special Needs" refers to children who may face difficulties that are more severe than those faced by other kids their age and may last a lifetime.In this study, the children with special needs like autism, mental retardation and learning disorder were chosen be the participants The current study has a sample size of 66 children. The collected data were consolidated, tabulated, analysed and interpreted as per the requirements of fulfilling the objectives using statistical tools. From the overall sample, 44 children were diagnosed with autism, 16 were with mental retardation and six were with learning disability. The Body Mass Index (BMI) distribution among children with special need reveals normal BMI is most common across all ages, highly distributed in the age group of 10 to 12 years of age. Whereas underweight is notably present in youngest and in the age groups of 13 to 15 years of age. Water intake varied across developmental disabilities. The nutrient intake analysis revealed gender and age variation, with boys consuming more energy and protein girls. Across disabilities, girls aged 10-12 years had lower energy intake than boys, calcium and iron remained inadequate in all age groups. These findings highlight the critical need for comprehensive nutritional interventions and support strategies tailored to improve dietary habits of children with developmental disabilities.

Key Words: Autism, Irregular Food intake, Body Mass Index, Mental Retardation, Learning Disorder

INTRODUCTION

"Children with Special Needs" refers to children who may face difficulties that are more severe than those faced by other kids their age and may last a lifetime. Speech and language impairment includes issues with understanding or self-expression. physical disability, including cerebral palsy, vision problems, or other illnesses. a learning disability that distorts the signals from their senses. emotional problems, such as antisocial conduct or other behavioral problems. Children with special needs may experience physical illnesses, mental health disorders, congenital abnormalities and developmental delays (Maryanti et al., 2022).

Intellectual disabilities are identified by formal psychometric testing to assess the IQ and adaptive skills, while developmental disabilities are more general and may include aspects of physical limitations. Often used interchangeably, the terms have been combined to form the term Intellectual and Developmental Disabilities (IDD), which encompasses all individuals with

cognitive and physical limitations resulting from central nervous system dysfunction that begins in childhood and has long-term consequences (Patel.,2016).

According to WHO estimates, that people with disabilities make up 12 percent of the population in poor nations and 10 percent of the population in industrialised nations. According to the 2011 census, there are over 26.8 million disabled people in India (Mehta et al.,2015).

Autism spectrum disorder is a neurobiological disease that is influenced by environmental and genetic factors that have an impact on the developing brain. Despite the paucity of neuropathologic research, those that have been conducted have identified minor malformations as well as changes in cerebellar architecture connectivity, limbic system abnormalities, frontal and temporal lobe cortical modifications. Focused disruption of cortical 3 laminar architecture was found in the majority of participants in a short exploratory study of young children's neocortical architecture, pointing to issues with cortical layer creation and neuronal differentiation. Children with autism spectrum disorder have been described to have overgrown brains in terms of cortical size as well as an increase in extra-axial fluid (Shen et al.,2017).

Intellectual Disability affects the mind, the body and the life-skills of individuals in everyday life which includes cognitive, language, motor, social and self-care skills. Children with disabilities often need extra help to attain and maintain good health. American Association of Mental Deficiency (AAMD) classifies mental retardation as mild, moderate, severe and profound based on the intelligence quotient (Reilly et al., 2022).

The study estimated the nutrient intake from food in the children with autism spectrum disorder observed overweight or obesity in children with autism aged 2 to5 years and proportionately more children with autism aged 6 to 11 years were underweight. Also the children with autism had high values of height, weight and BMI. On the other hand, more individuals were found to be underweight among autism children when compared with typically developing children (Sampaio et al.,2020).

Children with autism spectrum disorder have prevalence rates of abnormal feeding behaviours that range from 46 percent to 89 percent, which is much higher than the 20 percent observed for children who are typically developing. According to data from food diaries, the autism children consumed fewer items overall, especially vegetables, fruits and proteins than the other children. In fact, a number of studies have revealed that children with autism spectrum disorder prefer carbohydrates, snacks, processed foods and are especially hesitant to consume proteins, fruits and vegetables (Malhi et al.,2017).

OBJECTIVES

The aim of this research is to assess the nutritional status and dietary habits of children with special needs.

METHODOLOGY

Study Area

The study was carried out in Coimbatore city since there were enough special schools offering education to the differently able children. The school’s proximity and the support extended by the school authorities and teachers to the researcher were considered in choosing the area. Convenience sampling technique was used and three schools were selected after getting prior

permission from the concerned authorities. This study includes the parents and teachers of the children with special needs.

Study Tool

The data collected using an interview schedule where the participants were informed about the study purposes, benefits and conditions of confidentiality before starting the survey. This study's protocol was approved by the Institutional Human Ethics Committee and the approval number was AUW/IHEC/FSMD-22-23/XPD-08.

Study Sample

In this study, by using convenience sampling technique, the children with special needs like autism, mental retardation and learning disorder were chosen be the participants. The samples are selected based on their parent's willingness to participate in the study. The current study has a sample size of 66 children. From the overall sample, 44 children were diagnosed with autism. Out of 44 children, 37 were boys and remaining seven were girls. Sixteen children were identified as mentally retarded. Among the 16 mentally retardation children from the age group of 6-15 years, six were boys and ten were girls. Six of them were classified as having a learning disability, among six children, two were boys and four were girls.

Assessment of Nutritional Status and Dietary Challenges

Assessing the nutritional status should focus on three areas: Anthropometry measurements such as height, weight, head circumference, mid upper arm circumference, chest circumference, skinfold thickness, Childhood Autism Spectrum Test, clinical examination and dietary was assessed by interviewing parents on the child's dietary habits and their 24-hour recall.

Statistical analysis and Interpretation of Data

The collected data were consolidated, tabulated, analysed and interpreted as per the requirements of fulfilling the objectives using statistical tools. The statistical tools applied in the study were the mean, percent, standard deviation, chi-square and regression. All the analysis was carried out using the statistical software SPSS version 20.

RESULTS

The demographic profile of selected participants are provided in table I, the children hailed from urban and rural domiciles were 53 and 13 respectively. In this study, a greater number of special children resided in urban areas than in rural areas. Children with special needs hailed from the nuclear family were 51 and only 15 children come from joint family.

Table I: Demographic Profile of Children with Special Needs

Demographic Variables	Children with Special Needs (n=66)		
	Autism (n=44)	Mental retardation (n=16)	Learning disability (n=6)
Age (Years)			
6 to 9	15	5	0
10 to 12	8	3	1
13 to 15	21	8	3
Area of living			

Rural	9	2	2
Urban	35	14	4
Type of marriage			
Consanguineous	11	6	1
Non-Consanguineous	33	10	5
Type of family			
Joint	12	2	1
Nuclear	32	14	5

Kumar *et al*.,(2018) study revealed the prevalence of special children to be more common in the nuclear family. The table II shows that age wise distribution of children according to nutritional status. The Body Mass Index (BMI) distribution among children with special need reveals distinct patterns across special needs and age. Almost all the children were distributed in normal body mass index.

Table II: Nutritional Status of Children with Special Needs

Anthropometric Variable	**Children with Special Needs**								
	Autism (n=44)			**Mental retardation (n=16)**			**Learning disability (n=6)**		
	Age (Years)								
	6 to 9	**10 to 12**	**13 to 15**	**6 to 9**	**10 to 12**	**13 to 15**	**6 to 9**	**10 to 12**	**13 to 15**
Body Mass Index									
Underweight	3	1	3	0	1	1	0	0	1
Normal	8	5	11	2	1	4	0	1	4
Overweight	3	1	5	2	1	3	0	0	0
Obesity	1	1	2	1	0	0	0	0	0

The result of the present study highlights that most of the children with autism (32 boys and seven girls) were mostly non -vegetarian. Only a few of them were vegetarian and three members were Ovo vegetarian.

Among the mental retardation children, thirteen children were non vegetarian. Only two of the children were vegetarian. Only one girl was ovo-vegetarian and consumed only eggs. In learning disability all of them were non vegetarian. Non – vegetarian food items like meat, fish and chicken were consumed only once in a week.

Table III: Dietary Habits of Children with Special Needs

Dietary Habits	**Developmental Disability Children (N=66)**					
	Autism (n=44)		**Mental Retardation(n=16)**		**Learning Disability(n=6)**	
	Boys	**Girls**	**Boys**	**Girls**	**Boys**	**Girls**
Skipping meals	5	1	1	1	0	Nil

Water Intake (litre)						
One	3	2	2	2	Nil	3
Two	17	1	1	3	1	1
Three	17	4	3	5	1	Nil
Consumption Pattern of						
Meals	27	6	3	8	1	3
Regular	11	1	3	2	1	1
Irregular						
Frequency of eating						
outside	6	3	0	1	0	3
Weekly Once	11	1	3	3	0	0
Monthly Once	20	3	3	6	2	1
Rarely						

Table III reveals that only eight children reported skipping meals, primarily due to food avoidance, lack of appetite or depression with breakfast being the most frequently skipped. This aligns with findings by Zeybek and Yurttagul (2020), who reported that 30% of autistic children skipped meals, especially breakfast. Water intake varied by condition: boys with autism consumed 2–3 litres daily, while girls with mental retardation showed better hydration, often consuming up to 3 litres. Conversely, girls with learning disabilities had limited water intake. Irregular meal patterns, defined as consuming more than three meals per day, were observed in 12 children with autism, five with mental retardation and two with learning disabilities. Regarding eating-out habits, 25 boys and 10 girls with intellectual disabilities never ate out, while 14 boys and four girls dined out with their parents once a month and six boys and seven girls did so weekly.

Table IV: Mean Nutrient Intake of the Autism Children

Age (Years)	Nutrients consumed vs RDA	Gender	Energy (Kcal)	Carbohydrates (g)	Protein (g)	Fat (g)	Fiber (g)	Calcium(mg)	Iron (mg)
Six	Nutrients consumed	Boys	1380±272	230±34	41±10	38±24	20±6.4	280±111	7±2.51
		Girls	1365±0	255±0	42±0	43±0	24±0	220±0	12±0
	Deficit/excess of suggested RDA	Boys	20	100	25.1	13	-	-270	-4
		Girls	5	125	26.1	18	-	-330	1
Seven to Nine	Nutrients consumed	Boys	1470±260	240±40	48±8	43±23	21±1	340±180	8±1.4
		Girls	1775±0	270±0	56±0	70±0	20±0	430±0	10±0
	Deficit/excess of suggested RDA	Boys	-230	110	24.7	13	-	-310	-7
		Girls	5	140	32.7	30	-	-220	-5
Ten to Twelve	Nutrients consumed	Boys	1500±150	230±80	50±7	43±19	30±10	245±76	13±6.46
		Girls	1330±0	250±0	43±0	20±0	40±0	360±0	22±0
	Deficit/excess of suggested RDA	Boys	-720	100	18.2	8	-	-605	-3
		Girls	-730	120	10.2	-25	-	-490	-6
Thirteen to Fifteen	Nutrients consumed	Boys	1990±517	300±50	50±6.8	46±9.91	31±9	415±119	17±8
		Girls	1700±490	270±66	50±6	47±17	23±2	313±158	17±9.7
	Deficit/excess of suggested RDA	Boys	-960	170	5.1	-4	-	-585	-5
		Girls	-700	140	6.8	12	-	-687	-13

Nutrient intake among children with autism varied across age and gender. At age six, boys had higher energy and calcium intake, while girls had slightly higher protein, fat and iron. In the 7–9 age group, girls showed significantly higher intake of all nutrients. Among 10–12-year-olds, boys consumed more energy and protein, whereas girls had better calcium and iron intake. In the 13–15 age group, boys maintained higher energy and calcium levels, but both genders had similar protein and iron intake. Across all age groups, intakes of calories, calcium and iron were below RDA (2020). Limited dietary diversity, food aversions and low consumption of milk, vegetables and fruits contributed to these deficiencies, despite adequate protein and fat intake. A similar results was observed by Kavitha *et al*.,(2019) that energy, calcium and iron intake were low in all age groups of children with autism.

Table V: Mean Nutrient intake of the Mental Retardation Children

Age (Years)	Nutrients consumed vs RDA	Gender	Energy (Kcal)	Carbohydrates (g)	Protein (g)	Fat (g)	Fiber (g)	Calcium(mg)	Iron (mg)
Six	Nutrients consumed	Boys	1200±0	210±0	40±0	14±0	20±0	200±0	7±0
		Girls	1175±7	200±17	40±1	14±7	20±4	130±14	6±0
	Deficit/excess of suggested RDA	Boys	-160	80	24.1	-11	-	-420	-4
		Girls	-185	70	24	-11	-	-76	-5
Sven to Nine	Nutrients consumed	Boys	-	-	-	-	-	-	-
		Girls	1560±33	260±5	55±7	50±9	33±16	450±140	8±0
	Deficit/excess of suggested RDA	Boys	-	-	-	-	-	-	-
		Girls	-140	130	32	20	-	-200	-7
Ten to Twelve	Nutrients consumed	Boys	1500±0	200±0	47±0	47±0	26±0	270±0	12±0
		Girls	1140±92	180±28	37±6	24±9	16±7.7	340±220	7±1
	Deficit/excess of suggested RDA	Boys	-720	70	15.2	12	-	-580	-4
		Girls	-920	50	4.2	-21	-	-510	-21
Thirteen to Fifteen	Nutrients consumed	Boys	2250±611	310±70	50±5	43±2.3	27±8	480±122	21±10
		Girls	1400±197	230±30	42±4	29±13	20±2.5	210±63	11±8
	Deficit/excess of suggested RDA	Boys	-390	180	5.1	-7	-	-520	-1
		Girls	-1000	100	-1.2	-6	-	-790	-19

Among children with mental retardation, nutrient intake showed age and gender-related variation. At age six, nutrient intake was comparable between boys and girls, though calcium was slightly higher in boys. Girls aged 7–9 had relatively better overall intake. In the 10–12 group, boys had adequate energy and fat but low calcium. Girls in this age group had the lowest energy and fat intake. During adolescence, boys showed higher intake of energy and macronutrients, while girls had better calcium and iron. Across all age groups, energy, calcium and iron remained below recommended levels. Feeding difficulties, behavioural issues and poor consumption of nutrient-rich foods were key reasons for inadequate intake, despite sufficient protein and fat consumption.

Table VI: Mean Nutrient intake of the Learning Disability Children

Nutrients	Age (years)											
	10-12						13-15					
	RDA		Mean± SD		Deficit/excess of suggested RDA		RDA		Mean± SD		Deficit/excess of suggested RDA	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Energy (Kcal)	2220	2060	1570±0	1400±0	-650	-660	2860	2400	1600±0	1500±26	-1260	-900
Carbohydrates (g)	130	130	240±0	230±0	+110	+100	130	130	250±0	240±37	+120	+110
Protein(g)	31.8	32.8	45±0	40±0	+13.2	+7.2	44.9	43.2	45±0	53±11	0	+9.8
Fat(g)	35	45	50±0	40±0	+15	-5	50	35	60±0	44±12	+10	+9
Fiber (g)	-	-	22±0	20±0	-	-	-	-	20±0	23±8	-	-
Calcium(mg)	850	850	230±0	260±0	-620	-590	1000	1000	575±0	385±145	-425	-615
Iron(mg)	16	28	9±0	7±0	-7	-21	22	30	11±0	9±2	-11	-21

Children with learning disabilities generally exhibited insufficient intake of energy, calcium and iron across all ages. Boys aged 10–12 had higher energy and fat intake, while girls consumed more calcium and iron. In the 13–15 group, boys consumed more energy and fat, whereas girls had higher protein and calcium. Protein and fat intake were adequate across both age groups. Feeding challenges, preference for processed snacks and low intake of milk, green leafy vegetables, fruits and eggs contributed to micronutrient deficiencies. Inadequate feeding practices further compounded energy deficits despite normal macronutrient intake.

The findings indicate that all age groups of children had insufficient intakes of calories, calcium and iron as compared to the Recommended Dietary Allowances (2020). Children with learning disabilities had difficulty eating. Feeding practises are also one of the reasons for inadequate energy consumption. Protein and fat consumption were normal. Mostly, they prefer crunchy foods and snacks like chips, french fries, etc. Insufficient intake of milk, green leafy vegetables, eggs, fruits and vegetables was the reason for the deficit in calcium and iron.

DISCUSSION

Among the 16 children with mental retardation aged 6–15 years, six were boys and ten were girls. In the learning disability group (n=6) aged 10–15 years, two were boys and four were girls. Within the autism group, the highest number of children were from the 13–15-year age category. The overall study population consisted of 45 boys and 21 girls, indicating a predominance of male participants. This aligns with national data showing that among India's disabled population, 15 million are males and 11.8 million are females (Disabled Population in India, 2023). The majority of the study participants resided in urban areas, likely due to the urban location of the selected special schools, which were more accessible for both urban and rural families. Supporting this, Lakhan et al. (2015) reported a slightly higher prevalence of intellectual disability in urban (11/1000) compared to rural (10.08/1000; $P = 0.044$) populations.

To explore possible etiologies of developmental disabilities, parents were asked about the nature of their marriage. Among them, 48 children were born to parents in non-consanguineous marriages, while 18 were from consanguineous unions. This supports findings by Basel-Vanagaite (2014), which indicate that consanguinity significantly increases the risk of intellectual and other genetic

disorders. These results underscore the importance of genetic counseling and public health strategies to reduce consanguineous marriages.

Anthropometric data revealed that among children with autism (n=44), normal BMI was most prevalent, especially in the 10–12 years age group, while underweight was more common in the youngest and 13–15-year-old age groups. In children with mental retardation (n=16), most had normal BMI, followed by a few in the overweight category, particularly among 10–12-year-olds. Almost all children with learning disabilities maintained a normal BMI.

Dietary patterns across all groups showed that most children were non-vegetarian but consumed meat, fish and chicken only once a week. Skipping meals—especially breakfast—was reported, often due to food avoidance, poor appetite, or depressive symptoms. Water intake patterns varied and irregular meal consumption was more prominent among autistic children. Nutrient intake analysis revealed age and gender differences, with boys generally consuming more energy and protein than girls. Notably, girls aged 10–12 years showed lower energy intake. Across all disabilities, calcium and iron intake were consistently below the Recommended Dietary Allowances (RDA, 2020). Children with mental retardation often struggled with independent feeding and displayed inconsistent eating behaviors, resulting in energy deficiencies. Despite adequate protein and fat intake, low consumption of milk, green leafy vegetables, fruits and other nutrient-dense foods contributed to micronutrient inadequacies.

Emerging evidence supports dietary interventions in managing autism spectrum disorders. Common approaches include gluten-free, casein-free, ketogenic, low phenol and low oxalate diets, with gluten-free and casein-free regimens being most widely practiced (Mazurek et al., 2023). These diets have shown potential in reducing maladaptive behaviors, such as hyperactivity. Hasanah et al., (2023) emphasized the crucial role of mothers in implementing these dietary changes, underscoring the need for consistent and supervised adherence to maximize therapeutic outcomes. Future research should involve larger, diverse samples, longitudinal designs and include biochemical assessments. Exploring the impact of dietary interventions and the role of parental and socioeconomic factors in shaping nutrition would offer deeper insights.

CONCLUSION

The present study underscores the multifaceted nutritional challenges faced by children with developmental disabilities, characterized by both undernutrition and overweight. Irregular eating habits, limited dietary diversity and inadequate intake of key micronutrients particularly energy, calcium and iron were prevalent across all children with special needs. Despite adequate protein and fat intake, the insufficient consumption of nutrient-rich foods such as milk, green leafy vegetables and fruits contributed to significant nutritional gaps. These findings highlight the urgent need for individualized, evidence-based nutritional interventions, caregiver education and supportive policies to promote healthier eating habits and improve the overall nutritional status and well-being of children with special needs.

REFERENCES

- Hartati, A. D., Maryantii, R., Azizah, N. N., Al Husaeni, D. F., Wulandary, V., & Irawan, A. R. (2022). Indonesian Journal of Community and Special Needs Education. Indonesian Journal of Community and Special Needs Education, 2(1), 61-68.
- https://wecapable.com/disabled-population-india-data/ "Disabled Population in India: Data and Fact' . Wecapable.com. Retrieved May 11, 2023

- Kavitha, K., Padmaja, R., Pramanik, S., Pingali, P & Bantilan, C., (2019). Understanding nutritional outcomes through gendered analysis of time-use patterns in semi-arid India. Global food security, 23, 49-63.
- Kumar, M., Vishnu Prasad, S., Ramakrishnan, M., & Ravikumar, D. (2018). Report on oral health status and treatment needs of 5–15 years old children with sensory deficits in Chennai, India. Special Care in Dentistry, 38(1), 58-59.
- Lakhan, R., Ekúndayò, O. T., & Shahbazi, M. (2015). An estimation of the prevalence of intellectual disabilities and its association with age in rural and urban populations in India. Journal of neurosciences in rural practice, 6(04), 523-52
- Malhi, P., Venkatesh, L., Bharti, B., & Singhi, P. (2017). Feeding problems and nutrient intake in children with and without autism: a comparative study. The Indian Journal of Pediatrics, 84, 283-288.
- Mehta, A., Gupta, R., Mansoob, S., & Mansoori, S. (2015). Assessment of oral health status of children with special needs in Delhi, India. RSBO Revista Sul-Brasileira de Odontologia, 12(3), 239-246.
- Patel, D. R., Greydanus, D. E., Merrick, J., & Rubin, I. L. (2016). Introduction to intellectual and developmental disabilities. Health care for people with intellectual and developmental disabilities across the lifespan, 5-12.
- Reilly, C., Bjurulf, B., & Hallböök, T. (2022). Intellectual functioning and adaptive behaviour in children with Dravet syndrome: A population-based study. Developmental Medicine & Child Neurology.
- Sampaio, L. C., Rossi, A. L. C. V., Bucar, E. E. C., Horta, H. S. L., Faria, P. C. C., Ferreira, Y. R., & Cozac, E. (2022). The Neuropsychological Repercussions of Celiac Disease in Childhood: A Review Literature Integrative. CIPEEX, 3, 1-1.
- Shen, M. D., Kim, S. H., McKinstry, R. C., Gu, H., Hazlett, H. C., Nordahl, C. W., ... & Gu, H. (2017). Increased extra-axial cerebrospinal fluid in high-risk infants who later develop autism. Biological psychiatry, 82(3), 186-193.
- Yurttagul, M. & Zeybek, S. G., (2020). Nutrient status, diet quality and growth parameters of children with autism spectrum disorder in Northern Cyprus

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ASSESSMENT OF STORAGE STABILITY IN PROTEIN-ENERGY BARS BASED ON SENSORY, PHYSICO-CHEMICAL, TEXTURAL AND MICROBIAL PARAMETERS

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ABSTRACT

Protein-energy bars are increasingly valued by athletes and active individuals for their convenience, nutrient density and sensory appeal. As adherence to dietary regimens is closely linked to taste and texture, it is crucial that such functional foods maintain quality during storage. This study evaluated the shelf-life stability of Protein-Energy Bars (70 g serving size) designed for sports nutrition. Bars were packaged in brown Kraft paper laminated with a 12 mm aluminium surface barrier (80 mm × 155 mm) and stored under accelerated conditions (35 ± 2 °C, 70% RH) for 70 days. Samples were analysed at 7-day intervals for physico-chemical properties, texture, sensory characteristics and microbiological quality. Over the storage period, there was a slight increase in peroxide value (from 0.60 ± 0.04 to 2.17 ± 0.04 mEq O_2/kg fat), free fatty acids (from 0.32 ± 0.03 % to 1.61 ± 0.02 % as oleic acid) and acid value (from 0.63 ± 0.04 to 3.19 ± 0.24), all remaining within safe and acceptable limits. Water activity rose modestly from 0.46 to 0.60, while hardness increased (from 23.23 ± 1.15 N to 116.87 ± 1.53 N) and fracturability declined (from 22.10 ± 2.30 mm to 0.30 mm), indicating structural changes without compromising edibility. Sensory scores showed a statistically significant but not drastic decrease; for example, visual appeal dropped from 8.11 ± 0.32 to 7.22± 0.73 (Composite Score Card) and overall acceptability remained above 7.0 throughout. Microbiological assessment revealed no growth of *E. coli*, yeast or mold, while total bacterial counts increased slightly yet stayed well within permissible limits reflecting good manufacturing practices and the use of high-quality, shelf-stable ingredients. These findings confirm that the bars retained acceptable sensory, chemical, textural and microbial quality over 70 days of accelerated storage. The study supports the potential of such protein-energy bars as shelf-stable, athlete-friendly functional foods that balance nutrition, safety and consumer satisfaction.

Key words: Protein-Energy Bar, Accelerated Storage, Shelf-Life Stability, Microbial Quality, Sensory Evaluation

INTRODUCTION

The intersection of food science and sports nutrition has fuelled growing demand for functional, high-protein foods that support athletic performance, recovery and well-being. Protein, a vital macronutrient, is essential for muscle repair, tissue regeneration and satiety. During exercise, muscles undergo micro-damage, making adequate protein intake crucial for recovery (Fink &

Mikesky, 2011). Therefore, athletes need convenient, high-quality protein sources that are palatable and shelf-stable.

Protein-Energy Bars (P-E Bars) are bar-shaped functional foods formulated to enhance physical energy, typically composed of fats, carbohydrates and proteins and often fortified with vitamins and minerals (Ananthan et al., 2021). These bars have gained popularity for offering a nutrient-dense, portable option, especially among athletes. They usually contain 20–35 grams of protein per serving to support muscle recovery, energy sustenance and performance (Malsagova et al., 2021).

P-E Bars incorporate diverse ingredients to ensure nutritional adequacy and sensory appeal. Common components include cereals, pulses, whole grains, milk solids and protein isolates like whey, soy or pea protein. These are often blended with sweeteners (e.g., honey, corn syrup), binders and flavor enhancers like nuts, seeds, fruits, lecithin and natural or artificial flavorings. Preservatives may be added to maintain shelf life and product stability (Karam et al., 2001; Nadeem et al., 2012).

While nutritional value is central, sensory properties such as taste, texture and mouthfeel are equally important in consumer acceptance. Athletes are more likely to adhere to products they find enjoyable (AlJaloudi et al., 2024). However, achieving optimal sensory quality is complex due to ingredient interactions that affect structure and palatability.

Thus, successful protein bar formulation requires balancing nutrition with sensory satisfaction. Furthermore, attributes like flavour, appearance and shelf stability greatly influence consumer preferences and purchasing decisions (Jovanov et al., 2021). From both industrial and consumer perspectives, a longer shelf life enhances product safety, reduces waste and expands market potential—making it a key factor in the success of functional foods like protein-energy bars.

In addition to formulation, storage stability is a critical aspect in developing Protein-Energy Bars. Products with extended shelf life must resist changes in texture, flavour and microbiological safety. Packaging is equally important, safeguarding against moisture and oxygen exposure. This study focuses on the development and storage stability of P-E Bars packed in aluminium-laminated Kraft pouches. Bars were stored under accelerated conditions (35 ± 2 °C, 70% RH) for 70 days, with periodic evaluations of physico-chemical properties, texture, sensory quality and microbial safety.

OBJECTIVES

- To develop a protein-energy bar (P-E Bar) using milk protein concentrate and cereal and pulses-based optimised ingredients aimed at fulfilling the macronutrient requirements of physically active individuals.
- To evaluate the shelf-life stability of the developed P-E Bars under accelerated storage conditions (35 ± 2 °C and 70% relative humidity) over a 70-day period.
- To analyse changes in physico-chemical properties such as peroxide value, free fatty acids, acid value and water activity during storage.
- To assess the textural attributes including hardness and fracturability of the P-E Bars at regular intervals throughout storage.
- To determine the sensory acceptability of the developed P-E Bars using the Composite Score Card (CSC) during the storage period.
- To monitor microbiological quality and safety, including total bacterial count and absence of pathogens (e.g., E. coli, yeast and mold), during storage.

MATERIALS AND METHODOLOGY

Raw Material

Maize (*Zea mays*) flour, ragi (*Eleusine coracana*) flour and gram (*Cicer arietinum*) flour were procured from the Granary Super Store, Amul, in Anand, Gujarat, India. Soy Protein Isolate (SPI) was sourced through online purchase from NAKPRO Nutrition, Bengaluru, India. These ingredients were used to prepare crispies, which served as a primary raw material in the formulation of P-E Bars. The crispies were developed using a co-rotating Twin Screw Extruder (BTPL lab model EB-10, manufactured in Kolkata, India) housed in the laboratory of the SMC College of Dairy Science, Kamdhenu University, Anand. The extruder featured a three-zone configuration comprising feeding, heating and die zones with a barrel length of three feet and a diameter of 40 millimetres. It was equipped with a smooth barrel design, precise temperature control settings, a variable-speed motor and an inbuilt cutter, allowing controlled extrusion and shaping of the final crisped product. The process of manufacture of crispies as a raw material is described in the Figure 1.

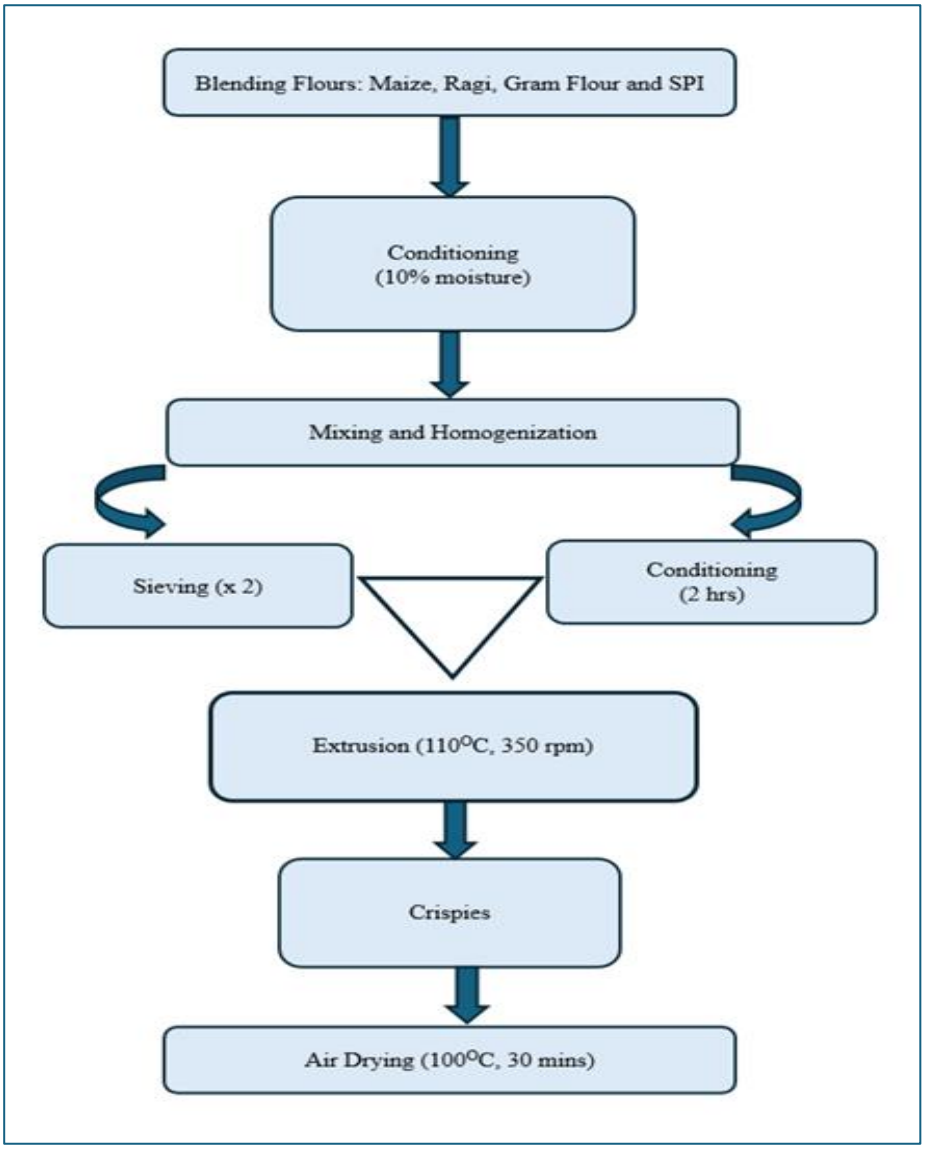


Figure 1 Procedure for Preparation of Crispies using a Twin-Screw Extruder

Other Ingredients

Whey Protein Concentrate-80 (WPC-80), with 80 % protein content, was sourced from Atuleet Foods Enterprise in Karamsad, Anand, Gujarat. Amul chocolate chips, butter and chia seeds (*Salvia hispanica*) were procured from Granary Super Store, Amul, Anand. Malt extract came from J.K. Malt Products Pvt. Ltd., Nadiad. Liquid glucose and soy lecithin were obtained from Deomals, Atlantis II, Vadodara. Additional ingredients like groundnuts (*Arachis hypogaea L.*), sugar, ghee, raisins (*Vitis vinifera*), black sesame seeds (*Sesamum indicum*) and coarsely ground dry dates were purchased from Apexa Dry Fruit Store, Vadodara. The raw ingredients prepared for the development of the P-E Bars are shown in the Figure 2.



Figure 2 Raw Ingredients for the Preparation of P-E Bar

Equipment / Instruments

The equipment and instruments used in the study included an analytical balance (Sartorius, England) for precise measurement of ingredients and a co-rotating twin-screw extruder (BTPL lab model, Basic Technology Pvt. Ltd., Kolkata, India) for the extrusion process. A hot air oven (Model No. IK-III, make: IKON, India) was utilized for drying and moisture analysis. Sample preparation and blending were carried out using a food processor (Bajaj Nx 01, 300 W Mixer Grinder), while product baking and recipe standardization employed an oven toaster grill (Morphy Richards 60-Litre, 60 RCSS Luxe Series).

Manufacture of P-E Bars

The prototype P-E Bar formulation was replicated under controlled lab conditions to confirm yield. Based on preliminary trials, standardization, literature and protein content, crispies, WPC-80 and SPI were chosen as independent variables for optimization. Other ingredients remained constant, with peanuts added by difference and soy lecithin at 0.2% as emulsifier.

To identify the optimal formulation for the development of protein-energy bars, Central Composite Rotatable Design (CCRD), a four-factor Response Surface Methodology (RSM), was employed using the statistical software Design Expert version 8.0.3 (Stat-Ease, Inc., Minneapolis). The ingredient proportions kept constant throughout the study included chocolate chips and sugar at 12.9 per cent each, ghee and malt at 9.7 per cent each, butter at 4.8 per cent; liquid glucose at 4.0 per cent; and date powder at 0.8 per cent. Additionally, sesame seeds and black seeded raisins were added at 0.8 per cent each, while chia seeds were included at 0.3 per cent in the final formula.

This research was structured with the objective of formulating a nutrient-rich bar that offered high sensory acceptability and strong market potential. The detailed development steps and corresponding parameters are illustrated in Figure 3.

The optimized P-E Bar formulation, which yielded the highest composite sensory score (Table 1), was selected for subsequent shelf stability evaluation. The final product is illustrated in Figure 4.

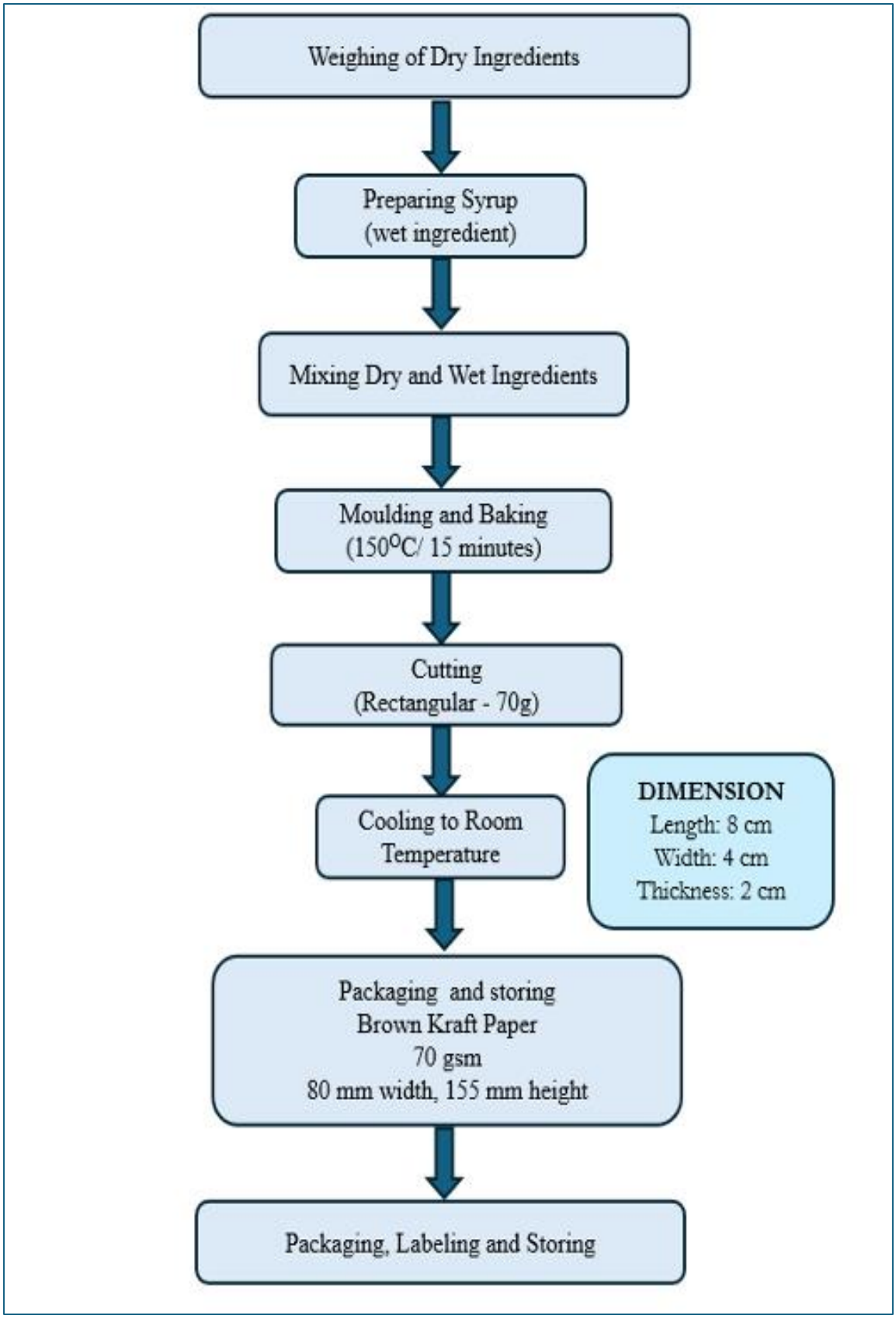


Figure 3 Procedure for Development of Protein Energy Bars

Table 1 Optimized P-E Bar Formulation

Sr. No	Component	Proportion (%)
1.	Crispies	7.3
2.	WPC-80	14.5
3.	SPI	13.7
4.	Peanut #	7.3
5.	Chocolate chips	12.9
6.	Sugar	12.9
7.	Ghee	9.7
8.	Malt	9.7
9.	Butter	4.8
10.	Liquid glucose	4
11.	Date powder	0.8
12.	Sesame seeds	0.8
13.	Raisin	0.8
14.	Soy lecithin	0.5
15.	Chia seeds	0.3
# Peanuts were added by difference in formula		



Figure 4 Protein-Energy Bars

Packaging Materials and Storage Conditions

To assess the shelf stability of the P-E Bars, the recommended serving size of 70 g was packaged using brown Kraft paper laminated with a 12 mm aluminium foil barrier. The packaging dimensions were 80 mm in width and 155 mm in height, providing adequate protection during storage. The packaged bars were subjected to accelerated shelf-life testing (ASLT) by storing them at 35 ± 2°C and 70 % relative humidity (RH) for a period of 70 days.

Shelf-Life Study of P-E Bars

Throughout the 70-day storage period, evaluations were conducted every seventh day to monitor changes in sensory attributes, physico-chemical properties, texture and microbial safety, thereby determining the shelf-life of the developed P-E bars.

Sensory evaluation was carried out using a composite scorecard with a 9-point hedonic scale by 18 semi-trained panellists from the Department of Foods and Nutrition, MSU Baroda. Physico-chemical properties were assessed using AOAC (2019) methods, water activity by Pardo et al. (2004) and texture analysis using a Texture Analyser. Microbiological quality was assessed by analysing yeast and mould counts as per IS 5403:1999 (reaffirmed 2018), total coliforms using IS 5401 (Part 1) and total bacterial count based on IS 5402 (Part 1).

Statistical Analysis

Data were analysed using SPSS (version 26.0). Results were expressed as mean ± standard deviation (SD). One-way Analysis of Variance (ANOVA) was employed to determine the significance of differences among the storage intervals.

FINDINGS AND DISCUSSION

The behaviour of P-E Bars, similar to other dairy and food products, during storage plays a vital role in determining their commercial viability. From both manufacturing and consumer perspectives, shelf life is a critical parameter. In this study, P-E Bars were stored at cabinet temperature (35 ± 2°C) and 70% relative humidity in laminated kraft packaging. They were evaluated at 7-day intervals for alterations in sensory attributes, physico-chemical properties, textural characteristics and microbiological quality throughout the assessed storage life span (ASLS).

Influence of Storage on the Organoleptic Property of P-E Bars

Organoleptic evaluation plays a vital role in determining food quality by analysing sensory attributes like appearance, taste, flavor, texture, mouthfeel, serving size, absence of defects and overall acceptability. In this study, Protein-Energy Bars were evaluated for sensory changes during storage by 18 semi-trained panellists' comprising faculty and Ph.D. scholars from the Department of Foods and Nutrition. Assessments were conducted using a Composite Score Card (CSC) with attributes scored out of 10, 15 or 20 (Table 2). Bars were stored in coated brown kraft paper at 35 ± 2°C and 70% RH.

Table 2 Influence of Storage on Sensory Attributes- CSC of P-E Bars

	Storage Period (Days#)										
	0	**7**	**14**	**21**	**28**	**35**	**42**	**49**	**56**	**63**	**70**
	Appearance (10)										
Mean ± SD	8.11 ± 0.32	8.17 ± 0.38	8.11 ± 0.32	8.06 ± 0.42	8.06 ± 0.42	7.94 ± 0.24	7.83 ± 0.51	7.78 ± 0.55	7.61 ± 0.78	7.39 ± 0.78	7.22 ± 0.73
F - Value	**6.445***										
	Taste (15)										
Mean ± SD	12.5 ± 0.99	11.89 ± 0.47	11.50 ± 0.62	10.5 ± 1.15	9.83 ± 1.20	9.83 ± 1.43	9.00 ± 0.77	8.83 ± 0.79	8.99 ± 0.91	7.56 ± 0.92	7.44 ± 0.78
F - Value	**58.856***										
	Flavor (10)										
Mean ± SD	8.28 ± 0.46	8.22 ± 0.43	7.94 ± 0.54	7.78 ± 0.65	7.00 ± 0.91	6.56 ± 0.92	6.44 ± 0.78	6.11 ± 0.68	5.89 ± 0.58	5.44 ± 0.51	5.22 ± 0.43
F - Value	**52.681***										
	Texture (20)										
Mean ± SD	16.44 ± 0.86	15.94 ± 0.94	15.72 ± 1.07	15.00 ± 0.91	14.67 ± 0.84	14.11 ± 0.68	13.72 ± 0.96	13.22 ± 1.00	12.56 ± 1.04	11.83 ± 1.04	11.61 ± 0.92
F - Value	**55.757***										
	Storage Period (days)										
	Mouthfeel (10)										
Mean ± SD	8.44 ± 0.51	8.17 ± 0.38	8.00 ± 0.49	7.83 ± 0.62	7.67 ± 0.49	7.17 ± 0.62	7.00 ± 0.77	6.72 ± 0.67	6.28 ± 0.67	6.11 ± 0.32	5.94 ± 0.24
F - Value	**45.907***										
	Serving Size (15)										
Mean ± SD	13.94 ± 0.64	12.94 ± 0.73	12.72 ± 0.75	12.56 ± 0.78	12.11 ± 0.90	11.89 ± 0.90	11.67 ± 0.97	11.44 ± 0.86	11.22 ± 0.65	11.06 ± 0.54	10.89 ± 0.68
F - Value	**26.081***										
	Absence of Defects (10)										
Mean ± SD	8.67 ± 0.59	8.39 ± 0.50	8.17 ± 0.71	8.11 ± 0.58	7.94 ± 0.64	7.83 ± 0.38	7.44 ± 0.51	7.17 ± 0.79	6.94 ± 0.73	6.56 ± 1.10	6.22 ± 1.00
F - Value	**21.669***										
	Overall Score (10)										
Mean ± SD	8.11 ± 0.32	8.09 ± 0.38	8.07 ± 0.32	8.06 ± 0.42	8.06 ± 0.42	7.94 ± 0.24	7.83 ± 0.51	7.78 ± 0.55	7.61 ± 0.78	7.39 ± 0.78	7.22 ± 0.73
F - Value	**6.445***										
***p < 0.05, Each observation is a mean ± SD of three replicate experiments by 18 semi trained panel members #ASLT**											

The sensory evaluation of P-E Bars over a 70-day storage period under accelerated conditions (35 ± 2°C and 70% RH) revealed notable trends in quality deterioration, as assessed through a CSC by a semi-trained panel. Table 2 highlights significant changes in multiple sensory parameters over time, indicating the influence of storage on the organoleptic properties of the product.

The visual appeal of the bars showed a marked decline over the storage duration. Initially, the appearance scores were recorded as 8.11 ± 0.32 on day 0, which dropped to 7.22 ± 0.73 by day 70. Given the maximum score of 10, this decrease was statistically significant ($p < 0.05$), indicating noticeable changes in colour and surface characteristics, likely caused by factors such as oxidation or moisture migration. However, when the final average scores exceeded 70 % of the maximum, the bars were still considered visually acceptable. Taste scores also declined considerably, falling from 12.5 ± 0.99 on day 0 to 7.44 ± 0.78 by day 70, with the maximum possible score being 15. These changes were statistically significant ($p < 0.05$), reflecting the impact of ingredient interactions, potential flavour degradation and possible microbial activity over time. Similarly, flavour ratings dropped from 8.28 ± 0.46 to 5.22 ± 0.43 during the same period, out of a maximum of 10 on a CSC.

These findings confirm a statistically significant reduction in perceived flavour intensity and appeal ($p < 0.05$).

The texture of the bars, evaluated on a 20-point scale, showed a significant decline in sensory quality, with scores reducing from 16.44 ± 0.86 to 11.61 ± 0.92 by day 70. This was supported by instrumental texture analysis, as referenced in Table 4.3, which revealed increased hardness with prolonged storage. This hardness is typically associated with moisture loss or ingredient interactions affecting product consistency. Mouthfeel also deteriorated over time, decreasing from 8.44 ± 0.51 to 5.94 ± 0.24 on a 10-point scale. Although this change was significant ($p < 0.05$), the scores remained slightly below 60% on the 70th day, indicating some retention of palatability. These changes can be attributed to moisture redistribution or oxidation, impacting how the product feels in the mouth.

Serving size is an important consideration for high-protein functional products like P-E Bars, as it affects nutrient delivery per portion. Although serving size scores declined significantly during storage, the bars remained 73% acceptable in terms of this criterion by day 70, indicating their continued suitability for standardized consumption. Overall sensory scores, based on a 10-point scale, declined from 8.11 ± 0.32 on day 0 to 7.22 ± 0.73 on day 70, again statistically significant ($p < 0.05$). However, these scores suggest that the product remained organoleptically acceptable until approximately 63 days of storage under accelerated conditions. These findings align with Giri and Mridula (2016), who reported similar sensory declines in energy bars, confirming acceptable shelf stability despite gradual quality changes.

Although the P-E Bars experienced statistically significant decreases in all sensory attributes, the final scores across appearance, taste, flavour, texture and mouthfeel still indicated a positive consumer response, suggesting that the product retains its acceptability for at least two months under accelerated storage conditions.

Influence of Storage on the Physico-Chemical Characteristics of P-E Bars

P-E Bars exhibit notable changes in their chemical properties during storage. As shown in Table 3, these changes were statistically significant ($p < 0.05$), indicating a measurable impact of storage conditions on the bars' chemical stability. The peroxide value, a marker of lipid oxidation, increased from 0.60 mEq O_2/kg fat on day 0 to 2.17 mEq O_2/kg fat by day 70, suggesting ongoing oxidation during storage. Despite this increase, the peroxide value remained well below the FSSAI's acceptable limit of 10 mEq/kg, indicating the product remained safe for consumption (FSSAI, 2019).

The free fatty acid (FFA) content increased from 0.32% to 1.61% oleic acid, indicating mild lipid hydrolysis over time. Similarly, the acid value rose significantly from 0.63 on day 0 to 3.19 on day 70, suggesting ongoing fatty acid liberation during storage. Despite these changes, values remained within acceptable limits, reflecting good storage stability. Water activity (aw), a key determinant of shelf life and microbial growth, increased from 0.46 to 0.60 over 70 days, likely due to environmental humidity, as supported by Padmashree et al. (2018) and Banach et al. (2016). These findings align with Rawat and Darappa (2015), confirming acceptable quality retention of P-E Bars during ambient storage.

Table 3 Influence of Storage on the Physico-Chemical properties of P-E Bars

Days#	Peroxide Value (mEq of O2/kg fat)		Free Fatty Acid (% Oleic Acid)		Acid Value		Water Activity (a_w)	
	Mean ± SD	F - Value	Mean ± SD	F - Value	Mean ± SD	F - Value	Mean ± SD	F - Value
0	0.60 ± 0.04	480.785*	0.32 ± 0.03	167.05*	0.63 ± 0.04	177.93*	0.46 ± 0.02	25.34*
07	1.09 ± 0.02		0.43 ± 0.05		0.86 ± 0.04		0.50 ± 0.01	
14	1.31 ± 0.02		0.62 ± 0.04		1.24 ± 0.03		0.50 ± 0.00	
21	1.52 ± 0.04		0.63 ± 0.05		1.26 ± 0.01		0.52 ± 0.01	
28	1.56 ± 0.03		0.65 ± 0.04		1.31 ± 0.03		0.52 ± 0.00	
35	1.60 ± 0.02		0.80 ± 0.03		1.56 ± 0.08		0.53 ± 0.02	
42	1.61 ± 0.00		0.92 ± 0.04		1.83 ± 0.04		0.54 ± 0.01	
49	1.72 ± 0.01		0.94 ± 0.03		1.88 ± 0.04		0.55 ± 0.01	
56	1.76 ± 0.02		1.17 ± 0.10		2.03 ± 0.05		0.57 ± 0.01	
63	1.82 ± 0.04		1.47 ± 0.03		2.92 ± 0.01		0.59 ± 0.01	
70	2.17 ±0.04		1.61 ± 0.02		3.19 ± 0.24		0.60 ± 0.01	

*p < 0.05, Each observation is a mean± SD of three replication of the experiment (n=3), # ASLT

Influence of Storage on the Textural Attributes of P-E Bars

Monitoring the textural changes in P-E Bars during storage is essential, as texture directly influences product quality and consumer acceptance. As presented in Table 4, the hardness of the bars increased significantly ($p < 0.05$) from 23.23 N on day 0 to 116.87 N by day 70, indicating a considerable rise in firmness and resistance to deformation.

Table 4 Influence of Storage on the Textural Attributes of P-E Bars

Days#	Hardness (N)		Fracturability (mm)	
	Mean ± SD	F - Value	Mean ± SD	F - Value
0	23.23 ± 1.15	465.99*	22.10 ± 2.30	74.07*
07	23.51 ± 0.58		18.27 ± 1.55	
14	24.67 ± 2.89		13.69 ± 2.58	
21	37.02 ± 2.65		4.51 ± 0.86	
28	57.35 ± 1.53		3.67 ± 2.02	
35	63.11 ± 1.00		3.41 ± 2.41	
42	74.42 ± 3.79		2.47 ± 0.60	
49	80.33 ± 3.21		1.63 ± 0.03	
56	90.00 ± 3.61		1.58 ± 0.04	
63	103.29 ± 4.16		1.54 ± 0.09	
70	116.87 ± 1.53		0.30 ± 0.27	
*p < 0.05, Each observation is a mean± SD of three replication of the experiment (n=3), # ASLT				

This hardness level at day 70 classifies the bars as moderately hard. In contrast, fracturability decreased significantly ($p < 0.05$) from 22.10 mm to 0.30 mm over the same period, suggesting a reduced tendency of the bars to break easily. This decline in fracturability is likely due to the increased hardness, which limits brittleness. These results indicate that formulation plays a crucial role in determining storage stability. The findings are supported by previous studies (McMahon et al., 2009; Pallavi et al., 2015; Padmashree et al., 2018), which reported similar trends in textural hardening and reduced fracturability in nutrition bars during extended storage under ambient conditions.

Influence of Storage on the Microbiological Quality of P-E Bars

The influence of accelerated storage on the microbiological quality of Protein-Energy (P-E) Bars is presented in Table 5. Total Bacterial Count (TBC), a primary indicator of microbial safety, increased from 1.34 ± 0.02 to 2.50 ± 0.02 $\log_{10}$ cfu/g over 70 days of storage at 35 ± 2°C and 70% RH. Although this increase was statistically significant, it remained within permissible FSSAI limits. The rise in microbial load was expected due to extended storage duration; however, water activity levels remained below 0.70 throughout, which is generally unfavourable for microbial proliferation. These results are consistent with findings reported by Farajzadeh and Golmakani (2011) and Padmashree et al. (2012), who observed similar trends in energy bars.

Crucially, E. coli was undetected at all time points, confirming the product's microbiological safety. Likewise, no yeast or mold growth was observed during storage, reflecting good manufacturing practices, proper handling and the use of high-quality ingredients. Overall, the P-E

Bars maintained acceptable microbial quality and safety under the accelerated storage conditions for the 70-day period.

Table 5 Influence of Accelerated Storage on the Microbiological Quality of Protein-Energy Bars

Parameter	Day 0	Day 70
Total Bacterial Count (log_{10} cfu/g)	1.34 ± 0.02	2.50 ± 0.02
E. coli	Not Detected (ND)	Not Detected (ND)
Yeast	Not Detected (ND)	Not Detected (ND)
Mold	Not Detected (ND)	Not Detected (ND)
Water Activity (aw)	0.46	0.6

CONCLUSION AND SUGGESTIONS FOR FUTURE RESEARCH

The present study successfully developed a P-E Bar incorporating milk protein concentrate and crispies prepared from maize, ragi and gram flour, aimed at supporting the macronutrient needs of active individuals. The optimized formulation was subjected to 70 days of accelerated storage at 35 ± 2°C and 70% relative humidity. Over this period, physico-chemical evaluations showed a gradual increase in peroxide value from 0.60 ± 0.04 to 2.17 ± 0.04 mEq O_2/kg fat, free fatty acids from 0.32 ± 0.03% to 1.61 ± 0.02% and acid value from 0.63 ± 0.04 to 3.19 ± 0.24, all within FSSAI permissible limits. Water activity increased slightly from 0.46 to 0.60, indicating good moisture control. Textural parameters showed increased hardness from 23.23 ± 1.15 N to 116.87 ± 1.53 N and a decrease in fracturability from 22.10 ± 2.30 mm to 0.30 mm, reflecting expected structural changes during storage. Sensory evaluation results revealed a decline in taste (12.5 ± 0.99 to 7.44 ± 0.78 out of 15) and flavour (8.28 ± 0.46 to 5.22 ± 0.43 out of 10), yet overall acceptability remained above 7.0 on a CSC throughout the study duration. Microbiological analysis confirmed safety, with E. coli, yeast and mold undetected and total bacterial count increasing from 1.34 ± 0.02 to 2.50 ± 0.02 log_{10} cfu/g — still within acceptable limits. These outcomes validate the bar's shelf-stability, sensory appeal and microbiological safety for at least 63 days under accelerated conditions, making it a promising, functional and nutritious option for health-conscious and athletic consumers.

Suggestions for Future Research

Future research could explore natural antioxidant incorporation to enhance oxidative stability and shelf life. Investigating the effects of alternative packaging materials and modified atmosphere packaging may further improve storage outcomes. Studies evaluating storage under real-time and varying environmental conditions would help in developing region-specific guidelines. Additionally, consumer acceptability trials over extended durations could provide more robust insights into market potential and shelf-life optimization.

REFERENCES

- AlJaloudi, R., Al-Dabbas, M. M., Hamad, H. J., Amara, R. A., Al-Bashabsheh, Z., Abughoush, M., ... & Iqbal, S. (2024). Development and characterization of high-energy protein bars with enhanced antioxidant, chemical, nutritional, physical and sensory properties. Foods, 13(2), 259. https://doi.org/10.3390/foods13020259
- Ananthan, P., Sharma, G. K., & Semwal, A. D. (2021). Energy bars: A perfect choice of nutrition to all. In G. K. Sharma & A. D. Semwal (Eds.), Advances in Processing Technology (pp. 309–332). CRC Press.
- Banach, J. C., Clark, S., & Lamsal, B. P. (2016). Instrumental and sensory texture attributes of high-protein nutrition bars formulated with extruded milk protein concentrate. Journal of Food Science, 81(5), S1254–S1262.
- Farajzadeh, D., & Golmakani, M. T. (2011). Formulation and experimental production of energy bar and evaluating its shelf-life and qualitative properties. Journal of Military Medicine, 13(3), 181–187.
- Fink, H. H., & Mikesky, A. E. (2015). Practical Applications in Sports Nutrition (4th ed.). Jones & Bartlett Learning.
- Food Safety and Standards Authority of India. (2019). Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011 (Updated in 2019). https://www.fssai.gov.in
- George, W., & Latimer, J. (Eds.). (2019). Official methods of analysis of AOAC International (21st ed.). AOAC International.
- Giri, N. A., & Mridula, D. (2016). Development of energy bar utilizing potato extrudates. Asian Journal of Dairy and Food Research, 35(3), 241–246.
- Jovanov, P., Sakač, M., Jurdana, M., Pražnikar, Z. J., Kenig, S., Hadnađev, M., ... & Marić, A. (2021). High-Protein Bar as a Meal Replacement in Elite Sports Nutrition: A pilot study. Foods, 10(11), 2628.
- Karam, L., Grossmann, M. V. E., & Silva, R. S. S. F. (2001). Oat Flour and Corn Starch Mixtures With High Content Amylopectin Production of Snacks. Ciência e Tecnologia de Alimentos, 21(2), 158–163.
- Malsagova, K. A., Kopylov, A. T., Sinitsyna, A. A., Stepanov, A. A., Izotov, A. A., Butkova, T. V., ... & Kaysheva, A. L. (2021). Sports nutrition: Diets, Selection Factors, Recommendations. Nutrients, 13(11), 3771.
- McMahon, D. J., Adams, S. L., & McManus, W. R. (2009). Hardening of High-Protein Nutrition Bars and Sugar/Polyol–Protein Phase Separation. Journal of Food Science, 74(6), E312–E321.
- Nadeem, M., Anjum, F. M., Murtaza, M. A., & Mueen-ud-Din, G. (2012). Development, Characterization and Optimization of Protein Level in Date Bars Using Response Surface Methodology. The Scientific World Journal, 2012, 518702. https://doi.org/10.1100/2012/518702
- Padmashree, A., Negi, N., Haridas, S., Govindaraj, T., Kumar, K. R. A., Semwal, A. D., & Sharma, G. K. (2018). Development and Quality Evaluation of Choco Quinoa Nutri Bar During Storage. Food and Nutrition Sciences, 9(7), 899–914.
- Padmashree, A., Sharma, G. K., Srihari, K. A., & Bawa, A. S. (2012). Development of Shelf Stable Protein Rich Composite Cereal Bar. Journal of Food Science and Technology, 49, 335–341. https://doi.org/10.1007/s13197-011-0283-6
- Pallavi, B. V., Chetana, R., Ravi, R., & Reddy, S. Y. (2015). Moisture Sorption Curves of Fruit and Nut Cereal Bar Prepared with Sugar and Sugar Substitutes. Journal of Food Science and Technology, 52, 1663–1669.

- Pardo, E., Marín, S., Sanchis, V., & Ramos, A. J. (2004). Prediction of Fungal Growth and Ochratoxin a Production by Aspergillus Ochraceus on Irradiated Barley Grain as Influenced by Temperature and Water Activity. International Journal of Food Microbiology, 95(1), 79–88.
- Rawat, N., & Darappa, I. (2015). Effect of Ingredients on Rheological, Nutritional and Quality Characteristics of Fibre and Protein Enriched Baked Energy Bars. Journal of Food Science and Technology, 52, 3006–3013.

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EVALUATION OF THE KNOWLEDGE, ATTITUDE AND PRACTICES OF POLYCYSTIC OVARY SYNDROME PATIENTS IN A CLINICAL SETTING OF WESTERN GUJARAT

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ABSTRACT

PCOS is an endocrine and metabolic disorder and a rising public health concern. Inadequate awareness about the condition itself and unhealthy lifestyle behaviors are regarded to be one of the reasons leading to PCOS. The study evaluated the knowledge, attitude and practices regarding management of PCOS among 100 women between 19-49 years old diagnosed with PCOS. The mean knowledge score was 15.8±4.86 with 38 % and 40 % of subjects exhibiting poor and average knowledge levels respectively and 91 % expressed a positive attitude. However, a substantial proportion of subjects (85%) had inadequate dietary and management practices even though majority of the subjects (71 %) were obese and 84 % had abdominal obesity. Majority of subjects were aware that unhealthy diet, physical inactivity and obesity are the risk factors. They also possessed good knowledge regarding diagnostic criteria and pregnancy complications. However, there was lack of awareness regarding the genetic predisposition, and metabolic and psychological components of PCOS. Knowledge levels were found significantly associated with attitude levels ($p<0.001$) whereas no significant association was observed between knowledge level and practice level ($p = 0.429$) and attitude levels and practice level ($p = 0.512$). The main source of information were health workers (46 %), friends (20%) and internet (18 %). Thus, future research needs to focus on bridging the gap between awareness and effective management strategies, including behavioural interventions, barriers and enhancers that might serve an important role in bringing favorable attitudes and knowledge into real-world application.

Keywords: Obesity, Awareness, Lifestyle intervention, PCOS

INTRODUCTION

Polycystic Ovarian Syndrome (PCOS) is an emerging public health issue with repercussions throughout the life cycle of women. It is characterized as the presence of at least two out of three features as per revised Rotterdam Diagnostic Criteria: Oligo-ovulation, clinical or biochemical hyperandrogenism and polycystic ovaries. Countries like Australia, Turkey, and Denmark showed a higher prevalence rate of PCOS of 15 % to 20 % while nations like Iran, China, and the USA displayed a lower prevalence rate ranging from 3% to 4 % (Deswal et al., 2020). In India, the prevalence of PCOS varied between 4.2% and 22.5%, with a combined prevalence of 11.33%

(Bharali et al., 2022). The underlying etiology of PCOS is still not fully comprehended but involves a disturbance in the feedback mechanism among the ovaries, hypothalamus, and pituitary gland, leading to a disruption in hormonal communication (Di Lorenzo et al., 2023). Women with PCOS face a higher risk for diabetes and its complications and cardiovascular disease.

Inadequate awareness about the condition itself and unhealthy dietary and lifestyle behaviors are regarded as one of factors leading to PCOS. Prior research studies have reported that awareness, diagnosis, and management of PCOS are suboptimal (B & Nayak, 2016; Manimegalai & Anitha, 2024). This highlights a considerable gap in awareness, leading to delays in diagnosis and inadequate management. Thus, understanding the knowledge, attitudes, and practices of women diagnosed with PCOS is crucial for formulating effective intervention strategies.

OBJECTIVE

To assess the knowledge, attitude and practices regarding PCOS in women diagnosed with PCOS.

METHODOLOGY

Study design and sample

This cross-sectional study was done on women between 19-49 years old with confirmed PCOS as per the Rotterdam Criteria. Subjects were recruited from the gynecology outpatient clinic. Participant consent form was obtained by the respondents, regarding the confidentiality of the responses and respondents. Before the study pilot testing was done on 30 individuals with PCOS and accordingly, the questions were modified.

Sample Size:

The sample size was calculated as 100 PCOS subjects considering the prevalence of metabolic syndrome as 37.02 % in the PCOS population (Kaur et al., 2019), the confidence interval as 95 % and the margin of error as 10 %, additional 10 % was added for potential non-response and incomplete data.

Study Tool

The questionnaire included three sections (Knowledge, attitude, and Practices). Each correct answer was scored as 1, whereas a 0 score was given to wrong answers. The scores were classified into 3 categories: poor (score < 60 %), average (score 60 % to 80 %) and good (score > 80%) (Table 1).

Section I: Knowledge regarding PCOS

This section included awareness about PCOS, its symptoms, risk factors, diagnosis methods, consequences, and management strategies among women diagnosed with PCOS. Knowledge scores fell in the range between 0 and 25; the higher the score the higher the knowledge level (Table 1).

Section II: Attitude regarding PCOS

This section included perceptions of PCOS subjects about their condition, including their concerns, beliefs, seriousness of the condition, and dietary and exercise interventions to manage PCOS. Attitude scores ranged between 0 and 10; the higher the score the more positive the attitude (Table 1).

Section III: Practices regarding PCOS Management

Practices followed by women with PCOS, including dietary habits, physical activity, and psychological health were assessed. Practice scores ranged between 0 and 22 (Table 1.)

Table 1. Scoring of knowledge, attitude and practice aspects

Knowledge aspects identified	Attitude aspects identified	Practice aspects identified	Scoring	Levels
< 15	< 6	< 13	< 60 %	Poor
15 **- 20**	6– 8	13 - 17	60 – 80 %	Average
>20	>8	>17	> 80 %	Good

Ethical consideration

The study was approved as a part of doctoral research by the Institutional Ethics Committee for Human Research (Ethical Number: IECHR/FCSc/Ph.D/2023/9).

Data Analysis

The data obtained was entered in MS Excel and analyzed using Zamovi software. Statistical significance was considered at $P \leq 0.05$. Association between categorical variables were analyzed by Fisher's exact test. Descriptive analysis (frequency statistics and percentage) was also conducted.

RESULTS

Background Information

The study included 100 subjects. The mean age of subjects was 23.9 ±5.25 years and 54 % were aged between 18 and 22 (Table 2). 52% were undergraduate students. As per Kuppuswamy's classification (2023), 64 % were from the upper socio-economic class, 20 % were from the upper-middle class and 16 % were from the lower middle socio-economic class (Table 2).

Table 2: Background information of PCOS subjects

Variables	Frequency (%) N = 100
Age (Years)	
18-22	54
23- 29	35
30-49	11
Educational Qualification	
Under-Graduation Students	52
Under-Graduates	19
Post-Graduation Students	6
Post-Graduates	23
Socio-Economic Status	

Upper	64
Upper Middle	20
Lower Middle	16

Anthropometric Status

The mean weight of the subjects was 71.2 ± 16.6 kgs and the mean height was 158 ± 6.15 cm. According to the Asia-Pacific classification for BMI (2000), a high rate of obesity was observed among subjects (71%) whereas underweight was also prevalent in 3% (Fig. 1). As per the IDF classification (2009), 85% of subjects had a waist circumference above the desired waist circumference.

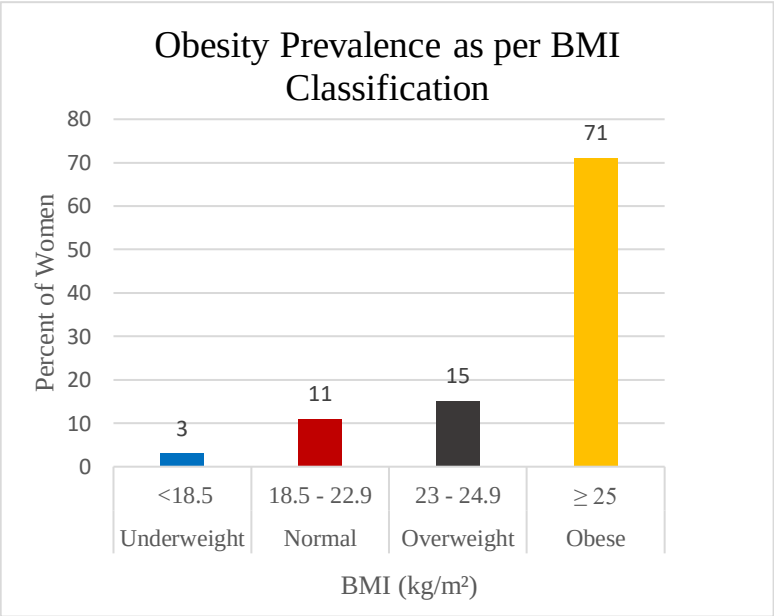


Figure 1. Prevalence of obesity among PCOS subjects

Knowledge about PCOS

The mean knowledge score was 15.8±4.86 and 38 % of subjects exhibited poor knowledge, 40 % showed average knowledge whereas merely 22 % demonstrated good knowledge and thorough understanding of PCOS (Table 3).

Table 3. Knowledge, attitude and practice scores of PCOS subjects

Score	Knowledge	Attitude	Practice
N	100	100	100
Mean ± SD	15.8 ± 4.86	7.51 ± 1.70	5.50 ± 5.10
Median	16.0	8.00	4.50
Range	4-23	3-10	0-20
IQR	8.00	3.00	7.00
Maximum Score	25	10	22

Table 4. Distribution of knowledge, attitude and practice levels among the PCOS subjects

Levels	Scores	Frequency (%)
Knowledge		
Poor	<15	38
Average	15 - 20	40
Good	>20	22
Attitude		
Poor	<6	10
Average	6-8	55
Good	>8	35
Practice		
Poor	<13	85
Average	13-17	11
Good	>17	4

An unhealthy diet was considered a risk factor for PCOS by majority (89 %) of subjects and 79 % of subjects considered physical inactivity as a risk factor, while obesity and stress were considered by 74%. The least recognized risk factor was a family history of PCOS (30%) indicating a lack of understanding about the condition's genetic predisposition (Table 5).

Menstrual disturbances (97%) and polycystic ovaries (92%) regarded as hallmark characteristics of PCOS were the most commonly known symptoms among the subjects whereas insulin resistance (29%) was the least known symptom followed by depression (48%) and anxiety (49 %) highlighting the need to create awareness regarding the metabolic and psychological components of PCOS. Moreover, majority of subjects recognized weight gain (82%), acne (72 %) and hirsutism (57%) as characteristic signs of PCOS (Table 5).

Nearly 72% of subjects had awareness regarding polycystic ovary morphology as a diagnostic method for PCOS whereas 66 % of subjects recognized clinical or biochemical hyperandrogenism and 57 % of subjects identified irregular anovulatory as a diagnostic marker. Pregnancy complication was recognized as a potential consequence of PCOS by majority of the subjects (95%) followed by diabetes (61 %) whereas 36% of subjects acknowledged heart disease (36 %) and psychological issues (30 %) as potential consequences of PCOS, thus suggesting that mental health is often overlooked. A healthy diet (93 %) and physical exercise (91%) were widely considered essential management strategies reflecting a good understanding of lifestyle interventions. However, 49 % of subjects considered medication as an effective strategy along with lifestyle intervention (Table 5).

Table 5. Distribution of knowledge aspects

Knowledge aspects of PCOS	Responses (%) N= 100	Maximum Score	Score (Mean ± SD)
Risk Factors of PCOS		5	3.46 ± 1.267
Family history of PCOS	30		
Obesity	74		
Physical inactivity	79		

Unhealthy diet	89		
Stress	74		
Signs and Symptoms of PCOS		8	5.28 ± 2.075
Weight Gain	82		
Menstrual disturbance	97		
Acne	72		
Hirsutism	57		
Anxiety	49		
Depression	48		
Insulin Resistance	29		
Polycystic ovaries	92		
Diagnosis Method		3	1.65 ± 1.175
Clinical or biochemical Hyperandrogenism	66		
Irregular anovulatory periods	57		
Polycystic ovaries	72		
Complication of PCOS		4	2.22 ± 1.186
Diabetes	61		
Heart disease	36		
Pregnancy complication	95		
Psychological issues	30		
Management of PCOS		3	
Medicines	49		
Diet	93		
Physical Exercise	91		
PCOS is a hormonal condition	100	1	1.00 ± 0.000
Minimum symptoms to be diagnosed with PCOS	12	1	0.12 ± 0.327
PCOS: Not Always Multiple Cysts	20	1	0.20 ± 0.402
Composite Score		25	15.8 ± 4.86

Attitude towards PCOS

The mean attitude score was 7.51±1.70 with 55 % of subjects exhibiting an average attitude score, while 35 % of subjects had a good attitude and only 10 % of subjects demonstrated poor attitude toward PCOS condition, menstrual regularity and its management (Table 4). A higher proportion of subjects (91 %) had high attitude scores toward managing PCOS through diet and exercise, whereas there was a comparatively lower acceptance of medication and surgical interventions. Nearly all subjects (99%) associated PCOS with conception and pregnancy-related complications, emphasizing concerns about its impact on fertility. Majority of the subjects (86%) did not consider irregular periods to be normal (Table 6).

Table 6. Distribution of Attitude aspect among PCOS subjects

Attitude Aspects of PCOS	Response (%) N = 100
PCOS as a Serious Health condition	86
Association of PCOS with conception/ pregnancy-related complication	99
Irregular periods are not normal	86
PCOS leads to hirsutism	53
PCOS affects reproductive-age subjects	82
PCOS can only be managed by medicine and surgery	90
PCOS can be managed through diet and exercise	91
Obesity reduction helps to reduce PCOS Complication	77
Satisfaction with current exercise regime	13
PCOS makes prone to depression	74

Practices for PCOS Management

The mean practice score was 5.50±5.10. A substantial proportion of subjects (85%) had inadequate dietary and management practices, 11 % adhered to slightly healthy practices and only 4% displayed effective PCOS management strategies (Table 4). Only 14% of subjects practiced exercise regularly, while 50% exercised occasionally and 36% were not physically active. In evaluating the level of adherence to dietary practices, only 3% adhered to their diet very strictly. Regarding dietary restrictions, merely 22% of subjects followed a hypocaloric diet, 41% followed a hypoglycemic diet, and 18% ensured a protein-rich diet. However, 51% restricted fat consumption, indicating that reducing low fat intake was the primary emphasis (Table 7).

Table 7. Distribution of Practice aspect among PCOS subjects

Practice Aspects of PCOS	Response (%)	Maximum Score	Score (Mean ± SD)
Engagement in Physical Activity		2	0.78 ± 0.675
Regularly	14		
Sometimes	50		
Not at all	36		
Particular diet for PCOS	18	1	0.18 ± 0.387
Adherence to Dietary Restrictions		3	0.68 ± 0.815
Very Strictly	3		
Strictly	13		
Liberally	33		
Not at all	51		
Consideration of Dietary Restriction while Eating		4	1.32 ± 1.448
Hypocaloric diet	22		
Hypoglycaemic diet	59		
Protein Rich food	82		
Less fat diet	49		

Foods avoid to Manage PCOS		6	1.6 ± 1.869
Trans Fat	31		
High Fat Milk	18		
High Glycaemic Index Foods	14		
Tetra Pack Fruit Juice	21		
Aerated Drink	43		
Processed Food	33		
Foods consumed Liberally to Manage PCOS		5	0.76 ± 1.19
Whole Grains	6		
Low-fat dairy products	13		
Seed and nuts	13		
GLVs	11		
Whole fruits	33		
Engagement in Mental Health Activities		1	0.16 ± 0.368
Practice any activity for mental health	16		
Composite score		22	5.50 ± 5.10

Subjects were evaluated on their avoidance of particular food items for managing PCOS. 69% did not abstain from trans fats in baked items, including cakes, cookies and crackers; 18% avoided high-fat milk, 14% avoided high glycaemic index foods, 21% avoided tetra pack juices, 43% avoided aerated drinks and 33% avoided processed foods. In response to the food liberally consumed to manage PCOS, only 6% emphasized whole grains, 13% included low-fat dairy products, 13% regularly consumed seeds and nuts and 11% consumed green leafy vegetables (GLVs). Of the subjects, 84 % were not engaged in any mental health or well-being activities. This indicates a possible gap in the holistic approach to managing PCOS (Table 7).

Association of knowledge, attitude and practices levels

Attitude levels were found to be significantly associated with knowledge levels ($p<0.001$ which highlights attitudes tend to improve with an increase in knowledge (Table 8). The results coincide with a recent study by R et al. (2024) which also reported an association between attitude and knowledge levels highlighting that individuals with high awareness are more likely to have a good attitude toward PCOS management.

Table 8. Association between knowledge and attitude level

Knowledge Level	Attitude Level			Total (N = 100)	Fisher's Exact Test	P value
	Poor	Average	Good			
Poor	7	29	2	38	41.4	<0.001
Average	3	23	12	40		
Good	0	3	19	22		

However, no significant association was observed between knowledge level and practice level (p = 0.429) and attitude levels and practice level (p = 0.512). These findings contrast with R et al. 2024 study which reported a positive association between knowledge, attitude and practice levels. This suggests that increased knowledge and positive attitude do not necessarily equate to better practice suggesting potential factors beyond knowledge and attitude such as motivation, behavioural interventions, barriers and enhancers need to be explored that might play a crucial role in bringing favorable attitudes and knowledge into real-world application and bridge the gap between awareness and effective management strategies.

Sources of Information Regarding PCOS

Health workers were the primary source of information regarding PCOS for nearly 46 % of subjects followed by friends (20 %), internet (18 %), mothers and relatives (10 %) and colleges and schools (6 %) (Fig. 2). The result aligns with prior research that exhibited healthcare professionals as the source of information for 83.7 % of subjects (Rao et al., 2020). Similar findings were shown by Nagarwala et al. (2020) that 70 % of subjects relied on healthcare professions and 64 % used the internet or social media as a source of information. In the current study, more than 50 % of subjects obtained information from sources besides health professionals which could bring about to misinformation and potentially hamper the effective management of PCOS.

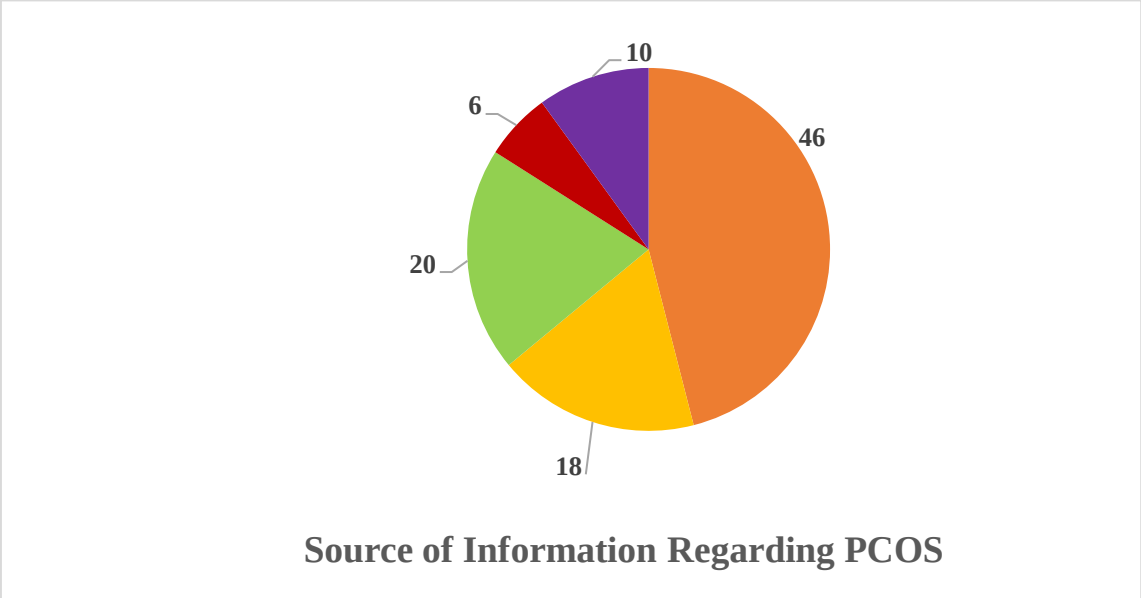


Figure 2. Sources of Information Regarding PCOS

This study demonstrated that most of the subjects had either poor or average knowledge of PCOS, contrasting with findings from a previous study where 74 % had average knowledge and only 2% had poor knowledge (Manimegalai & Anitha, 2024). Similarly, a descriptive survey reported that 76% of the nursing students exhibited average knowledge about PCOS whereas only 10.7% had good knowledge (B & Nayak, 2016).

Regarding risk factors, the current study's findings align with a previous study where 66.7 % of subjects recognized obesity to be a risk factor for PCOS and 90 % identified menstrual disturbances as a symptom (Bohsas et al., 2024). Similarly, while acne (72 %) and hirsutism (57%) were reported as characteristic signs of PCOS in this study, a prior study exhibited that 85.5 % of

subjects acknowledged excessive hair growth as a symptom of PCOS. Awareness of psychological complications varied, with a previous study reporting that 75.7% of subjects recognized anxiety and depression as PCOS complications, whereas the current study found lower recognition (30%) of mental health implications (Bohsas et al., 2024).

In the current study, 72 % of subjects had awareness about diagnostic markers mainly polycystic ovaries which contrasts with results from Lin et al. (2017), where most subjects (>86%) harbored misconceptions about diagnostic criteria and 95% reported in another study (Chauhan et al., 2021).

This study highlights that majority of subjects had a positive attitude indicating that subjects with PCOS recognize the severity, reproductive issues and importance of lifestyle management. Rao et al. (2020) reported similar findings that substantial proportion of patients had either a good or average attitude toward PCOS management.

This study revealed that majority of subjects were obese and had waist circumference measurements exceeding desirable levels, which may result in the metabolic complications associated with PCOS. Consistent physical activity has been well-documented to enhance insulin sensitivity, reduce adiposity, and enhance ovulatory function which is essential for the management of PCOS (Butt et al., 2023; Teede et al., 2018). However, despite this evidence, a significant proportion of subjects in the current study were less physically active and did not adhere to a structured dietary regimen, which could negatively impact PCOS management. These results contradict those of Nagarwala et al. (2020), who reported that 67% of their study population engaged in daily physical exercise. Moreover, the inadequate intake of whole grains, GLVs, seeds and nuts indicate low priority on nutrient-dense foods beneficial for PCOS management. These findings align with prior study, which also showed that although subjects with PCOS are often aware of the beneficial effect of lifestyle interventions, implementing these changes remains a challenge (Nadeem et al., 2024).

SUMMARY, CONCLUSION AND IMPLICATIONS

The current study was aimed to evaluate the knowledge, attitude and practices related to fundamentals and management of PCOS among subjects diagnosed with PCOS. The findings reveal that a significant proportion of subjects had an average understanding and had a positive attitude indicating that subjects with PCOS recognize the severity, reproductive issues and importance of lifestyle management. Around 71% of the subjects were obese as per the BMI classification and 84% had abdominal obesity. Besides this, the subjects received poor scores in the practice section and there was a significant correlation between their knowledge and attitude levels. However, no significant correlation observed between knowledge and practice levels which emphasize the need for a holistic approach that includes both educational and behavioral elements to improve compliance with lifestyle changes.

Future research needs to emphasize investigating the effects of personalized, culturally designed intervention programs and addressing the challenges that interfere with lifestyle modifications in subjects with PCOS, encompassing cultural norms, socioeconomic limitations and psychological factors that could affect motivation and compliance. Rectifying these gaps in knowledge, attitudes, and practices can lead to better health outcomes and an improved quality of life for subjects with PCOS.

REFERENCES

- B, S., & Nayak, S. (2016). A Study to Assess the Knowledge Regarding PCOS (Polycystic Ovarian Syndrome) among Nursing Students at NUINS. *Journal of Health and Allied Sciences NU*, *06*(03), 24–26. https://doi.org/10.1055/s-0040-1708657
- Bharali, M. D., Rajendran, R., Goswami, J., Singal, K., & Rajendran, V. (2022). Prevalence of Polycystic Ovarian Syndrome in India: A Systematic Review and Meta-Analysis. Cureus. https://doi.org/10.7759/cureus.32351
- Bohsas, H., Alibrahim, H., Swed, S., Abouainain, Y., Aljabali, A., Kazan, L., Jabban, Y. K. E., Mehmood, Q., Sawaf, B., Eissa, N., Alkasem, M., Edrees, Y., Cherrez-Ojeda, I., Fathey, S., Rashid, G., Hafez, W., AbdElrahim, E., Osman, H., Emran, T. B., . . . Khandaker, M. U. (2024). Prevalence and knowledge of polycystic ovary syndrome (PCOS) and health-related practices among subjects of Syria: a cross-sectional study. *Journal of Psychosomatic Obstetrics & Gynecology*, *45*(1). https://doi.org/10.1080/0167482x.2024.2318194
- Butt, M. S., Saleem, J., Zakar, R., Aiman, S., Khan, M. Z., & Fischer, F. (2023). Benefits of physical activity on reproductive health functions among polycystic ovarian syndrome subjects: a systematic review. *BMC Public Health*, *23*(1). https://doi.org/10.1186/s12889-023-15730-8
- Chauhan, P., Siddiqui, M. I., Chauhan, A. S., & Sandhya, N. (2021). A study to evaluate the effectiveness of structured teaching programme on knowledge regarding polycystic ovarian syndrome and related infertility among female students in Isabella Thoburn College at Lucknow. *Asian Journal of Nursing Education and Research*, *11*(1), 71–78. https://doi.org/10.5958/2349-2996.2021.00019.7
- Deswal, R., Narwal, V., Dang, A., & Pundir, C. S. (2020). The Prevalence of Polycystic Ovary Syndrome: A Brief Systematic Review. *Journal of human reproductive sciences*, *13*(4), 261–271. https://doi.org/10.4103/jhrs.JHRS_95_18
- Di Lorenzo, M., Cacciapuoti, N., Lonardo, M. S., Nasti, G., Gautiero, C., Belfiore, A., Guida, B., & Chiurazzi, M. (2023). Pathophysiology and Nutritional Approaches in Polycystic Ovary Syndrome (PCOS): A Comprehensive review. *Current Nutrition Reports*, *12*(3), 527–544. https://doi.org/10.1007/s13668-023-00479-8
- Kaur, J., Patil, M., Kar, S., Jirge, P., & Mahajan, N. (2019). Distribution of anthropometric, clinical, and metabolic profiles of subjects with polycystic ovary syndrome across the four regions of India. *The Onco Fertility Journal*, *2*(1), 20. https://doi.org/10.4103/tofj.tofj_7_19
- Lin, A. W., Dollahite, J. S., Sobal, J., & Lujan, M. E. (2017). Health-related knowledge, beliefs and self-efficacy in subjects with polycystic ovary syndrome. *Human Reproduction*, *33*(1), 91–100. https://doi.org/10.1093/humrep/dex351
- Manimegalai, N., & Anitha, J. (2024). A study to assess the level of knowledge regarding pcos among higher secondary school girls in Dharmapuri, Tamilnadu. *Global Journal for Research Analysis*, 12–14. https://doi.org/10.36106/gjra/5700594
- Nadeem, N. N., Zerish, N. Z., Niazi, N. S. G., Sahi, N. a. A., Babar, N. A., Khalid, N. R., Ijaz, N. H. L., Gulzar, N. U., & Aslam, N. I. (2024). Knowledge, Aptitude, and Practice study regarding modifiable factors among females diagnosed with PCOS. *Journal of Health and Rehabilitation Research*, *4*(3), 1–5. https://doi.org/10.61919/jhrr.v4i3.1469
- Nagarwala, R. M., Davda, P. V., Shyam, A. K., & Sancheti, P. K. (2020). Knowledge, attitude and practice towards exercise in young females diagnosed with polycystic ovary

syndrome. *Indian Journal of Obstetrics and Gynecology Research*, *7*(3), 369–373. https://doi.org/10.18231/j.ijogr.2020.079

- R, R. S., S, S. B., & Babu, B. (2024). Study of knowledge, attitude and practice about polycystic ovarian syndrome among PCOS patients. *International Journal of Reproduction Contraception Obstetrics and Gynecology*, *13*(10), 2723–2729. https://doi.org/10.18203/2320-1770.ijrcog20242802
- Rao, M., Broughton, K. S., & LeMieux, M. J. (2020). Cross-sectional study on the knowledge and prevalence of PCOS at a multiethnic university. *Progress in Preventive Medicine*, *5*(2), e0028. https://doi.org/10.1097/pp9.0000000000000028
- Teede, H. J., Misso, M. L., Costello, M. F., Dokras, A., Laven, J., Moran, L., Piltonen, T., & Norman, R. J. (2018). Recommendations from the international evidence-based guideline for the assessment and management of polycystic ovary syndrome. *Clinical Endocrinology*, *89*(3), 251–268. https://doi.org/10.1111/cen.13795

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A STUDY ON RELATIONSHIP BETWEEN DIETARY PRACTICES AND SCREEN TIME IN ADOLESCENTS OF PATNA DISTRICT IN BIHAR

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ABSTRACT

People have been spending more time in front of screens due to the creative and appealing electronic devices that have been made possible by the ongoing growth of technology. Increased sugar intake and low-nutritional items like French fries, refined grain goods, snacks, and sweets, as well as reduced intakes of fruits, vegetables, and whole grains, have all been connected to longer screen times and bad dietary habits. The aim of this study is to examine the relationship between dietary habits and screen usage in adolescents. Techniques: To assess the eating habits and screen time of 150 students from various schools, colleges, and universities of the Patna district of Bihar, a cross-sectional study was carried out. The selection of participants was done via purposive random sampling. A self-created questionnaire was used to gather data. In the data analysis, descriptive, chi-square, and partial correlation were employed. Findings: The study had 150 individuals in total. Of these, 39 (26.0 percent) were overweight, and only 12 (8.0 percent) were obese. Of them, 35 (23.0 percent) spent three to five hours in front of a screen, while 32.0 percent spent more than seven hours. ate more than they intended to 86 (57.0 percent), mostly skipped breakfast 81 (54.0 percent), and postponed meals 68 (45.0 percent). The majority ate sweets, 66 (44.0 percent), and fried meals, 84 (56.0 percent), while using electronic devices. Conclusions: Students' eating habits have been severely impacted by the high prevalence of screen usage. Students who spent more time in front of a computer typically snacked on junk food, fast food, sweet desserts, salty snacks, and caffeinated beverages.

Keywords: caffeinated beverages, junk food, obesity, screen time

INTRODUCTION

Adolescence is a crucial developmental period marked by quick physical development, hormonal shifts, and the expansion of social and cerebral abilities. During this time, lifestyle choices are made that have a big influence on long-term health results (Ragelienė & Grønhøj, 2020). Dietary habits and screen time are two important facets of adolescent lifestyle that have drawn a lot of attention lately (Alwafi et al., 2022a). The food habits developed in adolescence might affect a person's growth, nutritional health, and chance of developing chronic illnesses as an adult. In a similar vein, screen time—which includes time spent on computers, smartphones, televisions, and other electronic devices—has ingrained itself into teenagers' daily lives (Roorda & Cassin, 2025). It

is essential to comprehend how these two elements interact in order to create public health initiatives that encourage young people to lead better lifestyles. Adolescent eating habits have clearly changed in the last few decades, especially in cities like the Patna region in Bihar.

A diet heavy in processed foods, fast food, and sugary drinks is gradually taking the place of the traditional diet, which was abundant in fruits, vegetables, and home-cooked meals (Wakefield et al., 2010). Numerous causes, such as the increasing accessibility and promotion of unhealthy food options, modifications to family structures, and the impact of peers and the media, are frequently blamed for this trend (Bagnato et al., 2023). These eating habits have been linked to a number of detrimental health effects, such as malnutrition, obesity, and the early onset of chronic illnesses, including diabetes and cardiovascular disease (Shafiee et al., 2024). Simultaneously, there is growing public health concern over adolescents' increased screen time.

Teenagers who spend a lot of time using screens for social media, education, and entertainment have become more sedentary as a result of the widespread use of digital gadgets (Alwafi et al., 2022b). While screen time in moderation can be beneficial for education, excessive screen time is linked to detrimental health effects like inactivity, disturbed sleep, and mental health problems like despair and anxiety (Holmberg et al., 2016). Furthermore, given that excessive screen time is frequently linked to increased snacking, fast food intake, and irregular meal patterns, there is evidence to suggest that it may have an impact on dietary practices (Chung et al., 2021). It is crucial to comprehend the connection between screen time and eating habits for a number of reasons.

First of all, it can assist in identifying important risk factors for subpar health outcomes in teenagers, laying the groundwork for focused interventions (Chaudhary et al., 2020). For example, if it is discovered that excessive screen time is associated with unhealthy eating behaviors, treatments may be developed to lower screen time and encourage better eating practices at the same time. Second, by using this knowledge to guide policy decisions at the local and regional levels, resources can be deployed efficiently to address the health issues that adolescents face most urgently (Rocka et al., 2022).

The purpose of this study is to investigate the connection between dietary practices and screen usage among teenagers in the Bihar district of Patna. The research information was gathered on the dietary practices and screen-time behaviors of adolescents between the ages of 15 and 21 by using a cross-sectional study design. The results of this study were anticipated to add to the body of knowledge already available on adolescent health and offer insightful information to public health professionals, educators, and policymakers in Bihar. In conclusion, teens in Patna are increasingly influencing their own health through their dietary choices and screen-time habits as they negotiate the demands of contemporary life. By shedding light on the relationship between these two variables, this study hopes to lay the groundwork for future initiatives that encourage young people in this area to lead healthy lifestyles. Comprehending this correlation is crucial not only for managing present health concerns but also for averting potential health hazards that might emerge when these teenagers grow into adulthood.

OBJECTIVE OF THE STUDY

1. To know the dietary habits of adolescents of Patna district
2. To find out the screen time used by the adolescents.
3. To find out the relation between dietary habits and screen time.

RESEARCH METHODOLOGY

This cross-sectional study was conducted in the urban region of Patna, Bihar, to explore the relationship between screen time and dietary habits among adolescents. A total of 150 participants aged between 15 and 21 years were selected using purposive random sampling to ensure that the sample accurately represented the target group, which consists of college-going youth. The criteria for selection of the sample were that the participants were enrolled in an undergraduate course of the given age group, residing in Patna, and interested in participating in the survey. Primary data were collected using a structured interview schedule. A pretested questionnaire was developed and standardized for data collection. The questionnaire included information under different sections: socio-demographic information (such as age, marital status, family type, and socioeconomic status), media-based information (such as duration spent on smartphones, laptops/tablets, television, and gaming), and nutrition-based information (such as meal frequency and dietary patterns). To ensure the reliability and validity of the tools, expert reviews were obtained from professionals in the fields of nutrition, public health, and behavioral sciences, and required modifications were made on the basis of their suggestions. Reliability was established through a pilot test conducted on a small group of respondents, which confirmed consistency in responses. The final data were analyzed using descriptive statistics and statistical tests such as the chi-square test and correlation analysis to determine associations between screen time and dietary habits among the study population.

RESULT AND DISCUSSION

This chapter deals with the findings and discussion of the present study which have been concluded after the analysis and interpretation of the acquired data. The findings have been categorised as follows: -

- Sociodemographic profile and BMI classification
- Screen time usage
- Dietary habits while using screen
- Food choices while using screen
- Frequency of meal during screen usage
- Association between BMI and frequency of meal while using screen

Table 1: Distribution of sociodemographic profile and BMI classification of the respondents.

Variables	Category	Frequency	Percentage
Gender	Female	150	100
Age	15-17	76	51.1
	18-19	50	33.3

	20-21	24	16.0
Marital status	Married	14	9.3
	Unmarried	136	90.7
Family type	Joint	41	27.3
	Nuclear	109	73.2
Socio economic status	Lower class	62	41.3
	Middle class	74	49.0
	Upper class	14	9.3
Resident	Urban	111	74.0
	Rural	39	26.0
BMI	Underweight	76	51.1
	Normal	24	16.0
	Overweight	35	23.3
	Obese	15	10.0

The table shows the sociodemographic profile and BMI classification of the 150 female respondents who participated in the study. The entire sample consisted of females. More than half of the participants, 76 (51.1 percent), were aged between 15 and 17 years, followed by 50 (33.3 percent) in the 18–19 age group and 24 (16.0 percent) in the 20–21 age group. The majority, 136 (90.7 percent), of the respondents were unmarried, while only 14 (9.3 percent) were married. Information In terms of family structure, it indicates that most of them belonged to nuclear families; 109 (73.2 percent) belonged to nuclear families, whereas 41 (27.3 percent) were from joint families. Data Regarding socio-economic status, it indicates that about 74 (49.0 percent) of the respondents were of middle-class families, again about 62 (41.3 percent) of respondents were of lower-class families, and only 14 (9.3 percent) were of upper-class backgrounds. A majority of 111 (74.0 percent) of respondents reside in urban areas, and the remaining 39 (26.0 percent) are from rural areas. Through the assessment of Body Mass Index (BMI), it was found that 76 (51.1 percent) of the respondents were in the underweight category, about 35 (23.3 percent) were overweight, only 24 (16.0 percent) had a normal BMI, and the rest, 15 (10.0 percent), were in the obese category. The data highlights the variation in age, socioeconomic background, living conditions, and nutritional status of the adolescent female population under study.

Table 2: Distribution of respondents on the basis of screen time usage while eating

Screen time	**Frequency**	**Precent**
Once a day	11	7.3
Twice a day	34	22.6
Three times a day	49	32.6
None of these	56	37.3

The table presents the distribution of respondents on the basis of screen time uses while eating in a day. The data shows that 49 (32.6 percent) of the respondents were using screen-based devices three times a day, while 34 (22.6 percent) used them twice in a day. A very small person 11 (7.3 percent) of respondents, uses screens only once in a day. Interestingly, maximum of them 56 (37.3 percent) were selected "None of these," option which indicates their irregularity in using screen. Table clears that the significant numbers of adolescent engage themselves in watching screen reflecting increase in their integration with digital devices in their day to day life.

Table 3: Distribution of respondents on the basis of their dietary habits while using screen-based devices.

Dietary Habits While Using Screen			
Variables	**Category**	**Frequency**	**Percentage**
Do you find that once you start eating a certain meal, you consume	Yes	82	54.6
	No	68	45.3
How often do you consume meals while staring at a screen?	On and off	30	20.0
	Once a day	49	32.6
	Twice a day	31	20.6
	Thrice a day	25	16.6
	None of these	15	10.0
Do you put off eating when you're on a screen?	Yes	94	62.6
	No	56	37.3
Do you miss breakfast because you spend the whole night on your laptop or mobile device?	Yes	61	40.6
	No	89	59.3
Do you believe that using a phone or watching TV affects your eating habits?	Eat slowly	79	52.6
	Eat quickly	25	16.6
	Normal eating	46	30.6

The table 3 presents the dietary habits of respondents while using screen-based devices such as phones, laptops, and televisions. It shows that more than half, 82 (54.66 percent), of the respondents reported that once they generally eat more than the required/planned while watching screen. Information regarding frequency of watching screen while eating shows that about 49 (32.6 percent) of respondents use screen only once in a day, and 31 (20.6 percent) were using it twice daily and 25 (16.6 percent) used to watch screen every time of their meal three times. 30 (20.0 percent) of them reported that watching screen was not fix for them. They used it "on and off," as per their mood and Only 15 (10.0 percent) of them mentioned that they never eat while using screens. A significant number, 94 (62.6 percent) of respondent admitted that they developed dietary habit of putting off eating when they are engaged in screen. Late night use of screen always lead to skipping of breakfast

about 61 (40.6 percent) of the respondents agree to this while 59.3 reported that they never missed their breakfast. The next the information gathered on effect on speed of eating shows that, 79 (52.6 percent) of the respondents eats slowly while watching in screen whereas 25 (16.6 percent) eats quickly and 46 (30.6 percent) of them maintained their normal eating speed.

Table 4: Distribution of respondents on the basis of their food choices while using screen.

Food Choices While Using Screen			
Variables	**Category**	**Frequency**	**Percentage**
What kind of food do you typically eat in front of a screen?	Fast food (pizza, burger, processed food)	82	54.6
	Junk food(chips, Kurkure, pastries etc)	68	45.3
	Beverages, (soda drink, cold drink, soft drink)	18	12.0
	Fresh fruits and veggies	10	6.6
	Dessert	15	10.0
	Regular Meal	25	16.6
Fried food consumption combined with electronic device use?	Yes	110	73.3
	No	40	26.6
candy and/or chocolate consumption whilst using electronic devices?	Yes	94	62.6
	No	56	37.3

The table 4 shows the types of food that are commonly consumed by respondents while using screen-based devices. Majority of the respondents 82 (54.6 percent) reported that they like to eat fast foods like pizza, burgers, or processed items while watching screens. Junk food such as chips, Kurkure, and pastries were also commonly consumed food items reported by almost 68 (45.3 percent) of the respondents. In comparison to this only 10 (6.6 percent) of respondents choose healthier options like fresh fruits and vegetables, whereas about 15 (10.0 percent) prefer to consumed desserts again 25 (16.6 percent) of them sticked to their regular meal while watching meals. In addition to this 10 (6.6 percent) reported that they like to drink beverages such as soda cold drink other soft drinks when they are using screen.

The table further analysed some specific eating behaviour of the respondents while using screen. Very high 110 (73.3 percent), of respondents admitted that they where use to consume fried food while using electronic devices. Similarly, 94 (62.6 percent) of respondents habituated to consumed

candy and chocolate indicating a preference towards having high calorie processed snacks during screentime. This indicates that watching screen is screen strongly linked with unhealthy eating choices of adolescents.

Table 5: Distribution of respondents on the basis of relationship between meal frequency and putting off their meal while using a screen

Putting off meals during screen usage	**Frequency of meal during screen usage N(%)**					
	Once a day	Twice a day	Three times a day	None of these	Total	P value
Yes	36(24.0)	25(16.6)	19(12.6)	10(6.6)	90(60.0)	0.004
No	12(8.0)	12(8.0)	11(7.3)	4(2.6)	39(26.0)	
Seldom	8 (5.3)	7(4.6)	4(2.6)	2(1.3)	21(14.0)	
Total	56(37.3)	44(29.3)	34(22.6)	16(10.6)	150(100)	

The table shows the relationship between the frequency of meals while using screen and putting off the meal. About 90 (60.0 percent) of the respondents admitted that they putt off their meal during screentime. Out of which a maximum 36 (24.0 percent) uses screen once in a day while eating, followed by 25 (16.6 percent) twice and about 19 (12.6 percent) three times in a day. On the other hand, 39 (26.0 percent) of the respondents reported that they were not use to put off their meal always. Among them 12 (8.0 percent) does so once, and 12(8.0 percent) twice again 11 (7.3 percent) thrice in a day. In additionally to this 21 (14.0 percent) of the respondents "seldom" putting off their meals during screentime.

The analysis of **p-value** for the relationship between the two putting off the meal and frequency of the meals during screen time was **0.004** is statistically significant (typically, a p-value less than 0.05 indicates a significant association). This means that there is a meaningful relationship between the frequency of eating meals while using screen and the respondent's tendency to putt off their meal while watching screen.

Table 6: Distribution of respondents of relationship between BMI and frequency of meal during screen uses

Frequency of meals during screen uses	**BMI of the respondents**				**Total**	**p-value**
	Underweight	**Normal**	0.002 **Overweight**	**Obese**		
Once a day	5 (7.5)	3 (5.0)	2 (3.0)	1(2.0)	11(17.0)	
Twice a day	16 (24.0)	4 (6.0)	10 (15.0)	4 (6.0)	34(51.0)	
Three times a day	15 (23.0)	6 (9.0)	20 (30.0)	8 (12.0)	49(74.0)	
None of these	40 (60.0)	11 (17.0)	3 (6.0)	2 (3.0)	56(84.0)	
Total	76 (114.0)	24 (36.0)	35 (53.0)	15 (23.0)	150(100)	

The table 6 shows the distribution of respondents as per their BMI and frequency of meals during screen uses (like a phone, TV, or laptop). Among the 150 adolescents, maximum was under underweight category that is 40 (60.0 percent) were not using screen while eating. Table indicates that maximum of 8 (12.0 percent) obese and 20 (30.0) overweight people were using screen three or more time in a day. The analysis shows that higher frequency of meal during screen uses may leads more increase in weight resulting overweight and obese. A significant P value of 0.002 also proves the facts there is positive correlation between frequency of meal during screen uses.

DISCUSSION

Using a sample of 150 female participants, this study offers a thorough examination of the relationship between screen time and eating behaviours, revealing important trends in effect of screen time on body weight, socioeconomic status, and dietary practices. The analysis throws the light on the effect of screen time on the dietary habit food choices and general health of adolescents. The majority 110 (73.2 percent) of study sample were from nuclear households and out of these 137 (90.7 percent) were unmarried. as per the socioeconomic data maximum 74 (49.0 percent) were of middle class, 62 (41.3 percent) and 14 (9.3 percent) were upper class, this distribution highlights the fact that the majority of study samples were from middle class or lower class having low socioeconomic strata and poor economic background. About 111 (74.0 percent) were from urban areas, and 39 (26.0 percent) were from rural areas. Although urban population have more access to variety of food options and exposure to healthcare facilities along with the drawback of easy availability of fast food and sedentary life style may affect the result to a great extent. The rural individuals, on the other hand, facing difficulties with access of food and healthcare facility may as so affect result. The BMI data reveals an alarming trend that is 77 (51.1 percent) of participants were underweight category which could be a sign of inadequate dietary intake whereas 50 (33.0 percent) overweight and obese category would be due to unhealthy eating choices and sedentary lifestyle. Significant health disparities within the sample shows large range of BMIs, including both overweight and underweight. This variation might be a result of participant variations in lifestyle, food choices, and access to nutrient-dense foods. Further analysis shows that 82 (54.6 percent) of respondents over indulge in food when distracted by screens, which that screen time affects the eating behaviour of individuals. According to the findings, a noteworthy 97 (64.6 percent) of participants postpone eating while using screens, which affects their meal schedule having impact on nutrition too. Again 61 (40.6 percent) of participants skip their breakfast due to overnight and extended use of screen time, which definitely causes harmful effect on their metabolic well-being. Study also reveals that frequent use of screentime may lead to unhealthy food preferences and selection as 82 (54.6 percent) commonly use to eat fast food (such as pizza, burgers) and 68 (45.3 percent) chooses junk food (such as pastries and chips). A very few percent 25 (16.6 percent) and 10 (6.6 percent) have choices of fresh food and vegetables and regular meals. The high proportion of participants 94 (62.6 percent) who ate sweets or chocolate and 110 (73.3 percent) fried meals indicating a tendency to choose high-calorie, low-nutrient items while watching screens. Comfort and convenience food consumption are on the rise, and this can lead to long-term health problems like obesity and poor nutrition. Relation between frequency of meal using screen and put off meal while using screen shows a strong and significant relation. The significant value of p-value of 0.004 clearly indicates their positive correlation again the p- value of 0.002 means the results is statistically significant shows the positive correlation between frequency of meal and BMI during screen uses.

This correlation shows how screen time affects regular eating behaviour and also emphasizes that there is a need of initiatives to bring change in the present behaviour pattern.

CONCLUSION

The study shows a strong relationship between screen time and eating habits, with notable effects on food preferences, meal scheduling, and quantity control. The demographic study reveals that participants come from a variety of socioeconomic backgrounds, with middle-class and lower-class people making up the majority. The large urban population may face particular difficulties with lifestyle and food access. Targeted dietary interventions are necessary, as indicated by the BMI distribution, which points to problems with undernutrition and overweight within the sample. The high rate of meal skipping and the frequent ingestion of harmful items during screen time underscore the detrimental impacts of screen usage on eating patterns. Public health initiatives should prioritize encouraging mindful eating, expanding access to nutrient-dense foods, and promoting good eating behaviours in order to address these problems. Education initiatives should focus on increasing public knowledge of the negative impacts of screen time on eating habits and offering workable ways to lessen such effects. The study's overall findings highlight the necessity of a multimodal strategy to enhance eating habits and address the health risks related to screen usage.

SUGGESTION

Based on the findings of this study, it is essential to encourage healthy eating habits among adolescents to improve their nutritional status and overall well-being. Excessive screen time during meals was associated with unhealthy food choices, irregular meal patterns, and increased risk of underweight or overweight conditions. Therefore, certain steps must be taken by families, schools, and communities to reduce screen-related distractions during meals and promote healthier lifestyles.

- Discourage screen use (mobile, TV, laptop) during meals to support mindful eating.
- Conduct nutrition education programs in schools and colleges regularly.
- Raise awareness about the negative impact of fast food, sugary snacks, and meal skipping.
- Parents should set examples by holding screen-free family meals and encouraging good eating habits.
- Schools should implement policies to discourage screen use during lunch breaks.
- Integrate nutrition and health topics into the academic curriculum.
- Encourage balanced routines with proper sleep, physical activity, and timely meals.
- Use digital tools wisely**,** like apps that send health tips and reminders for meals and hydration.
- Promote further research with larger and more diverse adolescent groups.

REFERENCE

- Alwafi, H., Alwafi, R., Naser, A. Y., Samannodi, M., Aboraya, D., Salawati, E., Alqurashi, A., Ekram, R., Alzahrani, A. R., Aldhahir, A. M., Assaggaf, H., & Almatrafi, M. (2022a). The Impact of Social Media Influencers on Food Consumption in Saudi Arabia, a Cross-Sectional Web-Based Survey. *Journal of Multidisciplinary Healthcare*, *Volume 15*, 2129–2139. https://doi.org/10.2147/JMDH.S384523

- Alwafi, H., Alwafi, R., Naser, A. Y., Samannodi, M., Aboraya, D., Salawati, E., Alqurashi, A., Ekram, R., Alzahrani, A. R., Aldhahir, A. M., Assaggaf, H., & Almatrafi, M. (2022b). The Impact of Social Media Influencers on Food Consumption in Saudi Arabia, a Cross-Sectional Web-Based Survey. *Journal of Multidisciplinary Healthcare*, *Volume 15*, 2129–2139. https://doi.org/10.2147/JMDH.S384523
- Bagnato, M., Roy-Gagnon, M.-H., Vanderlee, L., White, C., Hammond, D., & Potvin Kent, M. (2023). The impact of fast food marketing on brand preferences and fast food intake of youth aged 10–17 across six countries. *BMC Public Health*, *23*(1), 1436. https://doi.org/10.1186/s12889-023-16158-w
- Chaudhary, A., Sudzina, F., & Mikkelsen, B. E. (2020). Promoting Healthy Eating among Young People—A Review of the Evidence of the Impact of School-Based Interventions. *Nutrients*, *12*(9), 2894. https://doi.org/10.3390/nu12092894
- Chung, A., Vieira, D., Donley, T., Tan, N., Jean-Louis, G., Kiely Gouley, K., & Seixas, A. (2021). Adolescent Peer Influence on Eating Behaviors via Social Media: Scoping Review. *Journal of Medical Internet Research*, *23*(6), e19697. https://doi.org/10.2196/19697
- Holmberg, C., E. Chaplin, J., Hillman, T., & Berg, C. (2016). Adolescents' presentation of food in social media: An explorative study. *Appetite*, *99*, 121–129. https://doi.org/10.1016/j.appet.2016.01.009
- Ragelienė, T., & Grønhøj, A. (2020). The influence of peers′ and siblings′ on children's and adolescents′ healthy eating behavior. A systematic literature review. *Appetite*, *148*, 104592. https://doi.org/10.1016/j.appet.2020.104592
- Rocka, A., Jasielska, F., Madras, D., Krawiec, P., & Pac-Kożuchowska, E. (2022). The Impact of Digital Screen Time on Dietary Habits and Physical Activity in Children and Adolescents. *Nutrients*, *14*(14), 2985. https://doi.org/10.3390/nu14142985
- Roorda, B. A., & Cassin, S. E. (2025). A Review of Food-Related Social Media and Its Relationship to Body Image and Disordered Eating. *Nutrients*, *17*(2), 342. https://doi.org/10.3390/nu17020342
- Shafiee, M., Al-Bazz, S., Lane, G., Szafron, M., & Vatanparast, H. (2024). Exploring Healthy Eating Perceptions, Barriers, and Facilitators among Urban Indigenous Peoples in Saskatchewan. *Nutrients*, *16*(13), 2006. https://doi.org/10.3390/nu16132006
- Wakefield, M. A., Loken, B., & Hornik, R. C. (2010). Use of mass media campaigns to change health behaviour. *The Lancet*, *376*(9748), 1261–1271. https://doi.org/10.1016/S0140-6736(10)60809-4

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IMPACT OF TAILORED DASH DIET ON NUTRIENT INTAKE AND CARDIOVASCULAR BIOMARKERS IN STAGE-1 HYPERTENSIVE PATIENTS: A CONTROLLED STUDY

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ABSTRACT

Hypertension stands as a common medical condition which creates various serious health problems including cardiovascular diseases. A research analyzed how customized versions of the Dietary Approaches to Stop Hypertension (DASH) diet affected the nutrient consumption and cardiovascular system measurements in patients with stage-I hypertension. The research was conducted between April 2022 to March 2023 at Ayodhya District Hospital India and subdivided 250 participants into Control, Experiment Group I and Experiment Group II. Researchers studied dietary intake together with biochemical measures before started the intervention along with after its completion. Researchers observed that experimental groups decreased their calorie and protein and fat and sodium intake because of which serum cholesterol and sodium levels improved compared to the Control Group. The investigative research concluded that the DASH diet both controls hypertension and promotes cardiovascular wellness. The research demonstrates that scheduled nutritional plans need to become standard practices in medical hypertension treatment.

Keywords: Cardiovascular Biomarkers, Dietary Intervention, Hypertension, Nutrient Intake.

INTRODUCTION

The condition known as high blood pressure or hypertension creates persistent excessive force which blood puts on artery walls. Hypertension causes major health problems that raise a person's chance of developing fatal heart conditions and strokes. Sources from the American Heart Association (2023) provide definitions of hypertension as when blood pressure maintains above 130/80 mmHg. Worldwide statistics demonstrate that high blood pressure affects 1.28 billion adults aged 30-79 years including numerous unidentified cases of hypertension in this population. Multiple factors including heredity and nutrition play a role in creating hypertension because of inactivity and unhealthful dietary choices. NHLBI (2022) indicates that blood pressure control requires both lifestyle adjustments with possible pharmacological treatment as separate components of treatment. Effective management and treatment of high blood pressure requires the

use of evidence-based guidelines developed by the Ninth Joint National Committee (JNC 9) as stated by James et al. (2021).

The significant worldwide health problem hypertension ensures that a major population segment suffers from this condition while making CVD events more likely according to Suri et al. (2020). Research has proven that the Dietary Approaches to Stop Hypertension (DASH) diet provides effective treatment of hypertension because of its established reputation (Suri et al., 2020; Campbell, 2017). The DASH diet promotes individuals to eat fresh fruits and vegetables paired with whole grains together with low-fat dairy substances while limiting both meat portions and salt levels along with saturated fats and sugars (Campbell, 2017). Following the DASH diet people need to eat fresh produce alongside whole grains alongside low-sugar dairy foods along with limited meat portions and small salt amounts and saturated fat together with reduced added sugar (Campbell, 2017).

Many studies illustrate how the DASH diet benefits heart health while lowering blood pressure (Suri et al., 2020; Campbell, 2017). Studied research indicates that the DASH diet enhances mental acuity and lowers the probability of cognitive degradation which reinforces its efficacy in managing neurocognitive damage (Smith, 2019). Researchers have failed to study how customized DASH dietary changes affect both nutrient consumption and cardiovascular biomarkers in stage-1 hypertensive patients. Stage-1 hypertensive patients will be part of a controlled experiment that evaluates how modified DASH dietary programs influence their nutrient consumption and complete cardiovascular biomarker results.

OBJECTIVES OF THE STUDY

1. To study and assess the nutrient intake of stage-I hypertensive patients.
2. To estimate the biochemical parameters (serum sodium and serum cholesterol level) of stage-1 hypertensive patients during post-intervention.

HYPOTHESIS

We hypothesized that implementing a tailored DASH diet in stage-1 hypertensive patients would lead to significant improvements in their dietary intake patterns and corresponding reductions in cardiovascular risk biomarkers. In particular, patients receiving the tailored DASH diet (Experimental Groups I and II) were expected to decrease their intake of total calories, fat, protein, and sodium (aligning more closely with recommended dietary guidelines) and to exhibit significant decreases in serum cholesterol and serum sodium levels, compared to the control group receiving standard care without a specialized diet. This hypothesis is based on the premise that a diet rich in fruits, vegetables, whole grains, and low-fat dairy, and low in sodium and saturated fat, will positively influence both nutrient consumption and cardiovascular health measures in hypertensive individuals.

MATERIALS AND METHODS

Study design and participants

This controlled intervention study was conducted at Ayodhya District Hospital (Uttar Pradesh, India) between April 2022 and March 2023. A total of 250 adult patients diagnosed with stage-1 hypertension were recruited and divided into three groups: a Control Group (n = 90) and two intervention groups (Experimental Group I: n = 83, and Experimental Group II: n = 77). Participants were assigned to the experimental or control groups based on their initial evaluations and consent to dietary intervention. All participants were stage-1 hypertensive (systolic blood pressure 130–139 mmHg or diastolic 80–89 mmHg) and were under medical supervision. The study received ethical approval from the Institute of Medical Sciences Ethics Committee at Banaras Hindu University, Varanasi. Informed written consent was obtained from each patient prior to participation.

Intervention

Participants in the experimental groups received tailored DASH diet plans, which were customized to local dietary preferences and nutritional needs while adhering to DASH principles. These plans emphasized increased consumption of fruits, vegetables, whole grains, legumes, and low-fat dairy, along with reduced intake of salt, red meat, saturated fats, and added sugars. Experimental Group I and Experimental Group II each received a version of the DASH diet with specific tailored modifications (such as individualized meal plans and counseling), while the Control Group received standard care and no specific dietary guidance beyond general advice. The intervention period lasted for 3 months, during which the experimental groups were counseled regularly to support adherence to the DASH diet modifications.

Dietary intake assessment

Dietary intake for all participants was assessed both before (pre-intervention) and after (post-intervention) the 3-month period using the 24-hour dietary recall method. Participants were interviewed by trained dietitians to recall all foods and beverages consumed in the past 24 hours, using a multiple-pass approach to improve accuracy. This recall was conducted on multiple, non-consecutive days to capture usual intake. The portion sizes and ingredients were carefully recorded, and nutrient intake was calculated using standard food composition tables and nutritional analysis software. Key nutrients of interest included total energy (calories), protein, fat, carbohydrates, and sodium. To evaluate dietary adequacy and improvements, the estimated nutrient intakes were compared against standard guidelines, including the Estimated Average Requirement (EAR) and Recommended Dietary Allowances (RDA) for the participants' age and sex. This comparison helped determine if and how the DASH diet intervention moved the participants closer to recommended nutritional targets.

Biochemical measurements

Biochemical assessments were performed pre and post-intervention to measure cardiovascular health biomarkers. Fasting venous blood samples were collected from each participant in the

morning. Serum cholesterol and serum sodium levels were analyzed using a standard auto-analyzer in the hospital's laboratory (following the manufacturer's protocols and quality control procedures). Serum total cholesterol was measured in milligrams per deciliter (mg/dL) and serum sodium in millimoles per liter (mmol/L). All biochemical assays were conducted by certified laboratory technicians, and the instruments were calibrated before each use to ensure accuracy. These measurements provided objective data on cardiovascular risk factors at baseline and after the dietary intervention.

Statistical analysis

All data were compiled and analyzed using IBM SPSS Statistics software (version 26.0). Descriptive statistics (mean and standard deviation) were calculated for nutrient intakes and biomarker levels in each group pre- and post-intervention. To determine the effect of the intervention, paired sample t-tests were used to compare pre- vs. post-intervention values within each group (Control, Exp I, Exp II). This test assesses whether the mean change in each variable was statistically significant within the same participants. A p-value < 0.05 was considered the threshold for statistical significance. We specifically examined the changes in calorie, protein, fat, carbohydrate, and sodium intake, as well as changes in serum cholesterol and sodium levels. Additionally, between-group differences in the magnitude of changes were observed descriptively; however, the primary analysis focused on within-group improvements. The results are presented with their p-values and degrees of freedom (df), and all significant findings are noted. The figures illustrating the key outcomes were generated to visualize differences between pre- and post-intervention means for each group.

FINDINGS AND DISCUSSION

Nutrient intake of the participants

Calorie intake

The Control Group participants experienced a major rise in their caloric consumption as their pre-intervention record of 2305.57 kcal turned into 2442.38 kcal following the intervention period which produced a -136.81 kcal difference. The participants in Experiment Group I consumed an average of 346.05 kcal fewer calories after the intervention period given that their pre-intervention intake amounted to 2208.34 kcal but decreased to 1862.29 kcal. The participants in Experiment Group II experienced a major decline in calorie consumption from their pre-intervention level of 2277.83 kcal down to 1657.14 kcal throughout the post-intervention period with a calculated difference of 620.69 kcal (Table 1). Average participants in the Control Group drastically increased their calorie consumption while both experimental groups significantly decreased their total calorie consumption. The data indicates that improper diet management allows patients to consume more calories which leads to worse hypertensive outcomes. The literature confirms that decreased calorie amounts lead to better blood pressure results and enhance cardiovascular wellness (Appel et al., 1997; Sacks et al., 2001, Belanger et al., 2023). Experiment Groups I and II demonstrate the powerful impact of caloric control as part of dietary guidelines according to Siervo et al. (2015).

Table1: Different type of nutrients taken by among respondents Pre/Post intervention

Groups	Calorie								
	Pre		Post		Difference		Paired t test	df	P
	Mean	SD	Mean	SD	Mean	SD			
Control Group	2305.57	206.87	2442.38	419.70	-136.81	596.85	2.37	89	<0.05
Experiment Group I	2208.34	215.80	1862.29	176.89	346.05	299.76	10.52	82	<0.001
Experiment Group II	2277.83	215.14	1657.14	108.92	620.69	252.53	21.57	76	<0.001
Protein									
Control Group	60.60	7.61	61.20	7.04	-0.60	9.24	0.62	89	>0.05
Experiment Group I	59.39	7.73	49.96	9.04	9.42	10.25	8.38	82	<0.001
Experiment Group II	56.35	7.09	43.82	4.10	12.53	7.32	15.03	76	<0.001
Fat									
Control Group	28.10	7.17	33.60	5.05	-5.50	5.99	8.72	89	<0.001
Experiment Group I	26.02	5.00	22.78	2.46	3.22	5.34	5.53	82	<0.001
Experiment Group II	26.09	5.37	20.74	1.39	5.35	5.46	8.60	76	<0.001
CHO									
Control Group	250.81	38.59	256.18	32.59	-5.37	26.77	1.90	89	>0.05
Experiment Group I	231.86	39.52	263.36	12.91	-31.51	40.61	7.07	82	<0.001
Experiment Group II	249.45	38.19	270.27	16.03	-20.82	39.70	4.60	76	<0.001
Sodium									
Control Group	1051.10	202.62	1117.94	143.94	-66.84	196.02	3.24	89	<0.01
Experiment Group I	1284.60	318.94	1091.57	93.97	193.04	340.75	5.16	82	<0.001
Experiment Group II	1339.81	301.42	1083.12	86.45	256.69	308.15	7.31	76	<0.001

Protein intake

The Control Group participants consumed a non-significant amount of protein that increased by -0.60 grams from 60.60 to 61.20 grams during the pre-intervention and post-intervention periods. The participants of Group I in the experiment showed a substantial drop in their average protein consumption from pre-intervention levels of 59.39 grams to post-intervention levels of 49.96 grams making their mean difference 9.42 grams. Participants in Experiment Group II experienced a statistically meaningful decrease in protein consumption from initial levels at 56.35 grams to 43.82

grams after the intervention applying a mean difference of 12.53 gram (Table 1). The Control Group recorded no substantial modification in protein consumption due to the challenge of improving diets when no specialized intervention occurs. The experimental subject groups successfully followed dietary guidelines which led to significant protein intake reductions because hypertension management requires such dietary control. Multiple studies demonstrate that hypertension patients benefit from moderate protein restriction because this practice decreases the renal load and leads to better blood pressure management (Wheeler & Bernard, 2020).

Fat intake

The Control Group participants increased their fat consumption by -5.50 grams between pre-test 28.10 and post-test 33.60. The average fat consumption decreased by 3.22 grams after intervention in Experiment Group I starting from 26.02 grams pre-intervention and ending at 22.78 grams post-intervention. Average fat consumption in Experiment Group II decreased by 5.35 grams from 26.09 grams before the intervention until it reached 20.74 grams post-intervention (Table 1). The Control Group experienced an elevated fat intake whereas experimental groups demonstrated significant decreases which demonstrates that no intervention could lead to unintentional fat consumption rise. Research findings that link decreased blood pressure risks to low-fat diets (Estruch et al., 2018) support the evaluation of Experiment Groups I and II which demonstrated notable reductions in their fat consumption. Proof exists for recommending low saturated fat dietary patterns to patients with hypertension per Whelton et al. (2018).

Carbohydrate (CHO) intake

The Control Group participants exhibited an unimportant rise in carbohydrate consumption between the pre-intervention measurements of 250.81 grams which reached 256.18 grams after intervention. This shift in results produced a -5.37 gram difference. The participants of Experiment Group I experienced a major change in carbohydrate consumption leading to pre-intervention levels of 231.86 grams shifting to post-intervention levels of 263.36 grams which produced a mean difference of -31.51 grams. The carbohydrate intake in Experiment Group II notably rose by -20.82 grams from 249.45 grams (SD = 38.19) pre-experiment to 270.27 grams (SD = 16.03) post-intervention (Table 1). The Control Group failed to generate significant carbohydrate intake elevation yet the experimental groups produced notable results due to their planned dietary intervention structure. The research demonstrates that hypertension treatment benefits from selecting complex carbohydrates and fiber while properly managing carbohydrate consumption patterns (Reis et al., 2014). The DASH diet containing whole grains and fruits and vegetables together with increased carbohydrate intake leads to better cardiovascular health according to Grosso et al. (2017).

Sodium intake

In the Control Group, the average sodium intake increased significantly from 1051.10 mg, pre-intervention to 1117.94 mg and post-intervention, with a mean difference of -66.84 mg. Experiment Group I demonstrated a significant decrease in average sodium intake from 1284.60 mg. pre-intervention to 1091.57 mg and post-intervention, with a mean difference of 193.04 mg.

Experiment Group II also exhibited a significant reduction in average sodium intake from 1339.81 mg, pre-intervention to 1083.12 mg and post-intervention, with a mean difference of 256.69 mg (Table 1). The significant increase in sodium intake in the Control Group underscores the challenges of maintaining low sodium consumption without intervention. The significant reductions in sodium intake in the experimental groups highlight the effectiveness of dietary interventions in reducing sodium intake, a key factor in managing hypertension (He & MacGregor, 2004, 2003; Graudal et al., 2017). This aligns with guidelines advocating for reduced sodium intake to lower blood pressure and cardiovascular risk (Whelton et al., 2018; Kawamura et al., 2016).

Table.2: Average increase/decrease in serum cholesterol and serum sodium between pre and post intervention

Groups	Serum Cholesterol Level								
	Pre		Post		Difference		Paired t test	df	P
	Mean	SD	Mean	SD	Mean	SD			
Control Group	239.40	23.18	238.83	14.19	.57	24.45	0.22	89	>0.05
Experiment Group I	236.82	22.14	224.70	17.47	12.12	26.40	4.18	82	<0.001
Experiment Group II	245.30	17.35	205.77	5.37	39.54	16.32	21.26	76	<0.001
Serum Sodium Level									
Control Group	161.96	5.81	161.67	4.28	0.30	5.21	0.54	89	>0.05
Experiment Group I	162.04	5.62	144.99	2.65	17.05	5.91	26.31	82	<0.001
Experiment Group II	162.13	5.60	141.20	3.81	20.94	6.52	28.18	76	<0.001

Biochemical parameter of the participants

Serum cholesterol level

The research demonstrates that dietary interventions affect stage-I hypertensive patients' nutritional intake while simultaneously modifying their biochemical parameter outcomes. The data from this study confirms existing research which demonstrates the crucial role of dietary adjustments in hypertension control and prevention of related health dangers. The Control Group participants experienced a negligible non-statistically significant reduction of 0.57 mg/dL in their mean serum cholesterol levels which decreased from 239.40 mg/dL before treatment to 238.83 mg/dL afterward. The serum cholesterol level of Experiment Group I decreased substantially by 12.12 mg/dL between pre-intervention at 236.82 mg/dL and post-intervention at 224.70 mg/dL.

The mean serum cholesterol level reduction in Experiment Group II reached a new peak after observing a significant decrease from pre-intervention 245.30 mg/dL to post-intervention 205.77 mg/dL which caused a mean difference of 39.54 mg/dL (Table 2).

Serum sodium level

Undertreated patients in the Control Group displayed a non-significant decrease in serum sodium levels from 161.96 mmol/L to 161.67 mmol/L that generated a mean change of 0.30 mmol/L (SD = 5.21). Serum sodium levels in Experiment Group I experienced a significant decrease from 162.04 mmol/L to 144.99 mmol/L while the mean difference between these values amounted to 17.05 mmol/L. The mean serum sodium level decreased from 162.13 mmol/L, pre-intervention to 141.20 mmol/L and post-intervention in Experiment Group II where the mean difference reached 20.94 mmol/L (Table 2). The Control Group's non-significant serum sodium pattern stands alone compared to the significant sodium decrease patterns in the experimental groups thus demonstrating why dietary interventions matter for sodium management. Research has authenticated that decreased sodium consumption lowers blood pressure effectively as well as improves cardiovascular health (Aburto et al., 2013; Graudal et al., 2017). Research backs up modern dietary guidance which states controlling sodium intake remains the main intervention for high blood pressure treatment (Whelton et al., 2018).

CONCLUSION

Stage-I hypertensive patients show substantial evidence that nutritional modifications lead to better eating habits and blood measurements. Dietary structure modification proves essential for hypertension treatment through its impact on measured carbohydrate intake and protein amounts and lipid quantities together with sodium content and blood sodium reading and cholesterol levels. The study's outcomes indicate that health professionals should implement dietary approaches such as DASH diets because they benefit hypertensive patient cardiovascular wellness. Investigators need to examine sustained dietary guideline follow-up while studying hypertension control from dietary and non-dietary lifestyle interventions.

FUTURE IMPLICATIONS

1. Mass awareness about high blood pressure should be launched because this condition creates severe damage to essential organs such as brain and heart and kidneys and eyes.
2. Having uncontrolled high blood pressure results in disability while causing patients to suffer from poor life quality. The monitoring of blood pressure changes requires continuous recording on charts so health professionals strongly recommend this practice.
3. Private hospital research should examine how blood pressure rates differ between people from low income areas and middle-income areas and high-middle income areas.
4. Effective promotion of dietary knowledge which combines potassium-rich and fiber-filled and protein-rich foods while avoiding sodium and saturated fats helps individuals keep their blood pressure in check to prevent heart disease and strokes.
5. Future research should expand the study area with a larger patient sample to include Stage-1 high blood pressure patients for extensive results.

REFERENCES

- Aburto, N. J., Hanson, S., Gutierrez, H., Hooper, L., Elliott, P., & Cappuccio, F. P. (2013). Effect of increased potassium intake on cardiovascular risk factors and disease: Systematic review and meta-analyses. *BMJ, 346*, f1378. https://doi.org/10.1136/bmj.f1378
- American Heart Association. (2023). Understanding blood pressure readings. Retrieved from https://professional.heart.org/en/professional-membership/become
- Appel, L. J., Moore, T. J., Obarzanek, E., Vollmer, W. M., Svetkey, L. P., Sacks, F. M., & Young, D. R. (1997). A clinical trial of the effects of dietary patterns on blood pressure. *The New England Journal of Medicine, 336*(16), 1117-1124. https://doi.org/10.1056/NEJM199704173361601
- Belanger, M. J., Kovell, L. C., Turkson-Ocran, R. A., Mukamal, K. J., Liu, X., Appel, L. J., & Juraschek, S. P. (2023). Effects of the DASH diet on change in cardiac biomarkers over time. *Journal of the American Heart Association, 12*(2), e026684. https://doi.org/10.1161/JAHA.122.026684
- Campbell, A. P. (2017). DASH eating plan: An eating pattern for diabetes management. *Diabetes Spectrum, 30*(2), 76–81. https://doi.org/10.2337/ds16-0084
- Estruch, R., Ros, E., Salas-Salvadó, J., Covas, M. I., Corella, D., Arós, F., & Martínez-González, M. A. (2018). Primary prevention of cardiovascular disease with a Mediterranean diet supplemented with extra-virgin olive oil or nuts. *The New England Journal of Medicine, 378*(25), e34. https://doi.org/10.1056/NEJMoa1800389
- Graudal, N. A., Hubeck-Graudal, T., & Jürgens, G. (2017). Effects of low sodium diet vs. high sodium diet on blood pressure, renin, aldosterone, catecholamines, cholesterol, and triglyceride. *Cochrane Database of Systematic Reviews, 4*. https://doi.org/10.1002/14651858.CD004022.pub4
- Grosso, G., Galvano, F., Marventano, S., Malaguarnera, M., Bucolo, C., Drago, F., & Caraci, F. (2017). Omega-3 fatty acids and depression: Scientific evidence and biological mechanisms. *Oxidative Medicine and Cellular Longevity, 2014*. https://doi.org/10.1155/2014/313570
- He, F. J., & MacGregor, G. A. (2003). How far should salt intake be reduced? *Hypertension, 42*(6), 1093-1099. https://doi.org/10.1161/01.HYP.0000102864.05174.E8
- He, F. J., & MacGregor, G. A. (2004). Effect of longer-term modest salt reduction on blood pressure. *Cochrane Database of Systematic Reviews, 3*. https://doi.org/10.1002/14651858.CD004937
- James, P. A., Oparil, S., Carter, B. L., Cushman, W. C., Dennison-Himmelfarb, C., Handler, J., & Ortiz, E. (2021). Evidence-based guideline for the management of high blood pressure in adults: Report from the panel members appointed to the Ninth Joint National Committee (JNC 9). *JAMA, 324*(8), 509-523. https://doi.org/10.1001/jama.2021.10857
- Kawamura, A., Kajiya, K., Kishi, H., Inagaki, J., Mitarai, M., Oda, H., & Kobayashi, S. (2016). Effects of the DASH-JUMP dietary intervention in Japanese participants with high-normal blood pressure and stage 1 hypertension: An open-label single-arm trial. *Hypertension Research, 39*(11), 777-785. https://doi.org/10.1038/hr.2016.78
- Kiblasan, J. I. A., Payagen, L. T., Dulnuan, R. E., Singson, E. C., & Uy, P. P. (2015). Correlational study on hypertension and dietary regimen among young adults in Bontoc,

Mountain Province Philippines. *Clinical Nursing Studies, 3*(4), 1-6. https://doi.org/10.5430/cns.v3n4p1

- Makhija, A., Khatik, N., & Raghunandan, C. (2021). A randomized control trial to study the effect of integrated yoga on pregnancy outcome in hypertensive disorder of pregnancy. *Complementary Therapies in Clinical Practice, 43*, 101366. https://doi.org/10.1016/j.ctcp.2021.101366
- National Heart, Lung, and Blood Institute. (2022). High blood pressure. Retrieved from https://www.sciencedirect.com/science/article/pii/S2666667722001143
- Reis, J. P., Loria, C. M., Sorlie, P. D., Park, Y., Hollenbeck, A., & Schatzkin, A. (2014). Lifestyle factors and risk for new-onset diabetes: A population-based cohort study. *Annals of Internal Medicine, 155*(5), 292-299. https://doi.org/10.7326/0003-4819-155-5-201109060-00006
- Sacks, F. M., Svetkey, L. P., Vollmer, W. M., Appel, L. J., Bray, G. A., Harsha, D., & Karanja, N. (2001). Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. *The New England Journal of Medicine, 344*(1), 3-10. https://doi.org/10.1056/NEJM200101043440101
- Siervo, M., Lara, J., Chowdhury, S., Ashor, A. W., Oggioni, C., & Mathers, J. C. (2015). Effects of the Dietary Approach to Stop Hypertension (DASH) diet on cardiovascular risk factors: A systematic review and meta-analysis. *British Journal of Nutrition, 113*(1), 1-15. https://doi.org/10.1017/S0007114514003341
- Smith, P. J. (2019). Pathways of prevention: A scoping review of dietary and exercise interventions for neurocognition. *Brain Sciences, 9*(1), 3-38. https://doi.org/10.3390/brainsci9010003
- Suri, S., Kumar, V., Kumar, S., Goyal, A., Tanwar, B., Kaur, J., & Kaur, J. (2020). DASH dietary pattern: A treatment for non-communicable diseases. *Current Hypertension Reviews, 16*(2), 108-114. https://doi.org/10.2174/1573402115666191025162645
- Wheeler, M. L., & Bernard, M. A. (2020). The relationship between protein intake and blood pressure: A review of the literature. *Nutrition Reviews, 78*(6), 404-413. https://doi.org/10.1093/nutrit/nuz087
- Whelton, P. K., Carey, R. M., Aronow, W. S., Casey, D. E., Collins, K. J., Dennison Himmelfarb, C., & Wright, J. T. (2018). 2017 ACC/AHA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults. *Journal of the American College of Cardiology, 71*(19), e127-e248. https://doi.org/10.1016/j.jacc.2017.11.006
- World Health Organization. (2021). Hypertension. Retrieved from https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)

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MENSTRUAL DISTRESS AMONG ATHLETES AND NON-ATHLETES RESIDING IN THREE DISTRICTS OF KERALA

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ABSTRACT

This study aimed to compare the nutritional status, and menstrual distress of athletes and non-athletes residing in three districts of Kerala State. A total of 100 participants (50 athletes and 50 non-athletes) from diverse socioeconomic backgrounds belonging to the age category of 18 to 23 years were included for the study. The tools and techniques for data collection include a combination of questionnaire and interview method. Anthropometric information was acquired regarding height, weight, and BMI. MOOS Menstrual Distress Questionnaire (MDQ) was the tool used to elicit Menstrual Distress and Dietary Assessment was done using a 24-hour dietary recall. Socio demographic data was evaluated using Kuppuswamy's Socioeconomic scale. It was observed that 10 % of the participants belonged to Upper lower class, 45 % each from Lower middle class and Upper middle class respectively. It was observed that 23% of the participants were underweight, a greater number of non-athletes being underweight as compared to athletes. Nearly half of participants (48%) belonged to the normal weight category. Additionally, 17% of the participants were categorized as obese. The menstrual distress score data revealed a range of pain severity, with participants reporting scores from 1 to 10. Six percent of participants experienced mild pain (rating 1), while 11% reported severe pain (rating 10). The majority fell into the moderate-to-high range, with 24% reporting an 8 and 12% reporting a 7 on the pain scale. From the 100 participants, 34 were Anaemic and 66 were non-anaemic. More number of non-athletes were Anaemic compared to Athletes. Evaluation of the menstrual distress during the different phases of the menstrual cycle indicated significant changes during menstruation compared to the premenstrual phase for both athletes and non-athletes. Overall, the data indicates that both athletes and non-athletes experience significant changes in multiple symptom categories across different phases of the menstrual cycle.

Keywords: Athletes, Non-athletes**,** Healthy eating Index (HEI), Menstrual Distress, Anaemia, Nutrient Adequacy Ratio (NAR)

INTRODUCTION

Menstruation, is a naturally occurring monthly cycle in sexually mature females. The cycle generally is a 28 day one, comprising three phases: follicular, luteal, and post-ovulatory. The follicular phase, powered by the hormone Follicular Stimulating Hormone (FSH), is for 10-14 days

before ovulation. The luteal phase, eight days after ovulation, peaks on days 18 and 22, and the post-ovulatory phase, continues for 14 days. The pre-ovulatory period can be delayed by 2-3 days due to psycho-physiological dysfunctions. In the days prior to menstruation, women who experience premenstrual syndrome (PMS) endure a range of emotional, mental, and physical symptoms. Epidemiological studies indicate that approximately 75% of women of childbearing age suffer from some condition linked with the premenstrual phase of the menstrual cycle (Gao *et al.*,2025). Menstrual dysfunction is a prevalent issue in the reproductive age group, often overlooked in modern society. It can be influenced by various menstrual cycle issues, such as polymenorrhoea, oligomenorrhoea, and amenorrhea. Psychological issues like stress, worry, and despair are common during the menstrual cycle. Dysmenorrhea, a painful menstrual cycle, can cause pain and aching in the lower abdomen or pelvis. Women often experience pain, anxiety, depression, exhaustion, and vomiting during the menstrual cycle. Exercise can help relieve dysmenorrhea, release endorphins, and change prostaglandin production. It can also help women with additional symptoms like anxiety, mood changes, and sadness. Sweating can help reduce bloating by removing excess water. The present study envisaged comparison of menstrual distress among adult female athletes and non-athletes across three districts of Kerala. Assessment of nutritional status by anthropometry, biochemical and dietary assessment was also a focal area of the research.

MATERIALS AND METHODS

In three districts of Kerala State- Idukki, Kottayam, and Ernakulam, the study was conducted among athletes and non-athletes. Availability of subjects in the athlete category across the districts was a primary criterion for selection of the three districts. Purposive non-random sampling technique was adopted to select 100 unmarried, undergraduate and postgraduate female students belonging to the age range of 18 to 23 years comprising equal number of athletes and non-athletes. Participants were selected for data collection to obtain a representative target population, to ascertain that findings can be generalized and can accurately reflect the characteristics, diversity, and variability present in the population of interest. To facilitate comparison of nutritional status and menstrual distress between athletes and non-athletes, 50 athletes and non-athletes were selected as subjects for the study. A pilot study among ten subjects in both categories from Ernakulam district facilitated establishment of the study protocol.

Data collection comprised socio-demographic information, comprising age, type of family, education, occupation, and socioeconomic class based on Kuppuswamy Socio-Economic Scale (SES) 2022, anthropometric measurements, such as height, weight, and BMI (Body Mass Index), were recorded following standardized procedures to assess the physical development and nutritional status of the participants. The World Health Organization's (WHO) cut-off scores for BMI were used to categorize participants into different BMI categories. BMI <18.5: underweight. BMI 18.5-24.9: normal weight. BMI ≥25.0: overweight. BMI ≥30.0: obesity (WHO, 2010). The cyanmethemoglobin method was used to assess haemoglobin levels. Based on the haemoglobin levels participants were categorised into four categories: "non-anaemic" (haemoglobin 12 g/dl or higher), "Mild Anaemia" (haemoglobin 11-11.9 g./dl.), "Moderate Anaemia" (haemoglobin 8-10.9 g./dl.), and "Severe Anaemia" (haemoglobin lower than 8 g./dl.) (WHO, 2011).

Using an open-ended questionnaire, an interview, and/or a review of prior research, the most frequently expressed menstrual symptoms were chosen to create the MOOS Menstrual Distress Questionnaire. The MDQ asks people to rate their symptoms using a five-point Likert type scale (0–

4). The eight scales of the MDQ are pain, water retention, autonomic reaction, negative affect, decreased focus, behavioural change, arousal, and control. The total scores were computed after scores from each of the eight scales were calculated independently. This scale helps classify the intensity of menstrual symptoms. The MOOS MDQ (Menstrual Distress Questionnaire) score interpretation is as below-

Score < 16: Minor menstruation signs

Score > 17 to < 32: Moderate menstruation signs

Score > 33 to < 48: Acute menstruation signs

Score > 49: Very acute menstruation signs

The dietary assessment comprised of both 24-hour dietary recall and the Healthy Eating Index (HEI). It aims to assess nutrient intake among participants. The data is typically converted from household to standard measurements for nutrient computation, using tools like NSR NutriCal Version 4, based on the Indian Food Composition Table (IFCT), 2017. The Healthy Eating Index (HEI) was computed to evaluate the quality of participants' diets and rate as good, fair or poor. Higher HEI scores indicate better adherence to healthy dietary patterns. The U.S. Department of Agriculture (USDA) developed the Healthy Eating Index (HEI) to assess adherence to recommended healthy eating patterns. The index ranges from zero to hundred, with each of the ten dietary components. A total score above 80 suggests 'good' dietary quality, 51 to 80 suggests 'needed improvement,' and 50 or less signifies 'poor quality' in the diet (Guenther, P.M. 2007). To evaluate the individuals' overall nutritional adequacy, the Nutritional Adequacy Ratio (NAR), a measurement of the percentage of food consumption that satisfies the Recommended Dietary Allowance (RDA) for particular nutrients, was computed. The NAR values were divided into many adequacy categories. A nutritional intake of ≤50.00 was considered low, ≤50.01 to 75.00 was considered fair, ≥75.01 to 100.00 was considered acceptable, and ≥100.01 was considered excessive.

SPSS version 25 for Windows (version 25, 2017, IBM Corporation, Armonk, New York, United States) was the tool used for data analysis. The Independent Sample T test was used to evaluate the differences in continuous parameters between athletes and non-athletes. The Mann Whitney U test was used to compare MOOS scores between athletes and non-athletes. The chi-square test was used for comparison. The Wilcoxon Sign Ranked Test was utilised to appraise the shift in the MOOS score throughout three stages.

RESULTS AND DISCUSSION

From the data collected from 50 athletes and non-Athletes, 10 % of the participants belonged to upper lower class, 45 % each to lower middle class and upper middle class respectively. Among the participants, 79% belonged to nuclear families; joint families represented 19% of the sample, while only 2% belonged to extended families. While there were more non-vegetarians in the athletes' group, there were no ovo-vegetarians in it. None of the non-athletes were vegetarians as depicted in Table 1.

Table 1 Socio-demographic profile of participants (n=100)

Categories	Frequency	Percentage
Type of family		
Nuclear	79	79
Joint	19	19

Extended	2	2
SES		
Upper lower	10	10
Lower middle	45	45
Upper middle	45	45
No. of family members		
2-4	61	61
5-9	39	39
Food pattern		
Vegetarian	2	2
Non-vegetarians	88	88
Lacto-vegetarian	4	4
Ovo-vegetarian	6	6

The BMI (Body Mass Index) classification provided an overview of the weight status of the study subjects (Table 2). Athletes were significantly taller as compared to non-athletes ($p<0.05$). No significant difference was observed in the weight or BMI of athletes and non-athletes ($p>0.05$). Of the 100 participants, 34 were anaemic and 66 were non-anaemic, a greater number of non-athletes being anaemic as compared to athletes (36 versus 32 %)

Table 2 Anthropometric assessment of athletes and non-athletes (n=100)

Criteria	Athletes (n=50)	Non-athletes (n=50)	Total (n=100)	t value	P value
Height (cm)	160.7±6.2	157.8±6.3	159.2±6.4	2.299	0.024*
Weight (kg)	54.8±11.1	53.9±7.9	54.4±9.6	0.463	0.644
BMI (kg/m2)	21.2±4.3	21.7±3.1	21.5±3.7	-0.578	0.565

* Significant $p < .05$

A significant difference was evident in the problems faced between athletes and non-athletes ($p<0.05$) during menstrual cycle. It was reported that 24% of the athletes passed large blood clots, 10% of the athletes struggled to complete their training session without changing protection and 6% felt the need to wear double sanitary protection during the cycle as depicted in Table 3.

Table 3 Issues among athletes and non-athletes during their periods (n=100)

Criteria	Athletes (n=50)		Non-athletes (n=50)		Total (n=100)		$\chi 2$ value	P value
	N	%	N	%	N	%		
Pass large blood clots	12	24	0	0	12	12	13.636	0.000*
Flood through protection to clothes	4	8	0	0	4	4	4.167	0.041*
Needing to frequently change pads	5	10	0	0	5	5	5.263	0.022*

Needing to wear double sanitary protection	3	6	0	0	3	3	3.093	0.079
Struggle to complete training session without changing protection	5	10	0	0	5	5	5.263	0.022*

* Significant p < .05

On studying the abnormal health conditions faced by the study subjects during menstruation, the data as presented in Table 4, revealed that among the participants, 20% reported experiencing unwanted hair growth on areas such as the face, abdomen, or thighs. Additionally, only 3% of participants reported milky discharge from their breasts during menstruation. Acne, however, was more prevalent, affecting 38% of participants.

Table 4 Abnormal health conditions faced by study subjects during menstruation (n=100)

Criteria	Frequency(n)	Percentage (%)
Unwanted hair - growth on face, abdomen, thighs		
Yes	20	20
No	80	80
Milky discharge from breasts		
Yes	3	3
No	97	97
Acne		
Yes	38	38
No	62	62

The Healthy Eating Index (HEI) was used to evaluate the food habits among athletes and non-athletes and they were classified into three groups: poor, fair, and good based on HEI. Among athletes, 18% had a poor HEI, 36% had a fair HEI, and 46% had a good HEI. In comparison, among non-athletes, 14% had a poor HEI, 44% had a fair HEI, and 42% had a good HEI (Table 5). Statistical analysis indicated no significant differences in the HEI score between athletes and non-athletes.

Table 5 Healthy Eating Index score among athletes and non-athletes (n=100)

HEI Score	Athletes (n=50)		Non-athletes (n=50)		Total (n=100)		$\chi 2$ value	P value
	n	%	n	%	n	%		
Poor	9	18	7	14	16	16	0.741	0.690
Fair	18	36	22	44	40	40		
Good	23	46	21	42	44	44		

The Nutritional Adequacy Ratio (NAR) of the participants' food intake was evaluated. With regard to energy, 45% of participants had a NAR of <=50.00%, suggesting potential inadequacy in their energy intake. For protein, a significant majority (63%) had a NAR greater than 100.01%, indicating that their protein intake exceeded the recommended levels. However, concerning calcium,

79% of participants had a NAR of <= 50.00%, suggesting potential insufficiency in their calcium intake. Similarly, more than half (52%) of participants had a NAR of <= 50.00% for iron, suggesting potential inadequacy in iron intake as indicated in Table 6.

Table 6 Nutritional Adequacy Ratio (NAR) of nutrients among study subjects (n=100)

Criteria	Frequency(n)	Percentage (%)
ENERGY		
<= 50.00	45	45
50.01 - 75.00	36	36
75.01 - 100.00	17	17
100.01+	2	2
PROTEIN		
50.01 - 75.00	11	11
75.01 - 100.00	26	26
100.01+	63	63
CALCIUM		
<= 50.00	79	79
50.01 - 75.00	16	16
75.01 - 100.00	4	4
100.01+	1	1
IRON		
<= 50.00	52	52
50.01 - 75.00	35	35
75.01 - 100.00	9	9
100.01+	4	4

The comparison of nutrient intake between athletes and non-athletes is presented in Table 7. Athletes had a higher fat intake than non-athletes, which could be attributed to their specific dietary needs for energy and performance. When it comes to micronutrients, both groups had similar calcium intake, but athletes had a higher iron intake, which is important for their increased iron needs due to higher physical activity levels.

Table 7 Nutrient Intake among athletes and non-athletes (n=100)

Nutrient	Athletes (n=50) Mean ± SD	Non-athletes (n=50) Mean ± SD	Total (n=100) Mean ± SD	T value	P value
Energy (Kcal)	1204.3±327.2	1170.4±270.3	1187.3±299.1	0.565	0.574
Carbohydrate(g)	160.2±56.2	164.1±57.3	162.2±56.5	-0.342	0.733
Protein(g)	41.4±12.9	42.6±14.1	42.0±13.4	-0.443	0.658

Fat(g)	40.7±14.2	33.2±9.6	37.0±12.7	3.1	0.003*
Calcium(mg)	316.8±223.5	329.9±153.1	323.3±190.7	-0.343	0.733
Iron(mg)	7.6	3.1	7.8±3.3	-0.749	0.456

*Significant

Regarding the pain intensity of menstrual cycle among athletes and non-athletes, 54 found their cycle sometimes painful, 34 found theirs painful and 12 had painless cycle.

Table 8 Pain intensity of menstrual cycle among athletes and non-athletes (n=100)

Criteria	**Athletes (n=50)**		**Non-athletes (n=50)**		**Total (n=100)**		**χ2 value**	**P value**
	n	%	n	%	n	%		
Painful	16	32	18	36	34	34	0.192	0.909
Painless	6	12	6	12	12	12		
Sometimes painful	28	56	26	52	54	54		

The MOOS Phase 1 (4 days before period) study aimed to assess the psychological well-being of athletes and non-athletes by examining various criteria. The results are presented in Table 9 and indicate that several differences existed between the two groups. Non-athletes reported increased levels of concentration difficulty, autonomic reactions, and water retention compared to athletes. However, no significant differences were observed with respect to pain perception, behavioural changes, negative effect, arousal, and perceived control between athletes and non-athletes.

Table 9 Comparison of MOOS MDQ Phase 1 among athletes and non-athletes

Criteria	**Athletes (n=50)**	**Non-athletes (n=50)**	**Total (n=100)**	**t value**	**P value**
Pain	3.32±3.242	4.64±4.039	4.0±3.7	-1.521	0.128
Minimum	0	0			
Maximum	11	15			
Concentration	0.2±0.833	2.72±3.27	1.5±2.7	-5.65	0
Minimum	0	0			
Maximum	5	10			
Behavioural	1.42±2.977	1.18±1.711	1.3±2.4	-1.37	0.171
Minimum	0	0			
Maximum	12	6			

Autonomic reactions	0.22± 0.465	1.12±1.837	0.7±1.4	-2.359	0.018*
Minimum	0	0			
Maximum	2	7			
Water retention	0.46±0.676	2.6±3.123	1.5±2.5	-3.692	0
Minimum	0	0			
Maximum	2	10			
Negative Effect	1.66±2.327	2.16±3.862	1.9±3.2	-0.718	0.473
Minimum	0	0			
Maximum	9	14			
Arousal	0.18± 0.56	0.32± 0.978	0.3±0.8	-0.122	0.903
Minimum	0	0			
Maximum	3	5			
Control	0.1±0.364	0.32±0.868	0.2±0.7	-1.289	0.197
Minimum	0	0			
Maximum	2	4			

* Significant

The comparison of sub-scales of the MOOS MDQ Phase 2 (during menstruation) between athletes and non-athletes revealed significant differences in several areas as presented in Table 10. These findings suggest that non-athletes experience more physical pain, have greater challenges in maintaining concentration, exhibit more behavioural changes, have stronger physiological responses to stress and higher levels of negative emotions compared to athletes.

Table 10 Comparison of MOOS MDQ Phase 2 among athletes and non-athletes

Criteria	Athletes (n=50)	Non-athletes (n=50)	Total (n=100)	t value	P value
Pain	6.86±3.938	9.14±4.669	8.0±4.4	-2.964	0.003*
Minimum	0	0			
Maximum	21	19			
Concentration	0.48±1.488	4.12±4.538	2.3±3.8	-5.736	0
Minimum	0	0			
Maximum	6	25			
Behavioural	2.9±2.88	4.78±3.303	3.8±3.2	-2.838	0.005*

Minimum	0	0			
Maximum	9	10			
Autonomic reactions	0.48±0.863	1.96±2.204	1.2+1.8	-3.919	0
Minimum	0	0			
Maximum	3	8			
Water retention	0.84±1.057	2.94±3.146	1.9±2.6	-3.602	0
Minimum	0	0			
Maximum	3	11			
Negative Effect	1.76±1.975	3.94±3.851	2.9±3.2	-3.035	0.002*
Minimum	0	0			
Maximum	8	18			
Arousal	0.14±0.405	0.18±0.56	0.2±0.5	-0.043	0.966
Minimum	0	0			
Maximum	2	3			
Control	0	0	0.0±0.0	0	1
Minimum	0	0			
Maximum	0	0			

* Significant

The comparison of sub-scales in the MOOS MDQ Phase 3 (rest of the cycle) between athletes and non-athletes is presented in Table 11. While both groups reported relatively low levels of pain, non-athletes tended to experience slightly higher levels of pain compared to athletes. In terms of concentration, athletes reported significantly better concentration abilities compared to non-athletes. Additionally, athletes exhibited lower levels of behavioural and autonomic reactions compared to non-athletes, indicating that athletes may have better control over their behavioural responses and experience fewer physical reactions to stress or stimuli.

Table 11 Comparison of MOOS MDQ Phase 3 among athletes and non-athletes

Criteria	Athletes (n=50)	Non-athletes (n=50)	Total (n=100)	t value	P value
Pain	0.24±0.744	0.7±1.607	0.5±1.3	-1.622	0.105
Minimum	0	0			
Maximum	3	8			
Concentration	0	0.92±2.381	0.5±1.7	-4.325	0

Minimum	0	0			
Maximum	0	13			
Behavioural	0.14±0.639	0.38±1.105	0.3±0.9	-1.083	0.279
Minimum	0	0			
Maximum	4	4			
Autonomic reactions	0	0.14±0.756	0.1±0.5	-1.421	0.155
Minimum	0	0			
Maximum	0	5			
Water retention	0.06±0.24	0.32±1.039	0.2±0.8	-1.146	0.252
Minimum	0	0			
Maximum	1	6			
Negative Effect	0.12±0.435		0.4±0.9	-2.882	0.004*
Minimum	0	0			
Maximum	2	4			
Arousal			0.4±1.1	-2.368	0.018*
Minimum	0	0			
Maximum	3	6			
Control			0	0	1
Minimum	0	0			
Maximum	0	0			

*Significant

Interpretation of each phase as a comparison between athletes and non-athletes

Pre-menstruation vs. During Menstruation:

Pain: Both athletes and non-athletes report a significant increase in pain during menstruation compared to the pre-menstrual phase.

Concentration: Non-athletes show a significant decrease in concentration during menstruation compared to the pre-menstrual phase. Athletes though do not exhibit a significant difference in concentration.

Behavioural Symptoms: Both athletes and non-athletes experience a significant increase in behavioural symptoms during menstruation compared to the pre-menstrual phase.

Autonomic Reactions: Both groups show a significant increase in autonomic reactions during menstruation compared to the pre-menstrual phase.

Water Retention: Athletes report a significant increase in water retention during menstruation compared to the pre-menstrual phase. Non-athletes, however, do not exhibit a significant difference.

Negative Effect: Both athletes and non-athletes experience a significant increase in negative effect during menstruation compared to the pre-menstrual phase.
Arousal: Athletes and non-athletes do not significantly differ in their arousal symptoms during the premenstrual and menstrual phases.
Control: Both groups show no significant difference in control symptoms between the pre-menstrual phase and menstruation.
During Menstruation vs. Post Menstruation:
The pattern of significant differences in the various criteria observed during this comparison is similar to that of the pre-menstruation vs. during menstruation comparison. Both athletes and non-athletes experience changes in pain, concentration, behavioural symptoms, autonomic reactions, water retention, and negative effect between these two phases.
Post Menstruation vs. Pre-Menstruation:
Pain, concentration, behavioural symptoms, autonomic reactions, water retention, negative effect, and control indicate significant differences between the two phases for both athletes and non-athletes. Arousal did not report any statistically significant differences between the two phases for either group.
Overall, the data indicates that both athletes and non-athletes experience significant changes in multiple symptom categories across phases of the menstrual cycle. This suggests that hormonal variations during the menstrual cycle can impact various aspects of well-being and symptomatology.

Table 12 Comparison of the MOOS Phases between Athletes and non-athletes

Criteria	Pre-menstruation vs during menstruation	During menstruation vs post menstruation	Post menstruation vs pre-menstruation
Pain			
Athletes	0.001	0.001	0.001*
Non-athletes	0.001	0.001	0.001*
Total	0.001	0.001	0.001*
Concentration			
Athletes	0.26	0.016	0.066
Non-athletes	0.033	0.001	0.001*
Total	0.019	0.001	0.001*
Behavioural			
Athletes	0.007	0.001	0.006*
Non-athletes	0.001	0.001	0.008*
Total	0.001	0.001	0.001*
Autonomic reactions			
Athletes	0.09	0.001	0.002*
Non-athletes	0.038	0.001	0.001*
Total	0.008	0.001	0.001*
Water retention			
Athletes	0.007	0.001	0.001*
Non-athletes	0.546	0.001	0.001*
Total	0.1	0.001	0.001*
Negative Effect			

Athletes	0.777	0.001	0.001*
Non-athletes	0.003	0.001	0.01*
Total	0.012	0.001	0.001*
Arousal			
Athletes	0.773	0.926	0.864
Non-athletes	0.393	0.033	0.149
Total	0.383	0.05	0.233
Control			
Athletes	0.059	1	0.059
Non-athletes	0.011	1	0.011*
Total	0.002	1	0.002*

*Significant

CONCLUSION

The study that compared athletes and non-athletes gave useful insights pertaining to health and wellbeing of athletes and non-athletes. Despite, some differences between the two groups, several findings lacked statistically significance. These results suggest that involvement in sports and physical activity can positively influence pain perception, concentration, and emotional regulation, contributing to the overall well-being of athletes. Further research to comprehend the intricate connections underlying nutritional status and menstrual distress among athletes performing different events and non-athletes can facilitate recommendations regarding optimal levels of athletic activity. Further, identification of factors that aggravate menstrual distress during athletic activities can help to structure the activities to optimize athletic performance.

REFERENCES

- Balaha, M. H., & Amr, M. A. (2013). Recognition of premenstrual syndrome and premenstrual dysphoric disorder among Egyptian women. Journal of Obstetrics and Gynaecology Research, 39(2), 429-434.
- Brown, J. E., Isaacs, J., Krinke, B., Lechtenberg, E., & Murtaugh, M. (2013). Nutrition Through the Life Cycle. Cengage Learning.
- Chandra, P. S., & Sharma, A. (2012). Prevalence and predictors of premenstrual syndrome and premenstrual dysphoric disorder among college-going girls. Indian Journal of Psychiatry, 54(3), 255-261.
- Freeman, E. W., Sammel, M. D., Lin, H., Nelson, D. B., & Sheng, L. (2006). Associations of hormones and menopausal status with depressed mood in women with no history of depression. Archives of General Psychiatry, 63(4), 375-382.
- Gao Y, Wang X, Wang Q, Jiang L, Wu C, Guo Y, Cui N, Tang H, Tang L. Rising global burden of common gynaecological diseases in women of childbearing age from 1990 to 2021: an update from the Global Burden of Disease Study 2021. Reprod Health. 2025 Apr 21;22(1):57. doi: 10.1186/s12978-025-02013-1. PMID: 40259342; PMCID: PMC12010537
- G, S., B.N, R., & G.K, S. (2013). Study of vo_2 max during phases of menstruation in young female athletes. Journal of Evolution of Medical and Dental Sciences, *2*(23), 4070–4078. https://doi.org/10.14260/jemds/802

- Gandhe, M. B. (2013). Evaluation of Body Mass Index (BMI) Percentile cut-off Levels with Reference to Insulin Resistance: A Comparative Study on South Indian Obese and Non–Obese Adolescents. Journal of Clinical and Diagnostic Research. https://doi.org/10.7860/jcdr/2013/6263.3213
- Gunjan Kumar, Dash, P., Jayeshmit Patnaik, &Gitanjali Pany. (2022). Socioeconomic status scale-modified kuppuswamy scale for the year 2022. International Journal of Community Dentistry, *10*(1), 1–6. https://doi.org/10.56501/intjcommunitydent.v10i1.26
- Halbreich, U., &Borenstein, J. (2003). The association between dysphoric premenstrual changes and depressive disorders: A prospective study. Journal of Clinical Psychiatry, 64(3), 337-344.
- Jamil, R. T., Bhagia, R., Kumar, S., & Verma, P. (2013). Prevalence of premenstrual syndrome and premenstrual dysphoric disorder among college students of Bhavnagar, Gujarat. Indian Journal of Psychiatry, 55(4), 403-406.
- Knowledge and Practice Related to Menstrual Health and Hygiene in Female Athletes– A Cross-Sectional Study. (2020, December 23). Indian Journal of Public Health Research & Development. https://doi.org/10.37506/ijphrd.v11i12.13215
- Sadler, C., Smith, H., Hammond, J., Bayly, R., Borland, S., Panay, N., ... & Williams, M. (2010). Lifestyle factors, hormonal contraception, and premenstrual symptoms: The United Kingdom Southampton Women's Survey. Journal of Women's Health, 19(3), 391-396.
- Sau, A. (2013). Studies of blood iron and other allied physiological changes of female athletes and non-athletes during graded exercise.
- Tiwari, P., & Sankhala, A. (2007). Prevalence of obesity, weight perception and dietary behaviour of urban college going girls. Journal of Human Ecology, 21(3), 181-183
- Ujwala, U. (2012). Nutritional transition, body mass index, and their implications in young adults. Indian Journal of Community Medicine, 37(2), 116-119.
- Weir, C. B., & Jan, A. (2022). BMI Classification Percentile and Cut Off Points. PubMed; Stat Pearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK541070/

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EVALUATION OF THE BIOACTIVE COMPONENTS OF PROSO MILLET

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ABSTRACT

Millets are small grains classified under to the family of Poaceae. It has drawn a lot of focus due its ability to withstand harsh climate. They are regarded as 'super foods'. The rich phytochemical profile of millets is primarily associated with anti-inflammatory, anti-microbial, anti-proliferative, and antioxidant properties. Millets are rich in phenolic compound which have anti-oxidant and anti-cancer effects. Among the millets there some minor millets that are under researched. Proso millet is one such under researched minor millet. Thus, the purpose of this study is to investigate the bioactive components of Proso millet (*Panicum miliaceum*). The qualitative and quantitative analysis was done using the standard procedures. The qualitative analysis of Proso millet indicates the presence of carbohydrates, tannin, phenol, and alkaloids. The quantitative analysis of Proso millet reveals the presence of tannins and flavonoids and radical scavenging activity of the millet. Antioxidants and phytochemicals help in preventing chronic diseases. Proso millet consist of tannins and antioxidants neutralise free radical which results in reduced oxidative damage in cells. Thus, the study advocates to include Proso millet should be included in daily diet due to its anticipated protective effect on health.

Key words: Antioxidants, Phenol, Phytochemical, Proso millet, Flavonoid

INTRODUCTION

Millets are a family of grasses with tiny seeds that are presumably cultivated all over the world. They are mostly grown in Asian and African nations. Moreover, India ranks first among the top 10 millet producing countries. When we have a look at the world's millet production; India produces 43 % of them. There has been seen a steady rise in the production of millets in India (USDA, Foreign Agricultural Services, 2024). The primary millet producing states in India are pearl millet, sorghum, little millet, foxtail millet and finger millets. It is majorly cultivated in Karnataka, Tamil Nadu, Telengana, Maharashtra, Madhya Pradesh, Gujarat, Haryana and Uttar Pradesh. These ten states attributes to the 98 % production of millets produced in India (Banerjee et al., 2024). Millets got less importance in human diet and were often used a bird or animal feed. The year 2023 was commemorated by the UN declaration, internationally as the year of millets. This initiative helped in reviving the millets in diets of the population. This campaign raised the awareness of millets (Banerjee et al., 2024).

Millets are basically of three types: Major millets, Minor millets and pseudo millets. Major millets have a greater seed size than that of the minor ones. Pseudo millets are so called as they are not similar to the family Poaceae. Major millets are Sorghum (*Sorghum vulgare*), Pearl millet (*Pennisetum thyphoideum*) and Finger millet (*Eleusine coracana*). The seed size of finger millet is smaller than that of the other two millets but due to its higher availability and consumption it falls under the category of major millets. Minor millets are Proso millet (*Panicum miliaceum*), Foxtail millet (*Setaria italica*), Kodo millet (*Paspalum scrobiculatum*), Little millet (*Panicum sumatrense*) and Barnyard millet (*Echinochloa crusgalli*). Pseudo millets are Amaranth (*Amaranthus cruentus*), Buckwheat and Quinoa (*Chenopodium quinoa*) (Kumari et al., 2024). Beyond its nutritional value, millets are an environmentally beneficial crop to farm. It thrives in dry conditions with little to no fertilizer required (Jadhav et al., 2022). Millets have been incorporated in several recipes in Indian and African cooking. A common culinary ingredient, millet is used to make a number of traditional dishes and drinks, including porridges, extruded snack snacks and fermented bread (Chandrasekara and Shahidi.,2011).

The Department of Foods and Nutrition has undertaken an array of studies on millets. A study was conducted on little millet incorporated recipes. Based on the study's findings, Bisi bele bhaat was considered quite acceptable which was followed by Masala Baati, Uttapam, Vegetable Upma and Curd Rice (Dhruv and Sharma, 2022).

Another study was conducted on Foxtail millet in the year 2021.15 recipes were developed incorporating foxtail millet. Foxtail incorporated chakli, sev and idli were highly acceptable (Dhruv and Thite, 2021).

The research was carried out on millets consumption by Nambiar and Patwardhan, 2013. Results showed that 88% females and 85 % of males had millets in the form of traditional Maharashtrian recipes but <16% consumed on daily basis as wheat and rice were their staple foods. 7 traditional recipes were made from the millets from which vada was the most acceptable and bhakri and khichdi being the least. Results showed that GI and GL of cheela was lowest where as Bhakri had higher GI and GL. Emic views also emphasised millets as helpful in managing diabetes. Hence, more traditional millet-based foods need to be promoted among youth to prevent the rise of NCDs (Nambiar and Patwardhan,2013). A study by Nambiar at al, 2015 on Pearl millet showed the array of health benefits attributed to its nutraceutical properties. The polyphenols present in Bajra has a protective role against the chronic degenerative diseases.

Supplementation trail was done on T2DM residing in Vadodara. They were supplemented 40 gms of Kodo millet for a duration of 28 days. Post supplementation positive trend was observed in FBS and HbA1c level. Also, a reduction was observed in microalbuminuria from 21.4% from 35.7%. No toxic effects on biomarkers of liver and kidney were seen. (Iyer and Dhruv et al., 2012). A study done on Kodo millet on the lipemic status of T2DM subjects. A significant rise was seen in Apo A levels (10.1%), significant reduction in Apo B/A ratio (14.2 %) and LDL (5.5%). The initially higher levels of TC, TG, LDL & VLDL started returning normal levels post supplementation. This emphasised the hypolipidemic effect of Kodri (Iyer and Dhruv et al., 2012).

Research was done on geriatric subjects by incorporating ragi ladoo with shakhpushpi. Calcium, haemoglobin levels, LDL, TC/HDL ratio and HDL levels geriatric subjects demonstrated improvement. Improvement was also noted in retention power, mental health and slight reduction was observed joint pain and lethargy levels in geriatric subjects (Mehta and Shah, 2010).

Among the minor millets, one such under explored millet is Proso millet. Proso millet (*Panicum miliaceum*) is one such millet that has shown many benefits which is displayed in Figure 1. In India it is widely referred as known as Chenna, Barri, Chenno, Bargu, Panivaragu etc in different

languages. Panicum miliaceum is rich in proteins, vitamins, minerals, dietary fiber, and polyphenols. Because it is gluten-free, it is in food of preference who are intolerant to gluten. It has a high lecithin content, which is beneficial for the neurological disorders. It is abundant in minerals like Phosphorous, zinc, magnesium, iron and folic acid. When we look at the amino acid profile of proso millet; it showed the presence of methionine and cysteine. There is evidence which is associated with reducing the risk of type developing 2 diabetes (Das et al.,2019). Proso millet also has array of vitamins, vital minerals like phosphorus, manganese, calcium, and magnesium, and oleic and linoleic acids, stearic acid. It has abundant in phytochemicals, which are known to lower the incidence of cancer (Nuvan et al., 2016). The polyphenol present in Proso millet has potential nutraceutical benefits. The flavonoid, tannins, lignin and phytic acid present in Proso millet has a protective mechanism on human body (Taylor et al., 2014).

Proso millet (*Panicum miliaceum*) remains retailvely underutilized despite of several benefits and its adaptability to grow in extreme condition. Limited studies have been conducted with respect to phytochemical composition and antioxidant potential of Proso millet. Therefore, there is a need to access the phytochemical profile and antioxidant activity with respect to this variety of Proso millet.



Fig 1: Proso millet

OBJECTIVE

To evaluate the phytochemical profile and bioactive components of Proso millet through qualitative screening and quantitative analysis.

METHODOLOGY

The procurement of proso millet was done from a wholesale dealer in Surat, Gujarat. The CO (PV)5 was utilized in the study. A thorough rinsing of the proso millet was performed under running tap water in order to remove any dust particles which have been present in the sample. Then were futher dried at room temperature. The millet was pulverized into fine powder using motar and pestal. Solvent mixture was made incorporating 70 % methanol and 30 % of water. Qualitative analysis was conducted on the hydroalcoholic extract of proso millet. The extracted material was used for analysis

of carbohydrate, protein, tannin, saponin, glycoside, alkaloid, phenol, steroid and flavonoid were analysed using standard protocols mentioned in Table 1.

Quantitative analysis of Proso millet was conducted. The antioxidant content present in Proso millet was analysed for 1,1-diphenyl-2-picrylhydrazyl (DPPH) free radical scavenging activity taking absorbance at 517 nm using methanol as the blank. The standard reference was obtained through the utilization of Ascorbic acid (Tadhani et al., 2007). In 1999, Zhishen et al used spectrophotometer in order to analyse the total flavonoid content and measured the absorbance at 510 nm and tannin content were estimated and the absorbance was determined at 700 nm by a UV spectrophotometer (Prapula Thejashwini et al., 2021). This study was approved by the Institutional Ethical Committee.

Table 1: Methodology for Qualitative analysis of Proso millet

ANALYSIS	TEST
Test of carbohydrate	Fehling's test
	Benedict's test
Test of Protein	Ninhydrin test
	Million's test
Test of Tannin	Lead acetate test
Test of Saponin	Foam Test
Test of Glycoside	Borntrager test
Test of Alkaloid	Mayer's Test
	Dragandroff's Test
	Wagner Test
Test of Steroid	Liebermann Burchard Test
Test of Phenol	Ferric Chloride Test
	KmNO4 test
Test of Flavonoid	Shinoda Test

Source: Jadhav et al., 2022

FINDINGS AND DISCUSSION

Phytochemicals are beneficial to human health as possessing antioxidant activity. Qualitative Screening of Proso millet enabled us to identify the active compounds which were present in the hydroalcoholic extract of Proso millet. The results indicated the presence of carbohydrate, tannin, alkaloid and phenol as described in Table 2.

The analysed sample showed the free radical scavenging activity of the proso millet sample was found to 6.266% (Table 3). Quantitative analysis of Proso millets revealed the flavonoid content was found to be 205.4 mg rutin equivalent/gm and tannin content was found to be 23.3 µg catechin equivalent/gm respectively which is mentioned in Table 4.

Table 2: Qualitative Phytochemical analysis of Proso millet

ANALYSIS	HYDROALCOHOLIC EXTACT
Test of carbohydrate	+
	-
Test of Protein	-
	-

ANALYSIS	HYDROALCOHOLIC EXTACT
Test of Tannin	+
Test of Saponin	-
Test of Glycoside	-
Test of Alkaloid	+
	-
	-
Test of Steroid	-
Test of Phenol	-
	+
Test of Flavonoid	-

+ indicates presence and – indicated absence

Table 3: Antioxidant activity of Proso millet

Test	% Scavenging activity
DPPH	6.266%

Table 4: Quantitative Analysis of Proso millet

Parameters	Result
Flavonoid	205.4 mg rutin equivalent/gm
Tannin	23.3 µg catechin equivalent/gm

It was observed that the study carried out by Jadev et al,2022 where the presence of carbohydrate and phenol were found in phytochemical screening of Proso millet which was found to be in line with our research. The findings of research by Yuan et al, 2022 also supported the presence of phenolic compounds was seen in both free and bound fractions of Proso millet sample. Also, the spray dried Proso millet powder showed higher content of tannins in terms of catechin equivalents (Malik et al., 2023). Comparable results were noted in the phytochemical analysis of proso millet methanol extract indicated the presence of alkaloids, tannins and phenol (Ramadoss & Shanmugam, 2024). Zhang et al., 2014 indicated the presence of phenolic compounds were in Proso millet such as ferulic and chlorogenic acid, exhibited antioxidant and antiproliferative properties.

Mounika et al, 2022 in Andra Pradesh, India, confirmed the presence of carbohydrate, tannin, phenol and alkaloid in the proso millet sample. Moreover, the present study also supported the results. The study conducted by Yuan et al., 2022 revealed that the flavonoid content of proso millet ranged from 284 to 978 mg rutin equivalents (RE)/kg DW. Increased flavonoid content was seen in different varieties of Proso millet. This may be attributed to the environmental condition, soil and the variety of proso millet.

Consuming Proso millet lowers the risk of acidity, diabetes, breast cancer, hypercholesterolemia, and celiac disease (Nuwan et al.,2016). This could be attributed to Proso millet's rich phytochemical, antioxidant, and nutritional profiles. Millets contain phenolic chemicals, which have strong antioxidant properties. They have the radical scavenging activities (Murugan et al., 2016). Proso millet consumption might has positive impact on heart health by reducing LDL-C and increasing the good cholesterol i.e HDL-C (Mathanghi at al., 2020).The phenols present in Proso millet have potent antioxidant properties. Alkaloids have anticancer and vasodilatory effects on humans. Tannins have led to reduction in serum cholesterol

levels, lower blood pressure and quicken the body's blood coagulation process (Niharika et al., 2020). Hence, alkaloid and tannin present in Proso millet could be linked to its cardioprotective properties and may help to control blood pressure and cholesterol level.

SUMMARY, CONCLUSION AND IMPLICATIONS

Proso millet possess a diverse array of phytochemicals. Antioxidants present has in proso millet reducing inflammation in the body. The quantitative analysis of Proso millet revelled the presence of flavonoids which known to exhibit anti-inflammatory and anti-cancer properties and have the ability to arrest DNA damage and reduce oxidative stress. Qualitative analysis of Proso millet revealed the presence of alkaloids, tannins and phenols. Alkaloids exhibit anticancer and vasodilatory effects. Tannins which are found in proso millet has helped in regulation of blood pressure and cholesterol reduction. Additionally, phenolic compounds present in proso millet have been proven to cause a reduction in inflammation status and oxidative stress which thereby lowering the chance of the chronic degenerative diseases.

SUGGESTIONS FOR FUTURE RESEARCH

- More studies can be conducted on incorporating Proso millet in traditional recipes. Sensory evaluation of these recipes can be done. Such recipes would help to incorporate millet in their daily diet.
- As few clinical trails have been conducted on Proso millet efficacy in management of Non communicable diseases. So further research can be conducted on them.
- Shelf-life studies and microbial analysis of Proso millet could be further conducted.

REFERENCES

- Banerjee, R., & Bharti, P. D. (2024). Comprehensive Analysis of Millets in India: Area, Production, Cost of Production and Export Statistics.
- Chandrasekara A, Shahidi F (2011). Determination of antioxidant activity in free and hydrolysed fractions of millet grains and characterization of their phenolic profiles by HPLC-DAD-ESI-MSn. Journal of Functional Foods 3(3):144-58
- Das, S., Khound, R., Santra, M., & Santra, D. K. (2019). Beyond bird feed: Proso millet for human health and environment. *Agriculture*, *9*(3), 64.
- Dhruv S. & Thite N. (2021) Product development and Sensory evaluation of Foxtail in cooperated recipes
- Dhruv S. & Sharma N. (2022) Nutrient profiling, product development and sensory evaluation of Little millet incorporated recipes
- India | USDA Foreign Agricultural Service. (n.d.). https://www.fas.usda.gov/data/production/country/in
- Iyer U. & Patel K. (2012). Studies on Product Development and Sensory Evaluation of Kodari (Paspalum Scrobiculatum Linn) Incorporated Recipes: Impact of Kodari Supplementation on the Lipid Status in Type 2 Diabetic Subjects.
- Iyer U., Dhruv S. & Jayswal D. (2012). Studies on Product Development and Sensory Evaluation of Kodari (Paspalum Scrobiculatum Linn) Incorporated Recipes: Impact of Kodari Supplementation in the Management of Hyperglycemia in Type 2 Diabetic Subjects.

- Jadhav BN, Nikam S, Salunke S et al. (2022) Phytochemical analysis of selective millets. Journal of Emerging Technologies and Innovative Research 3rd Ed. Nirali Prakashan (Pune): pp.137-139.
- Kumari, D., Thakur, N., & Upmanyu, S. (2024). The world of Millets: A comprehensive overview of Millets and their Significance. *Journal of Cereal Research*, *16*(3).
- Malik S, Mustapha A, Krishnaswamy K (2023). Development of millet-acid whey formulations with nutritional, microbiological, and sensory characterization. Frontiers in Sustainable Food Systems 7:1233689
- Mathanghi SK, Kanchana S, Perasiriyan V (2020). Pinnacles of Proso millet (Panicum miliaceum L.): A nutri millet. Trop Plant Res 7(1):238-44
- Mehta P. & Shah K. (2010). A study on Suitability of Ragi Based Product and Shankhpushpi (Convolvulus Pluricaulis) for Institutionalized Elderly with a Focus on Nutritional Status and Mental Health.
- Mounika D, Sangeetha U, Sireesha G (2022). Estimation of phytochemicals in Millets and selected Millet products. Indian J. Appl. Pure Bio 37:810-20
- Murugan S, Shanmugam A, Manoharan L et al (2016). Antioxidant Activity of Aqueous and Methanol Extract of Barnyard Millet. Research Journal of Pharmacy and Technology 9(3):262-6
- Nambiar V. & Patwardhan T. (2013). Consumption Patterns of Millets Among Patients with Non-Communicable Diseases of Pune City and Assessment of Glycemic Index of some Maharashtrian Traditional Millet Based Preparations
- Niharika B, Jaipuriar DS, Ranjan R et al (2020). A Study to Explore the Biochemical Properties Of Locally Grown Millets International Journal of Research and Analytical Reviews 375-382
- Nuwan VG, Ediriweera ER, Wasana RK (2016). Medicinal and nutritional value of Panicum miliaceum L.(Meneri): A review
- Prapula Thejashwini, P., Madhusudhan, M. C., Sushma, T., Gulnaz, A. R., Gowda, A. C. H., Roopa, G., Pushpalatha, H. G., & Geetha, N. (2024). Evaluation of phytochemical composition and in-vitro assessment of antioxidant and antimicrobial activities of various medicinal plant extracts. Journal of Pharmacognosy and Phytochemistry, 13(3), 37–45. https://doi.org/10.22271/phyto.2024.v13.i3a.14942
- Ramadoss, P. P., & Shanmugam, K. (2024). Evaluation of phytochemical analysis and total phenol content of Proso millet and Barnyard millet. *Proceedings of Anticancer Research*, *8*(2), 13–19. https://doi.org/10.26689/par.v8i2.5329
- Tadhani, M. B., Patel, V. H., & Subhash, R. (2007). In vitro antioxidant activities of Stevia rebaudiana leaves and callus. Journal of Food Composition and Analysis, 20(3–4), 323–329. https://doi.org/10.1016/j.jfca.2006.08.004
- Taylor, J. R., Belton, P. S., Beta, T., & Duodu, K. G. (2014). Increasing the utilisation of sorghum, millets and pseudocereals: Developments in the science of their phenolic phytochemicals, biofortification and protein functionality. *Journal of Cereal Science*, *59*(3), 257-275.
- Vanisha S Nambiar and JJ Dhaduk. (2015). Iron status of women of reproductive age living in pearl millet consuming areas of Banaskatha, Gujarat.

- Yuan Y, Xiang J, Zheng B (2022). Diversity of phenolics including hydroxycinnamic acid amide derivatives, phenolic acids contribute to antioxidant properties of proso millet. Lwt 154:112611
- Zhang, L., Liu, R., & Niu, W. (2014). Phytochemical and antiproliferative activity of proso millet. PloS one, 9(8), e104058.
- Zhishen, J., Mengcheng, T., & Jianming, W. (1999). The determination of flavonoid contents in mulberry and their scavenging effects on superoxide radicals. Food Chemistry, 64(4), 555–559. https://doi.org/10.1016/S0308-8146(98)00102-2

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THE DIET AND MENSTRUAL CHALLENGES FACED BY ADOLESCENT GIRLS WITH VISUAL IMAPAIRMENTS AND DEVELOPMENTAL DISABILITIES - A COMPARATIVE STUDY

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ABSTRACT

Menstruation is a complex process integral to femininity, with proper nutrition playing a key role in menstrual health. Poor diet and lifestyle can contribute to menstrual disorders, especially among young girls. Adolescent girls with disabilities face unique challenges during puberty, including menstrual hygiene management (MHM) issues due to limited access to facilities, caregiver reliance, and lack of awareness. This study surveyed 105 adolescent girls (58 with visual impairments, 47 with developmental disabilities) to explore their dietary habits, menstrual challenges, and MHM practices using a self-designed pretested questionnaire. Data were analysed using Chi-square, independent't' tests, and Pearson correlation coefficients. The mean age of menarche was 12.42 ± 1.23 years, with a mean menstrual duration of 4.16 ± 1.52 days. Girls with developmental disabilities (DD) experienced more frequent menstrual challenges, including severe abdominal pain, irregular periods, UTIs, white discharge, soiling of clothes, and school absenteeism. While girls with visual impairments (VI) had better MHM practices, both groups exhibited poor dietary habits. DD girls had significantly higher rates of overweight and obesity ($p=0.001^{**}$). Significant differences in macronutrient intake were observed ($p<0.05$), with no notable differences in micronutrient intake. A positive correlation was found between BMI and dietary habits, MHM practices, and menstrual problems. The study highlights the need for targeted interventions promoting healthy eating, exercise, and tailored MHM support, alongside national policies focused on menstrual health education, access to affordable products, and clean, accessible facilities in schools.

Key Words: Menstrual Challenges, Menstrual Hygiene Management Practices (MHM), Visual Impairment (VI), Developmental disabilities (DD)

INTRODUCTION

The Rights of Persons with Disabilities Act (2016) defines a person with a disability as someone with a long-term physical, mental, intellectual, or sensory impairment that, when combined with barriers, limits their full and equal participation in society. Visual impairment refers to permanent sight loss that cannot be fully corrected with glasses or contact lenses (Lee et al., 2024). Developmental disabilities encompass lifelong conditions, both intellectual and physical, such as

autism, cerebral palsy, intellectual disabilities, and ADHD (NICHD, 2025). Girls and women with disabilities often face heightened stigma due to the dual challenges of gender and disability (Carmine & Fischer, 2022).

Adolescence is a critical stage of physical, cognitive, and emotional development, including menarche (WHO, 2024). Menstrual health is vital for overall well-being but is often neglected, especially for those with disabilities. Girls with disabilities, such as visual impairments(VI), Autism Spectrum Disorder, and ADHD, face unique challenges during menstruation, including lack of privacy, unclean facilities, and physical discomfort, leading to irritability, UTIs, and nutritional deficiencies (White et al., 2016; Kuper et al., 2018). These girls often feel uncomfortable and depressed when needing assistance with hygiene tasks Groce et al., (2011).

Menstruation significantly impacts the quality of life for girls with visual and intellectual impairments and their caregivers (Nurkhairulnisa et al., 2018; Sobana & Deva, 2024; Canha et al., 2016). Girls with developmental disabilities also face irregular cycles, behavioral changes, and premenstrual symptoms due to sensory and motor challenges (Carmine et al., 2022). Menstrual hygiene management (MHM) is an important public health issue, requiring access to clean water, absorbents, and private spaces for proper hygiene (UNICEF, 2020; Tracy et al., 2016). Girls with disabilities face barriers such as lack of accessible facilities, limited education, and high menstrual product costs, leading to health issues like UTIs, vaginal scabies, and school absenteeism (Wilbur et al., 2019, Singhania & Muralidaran,2022).

Diet plays a significant role in menstrual health by regulating hormones and easing symptoms like cramps and fatigue. A balanced diet rich in proteins, vitamins (B vitamins, vitamin D), minerals (calcium, magnesium), and antioxidants can improve menstrual comfort and cycle regularity. Poor nutrition, unhealthy and monotonous eating habits, lack of exercise, medical comorbidities and issues like hyperactivity and dependence on caregivers, common in children with ASD, can worsen menstrual problems and overall health (Naraoka et al., 2023).

SIGNIFICANCE OF THE STUDY

Menstrual health is an important public health issue linked to the Sustainable Development Goals and human rights. However, girls with disabilities face unique challenges, such as limited knowledge, support, and facilities, which often go unaddressed and impact their well-being. While menstrual issues in Indian teenagers are well-researched, there is less focus on those with developmental and visual impairments. This study aims to investigate their menstrual challenges, the role of diet in menstrual health, and their menstrual hygiene management. The findings will help guide interventions and policies to enhance menstrual health, hygiene, and dietary support for these girls by identifying gaps in education and services.

OBJECTIVES OF THE STUDY

- To assess and compare the nutritional status, dietary habits, menstrual issues, and hygiene practices of adolescent girls with visual and developmental disabilities.

- To examine the link between nutritional status, dietary habits, and menstrual problems in these girls.

HYPOTHESES OF THE STUDY

H1: Significant differences exist in nutritional status, dietary habits, menstrual issues, and hygiene practices between girls with visual and developmental disabilities.

H2: Menstrual problems are significantly related to nutritional status, dietary habits, and hygiene practices in adolescent girls with disabilities.

METHODOLOGY

Selection of Sample: This cross-sectional study included 105 adolescent girls consisted of 58 visually impaired girls and 47 with developmental disabilities aged 13-19. The samples were purposively selected following the inclusion criteria - postmenarchal, free of comorbidities, attending school, and willing to participate from the schools for the blind and special education institutions in Chennai.

Tools Used: A pretested, self-structured questionnaire consisted of demographic details, menstrual challenges and hygiene practices followed. Nutritional status was assessed through anthropometric measurements (weight, height, waist, and hip circumference), with BMI classified using WHO Growth Charts. Dietary habits were examined through frequency of food consumption over the previous month on a scale from daily twice to never. From the 24 hours' diet recall, the nutrients were calculated. The questionnaire's reliability was confirmed with a Cronbach's alpha of 0.82.

Data Collection: Data was collected with prior permission and informed consent obtained from institutions, participants, and caregivers. For visually impaired students, questions were read aloud, and responses were recorded. For girls with developmental disabilities, primary caregivers, typically mothers, provided responses along with their children.

Statistical Tests Used: Data analysis was performed using SPSS version 21, with frequency analysis, t-tests, chi-square tests, and Pearson's correlation, setting significance at $p \leq 0.05$.

RESULTS AND DISCUSSION

Demographic Details of the Respondents

The participants, aged 13 to 19 years (mean age 14.28 ± 2.78), included 58 girls (55.2%) with visual impairments (55.2%) and 47 (44.8%) with developmental disabilities (44.8%). Among the latter, 38 (80.9%) had autism spectrum disorder and 9 (19.1%) had ADHD. The annual family income for visually impaired girls was below Rs.3 lakhs, while for girls with developmental disabilities, it ranged from Rs.5 to 10 lakhs.

Menstrual Details of the Respondents

Fig-1 shows that most visually impaired (74.1%) and developmentally disabled girls (51.1%) menarched between ages 11 and 13, with an average age of 12.42 ± 1.23 years. Irregular menstruation was reported by 44.7% of DD girls and 69% of VI girls, with DD girls experiencing more frequent irregular cycles (55.3%) compared to VI girls (31%). The average menstrual flow lasted 5.16 ± 1.52 days, with 72.4% of VI girls and 78.7% of DD girls having flows of 3-6 days. More VI girls (81%) had moderate flow compared to DD girls (59.6%), with fewer experiencing heavy or insufficient flow. These findings are consistent with studies by Kanmani & Ravisankar (2016) and Dundar & Ozsoy (2020).

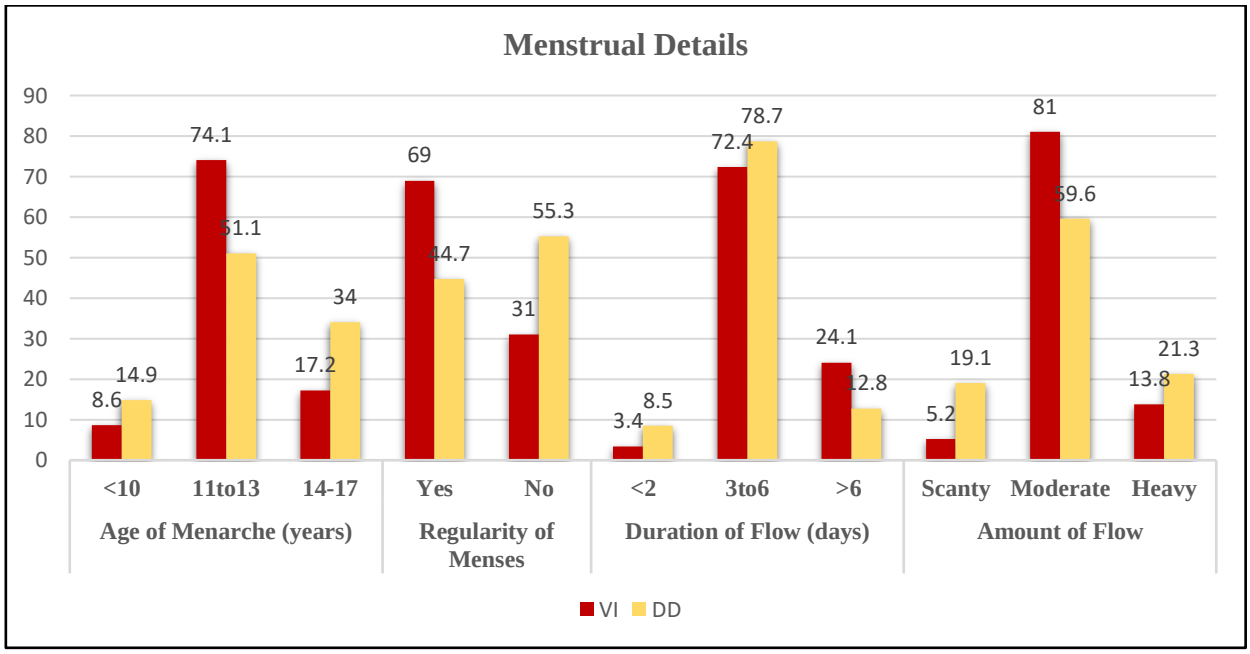


Fig- 1: Menstrual Details of Adolescent girls with vision impairment and developmental disabilities

Menstrual Challenges of the Respondents

Table- 1, highlights significant menstrual issues in both groups. Lower abdominal pain was common (VI: 89.7%, DD: 95.7%). DD girls reported higher rates of malaise (80.9%), mood swings (70%), headaches (34%), and backaches (83%) compared to VI girls (53.4%, 24%, 46.9%, 17.2%). DD girls also had significantly higher rates of dysmenorrhea (89.4%), oligomenorrhea (38.3%), and polymenorrhea (17%) compared to VI girls (75.9%, 22.1%, 8.6%) (p=0.001**). More DD girls (57.4%) reported white discharge, while 41% of VI girls experienced severe pain (p=0.001). Both groups had UTI symptoms, likely due to poor hygiene (65.5% VI, 87.2% DD). DD girls were more likely to miss school (59.6% vs. 24%) and soil clothes (76.6% vs. 26%), with significant differences. They also used hot sponging (34%) and hot baths (46.8%) more than VI girls. These findings partially support the hypothesis that girls with developmental disabilities face more menstrual challenges due to their disability and limited self-care, consistent with studies by Thapa &Sivakami (2017).

Table-1: Menstrual Challenges faced by Adolescent girls with Visual Impairment and Developmental Disabilities

Menstrual Problems		VI		DD		p-value
		N	%	N	%	
Type of menstrual Problems	Lower abdominal pain	52	89.7	45	95.7	0.667
	Backache	27	46.6	39	83.0	
	Headache	10	17.2	16	34.0	
	Anorexia	6	10.3	3	6.4	
	Malaise	31	53.4	38	80.9	
	Mood Swings	14	24.1	33	70.2	
Menstrual Disorder	Dysmenorrhoea	44	75.9	42	89.4	0.001**
	Menorrhagia	9	15.5	14	29.8	
	Oligomenorrhoea	13	22.1	18	38.3	
	Polymenorrhoea	5	8.6	8	17.0	
	White discharge	24	41.4	27	57.4	
	None	14	24.1	0	0	
Level of Pain during Menstruation	No pain	6	10.34	2	4.3	0.02*
	Hurt a little	14	24.1	5	10.6	
	Hurt a little more	20	34.5	13	27.7	
	Hurt whole lot	11	19.0	15	31.9	
	Hurt worst	7	12.1	12	25.5	
UTI	Yes	38	65.5	41	87.2	1.00
	No	20	34.5	6	12.8	
Menstrual & Academic Challenges faced	Soiling of clothes	15	25.9	36	76.6	0.001**
	Missing School	14	24.1	28	59.6	
	Poor Concentration	26	44.8	36	76.6	
Menstrual Pain management practices	Rest	14	24.1	28	59.6	0.18
	Take painkillers	0	0	11	23.4	
	Hot Sponging	0	0	16	34.0	
	Hot water bath	10	17.2	22	46.8	
	None	34	58.6	9	19.1	

Menstrual Hygiene Management Practices of the Respondents

Menstrual hygiene practices followed by developmentally disabled (DD) and visually impaired (VI) girls presented in Fig- 2, revealed that most VI and DD girls used sanitary pads, while 36.2% of VI and 10.6% of DD girls used cloth pads (p=0.041), as noted by Quint et al. (2016). Both groups primarily wore synthetic fabric innerwear (VI: 84.5%, DD: 68.1%, p=0.32). VI girls changed pads more often (77.6%), though the difference wasn't significant (p=0.24). Disposal methods varied, with 83% of DD girls disposing of pads openly compared to 29.3% of VI girls (p=0.02). Both groups had limited access to sanitary pads and disinfectants (VI: 89.7%, DD: 80.9%, p=0.167), but DD girls had more access to water in toilets (76.6% vs. 46.6%, p=0.05). Neither group had proper hygiene facilities (p=0.68) in their school. DD girls (95.7%) received

more caregiver assistance than VI girls (31%, p<0.001) especially during menses. The hypothesis is not supported as there is little difference in menstrual hygiene practices between groups, aligning with Joshi & Joshi (2015) and Arslan et al. (2024).

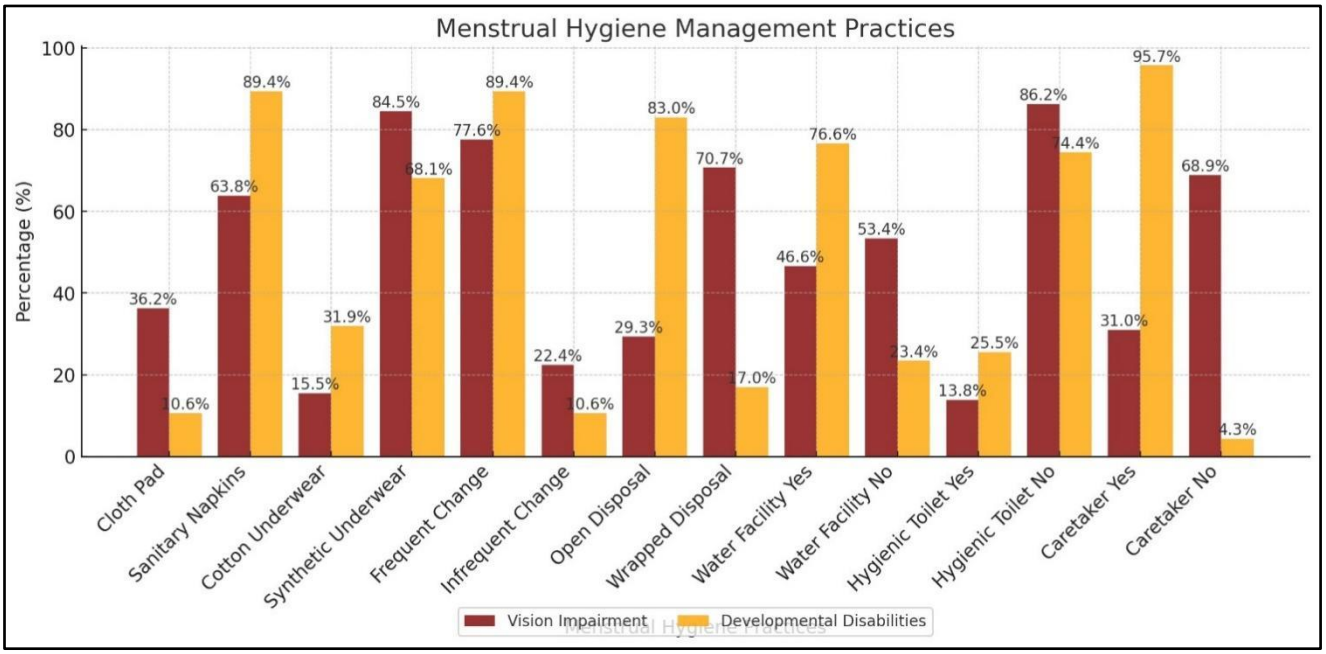


Fig- 2: Menstrual Hygiene Management Practices

Table 2: Comparison of Anthropometric Measures of the Respondents

Anthropometric Measures	Visually Impaired	Developmental Disabled	't' value	Level of Significance
Weight (Kg)	56.1± 8.3	58.5±10.2	1.32	0.186NS
Height (cm)	158.6± 7.2	155.5 ± 8.8	1.34	0.182NS
BMI	22.48±2.45	24.37±2.99	3.56	0.001**
WHR	0.86±0.11	0.95±0.32	2.00	0.047*

** Significant at 0.01level, * Significant at 0.05 level, NS-Not Significant

Table-2, compares the nutritional status of girls with visual impairments (VI) and developmental disabilities (DD), showing no significant differences in body weight (VI: 56.1±8.3 kg, DD: 58.5±10.2 kg) or height (VI: 158.6±7.2 cm, DD: 155.5±8.8 cm) (p>0.05). However, DD girls had a significantly higher BMI (24.37±2.99) compared to VI girls (22.48±2.45) (p=0.001**) and a higher Waist-Hip Ratio (DD: 0.95±0.32 vs. VI: 0.86±0.11) (p=0.047), indicating a higher risk of metabolic disorders in DD girls. The hypothesis was supported, with factors such as psychotropic medication, higher consumption of energy-dense foods, and low physical activity contributing to overweight and obesity in DD girls, as noted by Karthikayini & Arun (2021), Kittana et al., (2023).

Dietary Habits of the Respondents

Fig-3 shows that all visually impaired (VI) girls and 94% of developmentally disabled (DD) girls were non-vegetarians, eating 3-4 meals daily. While 94% of DD girls did not skip meals due to caregiver assistance, only 67.2% of VI girls maintained the same. About 83% of VI girls snacked 2-3 times a week, while 70% of DD girls snacked once daily. Both groups mostly drank less than 2 litres of water daily and consumed sweets, spicy foods, and coffee during menstruation (Williams & Seiverling, 2010).

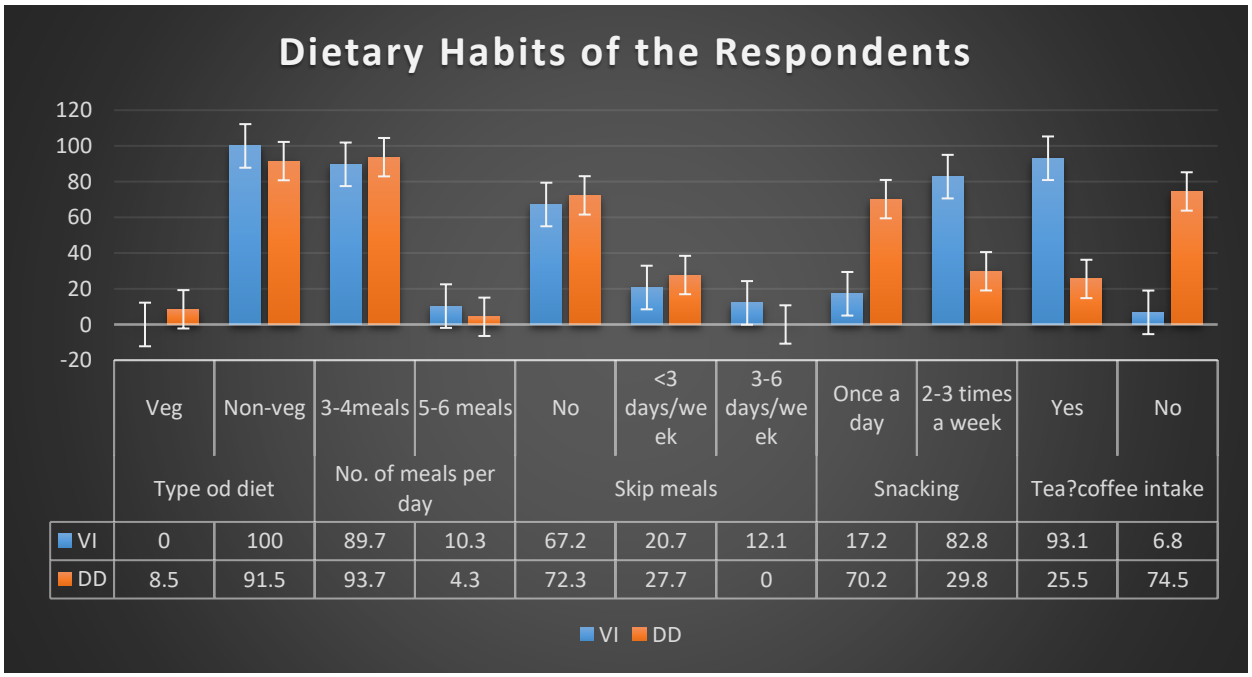


Fig-3: Dietary Habits of the girls with visual impairment & developmental disabilities

Table-3: Comparison of Nutrient Intake between girls with Visual Impairment and Developmental Disabilities

Nutrients	**Visually Impaired**	**Developmentally disabled**	**'t' value**
Energy Kcal)	2320 ± 198	2708 ±203	9.94**
Carbohydrates (g)	396 ± 27.0	431 ±13.0	8.15**
Protein (g)	35.83 ± 7.0	40.72 ± 6.6	3.65**
Fat (g)	25.6 ± 8.1	32.30 ± 5.2	4.9**
Calcium (mg)	218.75 ± 3.8	216.63 ± 4.6	1.4
Iron (mg)	28.07 ± 5.6	28.03 ± 7.1	0.027
Dietary Behaviour	4.14±2.11	3.27 ±2.40	1.94

** Significant at 0.01 level, * Significant at 0.0 5 level

Table-3 reveals that DD girls consumed more energy, carbohydrates, protein, and fat than recommended levels. DD girls had significantly higher energy intake (2708 ± 203 kcal vs. 2320 ± 198 kcal, p<0.001), fat (32.3 ± 5.2 g vs. 25.6 ± 8.1 g, p<0.001), protein (40.72 ± 6.6 g vs. 35.83 ± 7.0 g, p<0.001), and carbs (431 ± 13 g vs. 396 ± 27 g, p<0.001) than VI girls. Both groups had insufficient calcium and iron intake, with no significant differences. VI girls had a lower dietary score (3.27±2.4) compared to DD girls (4.14±2.11), though the difference was not significant, leading to partial acceptance of the hypothesis. These results are consistent with studies by Talekar (2023) ; Naz et al., (2020) which link poor nutrition to menstrual irregularities.

Association of BMI, Dietary habits with Menstrual Problems

Among visually impaired (VI) girls, 58% had a normal BMI, compared to only 19% of developmental disability (DD) girls. Menstrual problems were more common in obese, overweight, and underweight groups. Even DD girls with a normal BMI experienced menstrual issues, with a significant link between BMI and menstrual disorders (p=0.0001**). These findings are consistent with Dwivedi et al., (2024).

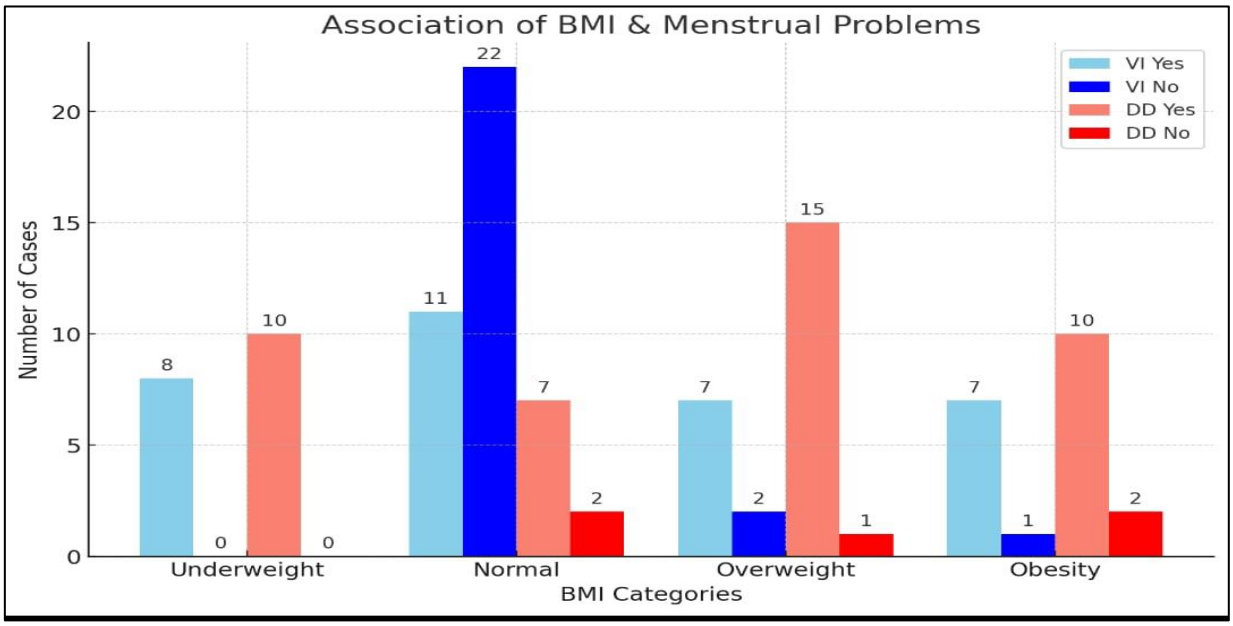


Fig -4: Association of BMI with Menstrual Problems

Table-4: Association of Dietary behaviours with Menstrual Problems

Dietary Behaviours		**VI**		**DD**		**p- value**
		Menstrual Problems		**Menstrual Problems**		
		Yes	**No**	**Yes**	**No**	
Type of Diet	Vegetarian	-	-	1 (2.1)	3 (6.4)	0.039*
	Non-vegetarian	54 (93.0)	4(7.0)	37 (78.7)	6(12.8)	
Meal Time	Regular	39 (83.0)	6(12.8)	6 (12.8)	9(19.1)	

	Irregular	10 (17.2)	3(5.2)	32 (68.1)	0	0.03*
Skipping Food	No	25(43)	4(6.9)	32(68.1)	2(4.2)	0.043*
	Breakfast	16(27.6)	3(5.2)	7(14.9)	0	
	Lunch	-	-	2(4.3)	0	
	Dinner	2(3.4)	8(13.8)	6(12.8)	6(12.8)	
Tea/Coffee/ Carbonated beverages consumption	Yes	14(24.1)	12	9(19.1)	9(19.1)	0.52
	No	2(3.4)	6(10.3)	38(80.9)	0	
Intake of Junk foods/ Processed foods	Yes	37(63.7)	18(31)	45(95.7)	0	<0.001
	No	1(1.7)	2(3.4)	2(4.2)	2(4.2)	
Sweets/ Spicy foods consump Tion	Yes	31(53.4)	16 (27.6)	41(87.2)	0	0.184
	No	5(8.6)	6(10.3)	5(10.6)	1	
Water consumption per day	<2.0 litres	40(69.0)	9(15.5)	47(100)	0	<0.001
	2.1-3.0 litres	1(1.7)	8(13.8)	0	0	
Overall Dietary Score	Poor	18(31)	0	26(55.3)	0	0.05*
	Fair	30(51.7)	4(6.9)	10(21.3)	5(10.6)	
	Good	1(1.7)	5((8.6)	3(6.4)	2(4.2)	
	Very Good	0	0	2(4.2)	0	

** Significant at 0.01 level, * Significant at 0.0 5 level

Dietary habits were strongly linked to menstrual issues in both groups (Table-4). Menstrual problems were particularly associated with non-vegetarian diets, especially high chicken consumption (p=0.039*). DD girls who had irregular eating times (68%) or skipped meals (33%) reported more menstrual issues (p=0.03* and p=0.043*). Regular tea or coffee drinking had no significant impact (p=0.52). Junk food consumption was common in both groups (VI: 94.8%, DD: 95.7%) and strongly correlated with increased menstrual discomfort (p<0.001), while spicy and sweet foods had no significant effect (p=0.184). Girls drinking less than two liters of water daily reported more menstrual problems (p=0.001). These findings align with Amgain and Neupane (2019) and Noraoka et al., (2023), linking poor dietary habits, especially junk foods, to menstrual issues.

Relationship between BMI, Dietary habits, Menstrual Hygiene Management Practices and Menstrual Challenges

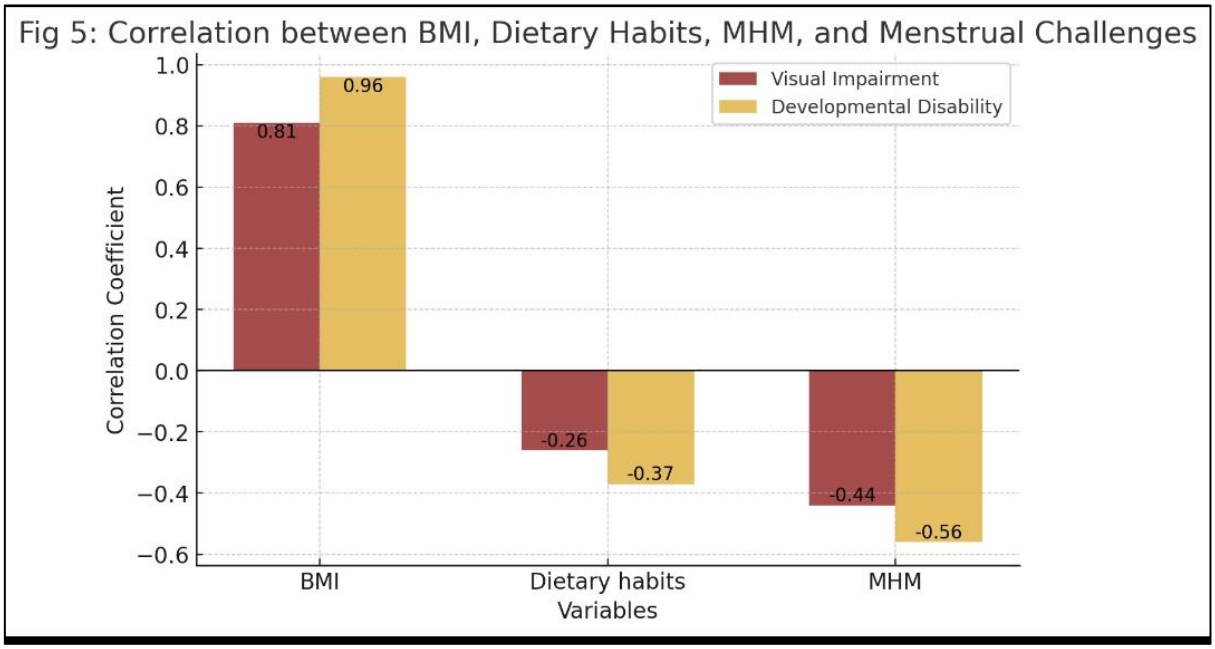


Fig-5: Correlation between BMI, Dietary habits, MHM Practices and Menstrual Challenges

Fig- 5, shows that the BMI and menstrual issues were strongly correlated in both DD (r=0.96) and VI girls (r=0.81). DD girls showed a stronger link between poor eating habits and menstrual problems (-0.37**) compared to VI girls (-0.26*). Both groups had a significant negative correlation between menstrual hygiene management and menstrual issues (-0.44** for VI, -0.56** for DD), indicating inadequate hygiene worsens menstrual problems, with a stronger impact in DD girls. These results support the hypothesis of a link between nutritional status, dietary habits, hygiene practices, and menstrual challenges in girls with disabilities, consistent with studies by Zafra et al. (2020) and Widayanti & Widawati (2018).

CONCLUSION

Menstrual health is a rising public health concern, yet remains a low priority for adolescent girls with disabilities. The study found that girls with developmental disabilities had higher BMI and waist-to-hip ratios and experienced more menstrual issues than visually impaired girls. These girls consumed more calories, carbs, and fats but lacked adequate protein, iron, and calcium. Poor dietary habits, such as skipping meals and consuming junk food, were linked to increased menstrual problems. Additionally, girls with developmental disabilities faced inadequate school WASH facilities and menstrual hygiene management issues. Both groups experienced menstrual poverty, lacking essential knowledge and support. The study calls for better nutrition, MHM interventions, and national policies to improve menstrual health education, access to menstrual products, and sanitary facilities in schools.

SUGGESTIONS FOR FUTURE RESEARCH WORK

Future research can address the current study's limitations by incorporating a larger sample size and a wider variety of impairments. Examining the influence of factors like income, location, and pre-existing health conditions could provide deeper insights. Additionally, long-term studies may help establish causal links and identify key factors that affect or mediate these relationships.

REFERENCES

- Amgain, K., & Neupane, S. (2019). Effects of food habits on menstrual cycle among adolescent girls. *Europasian Journal of Medical Sciences, 1*(1), 53-61. https://doi.org/10.46405/ejms.v1i1.35.
- Arslan, R., Yanık, D., & Pekşen Akça, R. (2024). Investigation of menstrual hygiene and self-care skills of adolescent girls with autism spectrum disorder: Mother views. *Journal of Autism and Developmental Disorders*. https://doi.org/10.1007/s10803-024-06446-8.
- Canha, L.C., Simões, C., Matos, M. G., & Owens, L. (2016). Well-being and health in adolescents with disabilities. *Psicologia: Reflexão e Crítica*, *29*, 32. https://doi.org/10.1186/s41155-016-0041-9
- Carmine L, Fisher, M. (2022). Menstrual and reproductive health in female adolescents with developmental disabilities. *Current Problems in Pediatric and Adolescent Health Care, Aug 52*(8), 101243. https://doi.org/10.1016/j.cppeds.2022.101243.
- Dündar, T., & Özsoy, S. (2020). Menstrual hygiene management among visually impaired women. *British Journal of Visual Impairment, 38*(3), 347-362. https://doi.org/10.1177/0264619620911441
- Dwivedi, D., Singh, N., & Gupta, U. (2024). Prevalence of menstrual disorder in women and its correlation to body mass index and physical activity. *Journal of Obstetrics and Gynecology of India, 74*(1), 80-87. https://doi.org/10.1007/s13224-023-01914-0
- Groce, N. A., Bailey, N., Lang, R., Trani, J.-F. T., & Kett, M. (2011). Water and sanitation issues for persons with disabilities in low- and middle-income countries: A literature review and discussions of implications for global health and international development. *Journal of Water and Health, 9*(4), 617-627. https://doi.org/10.2166/wh.2011.198
- Joshi, G. A., & Joshi, P. G. (2015). Study of menstrual patterns in adolescent girls with disabilities in a residential institution. *International Journal of Adolescent Medicine and Health, 27*(1), 65-68. https://doi.org/10.1515/ijamh-2014-0016
- Kanmani, K., & Ravisankar, A. K. (2016). Prevalence of menstrual problems and treatment-seeking behavior: A study among visually challenged women. *International Journal of Scientific Research and Publications, 6*(1). http://www.ijsrp.org/research-paper-0116.php?rp=P495054
- Karthikayini, S., & Arun, S. (2021). Challenges faced by primary caretakers of adolescent girls with intellectual disability during their menstrual cycle in Puducherry: A mixed method study. *Indian Journal of Community Medicine, 46*(3), 416-420. https://doi.org/10.4103/ijcm.IJCM_433_20
- Kittana M, Ahmadani A, Williams KE, Attlee A.(2023).Nutritional Status and Feeding Behavior of Children with Autism Spectrum Disorder in the Middle East and North Africa

Region: A Systematic Review. *Nutrients.* 2023 Jan 30;15(3):711. doi: 10.3390/nu15030711. PMID: 36771417; PMCID: PMC9920501https://pmc.ncbi.nlm.nih.gov/articles/PMC9920501/

- Kuper, H., Mactaggart, I., White, S., Dionicio, C., Cañas, R., Naber, J., Polack, S., & Biran, A. (2018). Exploring the links between water, sanitation, and hygiene and disability: Results from a case-control study in Guatemala. *PLOS One*. https://doi.org/10.1371/journal.pone.0197360
- Lee, S. Y., Gurnani, B., & Mesfin, F. B. (2024, February 27). *Blindness*. In *StatPearls* (Eds.), *StatPearls [Internet]*. StatPearls Publishing. Available from https://www.ncbi.nlm.nih.gov/books/NBK448182/
- Naraoka Y, Hosokawa M, Minato-Inokawa S, Sato Y. (2023). Severity of Menstrual Pain Is Associated with Nutritional Intake and Lifestyle Habits. Healthcare (Basel). Apr 30;11(9):1289. doi: 10.3390/healthcare11091289. PMID: 37174831; PMCID: PMC10178419.
- National Institute of Child Health and Human Development (NICHD). (n.d.). *Intellectual and developmental disabilities (IDDs)*. Retrieved March 29, 2025, from https://www.nichd.nih.gov/health/topics/idds/conditioninfo
- Naz, M. S. G., Kiani, Z., Fakari, F. R., Ghasemi, V., Abed, M., & Ozgoli, G. (2020). The effect of micronutrients on pain management of primary dysmenorrhea: A systematic review and meta-analysis. *Journal of Caring Sciences, 9*(1), 47-56. https://doi.org/10.34172/jcs.2020.008.
- Nurkhairulnisa, A.I., Chew, K. T., Zainudin, A. A., Lim, P. S., Shafiee, M. N., Kampan, N., Wan Ismail, W. S., Grover, S., & Azurah, A. G. N. (2018). Management of menstrual disorder in adolescent girls with intellectual disabilities: A blessing or a curse? *Obstetrics & Gynecology*, 11, 1-5. https://doi.org/10.1155/2018/9795681
- Quint, E. H., O'Brien, R. F., Braverman, P. K., Adelman, W. P., Alderman, E. M., Breuner, C. C., & Marcell, A. V. (2016). Menstrual management for adolescents with disabilities. *Pediatrics, 138*(1). https://pubmed.ncbi.nlm.nih.gov/27325636/.
- Singhania. A and Muralidharan, A. (2022). Menstrual Health and Hygiene Management for Persons with Disability, Insights and Good Practices from India *WaterAid India*. March 2022, United Nations Population Fund (UNFPA) in collaboration with WaterAid India (Jal Seva Charitable Foundation, https://india.unfpa.org/sites/default/files/pub-pdf/final_mhhm_-_for_persons_with_disability.pdf
- Sobana, R. M., & Jishnu Deva, B. (2024). Quality of life among mothers of children with learning disabilities: A comparative study. *International Journal of Research and Analytical Reviews, 11*(3), 1-7.PAPER ID : IJRAR24C1935, www.ijrar.org (E-ISSN 2348-1269, P- ISSN 2349-5138)
- Talekar, V., Singh, M., Kamble, K., & Mane, D. (2023). Role of dietary habits in menstrual disorders among adolescent girls in Navi Mumbai, Western Maharashtra. *BLDE University Journal of Health Sciences*, *8*(1), 100-105. https://doi.org/10.4103/bjhs.bjhs_101_22
- Thapa, P., & Sivakami, M. (2017). Lost in transition: Menstrual experiences of developmentally disabled school-going adolescents in Delhi, India. *International Journal of Women's Health, 9*, 61-68. DOI:10.3362/1756-3488.17-00012

- Tracy, J., Grover, S., & Macgibbon, S. (2016). Menstrual issues for women with intellectual disability. *Australian Prescriber, 39*(2), 54-57. https://doi.org/10.18773/austprescr.2016.024
- UNICEF. (2020). Guidance on monitoring menstrual health and hygiene. New York, USA: UNICEF. https://www.unicef.org/documents/guidance-monitoring-menstrual-health-and-hygiene
- White, S., Kuper, H., Itimu-Phiri, A., Holm, R., & Biran, A. (2016). A qualitative study of barriers to accessing water, sanitation, and hygiene for disabled people in Malawi. *PLOS One*. https://doi.org/10.1371/journal.pone.0155043
- WHO. (2024). Adolescent health. https://www.who.int/health-topics/adolescent-health#tab=tab_1
- Widayanti, L. P., & Widawati, P. R. (2018). Correlation Between Body Mass Index and Dysmenorrhea in Preclinical Female Students Aged 16-24 at The Hang Tuah University Medical Faculty, Surabaya. *International Conference on Sustainable Health Promotion*, *1*, 66-71. https://doi.org/10.29080/icoshpro.v1i0.16
- Wilbur, T., Torondel, B., Hameed, S., Mahon, T., & Kuper, H. (2019). Systematic review of menstrual hygiene management requirements, its barriers and strategies for disabled people. *PLOS One*. https://doi.org/10.1371/journal.pone.0210974
- Williams, K. E., & Seiverling, L. (2010). Eating problems in children with autism spectrum disorders. *Topics in Clinical Nutrition, 25*(1), 27-37. https://doi.org/10.1097/TIN.0b013e3181d10958.
- Zafra, O., Fernández-Martínez, E., Abreu-Sánchez, A., Iglesias-López, M. T., García-Padilla, F. M., Pedregal-González, M., et al. (2020). Relationship between diet, menstrual pain, and other menstrual characteristics among Spanish students. *Nutrients, 12*(1759),doi: 10.3390/nu12061759

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QUALITY ANALYSIS OF SOME SELECTED STREET FOODS OF KOLKATA, WEST BENGAL, INDIA

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ABSTRACT

The viable street foods trade in Kolkata are a dependable source of easily available, cheap nutrients for the city's workforce, Street foods refer to food and/or beverages prepared and sold by vendors in streets and similar other public places for immediate consumption. The present study was conducted to analyze the nutritive values of five selected street vended food items viz. singara, phuchka, ladoo, kulfi and ripe papaya from four different sale locations of Kolkata (three vendors from each locality in duplicates) and to investigate their microbiological status. Altogether 40 samples were analyzed for their moisture, carbohydrate, protein, fat and calorie content using the standard procedures of National Institute of Nutrition (NIN). Standardized techniques were used to ascertain their microbial load for quality assessment. In this regard, Hazard Analysis Critical Control Point (HACCP) study of phuchka was conducted to identify the stages of contamination. Informal observations of the vendors were also done for enumerating their hygienic practices. It was found that ripe papaya and kulfi provide 33.21±2.98 Kcal/100 gm and 84.32 ± 0.96 Kcal /100 gm respectively whereas fried foods like singara, phuchka and ladoo provides 216.84 ± 1.91 Kcal, 96.68 ± 4.75 Kcal and 274.86 ± 7.02 Kcal respectively/100 gm indicating high nutritional content of street foods. Microbiological analysis revealed that the food samples harboured microbes such as Rhizopus sp., Candida sp., Aspergillus sp. and yeast. Standard Plate Count (SPC) values showed microbial load which ranged from $61x10^5$ to $238 x10^5$ cfu / ml. Unwashed hands (50.00%), uncovered foods (87.5%), usage of tap water (100%), foods served in hands (62.5%) and waste thrown around the road itself (47.22%) are possible risk factors for contamination. Considering the socio-economic importance of street foods, education and training of the street food vendors on hygiene and handling of food is recommended.

Key Words: Street foods, Microbiological quality, Vendors, HACCP, Kolkata.

INTRODUCTION

Urbanisation has caused the street food business to prosper in and around Kolkata. Street foods are foods sold on streets and are "ready to eat foods and /or beverages sold by vendors & hawkers especially in the streets & similar other public places" (**Winarno, F.G. et.al., 1986**).Street foods are a source of easy available, lost cost, convenient and nutritious food providing food security to urban consumers and economic security to vendors (**Chakravarty, I., 2015**).The taste, flavor,

regional touch add to the popularity of street vended foods (**Chakravarty, I., 1995).**Studies in India showed that a vast majority of people eat street foods**(Kumar, M. et. al. , 2023; Muzaffar et. al. , 2009;Sudershan R.V. et. al., 2009).** Food and Agriculture Organization reported from a study in 2007 that worldwide an estimated 2.5 billion people consume street food everyday (**Simon, S., 2007).**Ministry of Urban Poverty Alleviation, Government of India has estimated that there are about 20 lakh street food vendors in India (**FSSAI, 2014**).Street foods are subjected to contamination depending on pH of food, environmental temperature, humidity, usage of quality of water, personal hygiene of vendor, storage of left over foods and therefore remains a major public health hazard (**Simon, S., 2007)**. Street food vendors usually sell their products at public places and corners which are overcrowded economic joints and do not satisfy food safety standards (**FAO/WHO Conference, 2005**).Most studies concluded that street foods establishments lack minimum hygienic standards and gets contaminated leading to health consequences(**Bryan , F.L., et. al., 1988**).Street food vendors lack education and awareness of safe food handling, personal hygiene, environmental cleanliness, food service techniques and usage of water (**Upadhyaya, S. et.al. 2017**). Education and training of vendors on food safety is an urgent necessary.

There is a dearth of data on nutritional contribution from street food items of Kolkata. The present study tries to explore the same. Moreover, the hygienic standards of selected localities of street vended items have not been reported till date. Thus, the purpose of the present study was done with following objectives.

OBJECTIVES

1. To determine the nutritive value of selected street foods namely singara, phuchka, ladoo, kulfi and ripe papaya of Kolkata, West Bengal, India.
2. To find out the microbiological profile of the selected street foods of Kolkata under study.
3. To study about the hygienic practices adopted by street food vendors in Kolkata in selected localities.
4. To conduct Hazard Analysis Critical Control Point (HACCP) study in a chosen street food item and assess the Critical Control Points where the food item is susceptible to contamination.

METHODOLOGY

Sampling:

Five different street foods were selected for study, namely, singara, phuchka, Ladoo, kulfi and ripe papaya. Singara is an easily affordable tea time snack item associated with casual get together whereas the tangy, crispy ‘phuchka’ is a ubiquitous snack consumed by all age groups. Bengalis have ‘sweet tooth’ and the dry sweet Ladoo fulfils their desires. Kulfi is a refreshing option in hot, humid weather of Kolkata and consumed by people in large scale. The people in the city are increasingly resorting to papaya as a healthier option packed with micronutrients. Selected samples of street food were aseptically collected from renowned street vending localities of Kolkata, West Bengal, India namely, Victoria Memorial, Alipore Zoo, Esplanade area and South Point School. Two vendors per food item in each locality were randomly selected depending on more public congregation. Collected samples were transported to the laboratory in ice boxes and analyses were conducted as soon as possible.

Table 1: Ingredients and description of selected street foods of Kolkata

Food items	Ingredients	Description
Singara	All purpose flour/maida with a filling of boiled, potatoes, peas, other seasonal vegetables with spices like ginger, cumin, chilli being added	Singara is deep fried crispy puff triangle pastry of flour stuffed with vegetables cooked in garam masala
Phuchka	Wheat or rava /semolina, tamarind, potatoes, raw onions, chick peas, herbs, spices	Small, fluffy, crispy fried hollow semolina or wheat shell stuffed with spicy potatoes, raw onions, herbs and exhibits tanginess being dipped in spicy tamarind water
Ladoo	Wheat flour or semolina, sugar/jaggery, ghee, dry fruits, condiments like cardamom , clove etc.	Sphere shaped sweet made of all purpose flour, sugar/jaggery , ghee and dry fruits flavoured by condiments
Kulfi	Pure full fat milk, sugar, flavourings like cardamom, saffron etc.	Traditional frozen dessert formed of dense evaporated milk flavoured with pistachios, saffron made in moulds
Ripe papaya	Tropical Fruit	Golden yellow with orange as base the fruits are peeled, cut and sold on kiosks in small shoal(made of dried leaf) containers

Biochemical estimation:

The moisture content of foods was estimated by standard drying method (1).

Percentage of moisture in sample = Initial weight – Final weight/ Weight of the sampled food ×100 (**FSSAI Manual of Methods of Analysis of Foods, 2016**).

Carbohydrate content of foodstuffs were estimated using 3,5-dinitrosalicylic method or DNS method(**Miller et.al. , 1959**).Standard curve of glucose was prepared by plotting concentration of glucose solution at various concentrations (mg/20 ml) and Optical Densities(OD) values of the same, unknown concentration of glucose of sample was ascertained using the following equation :

gm of carbohydrate present in 100gm of the sample= Concentration (mg) of glucose per 20 ml ×10 / weight of the sample used (gm) .

Protein content of foodstuffs was estimated using Kjeldahl method (**Indian Standards Institution, 1974**). The unknown concentration of protein of sample was estimated using the following equation:

$$\text{gm of protein present in 100gm of the sample} = \frac{(c-b) \times 14d \times 6.25 \times 100}{1000 \times a}$$

where,

a = weight of food taken (gm)

b = NaOH required for back titration

c = Actual volume of NaOH required for neutralization taken as 20 ml

d = Normality of NaOH taken as 0.125(N)

Fat content of foodstuffs was estimated using Soxhlet's apparatus. The difference in weight of the empty flask and the flask containing fat indicated the fat content of the samples in gm per 100 gm (**Bureau of Indian Standards, 1967**).

All the estimations for carbohydrate, protein and fat content were repeated thrice and the average was taken.

Calories: The total calorie content of samples per 100 gm were calculated using 4Kcal /gm of carbohydrate, 4 Kcal/gm proteins and 9.3 Kcal / gm fat(**Ch et al., 2020**).

Microbiological analysis:

Each sample was diluted in sterile distilled water. Serial dilutions of samples were prepared for further analysis. The diluted samples were transferred to petridishes containing Nutrient Agar media, yeast extract agar media and incubated at 37°C overnight. Post incubation the colony count on the plates was done. Enumerations of isolated colony characteristics of microorganisms were done w.r.t shape, size, colour, edge, surface texture and elevation. Gram staining procedure was performed with isolated microorganisms and seen using compound light microscope with oil-immersion objective at 100X magnification.

Evaluation of hygienic practices adopted by street food vendors:

The hygienic practices followed by a group of randomly selected 32 vendors, approximately 8 vendors from each of four street vending localities were studied for 10 to 15 minutes by administering an observation checklist covering aspects of personal hygiene, environmental cleanliness and waste disposal.

Safety analysis:

A phuchka sample was subjected to HACCP analysis and evaluation to identify the critical control points of contamination, list of potential hazards, and thus help to ensure hygienic standards fit for human consumption

Statistical analysis:

Data was tabulated in Microsoft Excel and mean ± SD values were assessed for biochemical parameters.

FINDINGS AND DISCUSSION

Table 2: Nutritive value of selected street foods of Kolkata

Name of street food	Moisture (%)	Carbohydrate (gm/100gm)	Protein (gm/100 gm)	Fat (gm/100gm)	Calories (Kcal/100 gm)
Singara	45.06	13.125 ± 0	6.675 ± 0.024	14.8 ± 0.1	216.84 ± 1.91
Phuchka	55.33	6.250 ± 1.565	4.832 ± 0.016	5.63 ± 0.115	96.68 ± 4.75
Ladoo	20.54	27.168 ± 1.1	9.164 ± 0.072	13.93 ± 0.251	274.8 ± 7.02
Kulfi	92.98	11.063 ± 0	2.586 ± 0.009	3.2 ± 0.1	84.32 ± 0.96
Ripe papaya	89.76	7.5 ± 0.625	0.575 ± 0.006	0.10 ± 0.05	33.21 ± 2.98

Table 2 shows the nutritive values of the selected five street foods, in particular the proximate principles, carbohydrate, protein and fat content /100 gm and the calorie content expressed as mean ± SD. Among the selected food items, carbohydrate content of ladoo is highest at 27.168 ± 1.1 gm/100 gm while that of phuchka is lowest at 6.250 ± 1.565 gm/100 gm. The protein content of Ladoo is highest at 9.164 ± 0.072 gm /100 gm, whereas ripe papaya has the lowest protein content at 0.575 ± 0.006 gm/100 gm. Again singara was found to contain the highest amount of fat at 14.8 ± 0.1 gm/100 gm as it is a deep fat fried item, and ripe papaya was found to have a negligible amount of fat at 0.10 ± 0.05 gm/100 gm. Ladoo was assessed via laboratory tests to be the most calorific food contributing 274.8 ± 7.02 Kcal/100 gm whereas ripe papaya was found to be the least calorific food chosen at 33.21 ± 2.98 Kcal/100 gm.The nutritive values indicate the nutritional importance of street food of a significant portion of the population. Previous studies reported high nutritive value of street foods (**Steyn et. al., 2014**).

Table 3: Microbiological profile of the selected street foods of Kolkata under study

Food item	**cfu/ 10^5 ml**	**Colony characteristics of 1×10^4 dilution**					
		Type of colony	**Colour of colony**	**Size of colony**	**Edge**	**Surface texture**	**Elevation**
Singara	224×10^5	round	white	0.2	entire	smooth shiny	elevated
		irregular	white	0.4	undulate	smooth	effuse
		round	whitish centrally yellow spots	0.4	smooth border lining	smooth	elevated
Phuchka	235×10^5	round	blackish centre	0.2	ramose	smooth shiny	elevated
		irregular	white	0.2	undulate	smooth	effuse
Ladoo	72×10^5	amoeboid	yellowish	0.3	ramose	shiny	elevated at centre
		irregular	deep white periphery	0.4	curled	smooth	smooth
Kulfi	58×10^5	round	white	0.2	undulate	smooth	elevated
		irregular	white	0.2	ramose	smooth	smooth
Ripe papaya	61×10^5	round	creamish centre	0.4	smooth	smooth shiny	elevated

Table 3 revealed the colony characteristics of chosen five street foods indicating bacterial contamination of the street foods sampled and the possible risk of transmission of infection on consumption of these foods. Previous studies at Pune (**Chumber et. al., 2007**) also revealed bacterial contamination of the street foods sampled.

Table 4: Observation under microscope (100x): colony and indicative microbes present

Food item (Slide no.)	Colony	Shape	Size(µ)	Arrangement of cells	Conclusion
Singara (Slide A)	Blackish and filamentous, undulate	Hyphae with head seen	76	Non septate hyphae as pseudomycelium	May be **Aspergillus. sp.**
Phuchka (Slide B)	whitish filamentous	bulb like	59	septate hyphae as pseudo mycelium	May be **Rhizopus. sp.**
Ladoo (Slide C)	grey round shining opaque	round	45	aligned with filaments	May be **Candida.sp.**
Kulfi (Slide D)	round, smooth. opaque and undulate	thick rice like	73	grape like clusters	May be **yeast**
Ripe papaya (Slide E)	round, elevated and effuse	oval	61	grape like clusters	May be **yeast**

Figure 1(Slide A. B, C, D, and E): Gram staining nature of selected street foods of Kolkata

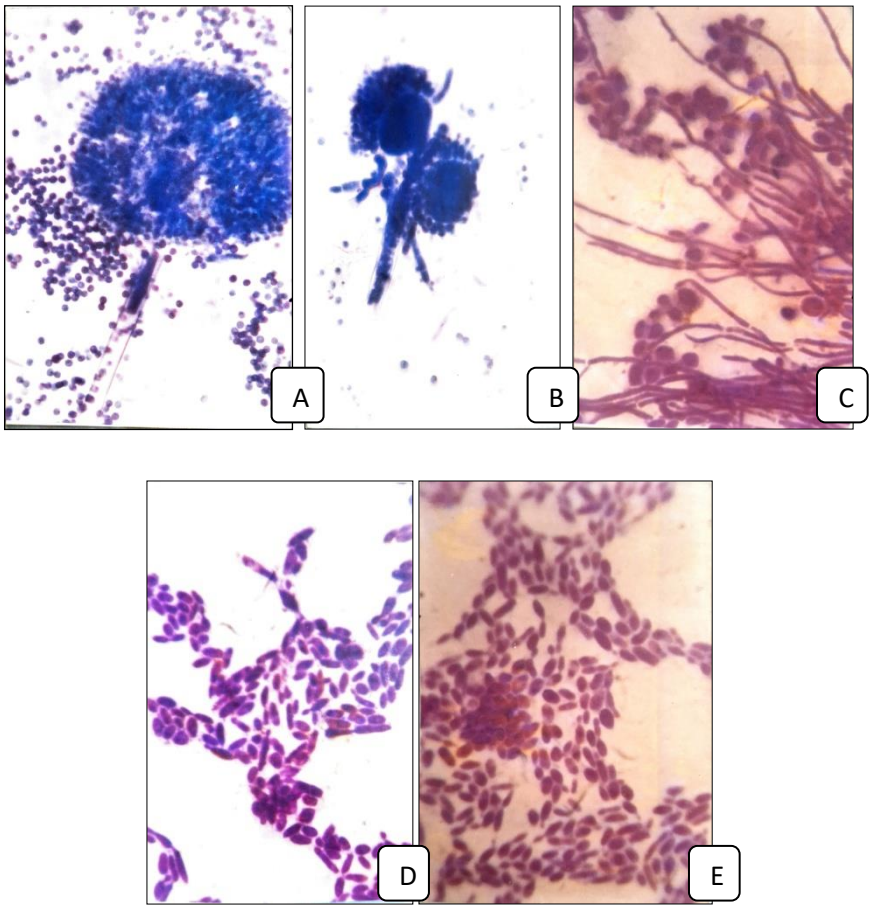


Table 4 and Figure 1 show the observation under microscope at 100x. Aspergillus. sp. from singara sample (Slide A) was identified and is known to cause mold infection. Microscopic observations were indicative of presence of Rhizopus sp., a fungus in phuchka sample (Slide B). Ladoo (Slide C) was observed to contain Candida sp., a fungus. Yeast was detected in Kulfi (Slide D) and ripe papaya (Slide E) indicating fungal contamination. This concurred with the study in street foods of Pune (Chumber **et. al., 2007**). Street foods are unhygienic as reported similarly in a recent study in Lucknow (**Verma et. al., 2023**). The findings are similar to reports in Coimbatore (**Chandrasekhar et. al, 2001**), in Panskura, WB (**Dutta et. al., 2019**).

Table 5: Report on hygienic practices adopted by street food vendors in Kolkata (n =32)

Attributes	No. of vendors	Percentage of vendors
Personal Hygiene		
Clean hands	16	50.00
Dirty clothes	10	31.30
Spits, scratches, picks nose during food handling	18	56.3
Nails cut	10	31.3
Environmental cleanliness		
Uses tap water	32	100
Water stored in pots	32	100
Foods left uncovered	28	87.5
Serving method		
Foods just given in hands	20	62.5
Waste disposal		
Thrown around the road itself	17	47.22

Table 5 depicts the hygienic practices adopted by street food vendors based on informal observation checklists. Out of 32 vendors observed, only 16 of them (50%) were found to have clean hands.10 (31.3%) were wearing dirty clothes and 18 of them (56.3%) were found spitting, scratching, picking nose while food handling. Only 10 vendors (31.3%) were found to have their nails cut. All vendors were found to use tap water and stored them in pots, most of them (87.5%) kept the food uncovered making the foods sold quite accessible to environmental contamination.20 vendors(62.5%) served foods in hands making the food unhygienic. 17 vendors (47.22%) threw all the waste around road making the environment unclean. Similar findings were reported from a recent study in Kolkata (**Ghosh et.al, 2023**).Studies in Coimbatore (**Chandrasekhar et. al, 2001**), Harare, Zimbabwe (**Gadaga et. al., 2007**) also found the same. Expectedly, poor socioeconomic conditions along with improper grasp on safe food handling are possible reasons for the inadequate facilities and quality compromise.

Figure-2: HACCP in the preparation of phuchka

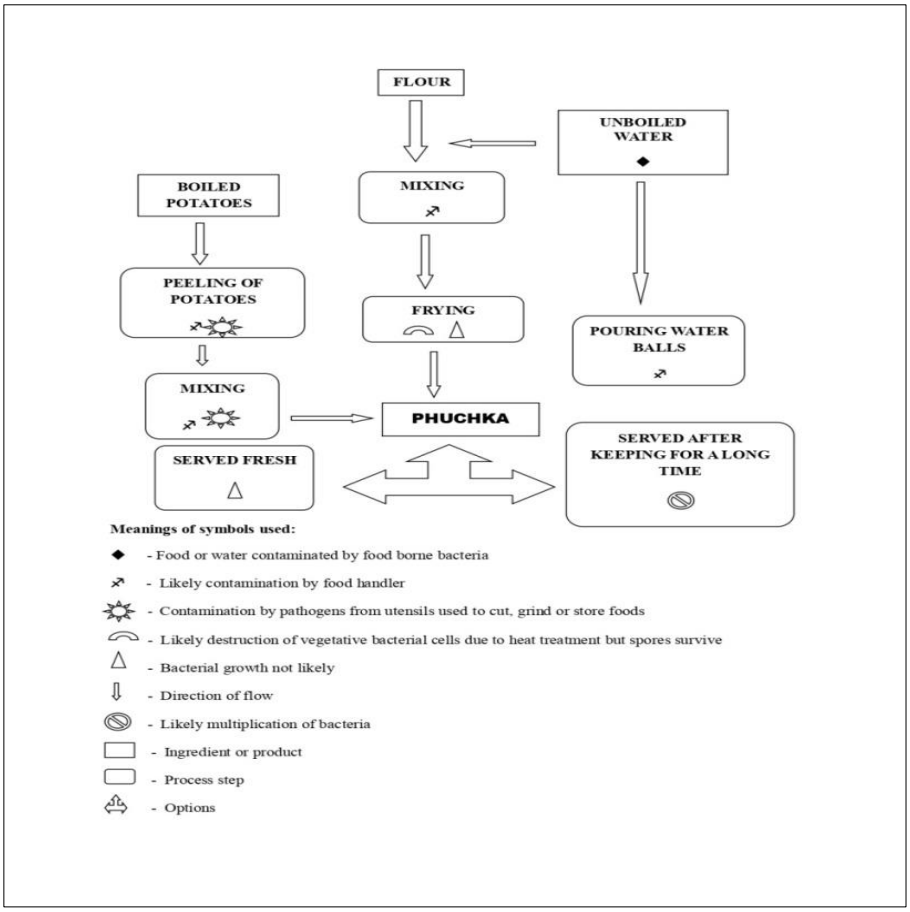


Figure 2, a flowchart depicts the stages of preparation of phuchka and the critical stages where the food becomes susceptible to contamination. Raw four is mixed with water, small units of dough made, and fried to make phuchka balls. Potatoes are boiled, peeled and mixed with masalas. Tangy water is mixed with lime, tamarind, black salt and masalas. Phuchka balls with potato mix is dipped in tangy water and served.

HACCP analysis identified the risks like usage of unboiled water, unclean hands during dough preparation, infection from food handler during potato peeling, mixing of potatoes with masala, and dipping of phuchka balls in tangy water. Serving was identified as a CCP (Critical Control Point) where monitoring can minimise the risk if served fresh and hot, whereas if served after a long time, microbiological hazard can occur. Phuchka samples had a microbial count of 235×10^{5} ml (Table 2). The present study reports align with microbial contamination indicating poor bacteriological quality of Panipuri in Amravati city (**Tambekar D.H. et. al., 2011**). , Greater Hyderabad Municipal Corporation, Hyderabad (**Tejasvi, G.U. S., 2022**), Baripada, Orissa (**Das, M., et.al. 2012**). Defective personal hygiene of vendor, water quality and exposure to environment are important factors affecting hygienic standards and public health.

SUMMARY AND CONCLUSION

In conclusion, this research explored the quality of five selected street food items including the popular snack - phuchka, a fried snack -singara, Ladoo- a sweet item, kulfi - a cold food and a raw food - ripe papaya collected from three different vendors from four renowned street vending localities of Kolkata, West Bengal, India. Proximate analysis provided valuable insights into the nutritional composition of selected street foods, calorific value of ladoo (274.8 ± 7.02 Kcal/ 100 gm) and singara (216.84 ± 1.91 Kcal/ 100 gm) indicates the nutritional significance of street foods as viable, affordable, calorie dense option. The collected data will satisfy the knowledge gap of the macronutrient intake of some street food items sold in Kolkata. The findings also suggest that street foods are vended under unhygienic conditions; colony counts concluded the presence of pathogens with high microbial content. Observation under microscope concluded the presence of Aspergillus. sp., Rhizopus. sp., Candida. sp. and yeast. The foods were not served hot which may be a possible reason for microbial load. HACCP evaluation of phuchka indicated the corrective action at different preparation stages for better public health. The study highlighted the need for addressing as also improving the safety and quality of street food options, creating awareness about good hygienic practices among vendors, training vendors for safer consumption of street foods.

SUGGESSTIONS FOR FUTURE RESEARCH

- Biochemical analysis of micronutrient parameters, vitamins and minerals of selected street foods can be done.
- Determination of nutritive value of varied street food items of Kolkata can be done in future
- Detection of adulteration levels in street foods and consequent safety analysis can be taken up**.**
- Studies on isolation of pathogenic strains of microbes, their identification in street foods can be conducted.
- Investigate the differences in microbial colony count at different seasons of the year and their comparative analysis can be done in future.

REFERENCES

- Bryan, F. L., Michanie, S. C., Alvarez, P., & Paniagua, A. (1988). Critical Control Points of Street-Vended Foods in the Dominican Republic. *Journal of food protection*, *51*(5), 373–383. https://doi.org/10.4315/0362-028X-51.5.373.https://www.fao.org/4/y5022e/y5022e04.htm
- Bureau of Indian Standards. (1967). IS 3579-1966: Methods of Test for Oilseeds.
- Ch, H., Rani, S. Y., & Tssk, P. (2020). Estimation of nutritive composition of seven small millets. *Journal of Pharmacognosy and Phytochemistry*, 9(3), 1871–1874. www.phytojournal.com
- Chakravarty, I. (2015).Street Foods – A Review, Down the Memory Lane. *Indian Journal of Hygiene and Public Health*, 1(1), 6 - 20.
- Chakravarty, I.(1995).Street foods in India, FAO/Rome.

- Chandrasekhar, U., Kowsalya, S., & Hemamalini, S. (2001). A Study on Selected Street Foods of Coimbatore. *The Indian Journal of Nutrition and Dietetics*, *38*(7), 216–222.
- Chumber, S. K., Kaushik, K., & Savy, S. (2007). Bacteriological analysis of street foods in Pune. *Indian journal of public health*, *51*(2), 114–116.
- Das, M., Rath, C. C., & Mohapatra, U. B. (2012). Bacteriology of a most popular street food (Panipuri) and inhibitory effect of essential oils on bacterial growth. *Journal of food science and technology*, *49*(5), 564–571.https://doi.org/10.1007/s13197-010-0202-2
- Dutta, S., De, S., Das D.C., & Das , M. (2019)Microbiological assessment of street foods of different location at Panskura block, West Bengal, India.*World Journal of Pharmacy and Pharmaceutical Sciences*, 8(12), 1274 -1279.http://dx.doi.org/10.20959/wjpps201912-15239
- FAO (1997) *Street Foods*. Food and Agriculture Organization Report, Rome, 1- 4.
- Food Safety and Standards Authority of India Ministry of Health and Family Welfare Government of India. (2016). Manual of Methods of Analysis of Foods: Fruit and Vegetable Products. https://www.fssai.gov.in/upload/uploadfiles/files/20_%20Appendix%20B.pdf
- Gadaga, T.H., Samende, B.K., Musuna, C. & Chibanda, D. (2008).The microbiological quality of informally vended foods in Harare, Zimbabwe. *Food Control*,19(8), 829-832, https://doi.org/10.1016/j.foodcont.2007.07.016
- Ghosh, A. (2023).An Account of Hygienic Practices and Street Food Safety around the Medical Colleges of Kolkata, India. *Journal of Pure and Applied Microbiology*, 17(4), 2502-2513. https://doi.org/10.22207/JPAM.17.4.48
- Indian Standards Institution. (1974). IS 7219-1973: Method for determination of protein in foods and feeds. https://archive.org/details/gov.in.is.7219.1973/is.7219.1973/
- Kumar, M. Parimita, Arora, P., Agarwal, S. (2023) Market Survey on Consumption Pattern of Street Food Products In Prayagraj District. *Journal of Pharmaceutical Negative Results*, 14(1), 155-162.
- Miller, G.L. (1959) Use of Dinitrosalicylic Acid Reagent for Determination of Reducing Sugar. *Journal of Analytical Chemistry*, 31, 426-428.http://dx.doi.org/10.1021/ac60147a030
- Muzaffar, A.T., Huq, I. and Mallik, B.A. (2009) Entrepreneurs of the streets: an analytical work on the street food vendors of Dhaka city. *International Journal of Business and Management*, 4(2), 80-88.
- Safety and Standards Authority of India (2006).Project Clean Street food. https://www.fssai.gov.in/upload/knowledge_hub/5ab3802273f60Clean_Street_Food_Brochure.pdf
- Simon, S. (2007). FAO, Promises and challenges of the informal food sector in developing countries, Rome.
- Steyn, N. P., McHiza, Z., Hill, J., Davids, Y. D., Venter, I., Hinrichsen, E., Opperman, M., Rumbelow, J., & Jacobs, P. (2014). Nutritional contribution of street foods to the diet of people in developing countries: a systematic review. *Public health nutrition*, *17*(6), 1363–1374. https://doi.org/10.1017/S1368980013001158
- Street Foods: Importance and challenges: Informal food distribution sector in Africa. (2005) FAO/ WHO Regional Conference on Food safety For Africa. Harare, Zimbabwe.

- Sualeh A, Zakir M. (2020). Street Food Consumption and Associated Health Risk. *International Journal of Research Studies in Agricultural Sciences*, 6(1), 8-18.
- Sudershan, R.V., Subbarao, G.M. and Polasa, K. (2009).Making Hyderabad the street food capital of India. A strategy. Hyderabad: National Institute of Nutrition, Indian Council of Medical Research.
- Tejasvi G.U.S. ,Vijaya Kumar, A. , Krishnaiah, N.(2022).Microbiological quality of panipuri sold in and around Greater Hyderabad municipal corporation, *Emergent Life Sciences Research*, 8(1): 127-133. https://doi.org/10.31783/elsr.2022.81127133
- Upadhyaya, S.,Srivastava, P.,Chandra, R., & Arora, N.(2017). Microbiological assessment and hazardous effect of ready-to-eat foods presented for sale in Lucknow City,India, *African Journal of Food Science*, 11(10), 346-352.
- Verma, R., Patel, M., Shikha, D., Mishra, S.(2023). Assessment of food safety aspects and socioeconomic status among street food vendors in Lucknow city. *Journal of Agriculture and Food Research*,11:100469. https://doi.org/10.1016/j.jafr.2022.100469
- Winarno, F.G. (1986). *Street foods in Asia: a proceeding of the regional workshop*. Jogjakarta, Indonesia, FAO; Food Technology Development Centre, Bogor Agricultural University.

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QUALITY OF LIFE (QOL)- A STUDY AMONG THE ELDERLY POPULATION OF ASSAM

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ABSTRACT

With the global rise in the elderly population, Assam, a state in northeastern India, faces unique socio-cultural and economic challenges affecting the quality of life (QOL) of its elderly residents. The study aims to assess the QOL among the elderly and identify the socio-demographic predictors of quality of life of the elderly. A cross-sectional study design was adopted, and 2997 elderly individuals aged 60 and above from various districts of Assam were surveyed using a structured questionnaire based on the WHO-QOL. The mean QOL scores were highest in the social relationship domain (58.41), indicating an average level of quality of life. This was followed by the environmental domain (56.58), psychological domain (56.51), and physical domain (55.51). The regression analysis of overall Quality of Life (QOL) showed an R-value of .462, indicating a moderate positive correlation between the socio-demographic factors and quality of life, with 21.4% of the variance explained by the model, showing socio-demographic conditions of the elderly to be the significant predictors of the quality of life. Economic factors like income levels and financial independence were crucial, with many elderly individuals experiencing economic insecurity. Social support from family and community enhanced QOL, while poor physical health had negative effects.

Keywords: Elderly, Quality of Life, Well-being, Socio-Demographic Conditions

INTRODUCTION

Ageing refers to the process of growing older, characterized by a gradual accumulation of changes in an organism's biological systems, psychological state, and social roles. The concept of Quality of Life (QOL) has garnered significant attention in public health and social research, particularly in the context of aging populations. As life expectancy increases globally, understanding the factors that contribute to the well-being of the elderly has become increasingly important. Quality of Life is a multidimensional construct that encompasses physical health, psychological well-being, level of independence, social relationships, personal beliefs, and interactions with the environment (World Health Organization, 1997). For the elderly population, QOL is particularly relevant as it directly influences their ability to live fulfilling, autonomous lives despite the challenges associated with aging.

Assam, a northeastern state of India, is home to a growing elderly population. The state, like much of India, is experiencing demographic transitions marked by increasing life expectancy and declining fertility rates, leading to a higher proportion of elderly individuals within the

population. The elderly in Assam, as in other parts of India, face unique challenges related to health care access, economic dependency, social isolation, and environmental factors, which can significantly impact their QOL (Goswami & Saikia, 2020).

Despite the growing number of elderly individuals in Assam, there is a paucity of research focused specifically on their quality of life. Previous studies in India have highlighted that elderly populations often suffer from poor physical and mental health, inadequate social support, and suboptimal living conditions (Dey, Nambiar, & Lakshmi, 2012).

Quality of Life for the elderly is influenced by a complex interplay of physical health, psychological well-being, social support, and environmental factors. Physical Health dimension covers aspects such as the presence of chronic illnesses, physical disabilities, and overall health status. Psychological plays a crucial role in determining QOL. Cognitive decline, including dementia, also profoundly affects QOL by impairing daily functioning and independence (Livingston et al., 2020). Social interactions with family, friends, and community members can provide emotional support, reduce feelings of loneliness, and contribute to a sense of belonging and purpose (Holt-Lunstad et al., 2015). The living environment, including housing conditions and access to community services, significantly impacts QOL. Adequate housing, safety, and accessibility, as well as the availability of services like healthcare and transportation, are essential for maintaining independence and well-being in older adults (Zhang & Zhang, 2022).

The present study aims to assess the Quality of Life among the elderly population of Assam and also examine the various dimensions of QOL, such as physical health, psychological well-being, social relationships, and environmental factors, this study seeks to provide a nuanced understanding of the socio-demographic conditions that contribute to the well-being of the elderly in this region.

OBJECTIVES OF THE STUDY

1. To assess the Quality of Life across various dimensions of QOL of the elderly.
2. To identify the socio-demographic conditions of the elderly.
3. To examine the socio-demographic determinants of the Quality of life of the elderly.

METHODOLOGY

The methodology for the study titled “Quality of Life (QOL) – A Study among the Elderly Population of Assam” was designed to align with the study's objectives. Assam was chosen as the study area, with a sample comprising 2,997 elderly individuals aged 60 years and above, selected from various districts. The study employed a cross-sectional design to gather data from these elderly individuals across Assam. The tools utilized in the study included: (i) Interview Schedule: This tool was developed to collect general demographic information about the participants, such as age, gender, education, occupation, current income, and other relevant details. (ii) WHOQOL-BREF: The WHOQOL-BREF, developed by the World Health Organization (WHO), is a widely used tool to assess quality of life (QOL) across different cultures and contexts. It consists of 26 items divided into four domains: (i)Physical Health: includes aspects like pain, energy, sleep, and mobility, (ii) Psychological: measures factors such as self-esteem, body image, and positive/negative emotions, (iii) Social Relations: Evaluates personal relationships, social support, and sexual activity, and (iv) Environment: addresses elements like financial resources, safety, healthcare, and the physical environment. Each item is rated on a 5-point Likert scale, with higher scores indicating a better quality of life. For the study, elderly individuals were randomly selected,

and the purpose of the study was explained to them to obtain their cooperation. Data was collected from those who agreed to participate, using the interview schedule and WHOQOL-BREF. The collected data were coded, classified, and tabulated before being subjected to statistical analysis. Percentage analysis was used to provide general information about the socio-demographic status of the elderly and the levels of QoL. The different aspects of the WHOQOL-BREF were analyzed by calculating the mean and standard deviation. Multiple regression analysis was applied to identify socio-demographic determinants of QoL. The Institute's Human Ethical Committee Clearance was obtained before conducting the study.

RESULT AND DISCUSSION

The findings from the analysis of data in the current study on "Quality of Life (QOL) – A Study among the Elderly Population of Assam" are presented and discussed below.

Table 1: Socio-Demographic Profile of the Elderly

Variables	Categories	N	%
Age	60-70	2097	70.0
	70-80	682	22.8
	80 above	218	7.3
Gender	Male	1498	50.0
	Female	1499	50.0
Education	Literate	2647	88.3
	Illiterate	350	11.7
Present income	Nil	585	19.5
	Below 5000	120	4.0
	5000-10000	927	30.9
	10000-15000	783	26.1
	Above 15000	582	19.4
Source of income	Retirement Pension	1874	62.5
	Savings	400	13.3
	Assistance from family members	597	19.9
	Any other (Government Schemes of Assam)	126	4.2
Economically dependent	Yes	888	29.6
	No	2109	70.4
Living situation	Living alone	124	4.1
	Living with family	2310	77.1
	Living with spouse	363	12.1
	Rent house	31	1.0
	Old-age Home	169	5.6

Demographic factors such as age, gender, education, present income, source of income, economic dependency, and living situation were analyzed and presented in the study. **Table 1** provides a detailed overview of the descriptive statistics for these variables. The majority of respondents, accounting for 70.0%, were between the ages of 60 and 70 years. A smaller

proportion, specifically (22.7%,) fell into the age group of 71 to 80 years. Only 7.3% of the participants were aged 81 years or older, highlighting a relatively small representation of the oldest segment of the elderly population. Regarding the source of income, a significant portion of the elderly population (62.5%) relied on retirement pensions as their primary source of income. A smaller percentage (4.2%), received income through government schemes, specifically from the Government of Assam. In terms of living arrangements, a vast majority of respondents (77.1%) were residing with their families. On the other hand, (5.6%) of the respondents were living in old age homes, pointing to a smaller but significant segment of the elderly population.

Table 2- Quality of Life of the elderly

Domains	Categories	N	%
Physical	Very poor	118	3.9
	Poor	372	12.4
	Average	2091	69.8
	Good	399	13.3
	Very good	17	0.6
Psychological	Very poor	29	1.0
	Poor	339	11.3
	Average	2173	72.5
	Good	349	11.6
	Very good	107	3.6
Social Relations	Very poor	117	3.9
	Poor	313	10.4
	Average	1676	55.9
	Good	870	29.0
	Very good	21	0.7
Environment	Very poor	83	2.8
	Poor	176	5.9
	Average	2197	73.3
	Good	469	15.6
	Very good	72	2.4

Quality of Life (QOL) is understood as an individual's perception of their position in life within the context of the cultural and value systems in which they live and this encompasses various dimensions, including a person's physical health, psychological state, level of independence, social relationships and environment. **Table 2** explains that a small fraction of the respondents, only (0.6%), reported having very good physical health. On the other end of the spectrum, (3.9%) of the participants reported having very poor physical health. In psychological, only (1.0%) of the respondents reported very poor psychological well-being, conversely, (3.6%) of the participants reported very good psychological well-being, indicating a small but significant portion of the elderly population feels mentally well, with positive emotions, self-esteem, and psychological resilience. The majority of respondents (55.9%,) reported having average social relationships, only (0.7%) of the respondents reported having very good social relationships. In environmental, a small portion of the respondents (2.4%), perceived their environmental conditions as very good, on the other hand, a large majority (73.3%), reported having average environmental conditions.

Table 3: Frequency and Percentage distribution of the Respondents according to their Quality of Life based on WHOQOL-BREF

Domain	N	Minimum	Maximum	Mean	Std. Deviation
Physical	2997	25.00	89.29	55.5186	10.18320
Psychological	2997	20.83	100.00	56.5107	13.57634
Social Relations	2997	8.33	91.67	58.4112	13.81150
Environment	2997	25.00	93.75	56.5847	10.29070

Table-3 shows that the mean QOL scores were highest in the social relations domain (58.41), indicating an average level of quality of life. This was followed by the environmental domain (56.58) and psychological domain (56.51). The lowest mean QOL score was seen in the physical domain (55.51).

Table 4 explains the regression analysis results between Overall QoL and socio-demographic factors. In the table socio-demographic factors such as age, gender, education, occupation, present income, source of income, economic dependency, and living situation are the predictors/independent variables, while Overall Quality of Life (QoL), Physical Health, Psychological, Social Relations, and Environment are the dependent variables.

Table 4: Socio-demographic Predictors of Quality of Life

Dependent Variables	Socio-demographic predictors	Beta Value	t	Sig.	R	R^2	F (df)	Sig.
Overall QoL	Age	-.216	-12.430	.000	.462[a]	.214	(8,1.185)	.000[b]
	Gender	.129	7.041	.000				
	Occupation	.288	12.517	.000				
	Present Income	.182	7.991	.000				
	Source of Income	-.075	-3.256	.001				
	Economically Dependent	.357	13.657	.000				
	Living Situation	.166	9.257	.000				
Physical Health	Age	-.440	-25.546	.000	.508[a]	.258	(8,4.606)	.000[b]
	Occupation	.194	8.425	.000				
	Present Income	.106	4.793	.000				
	Source of Income	.127	5.568	.000				
	Economically Dependent	.273	10.477	.000				
	Living Situation	.078	4.371	.000				

Psychological	Age	-.154	-8.470	.000	.366[a]	.134	(8, 8.638)	.000[b]
	Gender	-.105	-5.443	.000				
	Education	-.048	-2.743	.006				
	Occupation	.183	7.584	.000				
	Present Income	.345	14.489	.000				
	Source of Income	.175	7.251	.000				
	Economically Dependent	.055	2.001	.046				
	Living Situation	-.041	-2.172	.030				
Social Relations	Age	-.276	-14.818	.000	.309[a]	.096	(8, 2.409)	.000[b]
	Gender	.053	2.688	.007				
	Source of Income	.096	3.869	.000				
	Economically Dependent	.095	3.400	.001				
	Living Situations	.112	5.809	.000				
Environment	Age	-.258	-14.333	.000	.414[a]	.171	(9, 7.26)	.000[b]
	Occupation	.195	8.152	.000				
	Present Income	.338	14.455	.000				
	Source of Income	.275	11.553	.000				
	Economically Dependent	.122	4.441	.000				
	Living Situations	-.064	-3.458	.001				

Age, gender, occupation, present income, source of income, economic dependence, and living situation were found to be the significant predictors of Overall Quality of Life (QoL). Age has a moderate negative effect (β = -0.216, t = 12.430), indicating that QoL decreases as individuals grow older. Gender also plays a role, with females experiencing a slight but noticeable decline in QoL compared to males (β = -0.129, t = 7.041). Occupation emerges as one of the stronger predictors, where an increase in occupational challenges leads to a 0.288 decrease in QoL (t = 12.517). Financial factors are crucial, as present income (β = -0.182, t = 7.991) and source of income (β = -0.075, t = 3.256) both show statistically significant negative effects. Economic dependence stands out as one of the strongest influences, with economically dependent individuals experiencing a substantial decline in QoL (β = -0.357, t = 13.657). Additionally, living situation impacts QoL, where an increase in its negative effect leads to a 0.166 decrease (t = 9.257). The R-value of .462 indicates a moderate positive correlation between the independent and dependent with 21.4% variance given the R^2 of .214.

In Physical health, age, occupation, present income, source of income, economic dependence, and living situation were observed to be the significant predictors. Age has the strongest negative impact (β = -0.440, t = 25.546), indicating that as individuals grow older, their physical health declines substantially. Occupational challenges contribute to poorer physical health, with a moderate negative effect (β = -0.194, t = 8.425), emphasizing the difficulties associated with work. Financial factors also play a role, with present income (β = -0.106, t = 4.793) and source of income (β = -0.127, t = 5.568) showing statistically significant negative effects. Economic dependence has a moderate to strong negative impact (β = -0.273, t = 10.477), highlighting the physical strain linked to financial reliance on others. Additionally, living situation has a modest but significant effect (β = -0.078, t = 4.371), suggesting that poor living conditions may contribute to a decline in physical health. The R-value of .508 indicates a moderate positive correlation between the independent and dependent variables, explaining 25.8% of the variance, as shown by an R^2 value of .258.

In Psychological well-being, age, gender, education, occupation, present income, source of income, economic dependence, and living situation contributed to be significant predictors. Income reflects the strongest negative impact (β = -0.345, t = 14.489), suggesting that financial difficulties play a critical role in mental health. Age has a moderate negative effect (β = -0.154, t = 8.470), indicating that psychological well-being tends to decline with age. Gender shows a visible effect (β = -0.105, t = 5.443), implying that gender-related factors contribute to psychological distress. Education has a small negative impact (β = -0.048, t = 2.743), whereas occupation has a moderate positive effect (β = 0.183, t = 7.584), suggesting that employment may provide psychological benefits. The source of income plays a role with a moderate negative effect (β = -0.175, t = 7.251), emphasizing that financial security impacts mental well-being. Economic dependence (β = -0.055, t = 2.001) and living situation (β = -0.041, t = 2.172) have small but statistically significant negative effects, indicating that reliance on others for financial support and unfavourable living conditions can contribute to decreased psychological well-being. The table shows an R-value of .366, indicating the relationship between the independent and dependent variables to be a moderate positive correlation with 13.4% of variance, with R^2 being .134.

In Social Relationships, age, gender, source of income, economic dependence, and living situation were significant predictors. The findings reveal age having the strongest negative impact (β = -0.276, t = -14.818), suggesting that as individuals grow older, their social connections tend to decline. Gender has a small positive effect (β = 0.053, t = 2.688), indicating that gender-related factors contribute modestly to social engagement. The source of income (β = 0.096, t = 3.869) and economic dependence (β = 0.095, t = 3.400) both show small but significant positive effects, suggesting that financial stability and dependence may enhance social relationships. Lastly, the living situation has a small to moderate positive impact (β = 0.112, t = 5.809), highlighting the importance of a supportive living environment in promoting social connections. The table shows R-value being .309, indicating the relationship between the independent and dependent variables to be a positive correlation with 9.6% of variance, with R^2 being .096.

In the Environment age, occupation, present income, source of income, economic dependency, and living situation were the significant predictors. The findings highlight age having a moderate negative impact (β = -0.258, t = -14.333), indicating that as individuals grow older, their perceived environmental quality tends to decline. Income is the strongest positive predictor (β = 0.338, t = 14.455), signifying that financial stability greatly improves one's perception of their surroundings. The source of income plays a key role, showing a moderate positive effect (β = 0.275, t = 11.553), strengthening that financial security contributes to better environmental conditions. Occupation has

a moderate positive influence (β = 0.195, t = 8.152), highlighting the role of employment in shaping one's environmental experience. Economic dependence has a smaller positive effect (β = 0.122, t = 4.441), suggesting that dependence on financial support can still contribute to a better perceived environment. Lastly, the living situation shows a small but significant negative impact (β = -0.064, t = -3.458), indicating that unfavourable housing or community conditions may slightly reduce environmental satisfaction. The table shows the R-value of .414, indicating the relationship between the independent and dependent variables to be a positive correlation explaining 17.1% of variance, with R^2 being .171.

DISCUSSION

The study of Quality of Life (QOL) among elderly populations has gained considerable attention globally, given the demographic shifts towards aging societies. QOL is a multidimensional construct that includes subjective evaluations of physical health, psychological state, social relationships, and environmental contexts. Understanding these dimensions is essential for developing interventions that can improve the well-being of the elderly, particularly in regions like Assam, where socio-economic and cultural factors uniquely shape the aging experience. Research on QOL among the elderly has been extensive worldwide. Studies have consistently shown that factors such as physical health, social support, and financial stability significantly influence the quality of life in older adults (Bowling, 2005). Similarly, Walker and Mollenkopf (2007) highlighted that physical health, along with autonomy and control over one's life, is central to elderly well-being across different cultural contexts.

In India, where the elderly population is rapidly increasing, QOL has been the focus of various studies, particularly concerning health, social support, and economic security. A study conducted by Dey, Nambiar, and Lakshmi (2012) revealed that Indian elderly populations often experience poor health outcomes due to inadequate healthcare access, economic dependency, and social isolation. The study also pointed out that these challenges are exacerbated by the lack of comprehensive social security systems in India, leading to a lower quality of life for many elderly individuals.

Research specific to the northeastern region of India, including Assam, is relatively scarce compared to other parts of the country. However, the few studies that exist highlight unique challenges faced by the elderly in this region. A study by Goswami and Saikia (2020) provided an overview of aging and QOL in Northeast India, pointing out that cultural factors, economic conditions, and healthcare access play critical roles in shaping the elderly's QOL. They noted that while the elderly in this region often benefit from strong family support systems, issues like poverty, inadequate healthcare infrastructure, and geographical isolation contribute to lower QOL. A study by Bora and Saikia (2018) focused specifically on the elderly in Assam, revealing that while many elderly individuals receive support from their families, the lack of formal healthcare services and economic opportunities severely limits their quality of life. The study also noted significant differences in QOL between urban and rural elderly, with urban residents generally experiencing better outcomes.

CONCLUSION

The study aimed to assess the Quality of Life (QOL) among the elderly in Assam and to identify the possible sociodemographic factors influencing it. The results revealed that age, education, and occupation negatively impact overall QOL, with older age and lower education levels linked to declines in well-being. In contrast, present income, source of income, and economic independence positively correlate with better QOL, emphasizing the importance of financial stability. Living situation also showed a slight positive effect on overall well-being. In physical health, older age, lower education, and lack of occupation negatively affected outcomes, while financial resources improved them. Psychological well-being similarly declined with age and education but benefited from financial security. Social relations weakened with age, but financial resources and supportive living situations strengthened social ties. Environmental perceptions improved with higher income and financial independence, though older age led to less favorable views. The study underscores the critical role of financial stability in enhancing various aspects of quality of life among the elderly population in Assam. While demographic factors such as age and education tend to harm QOL, financial resources, economic independence, and supportive living situations are key determinants of better physical health, psychological well-being, social relations, and environmental perceptions. The study highlights that financial stability is crucial in enhancing the QOL of Assam's elderly, while demographic factors like age and education present challenges to well-being across various life dimensions.

The findings of this study have important implications for healthcare providers and social welfare organizations working with the elderly population in Assam. Financial stability emerged as a key factor, suggesting that pensions, income opportunities, and financial aid can enhance well-being. The negative effects of lower education and older age emphasize the importance of lifelong learning and age-friendly healthcare services tailored to the specific needs of this demographic. Programs that promote economic independence and reinforce social support through community care and co-living arrangements can further improve overall well-being. Integrating financial, educational, and social strategies into elderly care policies is essential to address the multidimensional challenges affecting the QOL of the aging population in Assam.

REFERENCES

- Bora, P., & Saikia, J. (2018). Quality of Life Among Elderly in Assam: A Comparative Study of Urban and Rural Areas. Journal of North East India Studies, 8(2), 91-102.
- Bowling, A. (2005). Ageing Well: Quality of Life in Old Age. Open University Press.
- Dey, S., Nambiar, D., & Lakshmi, J. K. (2012). Health of the Elderly in India: Challenges of Access and Affordability. Aging International, 37(1), 57-74.
- Goswami, S., & Saikia, N. (2020). Aging and Quality of Life in Northeast India: An Overview. Indian Journal of Gerontology 34(1), 25-37.
- Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2015). Social Relationships and Mortality Risk: A Meta-analytic Review. PLOS Medicine, 7(7), e1000316.
- Livingston, G., et al. (2020). Dementia prevention, intervention, and care: 2020 report of the Lancet Commission. The Lancet, 396(10248), 413-446.
- Ramachandran, R., & Arora, M. (2015). Quality of Life among Elderly: A Comparative Study in Rural and Urban Areas of North India. Indian Journal of Gerontology, 29(1), 85-98.

- Walker, A., & Mollenkopf, H. (2007). International and Multidisciplinary Perspectives on Quality of Life in Old Age: Conceptual Issues.
- World Health Organization. (1997). WHOQOL: Measuring Quality of Life. Retrieved from https://www.who.int/healthinfo/survey/whoqol-qualityoflife/en/.
- Zhang, X., & Zhang, W. (2022). The impact of living environment on quality of life in older adults: A systematic review. Journal of Aging and Health, 34(4), 563-577.

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Ordinal Position in Family Dynamics: Influence on Adolescents Personal Values, Personality and Adjustment

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ABSTRACT

This study aimed to investigate the influence of ordinal position on the personal values, personality, and adjustment along with their dimensions of adolescents. Study on the basis of a random sampling technique; data were collected from the various colleges and universities in Meerut city, Uttar Pradesh, India. Participants with a total sample of 550 adolescents aged; 17-19 years. Participants completed the psychological test questionnaires: The Personal Values Questionnaire (PVQ-sv), the Personality Inventory (PI-ss), and the Adjustment Inventory for College Students (AICS-ss). Statistical criteria (mean, standard deviation, and ANOVA) to analyze the influence of ordinal position on adolescents' personal values, personality and adjustment were computed by Excel and IBM "SPSS Statistics 29.0." Study revealed that ordinal position is not influenced by adolescents overall personal values; but adolescents with birth order first born, followed by second born, third born, and above, have a significant role in personal value dimensions, i.e., knowledge value and power value. Firstborn tend to be high in power value, whereas third-born tend to be high in knowledge value. The study depicted that the concept of ordinal position in reference to their influence on adolescents' personality, and adjustment with all its dimensions is not statistically significant. The study concluded that the highlight among adolescent's ordinal positions in reference to their influence on personal values, personality, and adjustment within family dynamics and social context are necessary to understand and valuable aspects of a late adolescent's life.

Keywords Ordinal position, Family dynamics, Adolescents, Personal values, Personality, Adjustment

INTRODUCTION

Ordinal position refers to the birth position in which the individual is born within their family; it simply refers to first born, second born, third born, and above. These unique positions held by adolescents in their families refer to certain characteristics for their personality development. (Armitage, 2007; Klavano, 1964). The ordinal position in the life of adolescents is precarious in nature and changes along with sociological, biological, and psychological factors as influencing factors in the process of development. Adolescents face a lot of challenges and tremendous changes in day-to-day aspects of social identification, adjustment, and adopting strong personal

values, as it is a systematic process for the holistic development of an individual, especially in adolescence (Hurlock, 2014).

Famous psychotherapist Alfred Adler (1900) introduces the concept of birth order. The theory significantly claims that personality and its traits refer to the child's birth position within the family (Juby & Marais, 2022). Adlerian birth order theory emphasizes the traits of control, structure, achievers, reliability, authoritarianism, and power as firstborn in the family. Second-born feel clasped between their siblings, which is why they become peacemakers, and social pleaser, sometimes they compromise between the parents and siblings within the family. Third born in the family is always a pampered child between the siblings in the family, which is why they reflect a joyful nature, are attention-seekers, and are outward; and self-centered in their personality traits (Mishra & Kiran, 2013). Each birth order of an individual in their family dynamics holds various features in their behavioral actions, personality traits, and interpersonal relations with family members in a living context.

Every individual has a set of value structures that distinguish them from other individuals of society. The human socialization process is based on the different value patterns adopted by the individuals in this living arena to achieve their desired goal and standard of living, which reflect in socialized behavior, personal action, and reaction to any situation in life. The concept of values is very vital and complex in nature, influenced by the person's surroundings. It is a primary belief system that shapes and represents the strong persona of an individual in this multifaceted domain. Human values indulge in ideas that monitor one's behavior and adjustment in different spheres.

Human development is the determinant of heredity, environment, maturation, and learning. It shapes the concept of personality development. Personality is the unique combination of behavior and thoughts the ecological settings; it is an ever-changing process of development that represents the traits and attributes of human beings in the context of socialization. Allport (1937).

Adjustment is a universal process between the individual and their situations. It is not only concerned with individual behavior but also with a person's psychological and physical potential under the influence of the environment. Human beings within their social surroundings introduce many things, and to achieve desirable goals, a person needs to be flexible and well-adjusted to accomplish satisfaction in the basic elements of life. The drive for adjustment is nothing new, but it is the process that starts straight from the birth until the death of living organisms. In every stage of life span the level of adjustment increases as a person develops and grows to its full strength, depending on their surroundings.

Each ordinal position that an individual hold within a family has its own advantages and disadvantages, experiences, and challenges, but it is the dynamic approach of a family to develop their adolescents in a holistic approach and turn them into well-adjusted, responsible human beings to form their identity. Sometimes parents' ignorance and belief that it may automatically change within a time of maturity may lead to suffering the child's emotions and feelings of neglect. It's important to provide each child with an equal chance and privileges to grow and develop, no matter what position they hold within their family.

Previous studies in the line of birth order influence on personal values, personality and adjustments of adolescents; researcher overview Murthy (2013) suggested that birth order has no significant influence on an adolescent's personality and adjustments. Kaur and Gupta (2019), Reddy (1966) concluded that a parent's education has a significant role in adolescent's better adjustment. A study identified that firstborns were found to be more unstable compared to second-born in their adjustment. Sahu (1997) investigated ordinal position in relation to adolescents' adjustments.

Study revealed that adolescents' emotional, social, educational, and health adjustment is not influenced by their order position. Kaur (2018) focused on an adolescent's personality in association with birth order. A study reported significant differences among first- and second-born on various dimensions of personality. Mondal (2021) emphasized that third, and- above birth order students are better than first- and second-birth order students in their social adjustment. This study addresses a gap in Indian research on how ordinal position within the broader framework of family dynamics and its potential influence on adolescent's personal values, personality, and adjustment during a critical transitional phase "enter into college life".

OBJECTIVES

1. To study the influence of ordinal position on the personal values and their dimensions of adolescents.
2. To study the influence of ordinal position on the personality and their dimensions of adolescents.
3. To study the influence of ordinal position on the adjustment and their dimensions of adolescents.

HYPOTHESES

1. There is no significant influence of ordinal position on personal values and their dimensions of adolescents.
2. There is no significant influence of ordinal position on personality and their dimensions of adolescents.
3. There is no significant influence of ordinal position on adjustment and their dimensions of adolescents.

METHODOLOGY

Sampling Technique:

The total sample of 550 adolescents aged 17-19 based on the random sampling technique was drawn from colleges and universities located in Meerut, Uttar Pradesh, India.

Measures

- Personal Values Questionnaire (PVQ sv) constructed by Sherry and Verma (2012)
- Personality Inventory (PI-ss) - constructed by Y. Singh and H.M. Singh (2017)
- Adjustment Inventory for College students (AICS-ss) - constructed by A.K.P. Sinha and R.P. Singh (2017)

Statistical Analysis

The results were based on the mean, standard deviation, and ANOVA evaluated through Excel and IBM "SPSS Statistics 29.0."

RESULT AND DISCUSSION

Table-1: ANOVA- Influence of ordinal position on the personal values of adolescents

Source of Variation	Sum of squares	df	Mean of square value	'F' value
Between Groups	243.61	2	121.80	
Within Groups	32439.94	547	59.31	2.05^{NS}
Total	32683.54	549	……	

Table value 2.99 at 0.05 level table values 4.60 at 0.01 levels; NS: Not Significant

Table 1 shows the influence of ordinal position on the personal values of adolescents. It is observed that the calculated 'F' value of 2.05 is not significant at the 0.05 level. Therefore, adolescents in the ordinal position of firstborn, followed by second born, third born, and above do not differ significantly in terms of total personal value scores. Thus, the null hypothesis is accepted. Hence, it is stated that there is no significant influence of ordinal position on the personal values of adolescents.

Table-2: N, Mean, S.D of ordinal position on personal values of adolescents

Variable	N	Mean	SD
First Born	200	117.54	110.48
Second Born	165	119.13	3.84
Third born and above	185	118.58	53.40

Table 2 shows the N, mean, and the SD values of ordinal position on the personal values of adolescents. It is observed that the mean score of first-born adolescents is 117.54 and the SD is 110.48, followed by second born adolescents, whose mean score is 119.13 and the SD is 3.84, mean score of third-born, and above is 118.58 and the SD is 53.40.

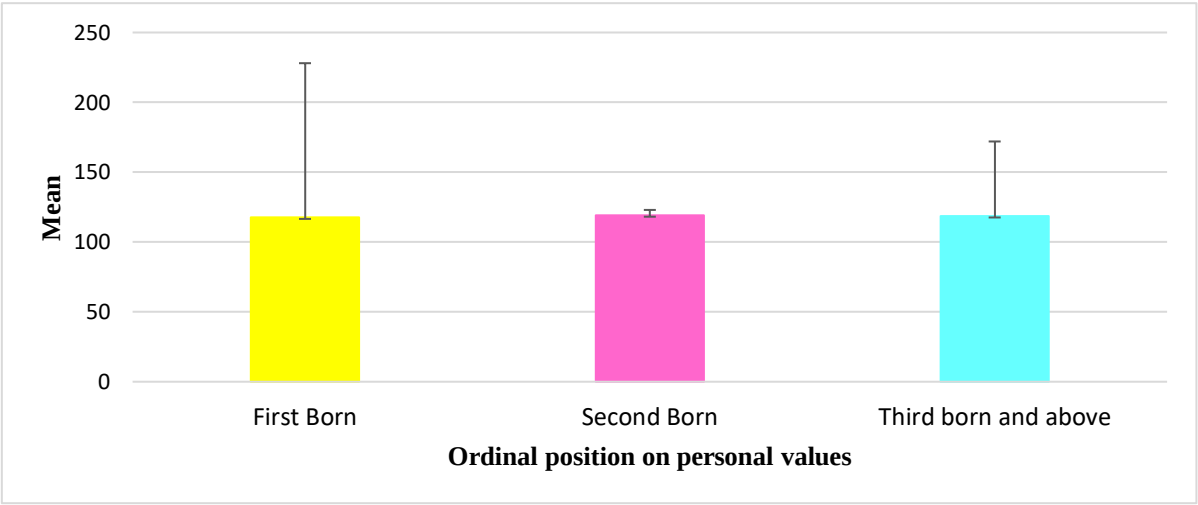


Figure-1: Influence of ordinal position on personal values of adolescents

Table-3: ANOVA Influence of ordinal position on personal value dimensions of adolescents

Dimensions	Variable	N	Mean	SD	'F' Value
Religious value	First born	200	10.77	13.13	2.57^{NS}
	Second born	165	11.48	11.32	
	Third born and above	185	11.42	10.32	
Social value	First born	200	11.4	10.09	1.85^{NS}
	Second born	165	11.9	10.17	
	Third born and above	185	12.0	11.77	
Democratic value	First born	200	15.49	12.61	1.22^{NS}
	Second born	165	15.84	10.59	
	Third born and above	185	16.02	11.37	
Aesthetic value	First born	200	11.9	7.83	0.57^{NS}
	Second born	165	12.0	8.03	
	Third born and above	185	11.7	7.17	
Economic value	First born	200	12.7	10.78	2.61^{NS}
	Second born	165	12.2	10.18	
	Third born and above	185	12.0	10.03	
Knowledge value	First born	200	13.0	9.89	6.78**
	Second born	165	13.6	8.58	
	Third born and above	185	14.1	9.89	
Hedonistic value	First born	200	10.5	9.56	0.39^{NS}
	Second born	165	10.3	7.61	
	Third born and above	185	10.6	8.94	
Power value	First born	200	9.5	9.39	3.67*
	Second born	165	9.0	9.07	
	Third born and above	185	8.6	10.25	
Family value	First born	200	12.59	10.23	0.097^{NS}
	Second born	165	12.70	11.15	
	Third born and above	185	12.56	8.11	
Health value	First born	200	9.8	6.53	1.52^{NS}
	Second born	165	10.1	5.61	
	Third born and above	185	9.6	7.13	

Table value 2.99 at 0.05 level table values 4.60 at 0.01 level; NS: Not Significant; *Significant at 0.05 level; **significant at both levels

Table 3 shows the influence of ordinal position on the personal value dimensions of adolescents. It is observed from the above investigation that out of ten dimensions of personal values, only knowledge value and power value are found to be significant. Therefore, adolescents with birth order first, followed by second, third, and above, have an influence on knowledge value and power value. Observing the mean scores of variables in different dimensions of personal values determines that firstborns tend to be high in economic and power value. Second-born tend to be high in religious, aesthetic, family, and health values. However, third-born and above tend to be high in social, democratic, knowledge, and hedonistic values. Thus, the null hypothesis is partially rejected.

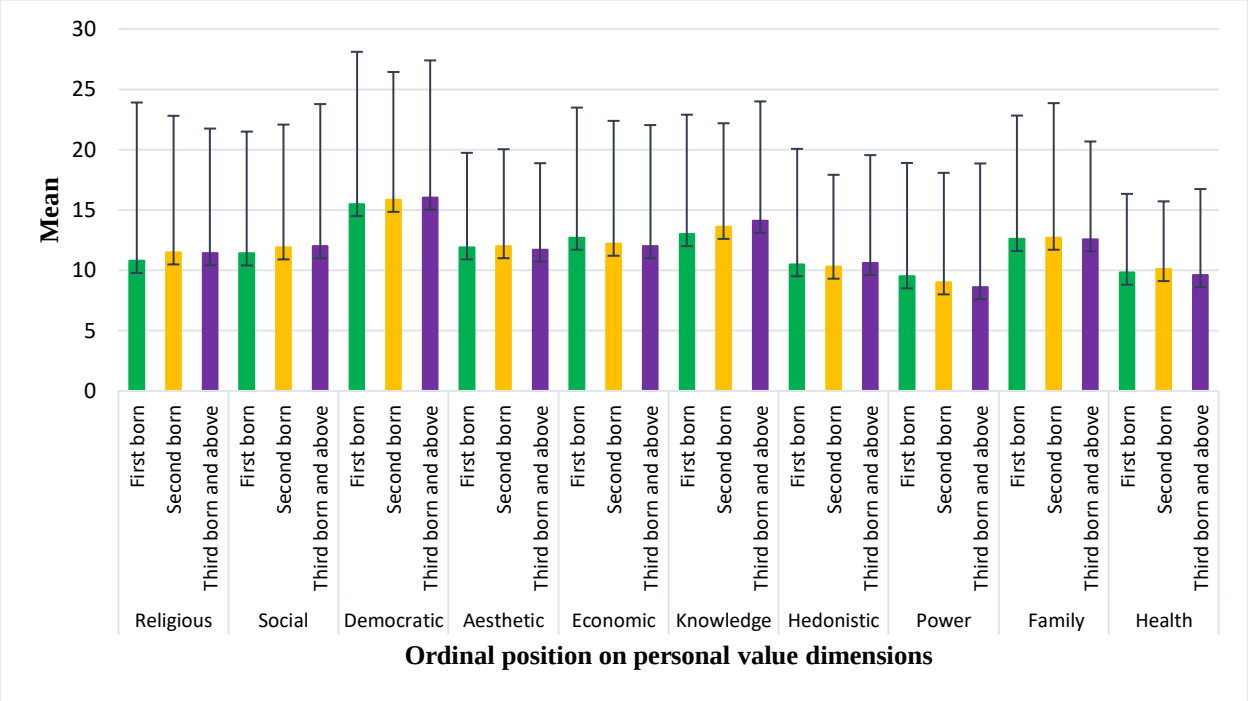


Figure-2: Influence of Ordinal position on personal value dimensions of adolescents

Table-4: ANOVA- Influence of Ordinal position on the personality of adolescents

Source of Variation	Sum of squares	df	Mean of square value	'F' value
Between Groups	19.974	2	9.99	1.02^{NS}
Within Groups	5340.06	547	9.76	
Total	5360.03	549	……	

Table value 2.99 at 0.05 level table values 4.60 at 0.01 levels, NS- Not Significant

Table 4 shows the influence of ordinal position on the personality of adolescents. It is observed that the calculated 'F' value of 1.02 is not significant at the 0.05 level. Therefore, adolescents with birth order first, followed by second, third, and above, did not differ significantly in terms of total personality scores. Thus, the null hypothesis is accepted. Hence, it is stated that there is no significant influence of ordinal position on the personality of adolescents.

Table -5: N, Mean, S.D Values of ordinal position on personality of adolescents

Variable	N	Mean	SD
First Born	200	54.85	10.38
Second Born	165	55.25	7.32
Third born and above	185	54.82	11.27

Table 5 shows the N, mean, and the S.D values of ordinal position on the personality of adolescents. It is observed that the mean score of first-born adolescents is 54.85 and the SD is

10.38, followed by second-born adolescents, whose mean score is 55.25 and the SD is 7.32, and the mean score of third-born and above is 54.82 and the SD is 11.27.

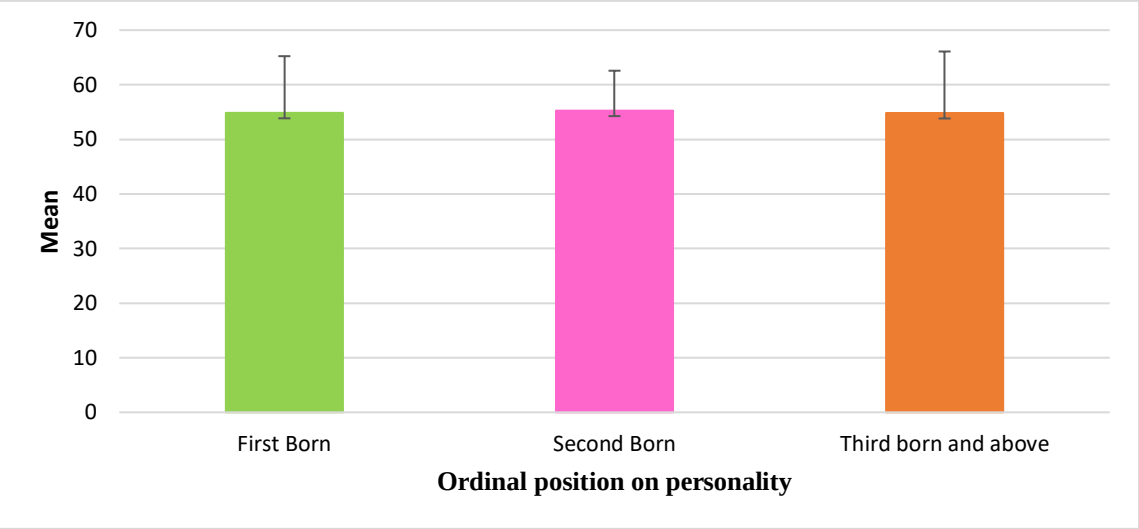


Figure 3: Influence of ordinal position on personality of adolescents

Table-6: ANOVA- Influence of ordinal position on personality dimensions of adolescents

Personality Dimension	Variable	N	Mean	SD	'F' Value
	First born	200	26.8	23.00	0.47^{NS}
Introversion	Second born	165	27.0	26.41	
Personality	Third born and above	185	26.5	24.71	
	First born	200	28.1	22.70	0.12^{NS}
Extroversion	Second born	165	28.3	25.97	
Personality	Third born and above	185	28.3	23.12	

Table value 2.99 at 0.05 level table values 4.60 at 0.01 levels, NS- Not Significant

Table 6 shows the influence of ordinal position on the personality dimensions of adolescents. It is observed from the above investigation that the calculated 'F' value 0.47 represents introversion personality and the calculated 'F' value 0.12 represents extroversion personality. Therefore, birth order does not significantly influence the personality dimensions of adolescents. Thus, the null hypothesis is accepted.

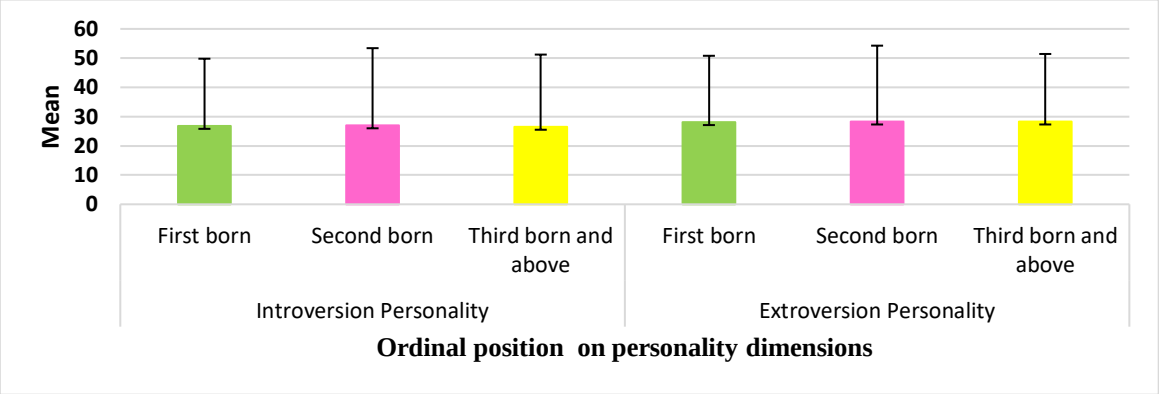


Figure 4: Influence of ordinal position on personality dimensions of adolescents

Table-7: ANOVA- Influence of ordinal position on the adjustment of adolescents

Source of Variation	Sum of squares	df	Mean of square value	'F' value
Between Groups	177.6696	2	88.83482	0.52^{NS}
Within Groups	93370.04	547	170.6948	
Total	93547.71	549	……	

Table value 2.99 at 0.05 level table values 4.60 at 0.01 levels, NS- Not Significant

Table 7 shows the influence of ordinal position on the adjustment of adolescents. It is observed that the calculated 'F' value of 0.52 is not significant at the 0.05 level. Therefore, adolescents with birth order first, followed by second, third, and above, did not differ significantly in terms of total adjustment scores. Thus, the null hypothesis is accepted. Hence, it is stated that there is no significant influence of ordinal position on the adjustment of adolescents.

Table-8: N, Mean, S.D Values of ordinal position on adjustment of adolescents

Variable	N	Mean	SD
First Born	200	50.0	192.06
Second Born	165	49.6	152.97
Third born and above	185	50.9	163.39

Note: as per the (AICS-ss Inventory) High score refers to low adjustment.

Table 8 shows the N, mean, and the S.D values of ordinal position on the adjustment of adolescents. It is observed that the mean score of first-born adolescents is 50.0 and the SD is 192.06, followed by second-born adolescents, whose mean score is 49.6 and the SD is 152.97. The mean score of third-born and above is 50.9 and the SD is 163.39.

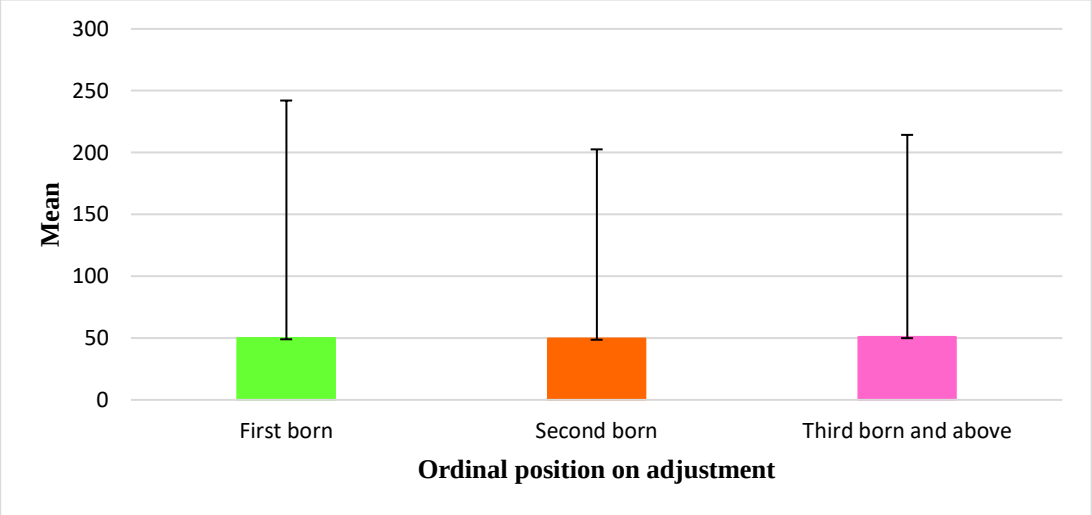


Figure 5: Influence of ordinal position on adjustment of adolescents

Table -9: ANOVA- Influence of ordinal position on adjustment dimensions of adolescents

Dimensions	Variable	N	Mean	SD	'F' Value
Home	First born	200	7.3	9.69	0.29^{NS}
Adjustment	Second born	165	7.2	7.68	
	Third born and above	185	7.4	10.28	
Health	First born	200	7.0	8.49	2.02^{NS}
Adjustment	Second born	165	6.8	7.32	
	Third born and above	185	7.4	8.90	
Social	First born	200	9.10	9.92	0.195^{NS}
Adjustment	Second born	165	9.09	7.44	
	Third born and above	185	9.26	10.18	
Emotional	First born	200	16.64	27.60	0.080^{NS}
Adjustment	Second born	165	16.43	20.73	
	Third born and above	185	16.56	23.38	
Educational	First born	200	9.97	16.08	0.28^{NS}
Adjustment	Second born	165	10.0	13.46	
	Third born and above	185	10.2	13.54	

Table value 2.99 at 0.05 level table values 4.60 at 0.01 levels, NS- Not Significant

Note: as per the (AICS-ss Inventory) High score refers to low adjustment.

Table 9 shows the influence of ordinal position on the adjustment dimensions of adolescents. It is observed from the above intervention that the calculated 'F' value of 0.29 represents home adjustment, the calculated 'F' value of 2.02 represents health adjustment, the calculated 'F' value of 0.195 represents social adjustment, the calculated 'F' value of 0.080 represents emotional adjustment, and the calculated 'F' value of 0.28 represents educational adjustment. The calculated 'F' value of adolescence, with birth order first followed by second, third, and above, has no statistically significant influence on adjustment dimensions of adolescents. Thus, the null hypothesis is accepted.

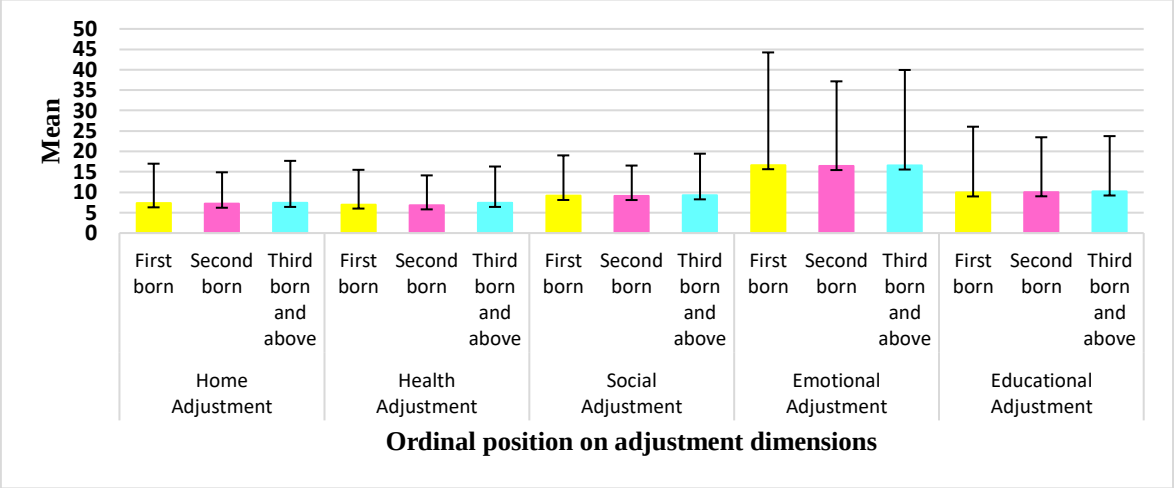


Figure 6: Influence of ordinal position on adjustment dimensions of adolescents

CONCLUSION

From the above study, the researcher concluded implication in education learning applied approach in the reference of the present study that influence of ordinal position on the personal values of adolescents. Findings suggested that adolescents, who represent the ordinal positions of first-born, second-born, third-born, and above are statistically not influenced by personal values. A study reveals that the mean score of second-born refers to high personal value. It may be due to their ordinal position in the family, as they share the middle position and have the ability to adjust with the siblings, which reflects their strong value pattern in socialized behavior and actions in any situation of life. It is needed for second-born to be high in their personal values, as it is observed that due to the attention and affection from parents being shared with young siblings in the family, they sometimes replicate good behavior with more aggressiveness, a rebellious nature, feeling neglected, and showing inadequate behavior. The investigation depicted that the influence of ordinal position on the personal value dimensions of adolescents refers to the statistically influenced knowledge value and power value. The study suggested that third and above tend to be high in knowledge value in association with other ordinal positions. The reason is that individuals born in the third ordinal position in the family are more sheltered by parents and elder siblings in the family; they gain wider knowledge and acquire more experiences from elder siblings, and they have the ability to develop strong interpersonal relations with both siblings and parents. The study also indicated that the mean score of variables in different dimensions of personal values determines that firstborn tend to be high in power value in association with second, third, and above ordinal positions. The reason for that firstborn being responsible, having leadership abilities, and being authority-oriented is due to their ordinal position in the family. Second-born tend to have high religious, aesthetic, family, and health values. The reason for this is that they may be more independent, supportive of their younger siblings, and clearly search for attention from their parents. Whereas third-born and above tends to be high in social, democratic, knowledge, and hedonistic value. Due to their joyful and social nature, they also received affection and support from elder siblings and parents, as they hold the younger position in the family. Further study suggested that, in reference to adolescents' personality, the mean score of second-born tends to be better than that of third-born and above, first-born. A study proposed that mean scores of variables in different dimensions of personality determine that second-born tend to be high in introversion personality; their ordinal position is responsible for the same as they refer to the middle-born;

between the younger and elder siblings, sometimes they suppress their emotions and seek attention from the parents and siblings. Whereas second-born, followed by third-born and above, tend to have a high extroversion personality. As they share the middle ordinal position, it holds responsible and mature behavior towards the young sibling and other roles in the family. Ordinal position third-born tend to be extroverts due to their environmental and family support; they are joyful, attention seekers, and charmers in social gatherings. Their parents and elder sibling shower love and care on them, which makes their personality complete in every aspect.

The present investigation supported that the influence on the ordinal-position of adolescents representing first-borns, second-born, third-born, and above is not significant on personality and their dimensions.

The present study advocated that it is observed through the mean score of second-born, which refers to high as compared to third-born, and above ten to be better than first-borns in their overall adjustment level. The reason for this is their ordinal position in the family, which works for them to become more adjustable in tendency soon after the birth of a younger sibling. The second ordinal position comprises the relationship and adjustment between the younger and elder sibling within the family dynamics. A study analyzed the influence of ordinal position on adjustment dimensions of adolescents and determined that second-born tend to have a high level of home, health, and social adjustment, their ordinal position contributes to a well-adjusted tendency in every sphere of life, especially social gatherings and home; third-born, and above tend to have a high level of emotional adjustment. As they recognize the responsibilities of other younger and older siblings, they are emotionally well adjusted to their experiences within the family dynamic. Firstborns tend to be high in educational adjustment; and their ordinal position in the family helps them to grow and achieve knowledge and attention towards learning new skills in life. Being the elders in the family, they acquire information from their experiences and share a gentle relationship with their younger siblings. Parents need more expectation from their older offspring to take on mature roles and indulge them in beliefs and values that permit them to be responsible for their family dynamics. Research interpreted that first-born, second-born, third-born, and above adolescents have no significant influence on overall adjustment and its dimensions, viz., home adjustment, health adjustment, social adjustment, emotional adjustment, and educational adjustment.

IMPLICATION OF THE STUDY

As a researcher in human development, the focus has been on adolescents' ordinal position within their family dynamics and its influence on their personal values, personalities, and adjustment patterns as they entered a new era of college life. The final outcomes of the present study may appeal to psychologists, counselors; researchers, social workers, and educators offer deep insight to journal readers.

RECOMMENDATION FOR THE FURTHER STUDY

Research can be conducted on childhood, early and middle Adolescents with a wider geographical area.

REFERENCES

- Allport, G. W. (1937). *Personality: a psychological interpretation.* Holt.
- Armitage, S. J. (2007). Birth Order: College Students' Perceptions of their ordinal position compared to Alfred Adler's Categories. https://minds.wisconsin.edu/bitstream/handle/1793/42229/2007armitages.pdf?sequence=1
- Harlock, BE. (2014). Development psychology. New Delhi: Mc Graw Hill education pvt. Ltd.
- Juby, B., & Marais, S. (2022, October 11). Birth order theory: How birth order affects your personality. https://psychcentral.com/blog/birth-order-and-personality
- Kaur, J. (2018). Study of personality in relation to birth order among adolescents. GHG Journal of sixth thought, 5(1), 18-23
- Kaur, J., & Gupta, P. (2019). A study of adjustment among secondary school students in relation to their home environment. International Journal of 3600 Management Review Education & its Relevant Areas in New Era**,** 7(5),33-37
- Klavano, M. (1964). The Relationship Between the Ordinal Position in the Family and Reading Achievement of Third Graders in Yakima, Washington. From https://digitalcommons.cwu.edu/etd/405
- Mishra, P., & Kiran, U.V. (2013). Impact of ordinal position on self-concept among adolescents Advance research journal of social science, volume, 4(1), 35-38. http://researchjournal.co.in/upload/assignments/4_35-38
- Mondal, C. (2021). A Comparative Study on Social Adjustment within Rural and Urban Adolescent. Students International Journal of Creative Research Thoughts (IJCRT), 9(2) 498-502.https://ijcrt.org/papers/IJCRT2102060
- Murthy, A. S. (2013). Personality of adolescents in relation to their Adjustment and Decision Making. From https://shodhganga.inflibnet.ac.in:8443/jspui/handle/10603/126627
- Reddy, N.Y. (1966). Adolescent adjustment in relation to home environment. Journal of Applied Psychology, 67, 341-349.
- Saha, S.L. (1997). Original position in relation to adjustment. Dept. of Pre-school and Ele-Education, unpublished M.Ed dissertation. New Delhi, Delhi university.
- Sinha, A., & Singh, P. (2017). Manual for Adjustment Inventory. Agra: National Psychological Corporation. pp.568.
- Singh, Y. S., & Singh, H. (2017). Manual for personality. Agra: National Psychological Corporation. pp.47
- Sherry, G. P., & Verma, R. P. (2012). Manual for Personal Values Questionnaire. Agra: National Psychological Corporation. pp.3–30.

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ROLE OF FATHERS IN PARENTING EARLY ADOLESCENTS LIVING IN DELHI

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ABSTRACT

The study examines fathers' pivotal role in the development and well-being of early adolescents in Delhi, addressing their involvement in education, emotional support, and the challenges they face. The research includes 24 participants from middle socioeconomic status, comprising 12 fathers and their early adolescent children. The findings reveal significant differences in the engagement levels of self-employed versus full-time employed fathers, with the former showing more consistent involvement. The study also highlights gender-specific differences in paternal involvement, with fathers engaging differently with sons and daughters. The challenges fathers face, such as balancing work and parenting, and the strategies they employ to overcome these difficulties are also discussed.

Keywords: Development, Early Adolescent, Father, Parenting, Paternal Approach

INTRODUCTION

The role of fathers in the caregiving of adolescents is a crucial yet often underexplored aspect of parenting. Traditionally, fathers have been viewed as distant figures, primarily responsible for decision-making and financial provision. They were regarded as the heads of families and sole breadwinners, with limited involvement in day-to-day caregiving (Salgado et al., 2021).

Social changes brought about by the women's rights movement and increased female participation in the workforce have contributed to a gradual shift in paternal roles (Wilson et al., 2015). Fathers have increasingly been encouraged to adopt more nurturing and emotionally responsive roles within the family. Despite this shift, research shows that the parenting experience becomes more complex during adolescence. Many researchers observe that fathers face greater challenges during this phase, as adolescents experience intense physical and emotional changes. Lin and Yi (2018) also note that these developmental transitions can heighten stress within the parent-child relationship.

Lipscomb (2011) emphasizes that active father involvement significantly contributes to a child's emotional well-being, identity formation, healthy development, and sense of responsibility. In the Indian context, however, fathers have long been perceived as providers rather than caregivers,

shaped by traditional cultural beliefs (Sriram & Sandhu, 2012). Although these norms are gradually changing especially since the rise of industrialization. Indian fathers are now becoming more engaged in their children's academic and social development (Sriram & Sandhu, 2012).

Globally, literature on fatherhood is expanding. However, in India, there remains a lack of in-depth research on paternal involvement with specific age groups of children and across different socio-economic statuses, which could reveal aspects and ways in which fathers are willing to contribute.

JUSTIFICATION OF THE STUDY

Studying fathers' roles during early adolescence is crucial for several reasons. Firstly, it fills a gap in existing research, which has predominantly focused on mothers, especially in the Indian context. By examining fathers' contributions, this study aims to provide a fuller understanding of parenting dynamics in India. Secondly, insights into fathers' roles can help shape policies and programs that support family cohesion and child development, particularly given the rapid social changes in urban India. Early adolescence, a period marked by significant cognitive, emotional, and social development, is a critical time for understanding fathers' impact on their children's academic, emotional, and social growth.

OBJECTIVES OF THE STUDY

- To assess the fathers' involvement in early adolescent development and well-being.
- To identify the extent and nature of paternal involvement with early adolescent boys and girls.
- To understand challenges and strategies for enhancing father's participation in caregiving.

METHODOLOGY

Sample of the study

The study included 24 participants from middle socio-economic status families. This comprised 12 fathers aged between 38 and 49 years, consisting of 6 fathers of early adolescent boys and 6 fathers of early adolescent girls. Additionally, there were 12 early adolescents aged 11 to 14 years, evenly divided between boys and girls.

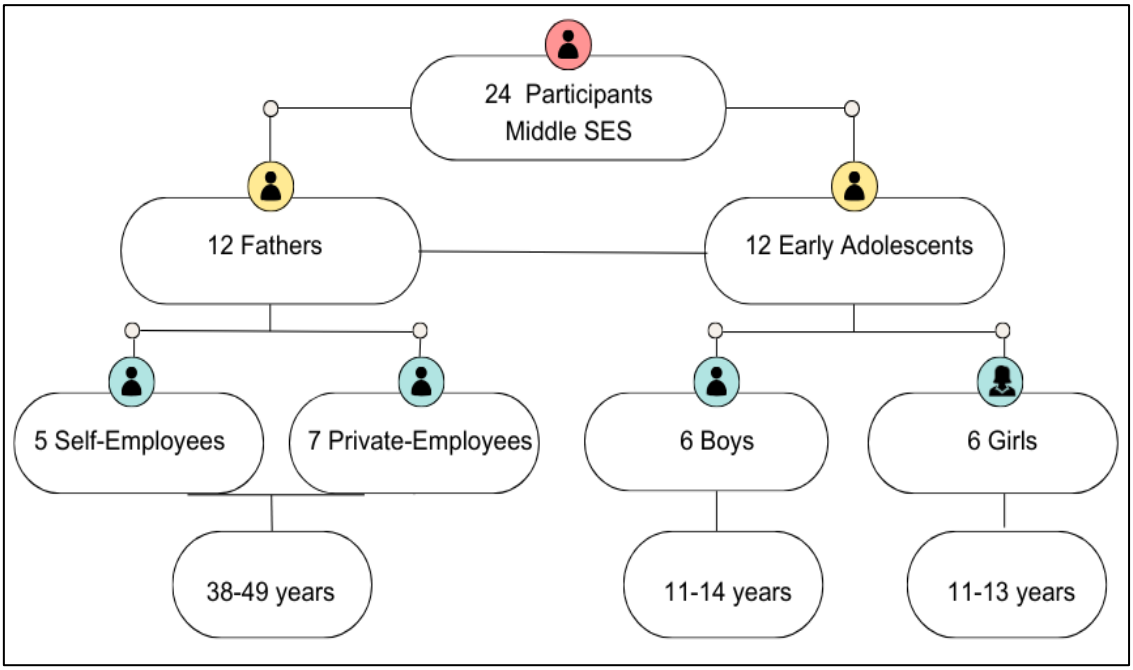


Figure 1: Sample of the Study

Research Design

The study used a qualitative approach to investigate the objectives. Purposive and snowball sampling techniques to reach target audience. To ensure that participants belonged to the middle socio-economic group, the Modified BG Prasad Classification (January 2024) was used. Per capita monthly income was calculated by dividing the self-reported household income by the total number of family members. Participants falling within Class II (₹4,566–9,130) and Class III (₹2,739–4,565) were considered as part of the middle-income group for the purpose of this study. Consent was obtained from each participant after a thorough explanation of the study, ensuring that their information would be kept confidential and used solely for academic purposes.

Tools for data collection

1. Semi-structured interview

   Semi-structured interviews were held with 12 fathers of South and West Delhi to explore their involvement in early adolescent development and the challenges they face in parenting. It was based on following themes:

   - Supporting extracurricular activities and interest
   - Involvement in education
   - Promoting well being
   - Challenges and adaptation
   - Communication and listening
   - Handling peer relationship & pressure
   - Setting boundaries and discipline
   - Risky behavior and safety concern

2. Questionnaire

   A questionnaire was administered to 12 early adolescents. The main focus areas were positive and negative engagement, Emotional responsiveness.

3. Case study

   Case studies of two fathers have been chosen from a selected group of participants for an in-depth study. The observation of fathers - Child duo was conducted as a non-participant observer.

Procedure of data collection

The qualitative data collected through the tools were analyzed using thematic analysis. Additionally, Field notes and responses were noted and transcripted later.

RESULTS AND DISCUSSION

Semi-structured interviews were conducted with fathers to explore their perspectives on adolescent development, wellbeing and the challenges they face in parenting. To gain a more holistic understanding, additional insights were gathered through questionnaires administered to early adolescents, which provided their views on paternal involvement and behavior. These parallel data sets were collectively analyzed and discussed below. Additionally, two fathers were selected for detailed case studies to further examine father-differences in parenting, child interactions through observational methods, offering deeper context and comparison between stated beliefs and actual behaviors.

Fathers' Nature of Involvement

- **Interaction with Children**

Self-employed fathers (5) had higher involvement with their children compared to full-time employed fathers. They engaged in shared activities like watching movies, eating together, and playing. In contrast, full-time employed fathers (7), due to work commitments, primarily spent quality time with their children on weekends, engaging in activities like watching TV or shopping. This pattern of higher engagement during weekends is consistent with previous studies by Keown & Palmer (2014) and Hull (2012), which highlight the positive impact of fathers' involvement on children's self-esteem.

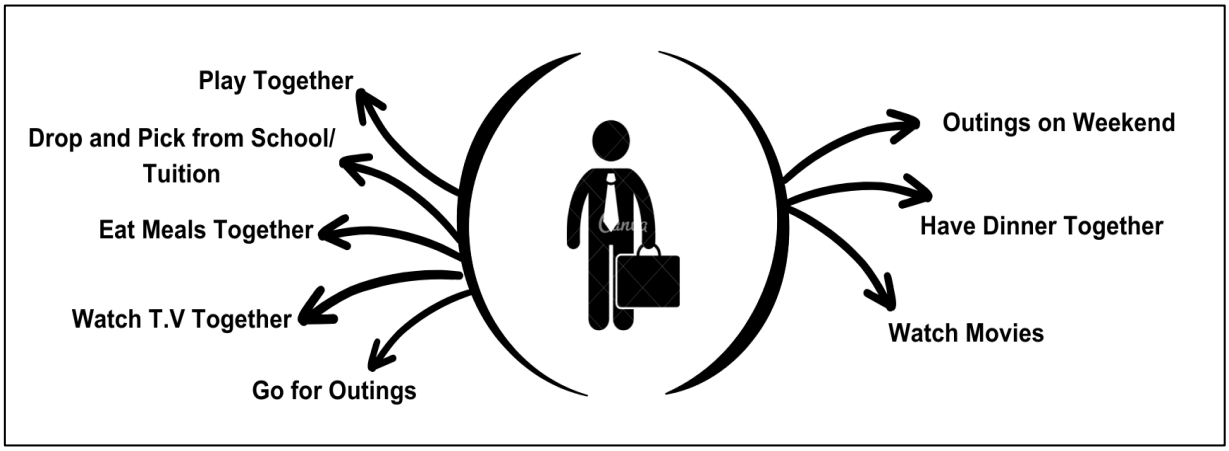


Figure 2: Father Involvement Comparison: Self-Employees vs. Full-Time Employees

- **Education and Extracurricular Activities**

Fathers' involvement in education varied. 10 out of 12 fathers didn't assist with schoolwork but attended meetings and supported extracurricular activities. They expressed regret for not helping more academically but provided material support and motivation for interests, while some limited activities to maintain academic focus.

Overall, fathers acted more as providers than active participants in their children's academic journeys but supported their children's exploration of interests and hobbies, helping them develop their identities. This finding aligns with studies like that of Dumont & Paquette (2013), which depict fathers as supporters in their children's activities.

- **Initiating Effective Communication**

The study found that most fathers (10) prioritize authoritative and open communication to create a supportive environment for their children, as noted by Kusumasari (2020). While many valued honest dialogues, some depended on the child's mother to bridge communication gaps. Fathers aimed to avoid replicating their own fathers' strict styles, instead adopting active listening and initiating conversations to overcome barriers. Full-time working fathers often used weekends to stay connected. Overall, the study highlights a shift from authoritarian as mentioned in Tuli (2012) to more engaged, communicative parenting, with a focus on trust and self-expression.

Involvement of Fathers in Child's Well-Being

- **Positive Emotional Responsiveness**

The findings emphasize the vital role fathers (9) play in their early adolescent children's emotional development by being consistently available and responsive. Through offering comfort during distress, praising achievements, and supporting their children's preferences, fathers help foster self-esteem, confidence, and a sense of security in their children's identities. This aligns with research by Muttaqin et al. (2022), which found that positive and responsive fathering practices lead to stronger commitments to positive identity formation in adolescents.

- **Implementing Healthy Routines**

Fathers in the study were aware of their early adolescent children's unhealthy behaviors, like poor eating habits and sedentary lifestyles. Many fathers (8) reported engaging in physical activities with their children on weekends, such as sports and yoga, though some struggled with time constraints. Emphasizing the importance of physical activity to counteract junk food and inactivity, these findings align with Rathi et al. (2024), highlighting the significant role Indian fathers play in promoting healthy habits despite modern lifestyle challenges.

- **Positive Behavioral Shift**

The study reveals that fathers adjust their behaviors to support their children's development by setting positive examples. They aim to promote healthy habits and a supportive environment, reflecting their commitment to their children's well-being and resilience as role models during early adolescence. *For instance, Father 2 remarks that* "मैं *mostly try* करता हूं कि जो मैं अपने बेटे को बताता हूं वो मैं भी *follow* करू जैसे की मैं टीवी ज्यादा नहीं देखता, *action movies avoid* करता हूं। कुछ चीज़े में बच्चों के सामने बात नहीं करता।"

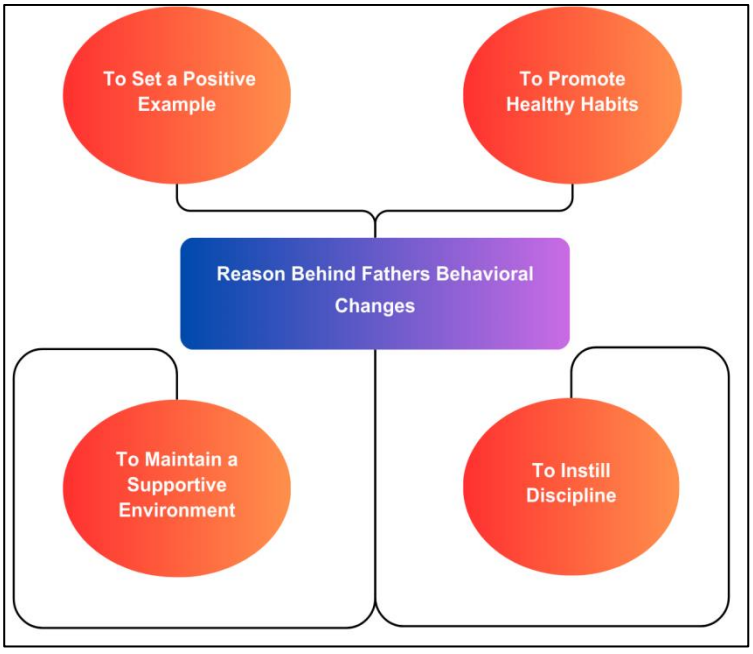


Figure 3: Diverse Motivations Behind Paternal Behavioral Changes

- **Safety Discussion**

Fathers expressed concerns about their early adolescent children's safety, including interactions with strangers, road and kitchen safety, and health issues. They emphasized awareness about avoiding risky situations and maintaining safety awareness, particularly regarding junk food and inactivity. However, fathers (12) of both genders were reluctant to discuss sensitive topics like bodily changes due to discomfort or societal expectations, which could impact effective communication and support for their children's self-image and self-acceptance.

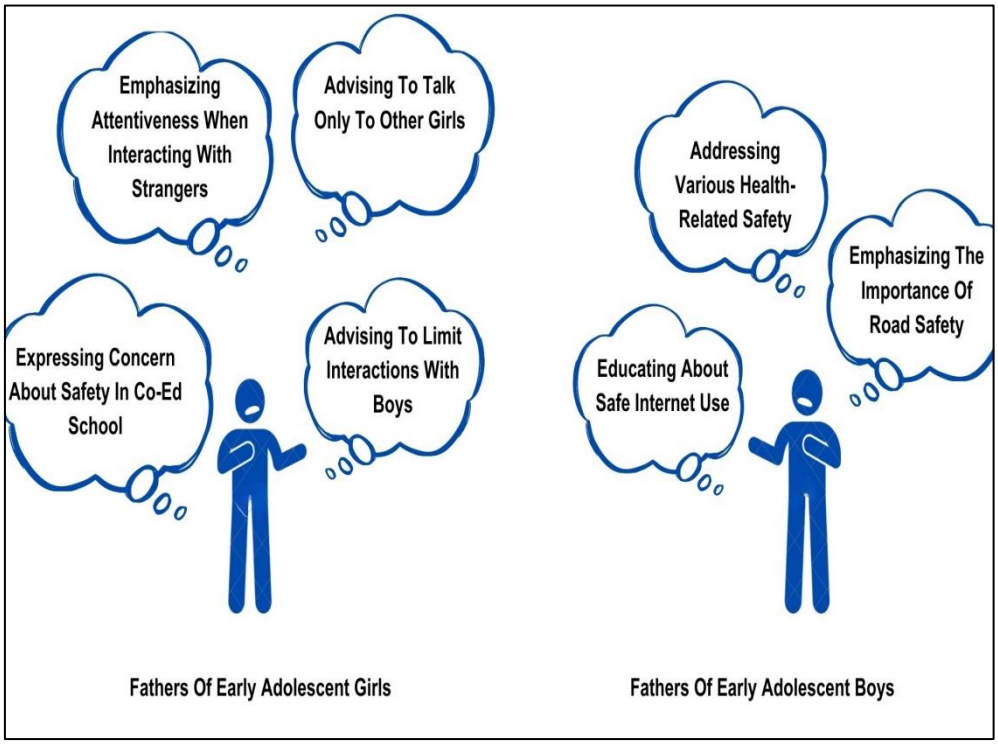


Figure 4: Differences in Safety Concerns Addressed by Fathers of Girls and Fathers of Boys

- **Managing Peer Influence**

The fathers recognized the significant influence peer groups have on their early adolescent children's behavior, with many (9) noting changes in their children's actions or preferences due to peer influence. For example, one father observed his child's adoption of makeup habits from friends, while another noticed an interest in skating influenced by a peer. Rest did not observe any peer influence. To manage peer-influenced behaviors, fathers (5) used strategies like open communication to understand their child's motivations, (2) use positive reinforcement by rewarding peer-influenced desires for good performance, and (5) setting clear boundaries to resist peer pressure.

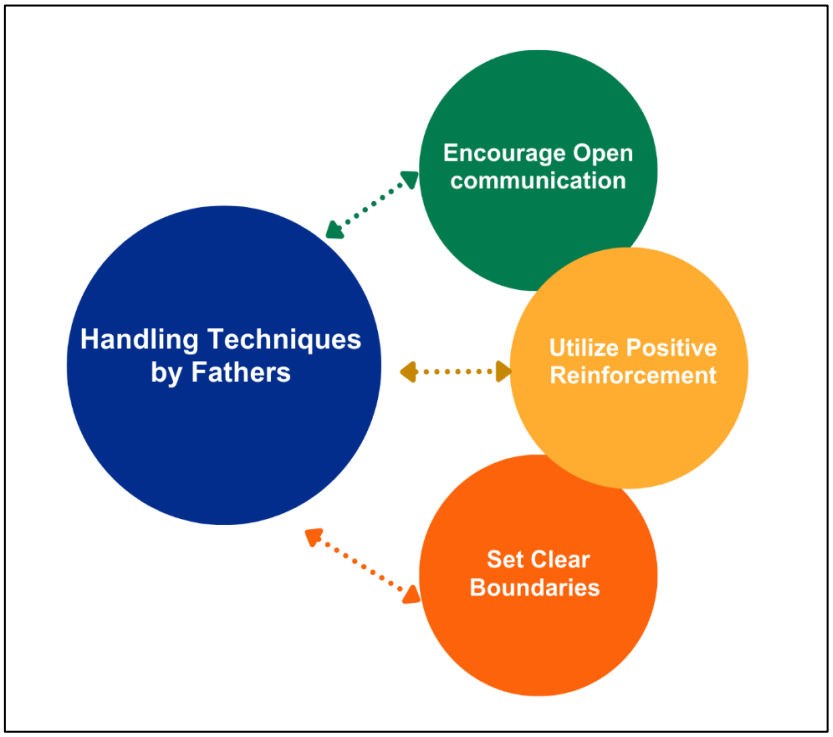


Figure 5: Handing Techniques by Fathers in Managing Peer Influence

Overall, the findings suggest that fathers play a crucial role in managing peer influence on them and helping their early adolescents to make informed choices and mitigate negative peer effects. This proactive approach highlights their understanding of shaping their children's identity during this critical developmental stage.

- **Supportive Ways During Tough Times**

The analysis showed that fathers actively support their children's emotions during challenging situations, with approaches varying by the child's age. Fathers (7) of 13 and 14 year olds focus on communication, listening, and empathy, particularly with issues like school stress or sibling conflicts, creating a safe space to build trust. In contrast, fathers (5) of 11 and 12 year olds often use gestures of affection, such as offering favorite foods or special outings, to comfort their children. This aligns with studies suggesting fathers may use comfort foods with younger children. Overall, fathers are seen positively as problem solvers, playing a key role in fostering resilience and emotional well-being, consistent with Lamb and Pleck's (1985) four-factor model emphasizing motivation, skills, self-confidence, and social support in fatherly involvement (Afrooz et al., 2022).

Fathers' Approach in Setting Boundaries, Disciplining and Supporting Aspirations

- **Setting Boundaries**

The findings reveal that fathers use various disciplinary approaches to instill values and enforce boundaries for early adolescents. Their involvement in discipline varies based on personal beliefs, family dynamics, and communication styles. Fathers actively set rules and limits on activities like playtime and the use of technology, including TV, phones, and gaming devices. They also emphasize the importance of healthy eating habits and enforce restrictions on junk food

consumption. Overall, fathers play a significant role in shaping their children's behavior through these disciplinary measures.

- **Disciplining**

The findings show that most fathers use an authoritative disciplinary approach with their early adolescent children, emphasizing clear rules, open communication, and positive reinforcement, which enhances relationships and improves outcomes. About 7 out of 12 fathers used these methods, avoiding harsh measures. In contrast, 3 out of 12 fathers use coercive methods like threats or physical punishment, which can harm relationships. Additionally, 2 out of 12 fathers adopt a more lenient approach, sharing disciplinary responsibilities with other parents. Overall, the study indicates a trend toward more effective and positive disciplinary strategies that benefit both the father-child relationship and the children's development.

- **Supporting Aspirations**

The findings highlight differences between self-employed and full-time employed fathers in their aspirations for their children's futures. Both groups are committed to supporting their children's goals, but self-employed fathers focus on maintaining the family name and reputation, often desiring societal success, like becoming successful businessmen. In contrast, full-time employed fathers prioritize their children's happiness and encourage them to pursue their own interests and passions, whether in academics, careers, or personal relationships. Despite these differences, all fathers share the common goal of wanting their children to thrive in their chosen paths.

Extent of Paternal involvement with Early Adolescent Boys and Girls

Although fathers appeared equally involved with both boys and girls, questionnaire with early adolescents reported notable differences in paternal behavior, especially in specific areas as mentioned below:

- **Taking Quality Time**

Analyzing the responses among 12 early adolescents, indicates the difference in how fathers engage with their early adolescent children based on their gender. The responses suggest that, on an average, fathers take quality time with early adolescent boys more than with early adolescent girls.

- **Actively Listening to the Thoughts**

The findings indicate that boys perceive their fathers as more consistently attentive listeners compared to girls, who view their fathers' listening behavior as more occasional. This suggests that fathers are more inclined to actively listen to boys than girls. Overall, the responses suggest that fathers demonstrate a slightly higher level of responsiveness towards their early adolescent boys, particularly in terms of active listening.

- **Giving Comfortable Space for Discussion**

The data reveal that girls (6) experience varying levels of their fathers' availability for personal discussions, with some reporting inconsistent support. In contrast boys (6) consistently find that their fathers frequently offer a comfortable space to have discussion. This suggests that fathers of boys are more comfortable in discussing their concerns than fathers of girls.

- **Making Decisions on Clothing and Styling**

The data reveal differing patterns in paternal involvement in clothing and styling decisions between early adolescent girls and boys. Most girls (4) reported significant paternal influence on their clothing choices, while boys' responses varied, with some experiencing frequent paternal involvement and others minimal. This suggests that fathers are more involved in their daughters' clothing choices than their sons'. These findings align with Sharma (2015) and Basu et al. (2017), which suggest that fathers may impose more conservative standards on girls' clothing, reflecting persistent gender biases.

- **Imposing Limitations**

The findings show that fathers set different limitations for their early adolescent children based on gender. Fathers of girls often impose stricter rules, such as limiting technology use, monitoring activities, and restricting outdoor playtime, including curfews like “before 7 PM.” In contrast, fathers of boys focus on regulating technology use but generally allow more freedom for outdoor activities. This gender-based difference suggests boys are granted more autonomy, which can benefit their social well-being, while girls face more control, potentially leading to social anxiety. Overall, fathers impose more restrictions on daughters, impacting their independence and development.

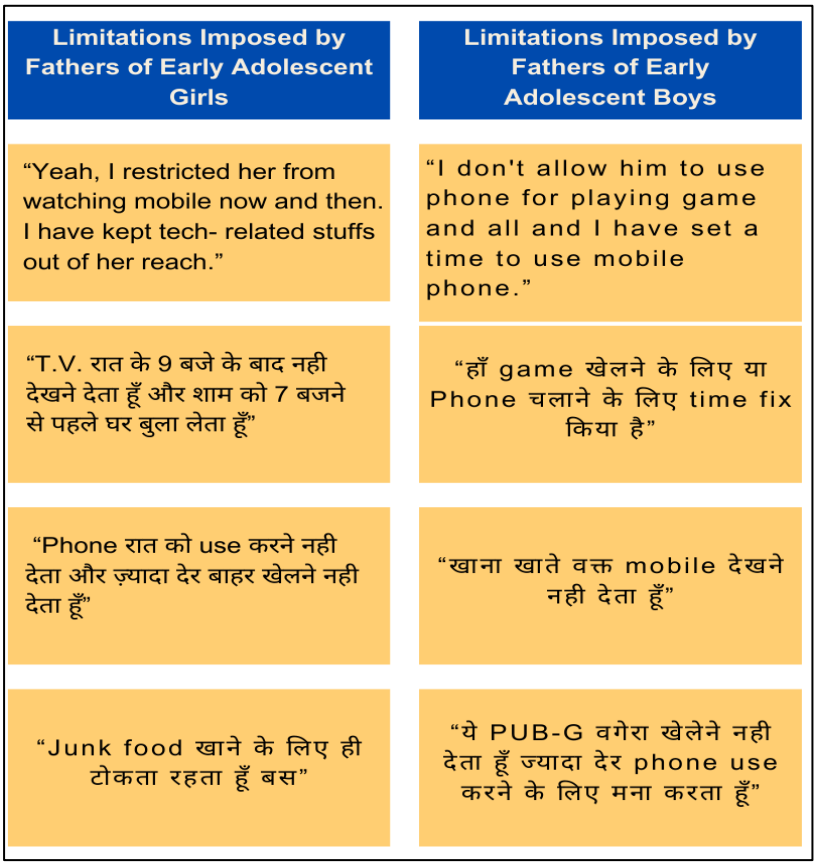


Figure 6: Fathers' Responses to Restrictions on Early Adolescent Girls and Boys

Challenges and Strategies for Enhancing Father's Participation In parenting

- **Challenges of Fathers in Parenting**

The analysis of fathers' responses reveals several challenges in parenting early adolescents. Key difficulties include:

Balancing work commitments with parenting responsibilities emerge as a significant hurdle, often resulting in limited quality time spent with children or opportunities for monitoring their children's activities or providing necessary guidance and support. Additionally, fathers (5) struggle with the rapid pace of technological advancements, finding it challenging to monitor their children's digital activities and promote responsible technology usage habits. These findings align with Rathi et al. (2024), which noted similar issues stemming from excessive screen time preferences and demanding work schedules.

Effective communication emerged as a significant challenge for fathers (7), particularly when responding to their children's questions or explaining underlying reasons. Many fathers also struggled to offer consistent emotional support, especially in managing emotional outbursts and addressing anxiety or stress. Additionally, balancing the need to grant autonomy while ensuring safety and fostering a sense of responsibility proved to be a considerable difficulty.

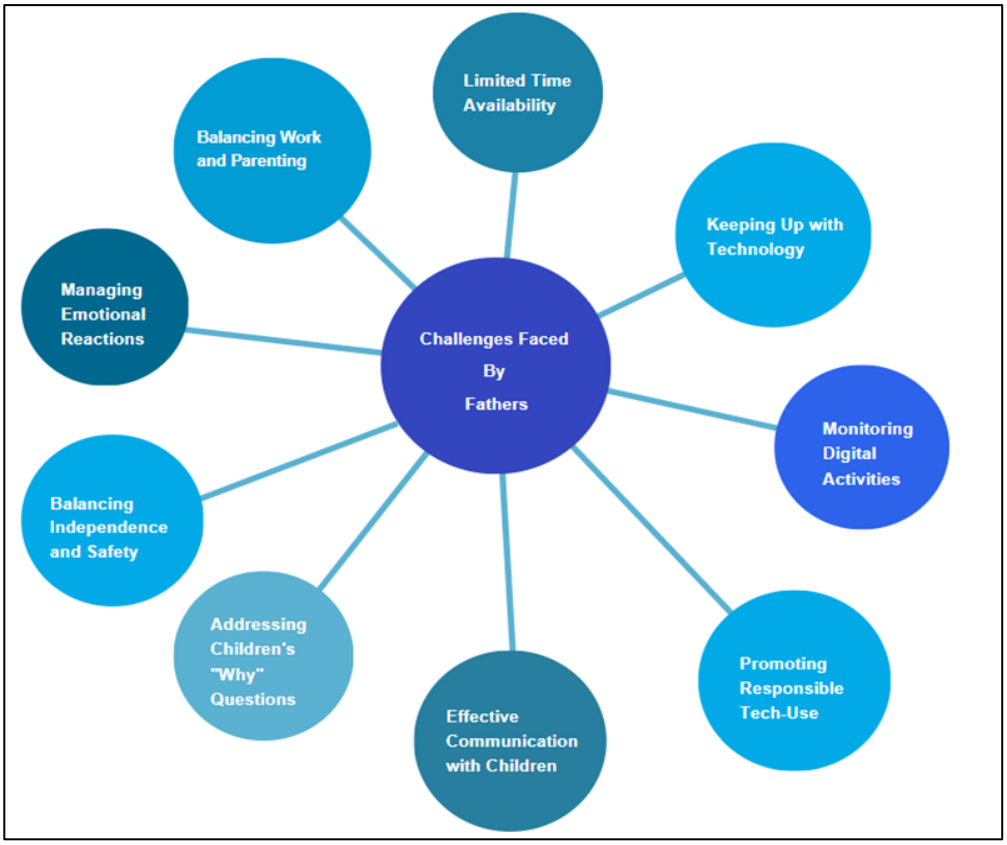


Figure 7: Challenges Faced by Fathers in Parenting Early Adolescents

- **Adapting and Overcoming Obstacles**

Fathers use various strategies to address parenting challenges. They prioritize open communication by clearly and patiently answering their children's questions and addressing concerns. To manage technology usage, they actively engage with and monitor their children's digital activities. Recognizing the complexities of parenting, fathers often seek external support, such as consulting other parents or using online resources. Overall, these strategies highlight fathers' commitment to overcoming parenting obstacles by fostering communication, engaging with their children, and seeking guidance when necessary.

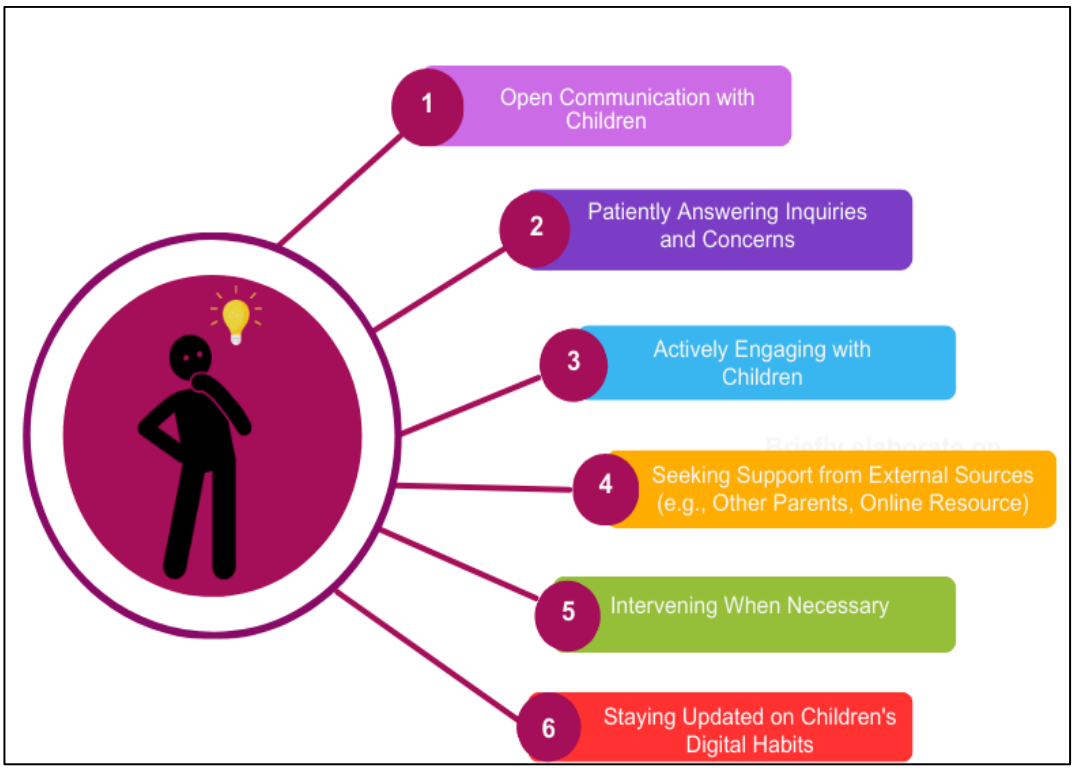


Figure 8: Parenting Strategies Employed by Fathers to Navigate Challenges

Analysis of the case study

The case study analyzed the parenting styles and interactions of two fathers with an 11-year-old boy and a 13-year-old girl, highlighting the varied approaches in parenting early adolescents.

It emphasized the significance of paternal involvement in adolescent development and well-being. The study revealed that parenting practices differ based on individual preferences, communication styles, and the needs of each child. The observation reveals the needs of feeling heard through effective communication, seeking for freedom and support, acknowledging emotional and understanding. It also provided insights into effective strategies for fostering positive relationships, emotional adaptability, and supporting growth during adolescence. Despite differing approaches, both fathers shared a commitment to supporting their children's interests and providing positive role modeling, underscoring the importance of understanding these dynamics for effective parenting and enhancing children's overall well-being.

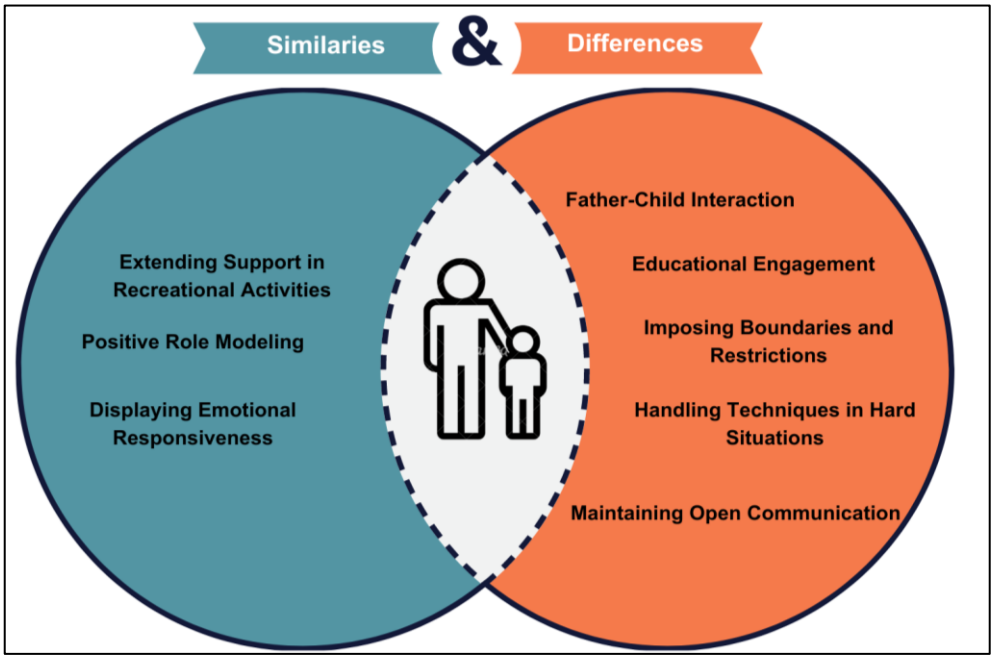


Figure 9: Similarities and Differences between the Paternal Approach in Two Case Studies

CONCLUSION

The study involved 12 fathers and their early adolescent children (6 boys, 6 girls). Fathers participated in interviews, adolescents completed questionnaires, and case studies were conducted with 2 selected fathers to explore interactions in depth. The study underscores the significant role fathers play in the development and well-being of their early adolescent children. Fathers have a notable impact on their children's social adaptation, self-esteem, academic motivation, and desire for achievement.

Findings show that self-employed fathers have more flexibility for engaging in activities with their children, whereas full-time employed fathers struggle to balance work and quality time, often spending weekends with their children. Despite these differences, all fathers stress the importance of engagement.

Fathers' involvement in educational and recreational activities is typically limited to a supportive role, consistent with previous studies. They prioritize open communication and adapt their parenting strategies to address modern challenges, offering emotional support based on their children's ages.

Gender-based differences were evident, with fathers spending more quality time with boys and being perceived as more attentive by them. Girls, on the other hand, face stricter limits and less proactive support, reflecting traditional gender norms. Fathers impose more restrictions on girls' technology use and outdoor activities, which can affect their development differently from boys.

Similarly, in case study, a father stated belief in his daughter's independence contrasted with observed behavior, where he imposed restrictions on her mobility and attire. This highlights how observation can reveal gaps between expressed parenting views and actual practices.

Fathers use communication, assertiveness, and collaboration in discipline. The study highlights challenges like balancing work, managing technology, and effective communication, stressing the need for adaptable strategies. It underscores the importance of balanced, gender-sensitive parenting for healthy development, with fathers committed to overcoming obstacles and fostering strong relationships.

RECOMMENDATIONS

The study recommends promoting awareness programs and interventions that highlight the importance of fathers' roles and challenge traditional gender norms influencing unequal parental involvement. Tailored workshops for fathers should be introduced to support them in addressing the challenges of parenting early adolescents. Emphasis should be placed on raising awareness about gender stereotypes and their effects on adolescent development. Schools and professionals are encouraged to actively support fathers' engagement in education. Additionally, developing supportive resources such as helplines, counseling, and peer groups can help fathers navigate parenting more effectively.

SUGGESTIONS FOR FUTURE RESEARCH

- Future research could focus on conducting similar research with a larger sample size and across varied income groups to enhance the scope and generalizability of the findings.
- Comparing fathers' involvement in parenting across diverse Indian cultures. This could help identify different parenting styles within the Indian context, influential factors, and unique challenges in paternal engagement.
- Exploring the link between fathers' parenting practices and child's academic outcome can unfold specific behaviors that lead to positive results among adolescents.

REFERENCES

- Afrooz, G. A., Asgharpour, H., & Kashani, F. L. (2022). The Father's Role in Parenting: a Comparison of Different Cultures and Psychological Perspective. Men's Health Journal, 6(1).
- Basu, S., Zuo, X., Lou, C., Acharya, R., & Lundgren, R. (2017). Learning to be gendered: Gender socialization in early adolescence among urban poor in Delhi, India, and Shanghai, China. Journal of Adolescent Health, 61(4), S24-S29. https://doi.org/10.1016/j.jadohealth.2017.03.012
- Dumont, C., & Paquette, D. (2013). What about the child's tie to the father? A new insight into fathering, father–child attachment, children's socio-emotional development and the activation relationship theory. Early Child Development and Care, 183(3–4), 430–446. https://doi.org/10.1080/03004430.2012.711592
- Hull, J. W. (2012). How fathers influence their adolescents' self-esteem: A longitudinal assessment [Master's thesis, University of Delaware]. https://udspace.udel.edu/server/api/core/bitstreams/9b68eb76-a596-4e3f-9c90-feeb74294fd8/content

- Keown, L. J., & Palmer, M. (2013). Comparisons between paternal and maternal involvement with sons: Early to middle childhood. Early Child Development and Care, 184(1), 99-117. https://doi.org/10.1080/03004430.2013.773510
- Kusumasari, N. M. (2020). Involvement of fathers in parenting as a predictor of adolescents' social adaptation. Psychological Research and Intervention, 3(1). https://doi.org/10.21831/pri.v3i1.34751
- Lin, W.-H., & Yi, C.-C. (2018). Subjective well-being and family structure during early adolescence: A prospective study. The Journal of Early Adolescence, 39(3), 326–347. https://doi.org/10.1177/0272431618770785
- Lipscomb, C. R. (2011). Strategies to Improve Fathers' Involvement with their Children's Development and Academic Achievement. Race, Gender & Class Journal, Vol. 18. 253-267. https://www.jstor.org/stable/43496847
- Muttaqin, D., Chanafi, A. R., Nofelia, B. I., Khristi, T. C., & Wahyuningsih, S. (2022). Role of parents and friends in adolescents' identity formation in Indonesia. Indigenous: Jurnal Ilmiah Psikologi, 7(1), 1-14. https://doi.org/10.23917/indigenous.v7i1.15680
- Rathi, N., Kansal, S., & Worsley, A. (2024). Indian fathers are involved in nurturing healthy behaviours in adolescents: A qualitative inquiry. BMC Public Health, 24(1). https://doi.org/10.1186/s12889-024-17634-7
- Salgado, M., González, L., & Yáñez, A. (2021). Parental involvement and life satisfaction in early adolescence. Frontiers in Psychology, 12. https://doi.org/10.3389/fpsyg.2021.628720
- Sharma, B. (2015). fathers' involvement in everyday in everyday lives of their adolescents [Unpublished master's thesis]. Lady Irwin College.
- Sriram, R., & Sandhu, G. K. (2012). Fathering to ensure child's success. Journal of Family Issues, 34(2), 159-181. https://doi.org/10.1177/0192513x12461136
- Tuli, M. (2012). Beliefs on parenting and childhood in India. Journal of Comparative Family Studies, 43(1), 81-91. https://doi.org/10.3138/jcfs.43.1.81
- Wilson, D. R., Linn, J. G., & Fako, T. T. (2015). historical Role of the Father. International Journal of Childbirth Education, 30(1), 12-14. https://www.researchgate.net/publication/270823715_Historical_role_of_the_father

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INFORMATION & COMMUNICATION TECHNOLOGIES (ICT) USE AMONG THE FAMILY MEMBERS BASED ON THE FAMILY ROLES – A DESCRIPTIVE STUDY

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ABSTRACT

Familial environment is filled with ICT devices, including radio, television, smartphones, and computers. The use of ICT by family members has taken several forms. The usage, purpose, and influence are also majorly determined by the familial roles such as father, mother, son and daughter. This research attempted to understand the ICT use based on familial roles. A survey method was used to gather data from family members in Chennai City. A total of 756 people from 378 families responded to the survey. The study found a significant difference in how parents, such as father and mother roles, and children, such as son and daughter roles, access ICT. Usage, frequency, purpose, preference, and interaction have a significant difference in family roles. The communication pattern is determined by the family dynamics, not significantly different based on the family roles. Also, it is found that father and mother, as well as the son and daughter pair, have remarkably comparable preferences for ICT.

KEYWORDS: Family Dynamics; Family Roles; Family Functioning; ICT in India; Indian Family; ICT Use

INTRODUCTION

ICTs such as television, radio, computers, and internet facilities are playing a pivotal role in people's daily lives, as well as the lives of their families, much like it does in health, business, education, and entertainment. Recent advancements have simplified daily life. Adults keep in touch with their partners, friends, peers, family members, etc. more frequently by using communication technology like computers and cell phones through email and social media. As a social outlet, it serves as an interaction model (Huisman et al., 2012). Working women manage their routine using the internet and bridge the distance between family members (Moore, 2006). Television programming has become entertainment-oriented, instructional, or informational, which aids in conceptual understanding for both children and their parents (Wartella et al., 2010). Family members also use ICT devices to communicate with non-resident family members (Rudi, 2015). Parents claim

that using computers at home for schoolwork and academic purposes helps their children become more intelligent (Kerawalla & Crook, 2002). ICT serves as a surveillance tool and can be used to keep an eye on the kids and other family members. Even though ICT serves as a hub and offers vital services to manage human life digitally, ICT has altered the way people use it. This shows that there is a scope to understand ICT influence among family members.

THEORETICAL BACKGROUND

ICT & Family

The family living space was replaced by televisions in the 1950s, and floor plans for homes started to integrate space for the television set within a home's structural arrangement, claims sociologist Spigel (1992). According to Watt & White (1999), the most significant effects of computer use in families are on education, communication, home management, leisure, home business, and home computing.

Children are more likely to spend more time on the internet and television, according to the digital revolution in homes. But the parental co-viewing helps to monitor them (Wartella & Jennings, 2000). Romero-Ruiz et al. (2017) classified the disadvantages of ICT as the loss of family talks, relationship destruction, high virtual communication, reduction of family time, less physical interaction, distance making, solitude, lacking affection, family disunity, and replacement emotions as the main concerns. Whereas the advantages are communication, video calls, social networks, sharing of images and videos, entertainment, banking, and shopping online.

Rompaey et al. (2002) found that children in families play a significant role in the use of the Internet. They use more than their parents. ICT & family studies conducted between 1998 and 2013, reviewed by Carvalho et al. (2016), found factors such as the socioeconomic condition of the family, non-residence, communication methods, cultural differences, satisfaction of demands, and the stage of family life have an impact on ICTs and usage patterns.

ICT supports healthy family dynamics and better management of daily tasks. In comparison to teens, parents of adults experience fewer issues with their children's usage of ICT (Carvalho et al., 2017). Social networking sites and messaging tools occasionally aid in the development of a healthy relationship, the ability to make wise decisions, the expansion of reflective time, the reduction of distractions, and the provision of quiet time for reflection (Perry & Werner-Wilson, 2011). ICT use is also significantly linked to family communication and functioning.

ICT & Family Roles

Families are classified according to the hierarchy of power among their members. When new information enters the family system, it develops new roles or competencies alongside the pre-existing ones, which may result in relational alterations (Mesch, 2006a; Watt & White, 1999). For instance, if computers are introduced into a home, the adolescent learns and develops as a technological expert, passing down his or her knowledge to other family members. As a result, their family system's structure alters, and family duties are reassigned. Older adults find this uncomfortable, especially parents and grandparents, because they are unfamiliar with technology and not willing to receive instructions/learn from younger parts of their family, which causes family disputes. Due to the responsibilities that each family member perceives themselves to play, the

redefinition of family roles has the potential to alter the way that the family interacts. When the new, technologically advanced family member assumes the family's leadership role, new family dynamics are created. The digital divide is the biggest worry for parents today.

Williams & Merten (2011) examined how parents and kids used the internet and discovered a beneficial relationship between technologies and increased family cohesiveness via microsystems. A family member can stay in touch due to the internet's "always on" feature. However, an increased usage was linked to fewer family connections. Teenage internet use and family norms revealed that 61% of parents limit their kids' online access. Older people establish guidelines and discuss their own online experiences. More than their mother, fathers monitor their children's online activity (Wang et al., 2005).

Mesch (2006b) discovered that adolescents with more internet usage experience had intergenerational conflicts. Adolescents' advice and knowledge on internet use are seen as reversing traditional family roles. Conflicts in families are more common among parents who lack education and come from diverse backgrounds in terms of education, income, and ethnicity. Dinesh Kumar and Arulchelvan (2019) examined the relationship between parents and kids and discovered that ICT had a significant impact on how modern families lived and formed opinions. Parents prefer ICT for entertainment, while kids mostly use ICT for education. Between parents and kids, there is a clear generational split in terms of device ownership and usage. Parents are gradually adopting a technologically focused lifestyle similar to what children are currently doing.

Based on the literature, it is evident that there is a strong association between ICT and family. ICT in daily life has both benefits and drawbacks. Additionally, it shows that each family's members use ICT differently depending on the roles they play in the family. Therefore, this study attempts to explore ICT usage characteristics in Indian families based on their familial roles. The main objectives of this study are (1) to know the frequency of ICT use in families based on family roles (2) to understand the preference and purpose of ICT use by different family members (3) to understand the interaction practices of different family members with special reference to family roles.

METHODOLOGY

This study employed the survey methodology. Based on the findings from the literature, the survey questionnaire was created. Chennai Families are used as the sample frame for this study. Chennai is one of India's major cosmopolitan cities and is a significant factor in the decision. The population of Chennai, which is diverse and made up of residents from Tamil Nadu and many regions of India, offers a more accurate picture of the study universe.

Due to the massive size of the population (approximately 11.8 million), this study used a multi-stage sampling method to derive samples. Five distinct steps were used to determine the sample from the overall population. Chennai city is orderly classified in the Census of India as Divisions, Zones, Wards, Families, and Individuals respectively. The residents of Chennai City served as the study's sampling unit. All three divisions of Chennai city were taken into consideration in stage one. In stage two, the Simple Random Sampling (SRS) method was used to choose six zones—two from each division—from a total of 15 zones. Using the SRS technique, five wards were selected from each of the designated zones from stage two to stage three. Streets were picked in stage four from the wards designated in stage three. Using the SRS technique, 15 families from each ward

are chosen in stage four. So, a total of 450 families are selected. In stage five, the family members were divided into two different strata as Parent and Child. One member from each stratum was selected randomly and then the responses were recorded. The reason for choosing different members/divisions of strata from family based on their roles (ex. Parents, children, grandparents) is to understand the influence of technology across generations.

Among the identified 450 families, the responses of 378 families were considered valid because 72 families did not provide sufficient data. Hence, 378 families with 756 members (from each stratum, i.e., 378x2=756) were considered for analysis.

The main variables of this research study are frequency of ICT use, preference for ICT use, the purpose of use, and interaction practices. In the interaction practices, the interaction time, ICT use for communication, a preferred method of communication, and communication pattern were used as sub-variables.

HYPOTHESES OF THE STUDY

The following hypotheses of the study were framed based on the research questions and objectives from the literature survey.

- H_{01}: The frequency of using ICT devices in a home differs among the family roles
- H_{02}: The preference for ICT devices differs based on family roles
- H_{03}: The purpose of ICT usage differs based on family roles
- H_{04}: The leisure-time activity of the family members using ICT differs based on family roles
- H_{05}: The interaction time between the family members has an association with the family roles
- H_{06}: The use of ICT devices for communication purposes has an association with family roles
- H_{07}: The preferred method of communication to interact with family members has an association with family roles
- H_{08}: The Preferred communication pattern of the family differs among the family roles

RESULTS

Demographic Details of the Respondents

Figure 1 reveals that 36% of the samples are from the 36–55 year age group, while 34% belong to the 16–25 year. Nearly 70% of the study's sample size came from these two age groups. Age groups 26–35% and 56–75 years represented 13% and 12% respectively. The age range of 8 to 15 years has the lowest percentage of respondents (5%). The samples' average age is 36.73 years. 52% of female participants and 48% of male participants took part in the study. It is found that 31% of the samples are school students, 22% were postgraduates, and 47% were undergraduates. This demonstrates that the majority of the samples are literate.

Demographic Variables	Category	Frequency	Percentage (%)
Age Group (in years)	8-15	37	5
	16-25	259	34
	26-35	91	12
	36-55	268	36
	56-75	101	13
Gender	Male	360	48
	Female	396	52
Educational Qualification	Schooling	232	31
	UG	358	47
	PG	166	22
Occupation	Student	258	34
	Government	90	12
	Private	206	27
	Business	80	11
	Home Maker	106	14
	Retired	16	2
Family Roles	Father	182	24
	Mother	196	26
	Son	178	24
	Daughter	200	26

Figure 1: Demographic profile of the respondents

It is evident that 34% of the respondents are students, followed by 27% private employees and 12% in government positions, and 14% are homemakers. 11% of people operate their firm, whereas 2% are retired. Looking at family roles, 50% of respondents are parents, while another 50% fall into the category of children. Of those, 52% are father and son category, and 48% are mother and daughter category.

Frequency of using ICT devices

As per Figure 2, 14.6% of the respondents said they regularly listen to the radio. 28% of people say they use it occasionally, and 72.2% say they never do. Among the respondents, 70.9% watch TV every day. 32% of people use smart TVs regularly. Based on ownership, it is evident that respondents use their television or smart TV every day. 35.2% of respondents use laptops daily, compared to 23.5% who use desktop computers. More than 50% of the respondents utilize a desktop or laptop every day for a variety of activities. 71.4% said they regularly use the internet. 52.4% of respondents said they use a mobile phone every day, with smartphones (78%) being the most popular choice. According to the result, smartphones, the internet, and television are the most used devices every day.

S. No.	Device/ ICT services	Daily	Once in three days	Once a week	Once a month	Never	Total
1.	Radio	110 (14.6%)	38 (5%)	26 (3.4%)	36 (4.8%)	546 (72.2%)	756
2.	TV	536 (70.9%)	44 (5.8%)	10 (1.3%)	22 (2.9%)	144 (19%)	756
3.	Smart TV	242 (32%)	18 (2.4%)	10 (1.3%)	4 (0.5%)	482 (63.8%)	756
4.	Desktop	178 (23.5%)	42 (5.6%)	36 (4.8%)	44 (5.8%)	456 (60.3%)	756
5.	Laptop	266 (35.2%)	64 (8.5%)	28 (3.7%)	62 (8.2%)	336 (44.4%)	756
6.	Mobile	396 (52.4%)	20 (2.6%)	8 (1.1%)	6 (0.8%)	326 (43.1%)	756
7.	Smartphone	590 (78%)	10 (1.3%)	8 (1.1%)	2 (0.3%)	146 (19.3%)	756
8.	Internet	540 (71.4%)	24 (3.2%)	10 (1.3%)	12 (1.6%)	170 (22.5%)	756

Figure 1: Frequency of ICT use

Preference for ICT device use

According to the results (Figure 3), the mean rank, which is measured on a scale of 1 to 5 runs, denotes a lower value (1) to a higher rank and a greater value (5) to an as lower rank. The average for smartphones (1.97) denotes that it is the most popular ICT device. Internet (2.21) and TV (2.22) are the next popular ICTs. Mobile phone (3.01), followed by a laptop (3.31), a smart TV (3.72), and a desktop (3.88), are in the next order. Radios have the highest mean (4.25), suggesting that it is the least popular ICT gadget.

S. No.	Device/ ICT services	Preference Mean (N=756)	Standard Deviation
1.	Radio	4.25	1.355
2.	TV	2.22	1.514
3.	Smart TV	3.72	1.776
4.	Desktop	3.88	1.564
5.	Laptop	3.31	1.685
6.	Mobile	3.01	1.823
7.	Smartphone	1.97	1.563
8.	Internet	2.21	1.653

Figure 2: ICT uses preference based on ranking

According to this study, the internet and smartphones are the most popular ICTs, placing the TV in third position. This indicates a significant development and widespread use of smartphones and internet services.

Purpose of Using ICT

Based on Figure 4, the respondents' most preferred purpose is entertainment/leisure activity (2.17). Social communication (2.44), gaining new knowledge (2.65), education (2.82), facilitating communication with extended family (2.93), using e-services (3.19), and office work (3.19), information searching (2.24) are the next significant purposes.

S. No.	Purpose	Preference Mean (N=756)	Standard Deviation
1.	Education	2.82	1.676
2.	Information	2.24	1.430
3.	Entertainment/ Leisure activities	2.17	1.318
4.	Social Communication	2.44	1.397
5.	Availing e-services	3.19	1.482
6.	Office works	3.46	1.665
7.	Facilitating communication with extended family members	2.93	1.340
8.	Acquisition of new knowledge	2.65	1.411

Figure 3: Results of the purposes of ICT use based on ranking

The main reason people use ICT is to entertain themselves and take a break from their regular tasks. The office work category has the highest mean value, indicating that it is not as popular as the other category.

Leisure Activities of Family Members in the Home

Based on Figure 5, it is found that watching television (83.6%) is the most preferred leisure activity. Communicating with family members is preferred by 63% of people, followed by internet surfing (61.1%), sleeping (57.4%), online chat (42.3%), reading (39.2%), going on dates with friends (33.6%), using social media (33.1%), playing video games online (24.6%), and playing actual games (14.6%).

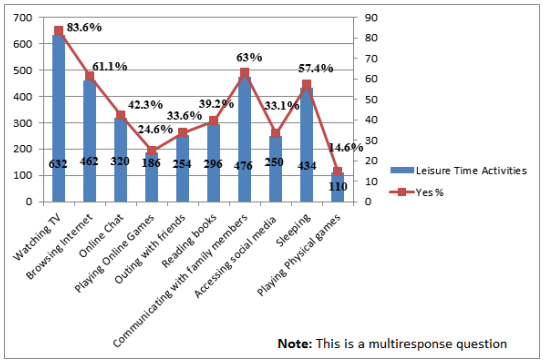


Figure 5: Family members' leisure activities

This shows that watching TV took up a large portion of the respondents' free time. On the other hand, more than half of the respondents say they prefer to talk to their family members when they have free time. This shows that people value their families even when ICT-based activities came in first. This fosters an understanding that ICT alone does not significantly influence family members' leisure activities.

Interaction Practices

Figure 6 shows that 29.6% of all respondents spend more than 4 hours a day interacting with their families. 22.5% of people interact for up to two hours, 19.6% for three to four hours, 15.9% for four or more hours, and 12.4% for less than an hour.

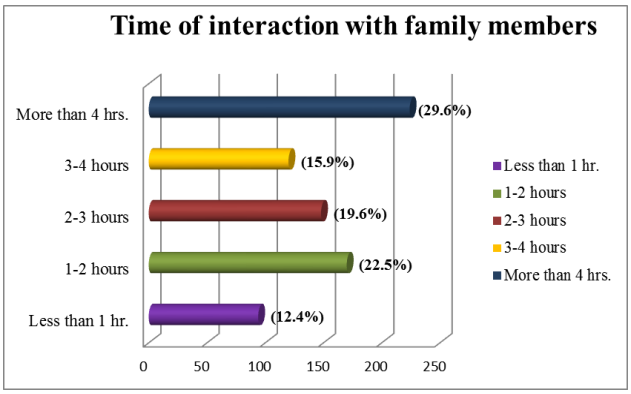


Figure 6 Interaction practices of family members

Among 85% of the responders, family time ranges from one hour to more than four hours. This shows a good interaction with the family members.

Hypothesis Results comparing different variables with family roles

H_{01}: The frequency of using ICT devices in a home differs among the family roles.

The Kruskal-Wallis test (figure 7) was used to validate the roles of family members and the frequency of ICT use, and it revealed a significant difference between the various roles: $\chi 2$ (3) = 44.789, p =.000.

Roles of family members and Frequency of Using ICT Devices/services	Test Statistic	Degrees of Freedom	Significance value	Decision
Mean- 3.06 Std. Dev.- 0.77 Min.- 1.33 Max.- 5	44.789	3	.000	Hypothesis accepted

Figure 7: Kruskal-Wallis H test comparing the difference in roles and frequency of ICT use

Roles	Roles	Test Statistic	Std. Error	Standard Test Statistic	Sig.
Son	Daughter	-1.190	22.478	-.053	1.000
	Father	95.731	22.996	4.163	.000**
	Mother	115.361	22.586	5.108	.000**
Daughter	Father	94.542	22.347	4.231	.000**
	Mother	114.172	21.925	5.207	.000**
Father	Mother	-19.630	22.456	-.874	1.000

Figure 8 Pairwise comparison between various roles and frequency of ICT use

To better comprehend the pairwise comparison between groups, a post hoc test was carried out (Figure 8). All pairs, except mother and father, and son and daughter, were determined to be significant at the 1% level. This demonstrates that though ICT use varies across generations, it is similar across family members of the same generation. Therefore, hypothesis H_{01} is accepted.

H_{02}: The preference for ICT devices differs based on family roles.

One-way ANOVA was used to analyze the differences (Figure 9) in ICT device preferences based on family roles. The result shows that F (3,752) = 13.644, p=.000, a statistically significant difference between the various levels of family members' preference towards ICT devices. The descriptive statistics of the preference for ICT devices concerning family roles suggest that the son (M=2.9171, SD=0.63888) preferred the ICT devices more, which is followed by the daughter (M=2.9400, SD=0.60293), the father (M=3.1580, SD=0.65930), and the mother (M=3.2653, SD=0.63429). This suggests that kids prefer ICT devices more than parents.

	Sum of Squares	df	Mean Square	F	Sig.	Test of Homogeneity	
						Levene's Statistic	Sig.
Between Groups	16.423	3	5.474	13.644	.000	1.397	.242
Within Groups	301.720	752	.401				
Total	318.143	755					

Figure 9: One-way ANOVA differences between the roles of family members and preference for ICT devices

(I) Role of family members	Role of Family Members (J)	Mean Difference (I-J)	Std. Error	Sig.
Father	Mother	-.10734	.06520	.353
	Son	.24083	.06677	.002
	Daughter	.21797	.06489	.005
Mother	Son	.34817	.06558	.000
Son	Daughter	-.02287	.06527	.985
Daughter	Mother	-.32531	.06366	.000

Figure 10 Post Hoc Test- Tukey HSD of roles of family members and preference of devices

To determine which specific age groups' mean values differ from one another, the post hoc Tukey test was carried out (Figure 10). It demonstrates that there are substantial differences in the preferences for ICT devices between father and son (P=0.002), father and daughter (P=0.005), mother and son (P=0.000), and mother and daughter (P=0.000). Combinations of father and mother (0.353) and son and daughter (0.985) show similar preferences for ICT equipment. This suggests that the ICT preferences of parents and kids are different. There is no distinction between the categories of parents and kids, such as the father-mother pair and the son-daughter pair. The homogeneous subset results provided evidence for this by displaying how the four sample groups were split into two distinct patterns. Son and daughter, who follow pattern one, prefer ICT more; father and mother, who follow pattern two, favor ICT less than the children. So, the H_{02} hypothesis is supported.

H_{03}: The purpose of ICT usage differs based on family roles.

The differences between the purpose of ICT use and family roles are studied and the result (figure 11) shows a significant difference $\chi 2$ (3) = 70.631, p =.000.

Roles and Purpose of Using ICT Devices/services	Test Statistic	Degrees of Freedom	Significance value	Decision
Mean- 2.73 Std. Dev.- 0.94 Min.- 1 Max.- 5	70.631	3	.000	Hypothesis accepted

Figure 11: Kruskal-Wallis H test comparing the difference in roles and purpose of ICT use

Roles	Roles	Test Statistic	Std. Error	Standard Test Statistic	Sig.
Son	Daughter	67.051	22.477	2.983	.017*
	Father	67.054	22.994	2.916	.021*
	Mother	104.317	22.585	4.619	.000**
Daughter	Father	134.104	22.346	6.001	.000**
	Mother	171.367	21.924	7.816	.000**
Father	Mother	-37.263	22.454	-1.660	.582

Figure 12 Pairwise comparison between various roles and purposes of ICT use

The comparison between pairs and their substantial difference was further investigated by the post hoc test (Figure 12). It shows that, aside from the father and mother, every other family member uses ICT differently. Hence, H_{03} is accepted.

H_{04}: The leisure-time activity of the family members using ICT differs based on family roles.

The Kruskal-Wallis test (figure 13) revealed a significant difference between the various roles of family members and leisure activities ($\chi 2$ (3) = 182.064, p =.000 at a 1% level).

Roles and leisure time activities Using ICT Devices/services	Test Statistic	Degrees of Freedom	Significance value	Decision
Mean- 3.10 Std. Dev.- 0.94 Min.- 1 Max.- 5	182.064	3	.000	Hypothesis accepted

Figure 13 Kruskal-Wallis H test comparing the difference in various roles and leisure time activities

Roles	Roles	Test Statistic	Std. Error	Standard Test Statistic	Sig.
Son	Daughter	-60.609	22.487	-2.695	.042*
	Father	207.879	23.005	9.036	.000**
	Mother	265.795	22.595	11.764	.000**
Daughter	Father	147.270	22.356	6.588	.000**
	Mother	205.186	21.934	9.355	.000**
Father	Mother	-57.916	22.464	-2.578	.060

Figure 14 Pairwise comparison between various roles and leisure time activities

Post hoc analysis (Figure 14) reveals that, except for the mother and father group, differences exist between all the groups. This demonstrates how varied family responsibilities affect their activities. Except for 5% difference between son and daughter, the combination of other groups is different. Additionally, it has been found that the leisure activities of the mother and father are similar. Hence, hypothesis H_{04} is accepted.

H_{05}: The interaction time between the family members has an association with the family roles

The amount of time spent interacting with family members each day was significantly associated with family roles $\chi 2$ (12, N=756) =49.043, $p<0.001$ (figure 15). Fathers interact more frequently for longer than four hours, then for two to three hours, three to four hours, and less than one hour. The optimum amount of time for interaction between the mother, son, and daughter is more than 4 hours. Hence, hypothesis H_{05} is accepted.

Role of the family members	Interaction time with family members per day					Result
	Less than 1 hr.	1-2 hrs.	2-3 hrs.	3-4 hrs.	More than 4 hrs.	
Father	24 (13.2)	44 (24.2)	38 (20.9)	28 (15.4)	48 (26.4)	Significant
Mother	18 (9.2)	44 (22.4)	18 (9.2)	36 (18.4)	80 (40.8)	
Son	36 (20.2)	36 (20.2)	44 (24.7)	30 (16.9)	32 (18)	
Daughter	16 (8)	46 (23)	48 (24)	26 (13)	64 (32)	
Chi-Square Value- 49.043 (df- 12) **Significance Value**- 0.000** **Cramer's V**- 0.147						
Note: Numbers denoted within () are row percentages. Numbers denoted without brackets are frequency counts. S- Significant, NS- Not Significant, *- Significant at 5% level, **- Significant at 1% level.						

Figure 15: Chi-Square association between roles of the family members and interaction time per day

Cramer's V value is examined to find the association's strength. The row size in this analysis is less than the column size. Row size is therefore taken into account (df=4-1=3) and df=3 is chosen. Cramer's score of 0.147 at df=3 denotes a moderate connection. Thus, it further clarified that there is only a moderate relationship between family members' roles and interaction time. This demonstrates that, despite differences in family duties, all family members interact nearly to the same level.

H_{06}: The use of ICT devices for communication purposes has an association with family roles

There is a strong association found between the family members' roles and the amount of time they use ICT for family communication each day $\chi 2$ (12, N=756) =27.150, p0.05) (figure 16). Less than one hour, one to two hours, three to four hours, and more than four hours are the preferred usage times for ICT for communication within the parent group. Whereas the Sons group follows the father's pattern, while daughters fall under the same pattern as their mothers. This demonstrates that mother and daughter follow one pattern while father and son follow a different one. Despite the similarities among groups, the association is proven at a 5% level. Hence, hypothesis H_{06} is accepted.

Role of the family members	Use of ICT device for communicating with family members					Result
	Less than 1 hr.	1-2 hrs.	2-3 hrs.	3-4 hrs.	More than 4 hrs.	
Father	100 (54.9)	54 (29.7)	16 (8.8)	8 (4.4)	4 (2.2)	Significant
Mother	120 (61.2)	52 (26.5)	18 (9.2)	2 (1.0)	4 (2.0)	
Son	106 (59.6)	44 (24.7)	18 (10.1)	8 (4.5)	2 (1.1)	
Daughter	98 (49)	48 (24)	30 (15)	10 (5)	14 (7)	
Chi-Square Value- 27.150 (df- 12) **Significance Value**- 0.007* **Cramer's V**- 0.109						
Note: Numbers denoted within () are row percentages. Numbers denoted without brackets are frequency counts. S- Significant, NS- Not Significant, *- Significant at 5% level, **- Significant at 1% level.						

Figure 16: Chi-Square association between the usage of ICT for communication with family members and the role of the family members

The Cramer's V was considered by taking the row size since it is smaller than the column size. The observed effect size of 0.109 at df=3 is very near to a negligible connection. This demonstrates that while there is an association between the variables, it is very weak.

H_{07}: The preferred method of communication to interact with family members has an association with family roles

Through the Kruskal-Wallis test (figure 17), it is found that there are statistically significant differences between the preferred way of interaction and the family roles $\chi 2$ (3) = 45.154, p =.000) at a 1% level.

Roles and Preferred Method of Communication to Interact with family members	Test Statistic	Degrees of Freedom	Significance value	Decision
Mean- 2.95 Std. Dev.- 0.83 Min.- 1 Max.- 4.5	45.154	3	.000	Hypothesis accepted

Figure 17: Kruskal-Wallis H test comparing the difference in various roles and preferred methods of communication to interact with family members

Roles	Roles	Test Statistic	Std. Error	Standard Test Statistic	Sig.
Son	Daughter	57.958	22.476	2.579	.060
	Father	91.285	22.993	3.970	.000**
	Mother	14.768	22.584	.654	1.000
Daughter	Father	149.243	22.345	6.679	.000**
	Mother	72.726	21.923	3.317	.005**
Father	Mother	76.517	22.453	3.408	.004**

Figure 18 Pairwise comparison between various roles and preferred methods of communication to interact with family members

Son and mother, and son and daughter pairs are similar in their interaction approach, according to post hoc comparison data (Figure 18), while the other groups are found to be different at a 1% level. Hence, hypothesis H_{07} is accepted.

H_{08}: The Preferred communication pattern of the family differs among the family roles

The Kruskal-Wallis test (figure 19) shows no significant difference between the family members' communication patterns and family roles $\chi 2$ (3) = 2.975, p =.395.

Roles and Communication Pattern of Family	Test Statistic	Degrees of Freedom	Significance value	Decision
Mean- 3.05 Std. Dev.- 0.87 Min.- 1 Max.- 5	2.975	3	.395	Hypothesis Rejected

Figure 19: Kruskal-Wallis H test comparing the various roles and communication patterns of the family members

This shows that family member categories don't differ in the way families communicate. Hence, hypothesis H_{07} is rejected.

DISCUSSION

This study found that more than television, smartphones, and internet services are accessed by family members. The majority of the sample families own at least four to five ICT devices like radio, TV, smartphones, computers, etc. in their homes. Radio and television are mainly used for entertainment and to get information. But the use of radio is comparatively lower than that of television. Both normal television and Smart TV are perceived similarly by family members which is for entertainment. Smart TV is used as an iconic device in the family and not all the services associated with it are used frequently. The desktop is mostly used for getting information and entertainment whereas a laptop is used for educational purposes than other purposes. Internet services were utilized more for entertainment and social communication with friends and other family members. Normal mobile phones are commonly used for communication purposes whereas smartphones are used for entertainment, education, social communication, accessing e-services, etc.

The frequency of ICT use differs between the generations of family members such as fathers, mothers, children, and grandparents. The preference and purpose of ICT device use are different between various categories of age groups and family roles, but not by gender. ICT usage practices are perceived differently by family members for personal and household use. In a family setup, watching television with other family members is the most frequent ICT-based activity.

The interaction time with family members is significantly different among the various age groups and family roles. Elder family members communicate more than the younger age group. Regarding family roles, parents and children understood the importance of communication and gave separate time for that. The usage time of ICT for communication purposes is different among age and family roles and not with gender. Various methods of interaction are followed by the family members, and they differ based on age group and gender. The younger age group often uses ICT whereas the middle and older age group people prefer direct interaction, followed by ICT-based interaction. The communication pattern of the family does not change according to the nature of the family and family roles. It is perceived as similar to the different generations of members that exist in the family. Also, the communication pattern is the same in the joint as well as the nuclear family.

CONCLUSION

This study compared the roles of the family members and examined key features of ICT use. The family roles are found to differ in terms of frequency, preference, purpose, leisure activities, interaction time, and ICT use for communication. It suggests that everyone views all activities differently depending on their familial duties. Father and mother share similar perceptions, particularly in terms of preferences, whilst son and daughter share similar perceptions. Mother and daughter use ICT for communication similarly, whereas father and son utilize it similarly. This shows that age and gender are significant factors in determining ICT use. The generational divide is also highly supported in this study's results, while understanding the difference in ICT access. The one factor that is the same for all family roles is the communication style. This demonstrates that the communication pattern doesn't act as a highly influential factor based on family roles.

LIMITATIONS & FUTURE DIRECTIONS

This study focused solely on how ICT is used in family roles. A few other demographic characteristics such as education, socioeconomic status, and profession, can be considered in the future. The variables related to family functioning are excluded. In the future, the study can be expanded to both urban and rural locations, and comparisons can be made. Though this study is solely based on one cosmopolitan city in India, this contributes more to the literature as the population group is heterogeneous. Also, further studies incorporating the joint, nuclear family system and other family characteristics across cultures can help understand the broader view of ICT use in the Indian family system.

REFERENCES

- Carvalho, J. and Fonseca, G. (2016) "Information and communication technologies and family: Patterns of use, life cycle, and family dynamics," Journal of psychology & psychotherapy, 06(01). doi: 10.4172/2161-0487.1000240.
- Carvalho, J., Francisco, R. and Relvas, A. P. (2017) "ICTs and family functioning: A study on Portuguese families with adolescents and emerging adults," Contemporary family therapy, 39(4), pp. 281–288. doi: 10.1007/s10591-017-9436-8.
- Huisman, S. and Edwards, A. (2012) "The impact of Technology on families," International Journal of Education and Psychology in the Community (IJEPC), 2(1), pp. 44–62.
- Jennings, E. A. W. & N. (2000) "Children and Computers: New Technology, Old concerns," The future of children, 10(2), pp. 31–43.
- Kerawalla, L. and Crook, C. (2002) "Children's Computer Use at Home and at School: Context and Continuity," British educational research journal, 28(6), pp. 751–771. doi: 10.1080/0141192022000019044.
- Kumar, D. and & Arulchelvan, J. (2019) "The Role of Information and Communication Technologies in Family Dynamics: Difference Between Parents and Children," International Journal of Information Communication Technologies and Human Development, 11(3), pp. 1–20.
- Mesch, G. S. (2006a) "Family characteristics and intergenerational conflicts over the Internet," Information, communication and society, 9(4), pp. 473–495. doi: 10.1080/13691180600858705.

- Mesch, G. S. (2006b) "Family relations and the internet: Exploring a family boundaries approach," Journal of family communication, 6(2), pp. 119–138. doi: 10.1207/s15327698jfc0602_2.
- Moore, A.M. (2006) "A parent's look at technology". Montessori Life, 18(2), pp.11.
- Perry, M. S. and Werner-Wilson, R. J. (2011) "Couples and computer-mediated communication: A closer look at the affordances and use of the channel: Couples and cmc," Family and consumer sciences research journal, 40(2), pp. 120–134. doi: 10.1111/j.1552-3934.2011.02099.x.
- Romero-Ruiz, K. et al. (2017) "Information and communication technologies impact on family relationship," Procedia, social and behavioral sciences, 237, pp. 30–37. doi: 10.1016/j.sbspro.2017.02.007.
- Rudi, J. et al. (2015) "Parents' use of information and communications technologies for family communication: differences by age of children," Information, communication and society, 18(1), pp. 78–93. doi: 10.1080/1369118x.2014.934390.
- Spigel, L. (1992). Make room for TV: Television and the family ideal in post-war America. Chicago: University of Chicago Press.
- Van Rompaey, V., Roe, K. and Struys, K. (2002) "Children's Influence on Internet Access at Home: Adoption and use in the family context," Information, communication and Society, 5(2), pp. 189–206. doi: 10.1080/13691180210130770.
- Wang, R. (2005) "'Teenagers' Internet use and family rules: A research note," Journal of Marriage and Family, 67(5), pp. 1249–1258.
- Wartella, E., Richert, R. A. and Robb, M. B. (2010) "Babies, television and videos: How did we get here?" Developmental review: DR, 30(2), pp. 116–127. doi: 10.1016/j.dr.2010.03.008.
- Watt, D. & White, J. M. (1999) "Computers and the family life: A family development perspective," Journal of Comparative Family Studies, 30, pp. 1–15.
- Williams, A. L. and Merten, M. J. (2011) "IFamily: Internet and social media technology in the family context: IFAMILY," Family and consumer sciences research journal, 40(2), pp. 150–170. doi: 10.1111/j.1552-3934.2011.02101.x.

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DEVELOPING EARLY LITERACY SKILLS IN MALAYALAM ALPHABET AMONG PRESHOOLERS THROUGH CORPOREAL ACTIVITIES

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ABSTRACT

Procedural memory is the ability to perform a task without conscious thought, after learning it through repetition. Corporeal activities or kinesthetic activities refer to touching, doing or being physically active. The present study aimed to develop corporeal activities to improve the procedural memory of beginners in Malayalam Alphabet. For this purpose, a questionnaire (pretest) was designed for ten preschool children between the age group of three to six years. The questionnaire prepared was used to analyze the beginners' understanding, knowledge and performance level in Malayalam. The questionnaire was further categorized into five sections. After the pre-test and analyzing each one's performance a self-designed activity book ('Learn Malayalam through Art and Craft') which consisted of 51 alphabets was introduced to the respondents from the activity book. Later a post-test was conducted to analyze the efficacy of activity book developed. The data procured was consolidated and analyzed and compared using percentages which showed development of respondents in each category in their post-test. An instructional CD was also incorporated with activity book.

Keywords: Development, Corporeal activities, performance level, procedural memory.

INTRODUCTION

Procedural memory is a type of implicit memory system that supports the acquisition of cognitive and motor skills as well as habits (Buffington and Morgan, 2019). Procedural memory does not involve conscious awareness. Procedural memory is also important in language development, as it allows a person to talk without having to give much thought to proper grammar and syntax (Zimmermann, 2014). Procedural memory develops gradually through repetition without any requisite awareness that the skill is being learned (Ginette Laflehe, 2004). These sequencing is very important in writing. Procedural memory can be improved mainly through corporeal activities.

Corporeal or kinesthetic activities are fantastic method to learn reading and spelling. In a study regarding the impact of art and literature based approach on writing and reading skills, it was proved that there is a complementary relationship between the language of art and language of words which links the ability to visualize with the development of solid reading and writing skills and recognize the diverse learning styles of children, and by this educators and administrators are being called upon to recognize the vital role that the art can play in the literacy learning of all students (Olashansky, 2007). Alves and Alves (2019) portraits physical activity as something which does not

appear to impair the child's linear growth and contributes to the ideal shaping of bone and muscle tissues, ensuring possible beneficial effects throughout life. One important skill which the corporeal activities stimulate is motor skill. Motor skill refers to the movement of the body which involves large muscles. There are two types of motor development, gross motor skills and fine motor skills. Fine motor skills focus on the fine movements which involve small muscles and controls that take place. Thus for writing, fine motor development should be attained by children. But according to Chandler (2021) learning to write is challenging for young children, as they must integrate their still-developing fine motor skills with an understanding of written language to produce a mark that has meaning.

OBJECTIVES

1. To check the awareness of writing Malayalam alphabet among selected respondents.
2. To develop activities for improving fine motor skills in respondents.
3. To provide repetitive activities to reinforce the procedural memory in the formation of alphabet in Malayalam.
4. To create kinesthetic activities for Malayalam vowels and consonants for the improvement of procedural memory and to compile the activities into a workbook and develop an instructional CD which encompasses all three styles of learning – visual, auditory and kinesthetic.

REVIEW OF LITERATURE

Starting primary school is certainly a new chapter and an exciting step for both students and their families. First-grade students attending elementary school which is the beginning of a tiring process for both teachers and students are equipped with the speaking skill that is the most natural communication tool in a language. The hearing and speaking skills, which are essential for teaching, are two basic elements of basic language skills and they have an important role in the acquisition of two other basic skills of reading and writing which come under literacy skills (Cakiroglu, 2018). To communicate and understand others, language is vital. Mother tongue is the first language one learns as a baby, the language one grows up knowing. Mother tongue is central in framing the thoughts and emotions of individuals. Learning in school highlights with the use of mother tongue. Mother tongue is an influential tool in advancing the learning in people (Nishanthi, 2020).

Malayalam is the official language and mother tongue of people in Kerala. A study by Gafoor and Remia (2013) has found that out of hundred students 1/5 of upper primary students have spelling difficulty and 1/3 of them had difficulty in identifying letters in Malayalam alphabet, more than 1/3 of them using vowel symbols improperly. The study revealed that beginners fail to master alphabet during the explicit teaching. In the study the lower primary teachers when interviewed about this revealed that a noticeable share of their students commit a lot of errors in spelling. Due to the lineage deriving from both Sanskrit and Tamil, Malayalam alphabet has largest number of letters, at least among Indian languages. This factor makes learning to spell Malayalam more difficult and prone to spelling errors, than among other phonetic languages (Gafoor and Remia, 2013). Others also pointed out that agglutinative language like Malayalam is rich in morphological aspects in which identifying the morphological suffixes of verbs and nouns is a tough task (K, R, & Kumaraswamy, 2015). With this background the study was planned to develop corporeal activities to improve the procedural memory in beginners and to test the efficacy of evolved workbook and CD in improving the formation of Malayalam alphabet in beginners.

HYPOTHESIS

- There was a significant difference in the students' performance level in the pre-test before introducing the activity book and in the post-test after introducing the activity book.

METHODOLOGY

The aim of the present study was to develop corporeal or kinesthetic activities to improve the procedural memory of beginners.

Research design: Research design is used to study the efficacy of the developed activity book and instructional CD in beginners. The study was done in four phases as follows:

- Phase 1 – Developed of a tool (pre-test) to assess the initial performance level of the beginners.
- Phase 2 – Developed an activity book and a CD which contain certain instructions about the procedure of doing activities.
- Phase 3 – Assessed the initial level of performance in writing, introduced the activity book and CD to beginners and helped them to do the activities, reassessed the performance of beginners by post-test.
- Phase 4 – Assessed their improvement by post-test results, expert evaluation and application of developed activities in the regular school curriculum.

Sample: Purposive sampling was used to choose beginners from different schools in Thodupuzha from Idukki district of Kerala. The sample had 10 preschool children between the age group of 3-6 years. Before the COVID pandemic many children used to attend schools but during the pandemic the number became very less. Expert evaluation and application of activities in the regular school curriculum was done by five teachers from the same schools.

Tools used:

1. Questionnaire for pre-schoolers to analyze their understanding in Malayalam.
2. A self-designed activity book for pre-schoolers to improve procedural memory.
3. Instructional CD to form better understanding of activity book.
4. A self-designed questionnaire for teachers to know their feedback on activity book developed.

Data analysis: Percentage analysis, parametric test – paired sample t-test.

RESULT AND DISCUSSION

In the study the data collected was consolidated, converted into percentage, tabulated and then analyzed by SPSS software using suitable statistical techniques. The results were explained as follows:

1. General information of respondents.
2. Development of activity book and instructional CD.
3. Knowledge of respondents in Malayalam language.
    - Letter identification.
    - Arrangement of Malayalam alphabet.
    - Letter recognition.

- Word and picture recognition.
- Writing skills.

4. Observation of investigator on performance of respondents.
5. Assessment of the effectiveness of activity book developed.
6. Evaluation of developed activity book by experts.

Table-1 General information of respondents

SL No:	Particulars	Responses (N=10)%
1.	**Gender**	
	• Male	40
	• Female	60
2.	**Age in years**	
	• 3	20
	• 4	50
	• 5	10
	• 6	20
3.	**Class**	
	• Completed LKG (6 years)	20
	• Pre-school	80

GENERAL INFORMATION OF REPONDENTS

The selected sample consists of 10 pre-schoolers of 3 to 6 years in which six students were girls and four were boys. Two students were six year old and others were three to five years. All ten children were from Malayalam speaking families.

DEVELOPMENT OF ACTIVITY BOOK AND INSTRUCTIONAL CD

One main tool of the study was the activity book which consisted of corporeal activity for the improvement of procedural memory in pre-schoolers. The activities were for Malayalam alphabet (Swaraksharangal and Vyanjanaksharangal) which consisted of 51 alphabets. The title of the activity book was 'learn Through Art and Craft'. The activities symbolize art and craft and this is how the title of the book formed. The book was self-designed by the investigator itself. The activity book was designed using software called Canva. For each letter three pages are provided. First page gives an idea about the letter formation and also gives what all things are needed to do the activity for that specific letter. The second page explains the procedure like how to do the activity. The third page is a plain worksheet which provide area to do the activity. For users to understand better each page was designed in a specific manner, that is activity pages have yellow colored sheets, procedure sheets are green colored and worksheets are blue colored.

The main aim of the activity book was to improve the fine motor skills in pre-schoolers. Some activities included functions like tracing, coloring, sticking, clay modeling etc. some activities were taken from other sources, but few were designed by the investigator itself. The activity book consisted of one instructional CD which ensured the clear understanding of respondents to do

activities. Both tools encompass all the three styles of learning – visual, auditory and kinesthetic. The instructional CD consisted of explanation and instructions about the activities in video which were incorporated in activity book. The CD included the activities for all the 51 letters in Malayalam alphabet. The videos gave a clear idea like what all materials were used for each activity. How each step should be done correctly in activities etc.

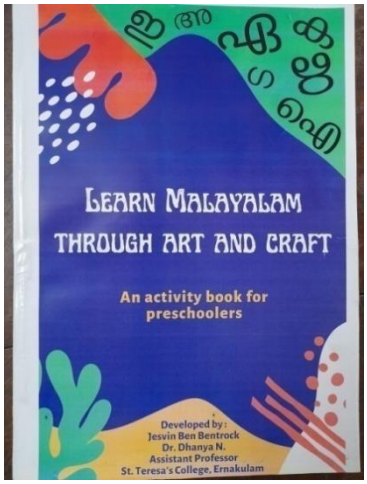




Fig.-1 and Fig.-2 Activity book developed

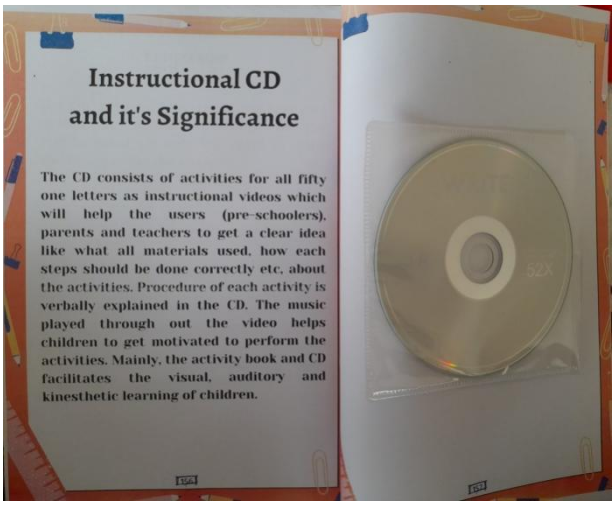


Fig.-3 Instructional CD incorporated in activity book

KNOWLEDGE OF RESPONDENTS IN MALAYALAM LANGUAGE

The initial understanding of respondents in Malayalam was assumed by a self-designed questionnaire which was developed with the help of some experts who also evaluated the activity book. The questionnaire consisted of five questions which were further categorized into letter identification, arrangement of Malayalam letters, letter recognition, word and picture recognition and writing skills. The questionnaire was a three-point scale where 3, 2, 1 implied excellent, very good and good respectively out of total fifteen marks where each question three marks.

LETTER IDENTIFICATION

As shown in fig.-1 for letter identification, child 1 for letter identification, child 1 showed sustained excellent score for both pre-test and post-test, the child was very intelligent and had great observation. On other side child 2, 3, 4, 5, 6, 8 and 9 showed improvement in their performance while child 7 and 10 showed no improvement.

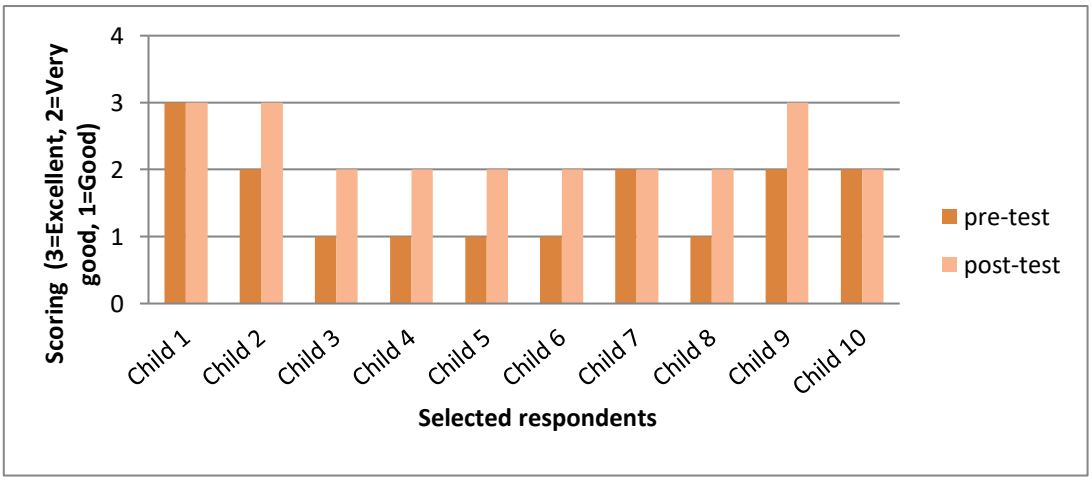


Fig.-4 Skill on letter identification

ARRANGEMENT OF MALAYALAM LETTERS

As shown in fig.-2 for the post-test child 1, 3, 5, 7 and 9 showed a great improvement in their work, like from very good level (66%) to an excellent level (100%).

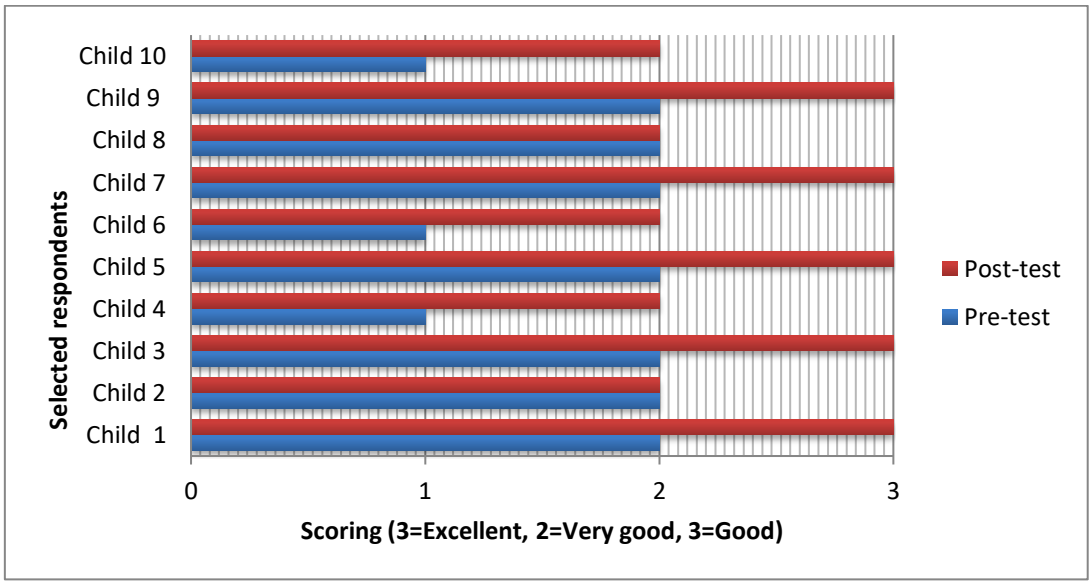


Fig.-5 Skill in arrangement of Malayalam alphabet

LETTER RECOGNITION

Fig.-3 indicates the response of respondents on the knowledge on letter recognition. In the post-test child 10 showed improvement from a good level (33%) to very good (67%) level.

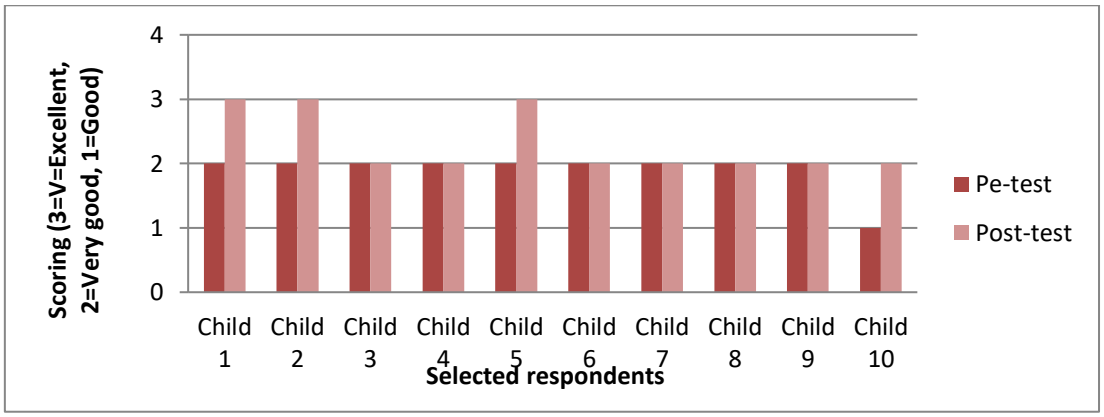


Fig.-6 Knowledge in letter recognition

WORD AND PICTURE RECOGNITION

Fig.-4 depicts the skills on word and picture recognition. Child 1, 2, 3 and 9 showed an advanced growth from pre-test to post-test while child 6, 7, 8 and 10 level of performance remained unchanged.

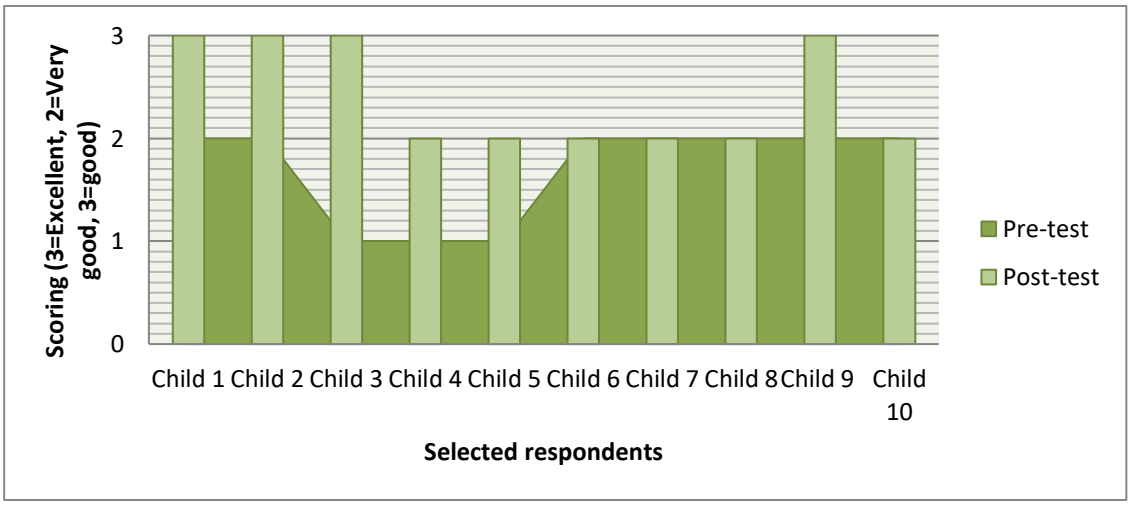


Fig.-7 Skill on word and picture recognition

WRITING SKILLS

For aptitude on writing skills as shown in fig.-5, these skills determine a child's ability to hold and use a pencil fluidly, write legible and neatly then draw and colour with precision. In post-test child 8 and 10 have also showed improvement in writing skills and child 3 showed a sustained

level of performance comparing the pre-test, but in contradiction to that, child 9 showed a fall in the performance compared to the pre-test.

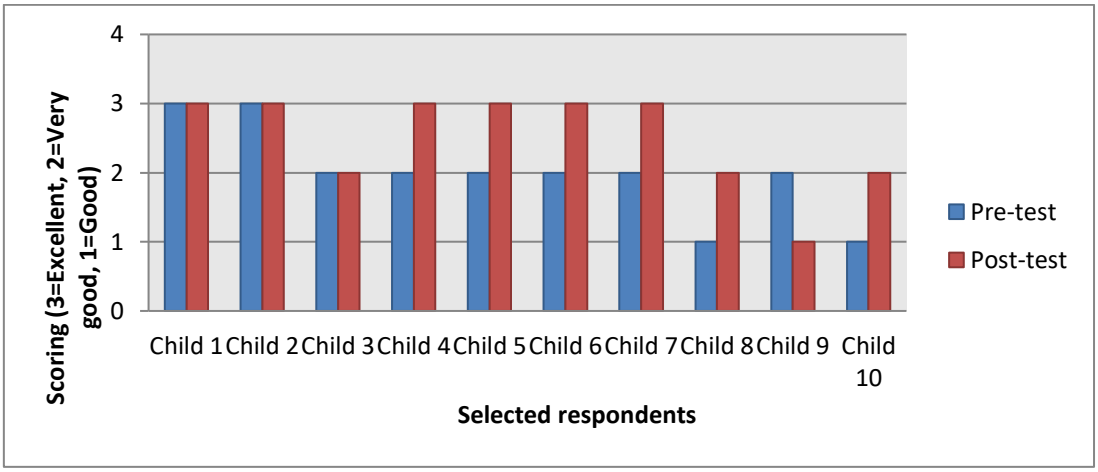


Fig.-8 Aptitude on writing skills

OBSERVATION OF INVESTIGATOR ON PERFORMANCE OF RESPONDENTS

To analyze the efficacy of activity book developed, researcher tried some activities in respondents from activity book. Ten activities were tried from the activity book. The colorful materials for the activities made excitement in respondents. The activities were useful for improving the respondents' eye hand coordination, fine motor skill, writing skill and to improve their procedural memory. With the help of some teachers and researcher respondents were very active and supportive also they showed good interest to do the activities. Pencil drawing activities induced more eagerness in respondents.



Fig-9 Activity done by a respondent

ASSESSMENT OF THE EFFECTIVENESS OF THE ACTIVITY BOOK AND CD DEVELOPED

Table-2 effectiveness of the activity book and instructional CD was measured by comparing the scores of pre-test where the test consisted of five questions.

Table-2 Effectiveness of activity book developed

SL No:	**Particulars**	**Responses (N=10) (out of 3)**	
		Pre-test	Post-test
1.	Skills of respondents on letter identification.	1.6	2.3
2.	Knowledge of respondents on arrangement of Malayalam alphabet.	1.7	2.5
3.	Knowledge of respondents on letter recognition.	1.9	2 3
4.	Skills of respondents on word and picture recognition.	1.7	2.4
5.	Aptitude of respondents on writing skills.	2.0	2.5
SL No:	**Particulars**	**Responses (N=10) (out of 3)**	
		Pre-test	Post-test
1.	Skills of respondents on letter identification.	1.6	2.3
2.	Knowledge of respondents on arrangement of Malayalam alphabet.	1.7	2.5
3.	Knowledge of respondents on letter recognition.	1.9	2 3
4.	Skills of respondents on word and picture recognition.	1.7	2.4
5.	Aptitude of respondents on writing skills.	2.0	2.5

The questions were categorized as: Skills of respondents on letter identification, Knowledge of respondents on arrangement of Malayalam alphabet, Knowledge of respondents on letter recognition, Skills of respondents on word and picture recognition, Aptitude of respondents on writing skills and for the sections for pre-test respondents scored 1.6, 1.7, 1.9, 1.7 and 2.0 for post-test they scored 2.3, 2.5, 2.3, 2.4 and 2.5 respectively.

To check the effectiveness of the activity book developed for improving the level of performance in Malayalam language, a paired sample t-test was conducted where the pre-test and post-test is taken into consideration. A paired sample t-test was conducted the pre-test and post-test score on the effectiveness of the developed activity book for pre-schoolers. The sample consisted of ten pre-schoolers. Table-3 shows the comparison of means on the effectiveness of activity book developed which shows the descriptive statistics of the variables which are mean, standard deviation, standard error mean and the number of observations.

Table-3 Comparison of means on the effectiveness of the activity book developed

Paired Sample Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pre-test	8.9000	10	1.72884	.54671
Post-test	12.0000	10	1.63299	.51640

Table-4 shows the result of the paired sample t-test. The results indicate a significant difference between the pre-test before introducing the activity book which was (M=8.9000; SD=1.72884 and the average post-test score after introducing the activity book which was (M=12.0000; SD=1.63299, [t(9) – 9.858, p = .000]. Hence the null hypothesis is rejected.

Table-4 Paired sample t-test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-test - Post test	-3.10000	.99443	.31447	-3.81137	-2.38863	-9.858	9	.000

EVALUATION OF DEVELOPED ACTIVITY BOOK BY EXPERTS.

To understand the efficacy of the activity book and CD, a questionnaire was developed for expert evaluation. Five teachers have evaluated the efficacy of the book and the CD. The questionnaire consisted of seven questions. The experts were from the same schools as of respondents. The following table shows the responses of the experts for the activity book and CD.

Table-5: Evaluation of experts for the developed Activity Book

SL No:	Particulars of questionnaire	Number of experts chosen each option (N=5)
1.	Effectiveness of activity book. (Out of 5)	
	• 5-Excellent	4
	•4 - Very good	1
	•3 - Good	0
	•2 - Fair	0
	•1 - Need more input	0
2.	Comparing and rating the activity book with the basic Malayalam text book (Out of 5).	
	• 5 - Excellent	5
	•4 -Very good	0
	•3 - Good	0
	•2 - Fair	0
	•1- Need more input	0
3.	Children excited to do activities.	
	• Yes	4
	• No	1
4.	Element of activity book which is more effective.	
	• Worksheets	1
	• Activities in activity book	3
	• CD	1
5.	Easy to understand the activities	
	• Yes	5
	• No	0
6.	Easy accessibility of resources for the activities	
	•Yes	5
	•No	0
	• Rarely available	0
7.	Activities were effective in improving the writing skills of children	
	• Yes	5
	• No	0

The teachers commented that the activity book was excellent compared to the current text books and this may be because of the activities incorporated in the activity book and for current education usually Malayalam text books only explain the letters. Experts commented that the activities made respondents more motivated and excited. According to three experts' activities in activity book were more effective than the worksheets and CD. About respondents' response while

doing the activity some experts commented that some were excited while some were not and experts said that, this maybe because of gender difference that is girls showed more excitement than boys in doing activities. Experts suggested that if this happens; make sure to introduce activities with some breaks in-between. Experts then commented that instructions in the book were easy to understand and CD was really useful for this purpose. They also said that activity book was very effective for improving the writing skills in beginners.

CONCLUSION

The present study seeks to find whether the developed activity book helped beginners in improving their procedural memory in the formation of Malayalam alphabet. According to Gavin Newsom (2022) art education helps build academic skills and increase academic performance, while also providing alternative opportunities to reward the skills of children who learn differently. People learn things in different ways some grasp things easily when they observe it and are visual learners, some learn things when they hear and listen and while some others learn things when they do things or by feeling it. Here physical movement energies the brain by increasing blood flow, oxygen and nutrients. This increases alertness, attention and motivation then more nerve cells bind together and the chemicals released at the synapse help fix memories then helps to recall. So the procedural memory can be improved mainly through kinesthetic activities. The findings of the present study also enhanced the necessity of corporeal or kinesthetic activities. For the post-test which means after introducing the activity book respondents showed great progress in letter identification, arrangement of Malayalam alphabet, letter recognition, word and picture recognition and writing skills. To understand the efficacy of the activity book developed some activities were introduced to respondents. For pencil drawing activities respondents showed more enthusiasm.

From these observations, it can be deduced that corporeal or kinesthetic activities which improves fine motor skills reinforce the procedural memory in the formation of letters, thus it would be highly beneficial for beginners. The present study shows that learning through art and craft is fun yet an easy way to make beginners get interested in learning.

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The present study was limited to only 10 preschoolers because of the pandemic. This study could be implemented on a large sample. Malayalam language has been more alphabet like long and short vowels and this study can be extended to that.

REFERENCES

- Cakiroglu, A. (2018, December 27). The Language Acquisition Approaches and the Development of literacy Skills in Children. *International Electroni Journal of Elementary Education , 11* (2), pp. 201-206.
- Ginette Laflehe, M. V. (2004). Amnesia. In *Encyclopedia of applied psyhology* (pp. 129-138). Elsevier.
- Joao Guilherme Beerra Ales, G. V. (2019, March-April). Effects of physical activity on children's growth . *Jornal de Pediatria , 95* (Supplement 1), pp. 72-78.
- Joshua Buffington, K. M.-S. (2019). Declarative and procedural memory as individual differences in second language aptitude. In *Language Aptitude - Adancing Theory, Testing, Rsearch and Practice* (pp. 215-237). New York: Routledge.

- K, V. V., R, S., & Kumaraswamy, N. S. (2015). Acquisition of Plural Markers in Typically Developing Malayalam Speaking Children. *Language in India , 15* (9), 128-134.
- Kunnathodi Abdul Gafoor, K. R. (2013). Spelling Difficulties in Malayalam among Lower Primary Students. *Journal of Studies in Teacher Eduation , 5* (2), 31-40.
- Madison C. Chandler, H. K. (2021). Self-regulation moderates the relationship between fine motor skills and writing in early childhood. *Early Childhood Researh Quarterly , 57* (4th Quarter 2021), 239-250.
- Newsom, G. (2022, April 5). *Integrating the Arts in Education.* Retrieved January 10, 2025, from educationtodayonline.com: https://educationtodayonline.com/2022/04/05/magazines/integrating-the-arts-in-education/
- Nishanthi, R. (2020, December). Understanding of the Importance of Mother Tongue Learning . *International Journal of Trend in Scientific Researh and Development , 5* (1), pp. 77-80.
- Olshansky, B. (2007). Impact of an Art-and-Literature-Based Approach on Writing and Reading Skills of At-Risk Learners: Sixteen Years of Evidence. *Arts and Learning Research Journal , volume 23 Number 1*.
- Zimmermann, K. A. (2014, February 22). *Procedural Memory: Definition and Examples*. Retrieved April 12th, 2022, from Live Science: https://www.livescience.com/43595-procedural-memory.html?fwa

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BEHAVIORAL PROBLEMS IN SCHOOL CHILDREN BORN TO TEEN MOTHERS

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ABSTRACT

Behavior refers to actions usually measured by commonly accepted standards. Behavioural problems in children are actually the characteristics that do not meet the criteria of mental disorder, but can lead to the development of mental disorder in later life if not taken care of. A cross-sectional home-based study was conducted to assess behavioural problems in school children born to teen mothers. Correlation research design was employed to find out the relationship between maternal characters with behavioral problems of children. Total 120 school children and their mothers residing in Pandavapura thaluk were selected for the study. Self-developed questionnaire and Child Behaviour Checklist (CBC) developed by Achenback were used to elicit the information. The results indicate a slightly higher proportion of females (59.16%) among the children, with a majority falling within the 6 to 7 years age group (55.83%). Class distribution shows a relatively even spread, with 55% in 1st to 2nd class and 45% in 3rd to 4th class. Among mothers, a significant portion are aged 22 to 24 years (58.33%), with the majority having more than 10 years of education (60.83%) and being non-working (65%). Behavioural problems among children show correlations with age, class, and mother's factors such as age, education, and occupation, with certain behavioural issues being significantly associated with these demographic variables. The study concludes that these findings underscore the intricate relationship between demographic characteristics and behavioural problems in children, highlighting the importance of considering both child and mother factors in addressing such issues.

Key words: Behaviour problems, Teen mothers, School children

INTRODUCTION

The United Nations Convention on the Rights of the Child (UNCRC) defines child as "a human being below the age of 18 years unless under the law applicable to the child, majority is attained earlier" School child development describes the expected physical, emotional, and mental abilities of children ages 6 to 12. School child development is a range from 6 to 12 years of age. During this time period observable differences in height, weight and build of children may be prominent. (American Academy of Paediatrics) Adolescent mothers is defined as a woman between the ages of 11 and 19 who become pregnant and parent their children. (Merith Cosden). Early marriage is defined as a married girl or boy before the age of 18 and refer to both formal marriages

and informal unions in which children under the age of 18 live with a partner as if married (UNICF). Teenage pregnancy as "pregnancy from a girl who is 10-19 years of age", the age begins defined as her age at the time baby is born (WHO). India is home to the more stunted children than any other country and is one of the ten countries with the largest burden of teenage pregnancy. Maternal age at childbirth (< 20 years) was associated with increased risk of intrauterine growth restriction, low birth weight, preterm birth, infant mortality and poor child growth. children born to older mothers. Social and academic adjustment problems persist for at least ten years. The children of adolescent mothers were overly conforming and uncommunicative, and at age seven they were more hostile, resentful of authority and subject to some speech problems. Both boys and girls had school adjustment problems in relating to peers and had low frustration tolerance (Maracek 2015). The term behaviour problem is used to designate a deviation in behaviour from one expected or approved by the group. It defined as when children cannot adjust to a complex environment around them, they become unable to behave in the socially acceptable way resulting in exhibition of peculiar behaviours and this is called the behaviour problems. Common behavioural problems in children are hurts other children, destroys things, uses bad languages, thumb sucking, bedwetting, attention seeking, fears, stealing, lying, runs away from home, refuses to eat and disturbed sleep. The school age children of adolescent mothers are more likely to be below the third percentile for height and weight, than birth weight matched children of older mothers. At age eight and ten these children were more dependent on their mothers and more distractible (Turkheimer et al., 2007). The children of adolescent's mothers are reported to be more active in infancy and to show distractibility and poor impulse control in the preschool years (Sarah et al., 2014) and distractibility, poor impulse control and aggression in the early elementary school years (Kellam et, al 1999). There is a growing need to study behavioral problems in school children born to teen mothers due to the unique challenges these children often face, including limited emotional, social, and financial support. Teen mothers may lack the maturity and resources necessary for effective parenting, which can impact their children's development and behavior. Understanding these behavioral issues is crucial for educators, policymakers, and caregivers to design early interventions and support systems. This study is significant as it can inform targeted strategies to promote the well-being and academic success of children from such vulnerable backgrounds.

OBJECTIVES OF THE STUDY

- To assess the behavioural problems of children born to teen mothers.
- To know the factors influencing on behavioural problems of children.

Materials and methods

A cross-sectional study is a type of observational study that analysis data from a population or a representative subset, at a specific point in time. A Cross- sectional home- based study was adopted to assess parenting, nutritional status and behaviour problems a study on school children born to teen mothers in Mandya. Correlated research design was employed to know the relationship between parenting style, on behavioural problems of school children. To find out the relationship between maternal characters such as age at marriage, type of marriage, age at conception, number of conceptions, number of abortions, number of still birth, number of live birth and maternal BMI on behavioural problems of school children born to teen mothers. On the whole 120 school children in

the age range of 6 to 10 years and their parents residing in Pandavapura thaluk villages were included as subject for the present study.

Tools used for the study

1. **Self-developed questionnaire** on socio-demography was used to know the detail information of the respondent. This includes two parts such as, general information of the child and the family information.
   a. **The general information** of the child's characteristics included the age, gender, birth history and parental information like age, education, working status, income, weight, height, family background and living conditions
   b. **Family background** included name of the family members, their age, gender, education, occupation and income of family.
2. **Specific information** like maternal history includes pregnancy details, child's birth history like birth weight, height, type of delivery, term of delivery, current nutrition status of the child, physical assessment like growth like height, weight, mid arm circumferences, hip circumference, skin fold thickness and waist circumference.
3. **Child Behaviour Checklist for Ages 6 to 18 years of children, t**he CBCL was developed in 1996 by psychologist Thomas M. Achenbach. For the school age version of the CBCL (CBCL/6-18), parents or others who interact with the child in regular contexts rate the child's behaviour. Respondents rate the child's behaviour on a 3-point scale (not true, somewhat or sometimes true, and very true or often true) and are instructed to rate the behaviour as it occurs now or within the previous two months.

The school checklist contains 113 problem behaviour questions. The Child Behaviour Checklist provides information on eight sub scales such as, affective Emotionally Reactive, Anxious/depressed, withdrawn/depressed, somatic complaints, social problems, thought problems, attention problem, rule-breaking behaviour, aggressive behaviour. The sum of all the items in each sub scales converting into percentile score. The interpretation of percentile scores as below 93rd percentile as normal, 93rd to 97th percentile and 97th percentile classified as boarder line and clinical range respectively.

DATA COLLECTION AND ANALYSIS

The survey and questionnaire method were used to collect the data from teen mothers of school children at villages in Pandavapura taluk in Mandya district. School children with age group of 6years to 10years were focused and the parents of the children were also included as respondents. The survey and questionnaire / interview methods were predominantly used to collect the data. The self-developed questionnaire was used to collect the information on socio demographic conditions, family background, maternal history and child history. The survey was conducted by visiting households and interviewed the mothers. The collected data was entered to MS Excel sheet and SPSS version 16.0 for windows was used to carry out statistical analysis as per the objective of study. Frequency and percentages were calculated for socio-demographic information. Mean and SD were calculated for the total respondents as well as under independent variables. t- Test and correlation analysis was carried out to check the relationship between independent variables and/with dependent variables.

RESULTS AND DISCUSSION

Table 1: Information of child

Variables		No	%
Gender	Male	49	40.83
	Female	71	59.16
Age (years)	6 to 7	67	55.83
	8 to 9+	53	44.16
Class	1st to 2nd	66	55
	3rd to 4th	54	45

The distribution of demographic characteristics among the children in Table 1 reveals some notable trends. In terms of gender, there is a slight majority of females, constituting 59.16% of the sample, while males represent 40.83%. This indicates a relatively balanced representation, albeit with a higher proportion of females. When examining age groups, it's evident that the majority of children fall within the 6 to 7 years bracket, comprising 55.83% of the sample, compared to 44.16% for the 8 to 9+ years category. This suggests a slightly higher prevalence of younger children within the dataset. Regarding class distribution, a similar balance is observed. The 1st to 2nd class bracket encompasses 55% of the children, while the 3rd to 4th class group represents 45%. This distribution indicates a relatively even spread across the different class levels, with a slightly higher representation in the lower classes.

Overall, these findings offer insights into the composition of the child population under study. The higher prevalence of females and younger children could potentially influence certain outcomes or behaviors within the dataset. Similarly, the balanced distribution across class levels suggests a diverse sample that adequately represents different stages of primary education. Understanding these demographic patterns is essential for interpreting any subsequent analyses or drawing conclusions based on the dataset.

Table –2: Information about mother

Variables		No	%
Age in years	22 to 24	70	58.33
	>25	50	41.66
Education	< 10	47	39.16
	>10	73	60.83
Occupation	Working	42	35
	Non-working	78	65
Income per month (Rupees)	Working	42	35

Table 2 provides valuable insights into the demographic characteristics of mothers within the studied population. Firstly, when considering age distribution, a higher proportion of mothers fall within the 22 to 24 years bracket, constituting 58.33% of the sample, compared to 41.66% for those aged over 25 years. This suggests a relatively young maternal population within the dataset. Regarding educational attainment, the majority of mothers have received more than 10 years of

education, representing 60.83% of the sample, while 39.16% have received less than 10 years of education. This indicates a predominant presence of mothers with a higher level of education within the dataset. In terms of occupation, a notable proportion of mothers are non-working, comprising 65% of the sample, while 35% are employed. This distribution suggests that a significant portion of mothers may be primarily engaged in caregiving responsibilities within the household rather than participating in the workforce. Furthermore, considering income per month among working mothers, 35% fall into this category. This finding aligns with the proportion of working mothers, indicating that a sizable portion of working mothers might contribute to the household income.

These insights shed light on the socio-demographic profile of the maternal population under study. The prevalence of younger mothers, a relatively higher level of education, and a notable proportion of non-working mothers indicate potential factors that could influence various aspects of child development and family dynamics. Understanding these demographic patterns is crucial for formulating targeted interventions or policies aimed at supporting maternal and child well-being within the community.

Table 3: Behaviour problems of children

Behaviour problems	N	%
Normal	40	33.33
Boarder line	7	5.83
Clinical	73	60.83

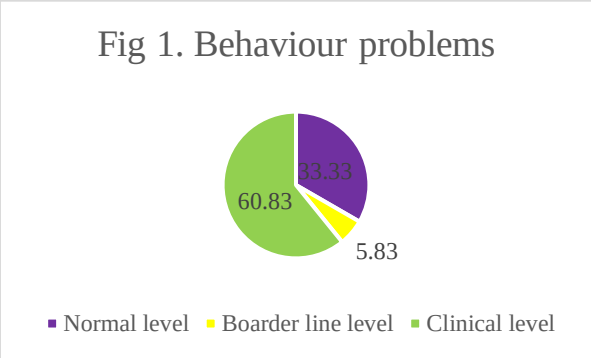


Table 3 and Fig.1, behaviour problem of children total behaviour problem was three categories normal level (33.33%), boarder line level (5.83%) and clinical level (34%) among total sample. Whereas normal level behaviour problems higher than clinical and boarder line level. The findings in line with the study conducted by Barman et al in 2018 reported that, 18 % of school children had abnormal behaviour problems while 12% had borderline problems and 70% were found to have normal behaviour

Table 4: Distribution of behavior problems with child's factor

Behavior problems		Normal		Boarder line		Clinical		$\chi 2$ df Sig
		N	**%**	**N**	**%**	**N**	**%**	
Gender	**Male**	17	42.5	1	14.3	29	42.5	2.169 (2) 0.338
	Female	23	32.3	6	8.45	42	59.1	
Age	**6 to 7 years**	40	59.7	4	5.9	23	34.3	3.082* (2) 0.042
	8 to 9+ years	17	25.3	3	4.4	33	49.2	
Class	**1st to 2nd**	23	34.8	4	6.0	39	59.0	

	3rd to 4th	17	25.7	3	4.5	34	51.5	0.187 (2) 0.911

Table 4 depicts distribution of behavioural problem with child's factor. According to gender females 57.5% were equal in normal level and clinical level whereas 85.7% in boarder line level its compare to males, females was high in male's behaviour problem. As per the age group, 57.5%, 57.1% and 54.8% of the 6 to 7 years respectively were normal level, boarder line level and clinical level its high in 6 to 7 years children its compare to 8 to 9+ years children. there is significantly association based on child's age significant value (0.042). As per class 57.5%, 57.1% and 53.4% of the 1st to 2nd standards respectively were normal level, boarder line level and clinical level its high in 1st to 2nd standard children its compare to 3rd to 4th standard children. Child's age was significantly associated with behavioural problem among school children.

Table 5: Distribution of behavior problems based on mother's factors

Behavior problems		**Normal**		**Boarder line**		**Clinical**		**χ2 df Sig.**
		N	**%**	**N**	**%**	**N**	**%**	
Age	22 to 24 year	41	58.57	4	5.71	25	35.7	6.431* (2) 0.006
	>25 year	15	30.0	3	6.0	32	64.0	
Education	<10	14	29.7	3	6.4	30	63.8	0.446 (2) 0.800
	>10	26	35.6	4	5.5	43	58.9	
Occupation	Working	12	28.5	2	4.76	28	66.66	0.928 (2) 0.629
	Non-working	45	57.69	5	6.4	28	35.9	

Table 5 depicts distribution of behavioural problem with mother's factor. According to age 58.57% in 22 to 24 years mother is high in 25 year and above age mother followed by normal level, 5.71% in 22 to 24 years mother is high in 25 year and above age mother followed by boarder line level, 64.0% year and above age in mother is high in 22 to 24 years 25 mother followed by clinical level were compare to 22 to 24 year is high in 25 and above age group. there is significantly association based on mother's age. As per the education group, 35.6%,10th and above, 6.4% and 63.8% of the below 10th respectively were normal level, boarder line level, and clinical level its high in 10th and above its compare to below 10th children. As per occupation 57.69% and 6.4% of the non-working respectively were normal level, boarder line level and 66.66% of the working mother were clinical level its high in non-working mothers its compare to working mothers. As per BMI 35.7% of the overweight were normal level its high in normal and obese mothers BMI, 9.0% and 72.7% of the obese were followed in boarder line level and clinical level is high to compare over weight and normal. Mother's education was significantly associated with behavioural problem among school children. The study conducted by Goossens et al., 2015 reported that the teen mothers are more at risk for postnatal depression, school dropout and bad socioeconomic status. The babies and children are more at risk for prematurity and low birthweight and later for developmental delays and behavior disorders.

Table 6: Correlation values for behaviour problems with child's factors

Behaviour problems		Gender	Age	Class
Anxious	r	0.045	0.047	0.027
	Sig	0.623	0.290	0.768
Withdrawn	r	0.069	0.097	0.106
	Sig	0.453	0.290	0.247
Somatic	r	0.020	0.050	0.106
	Sig	0.830	0.585	0.247
Social	r	0.026	0.027	0.586**
	Sig	0.775	0.768	0.000
Thought	r	0.011	0.024	0.033
	Sig	0.905	0.791	0.719
Attention	r	0.000	0.094	0.489**
	Sig	0.998	0.306	0.000
Rule- breaking	r	0.045	0.189*	0.157*
	Sig	0.629	0.039	0.047
Aggressive	r	0.687**	0.020*	0.019
	Sig	0.000	0.830	0.835
Over all behaviour problem	r	0.488	0.541**	0.670**
	Sig	0.000	0.000	0.000

Table 6indicated correlation of behaviour problem with child's factor. Then anxious, with drawn, somatic and thought problem no statistically significant correlation with child's gender, age and class. Social problem was the statistically significantly positive correlation was seen with class of the children and no statistically significant correlation with gender and age of the children. With regards to attention problem the statistically significant positive correlation was seen with class of the children and no statistically significant correlation with gender and age of the children. Then rule-breaking problem statistically significant positive correlation was seen with age and class of children and no statistically significant correlation with gender. Then aggressive problem statistically significant positive correlation was seen with gender and age. no statistically significant correlation with class of the children. Overall behavioural problem statistically significant correlated with child's factor.

Table 7: Correlation values for behaviour problems with mother's factors

Behaviour problems		Age	Education	Occupation
Anxious	r	0.015	0.079	0.104
	Sig	0.869	0.394	0.258
Withdrawn	r	0.071	0.043	0.003
	Sig	0.444	0.639	0.917
Somatic	r	0.409**	0.192*	0.288**
	Sig	0.000	0.036	0.001
Social	r	0.075	0.031	0.126
	Sig	0.414	0.734	0.169

Thought	r	0.048	0.046	0.053
	Sig	0.606	0.616	0.568
Attention	r	0.317**	0.021	0.023
	Sig	0.000	0.818	0.805
Rule- breaking	r	0.158*	0.308**	0.080
	Sig	0.050	0.001	0.384
Aggressive	r	0.514**	0.092	0.187*
	Sig	0.000	0.316	0.041
Over all behaviour problem	r	0.603**	0.461**	0.461**
	Sig	0.000	0.000	0.000

Table 4.8.2. indicated correlation of behaviour problem with mother's factor. Then anxious, with drawn and social problem were non-statistically significant correlation with mother's age, education, occupation and BMI. With regards to somatic problem the statistically significantly positive correlation was seen with age, education and occupation of the mother, no statistically significant correlation with BMI of the mothers. With regards to thought problem the statistically significant positive correlation was seen with BMI of the mothers. no statistically significant correlation with age, education and occupation of the mothers. With regards to attention problem the statistically significant positive correlation was seen with age of the mother. no statistically significant correlation with education, occupation and BMI of the mother. Then rule-breaking problem statistically significant positive correlation was seen with age and education of mother, no statistically significant correlation with occupation of the mothers. Then aggressive problem statistically significant positive correlation was seen with age and occupation. no statistically significant correlation with education and BMI of the mother. Overall behavioural problem of the children were statistically significant correlation with mother's factor. The study conducted by Barman et al in 2018 revealed that emotional problems were significantly associated with age of the child. Again, conduct problem was found to be significantly associated with gender.

CONCLUSION

The study offered valuable insights into the behavioral problems of children and their correlation with both child and mother factors. Firstly, concerning child factors, it's evident that certain behavioral problems show significant associations with age and class level. Specifically, children aged 6 to 7 years old exhibit a higher prevalence of behavioral issues compared to older children aged 8 to 9+. Additionally, there's a notable correlation between class level and behavioral problems, with children in the lower classes showing higher rates. While gender does not significantly correlate with behavioral problems, attention and aggressive issues are more prevalent among males. The analysis demonstrates significant correlations between maternal age, education, occupation, and behavioral problems in children. Younger mothers, particularly those aged 22 to 24 years, tend to have children with more behavioral issues compared to older mothers. Similarly, mothers with lower levels of education are associated with higher rates of behavioral problems in their children. Interestingly, maternal occupation also plays a role, with non-working mothers having children exhibiting more behavioral problems compared to working mothers.

Moreover, the overall behavioral problems of children are significantly correlated with both child and mother factors. This indicates the complex interplay between demographic characteristics of both children and mothers in influencing behavioral outcomes. The findings underscore the

importance of considering not only individual characteristics but also family dynamics and socio-economic factors in understanding and addressing childhood behavioral issues.

The study highlighted that the multifaceted nature of behavioral problems in children and their association with various demographic factors of both children and mothers. These insights are crucial for developing targeted interventions and policies aimed at promoting child well-being and addressing behavioral issues effectively. Additionally, the findings emphasize the need for comprehensive approaches that take into account the broader socio-economic context in which children are raised to foster positive developmental outcomes.

IMPLICATIONS OF THE STUDY

The findings of this study have important implications for educators, healthcare professionals, policymakers, and community workers. Firstly, early identification and intervention strategies should be prioritized for children, especially those in the younger age groups and lower-class levels, who are at a higher risk for behavioral issues. Schools should implement behavior screening and support programs tailored to the specific needs of these children. Secondly, maternal factors such as age, education, and employment status must be considered when designing family-centered support services. Programs aimed at educating and empowering teen and young mothers could help mitigate the risk of behavioral problems in their children. Furthermore, employment and education opportunities for mothers may indirectly promote better child outcomes. Policymakers should consider implementing integrated support systems that address both child development and maternal well-being. Finally, the study highlights the need for a holistic, socio-ecological approach to child development that includes family dynamics, maternal characteristics, and broader socio-economic factors to effectively address and prevent behavioral problems in school-aged children.

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REFERENCES

- Barman N., Mridula D & Khanikor S. 2018, Prevalence of Behavioural Problems among School Children: A Pilot Study. *International Journal of Health Sciences & Research*. 8 (12): 95-101.

- Goossens G., Kadji C & Delvenne V., 2015, Teenage pregnancy: A psychopathological risk for mothers and babies?. Psychiatria Danubina. 27 (1):499–503.
- Maracek J. 2015, Psychological and behavioural status of children born to adolescent parents presented at American psychological association conversation, New York. 11(3): 54-61.
- Sarah E. Oberlander & Maureen M. 2014, African American Adolescent Mothers' Early Caregiving Involvement and Children Behaviour and Academic Performance at Age 7. Journal of Clinical Child & Adolescent Psychology, 8(103: 116) 756-764, DOI: 10.1080/15374416.2011.597087.
- Turkheimer E., Paige K., Stacy & Lynch, 2007, A Behavior Genetic Investigation of Adolescent Motherhood and Offspring Mental Health Problems. Journal of Abnormal Psychology. 116(4): 667-683.

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THE SILENT SCROLL: SOCIAL MEDIA AND PSYCHOLOGICAL WELL BEING OF ADOLESCENTS

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ABSTRACT

Engagement with screen-based technologies is increasing and real world interaction is decreasing. Several studies report that high screen time may affect mental health and well-being of an individual specially adolescents. The present study was carried out to assess social media usage and psychological well-being of adolescents girls in 2024. A sample of fifty five school going girls were selected using simple random sampling technique. Results of the study showed that participants spent 45 minutes to one hour on each social that concludes that on average participants spent three to four hours on digital devices during weekdays and weekends. They used digital devices for gaming, entertainment and chatting purposes. Participants reported low level of psychological well being. Study suggests that early invention can be planned to reduce screen time among adolescents for their well being.

KEYWORDS Social media, Screen time, Games, Exposure, Psychological well being, digital devices

INTRODUCTION

Use of digital gadgets such as smart-phones, computers, laptops, tablets, e-gaming etc among people increased at a high pace after COVID-19 pandemic. Lockdown guidelines for safety purposes curtailed social gatherings that elevated levels of screen time for connecting virtually with loved ones, entertainment and learning etc. (Pandey and Pal 2020). According to Gokcearslan et al. (2018) an individual become addicted to digital devices, when he/she exhibiting symptoms of physical and mental illness because of lack of control on his/her behavior. Smart phone is considered as an important communication tool where people can interact with people and also became necessity of people. Smartphones bring people close to each other by connecting virtually through various social networking platforms and also make them socially isolated due to excessive involvement with smartphones (Tonacci et al., 2019). Research evidences support that phubbing and smartphones have a strong relationship with each other that negatively affect psychological well being and life satisfaction among individuals (Chotpitayasunondh and Douglas, 2016; Guazzini et al., 2019; Tonacci et al., 2019; Chatterjee, 2020; Vallespín et al., 2017)

Digital devices are double edged swords that have benefits along with associated risks. To get maximum benefits, it should be regulated and more or less fix hours as well as for

entertainment and leisure time activities like e- gaming, video games, social media for interactions, movies etc. Exposure to these gadgets is sedentary activity which impacts not only physical health of an individual but mental health also. Research suggested that prolonged exposure to social media is linked with an increased risk of psychological problems such as ADHD, anxiety, withdrawn behavior, lack of concentration and depression etc. (Maras et al. 2015). Chatterjee, 2020; Schinka et al. 2012) said that, individuals' mental health deteriorate when they involve in online conservation with their peer groups and limited their interaction with family members. Language and abstract thinking of an individual starts declining with screen time more than two hours per day. Children having exposure to different digital devices more than seven or more hours a day show major changes in the lining of cortex of brain that ultimately affects their retaining power and thinking abilities (Le, 2018). Andrew and Amey (2019) in their study explored that each hour spent on digital screens decreased sleep during night by 3-8 minutes and significantly lowers the level of sound sleep. From the above mentioned point this research was an attempt to explore the amount of time spent on different social media platforms and influence of these digital devices on level of psychological well being among students. The present study tries to address the social media usage and its effects on psychological well being of an individual.

OBJECTIVES

The objectives of this study are:

To assess the social media usage among adolescents on weekdays and weekends

To examine psychological well-being of adolescent girls

To establish correlation between psychological well being and social media usage on weekdays and weekends

METHODOLOGY

The study examines the amount of time participants spent on various social media handles on weekdays and weekends. The study was conducted according to the ethics of the research and got its Ethics Committee number H.Sc./EC/027/24.02.2023 by ethical approval committee. A questionnaire was prepared that contains statements regarding amount of time participants spent on different social media platforms during weekdays and on weekends. The questionnaire was divided into two sections in which section one assess the amount of time spent on various social media and other section evaluate psychological well being of adolescents. Chronbach's alpha formula was used to check the reliability of the questionnaire and got 8.79 score which indicates that the tool was reliable for research purpose. The questionnaire used in the research was based on 4 point likert scale in which 0 to 4 scores were given for each answer marked by the participants. The psychological well being of the participants due to excessive social media usage was assessed using self-made questionnaire including anxiety, depression, poor dietary habits, lack of concentration, low academic grades and social isolation etc. Before collection of data participating school head teachers were approached and their permission were taken for smooth conduction of study. School heads were also provided with all essential information such as purpose of the study, procedure in the form of a letter to maintain confidentiality of the respondents. The present paper is the part of research project. The sample size of sixty participants is under the pilot study. From the total only fifty five students filled the questionnaire completely. Government Girls Senior Secondary School, Gandhi Nagar, Jaipur was selected randomly to conduct this study. The data was gathered by personal visits in the school.

Consequently, females were independently assessed through interview method to solicit information needed for the study. Different statistical tests were applied to get the results. Frequency and percentage were calculated to know different digital activities they performed. Spearmens' co-efficient of correlation was assessed to get insights about psychological well being and screen time exposure.

RESULTS

BACKGROUND INFORMATION

The selected students were in the age group of 14-17 years where most of the students were studying 11th standard. Seventy six percent of the participants responded that they belonged to nuclear family system with small family size. Majority of the respondents' fathers were doing job in unorganized or private sector. They have been completed their basic education only. On the other hand; most of the respondent's mothers were non- working. The respondents of the present study were belonged to middle family income group.

Table 1 Percentage distribution of social media usage among adolescents on weekdays

Sr. No.	Types of Gadgets	Weekdays (Percentage)	Frequency (n=55)	Mean± SD
1.	**Watching Television**			
	None	29.1	16.1	**2.25±1.98**
	Less than one hour	49.1	27	
	2-4 hours	18.2	10	
	5 or more than 6 hours	3.6	2	
2.	**Use of computers**			
	None	70.9	39	**0.76±1.36**
	Less than one hour	19.9	11	
	2-4 hours	9.1	5	
	5 or more than 5 hours	-		
3.	**Handheld games**			
	None	41.8	23	**1.43± 1.82**
	Less than one hour	49.1	27	
	2-4 hours	5.4	3	
	5 or more than 5 hours	3.6	2	
4.	**Chatting**			
	None	20	11	**1.89±1.78**
	Less than one hour	63.5	35	
	2-4 hours	12.6	7	
	5 or more than 5 hours	3.6	2	
5.	**Facebook**			
	None	65.5	36	**0.87± 1.37**
	Less than one hour	27.3	15	
	2-4 hours	7.3	4	

	5 or more than 5 hours	-	-	
6.	**What's app**			
	None	10.9	6	**1.76± 1.26**
	Less than one hour	81.8	45	
	2-4 hours	7.2	4	
	5 or more than 5 hours	-		
7.	**Instagram**			
	None	80	44	**0.76±1.83**
	Less than one hour	9.1	5	
	2-4 hours	7.3	4	
	5 or more than 5 hours	3.6	2	

Table 1 showed the amount of time participants spent on social media during weekdays i.e. Monday to Friday. It depicted that nearly half of the girls watch television for less than one hour followed by 29.1% who do not watch television, 18.2 percent watch television for a period of 2 to 4 hours and only 3.6% of the girls watch television more than 5 hours on weekdays.

The above table portrayed that 70.9 respondents did not use computer or laptop. It indicated that respondents using computer/laptop for a time period of less than one hour were 19.9 percent. Nine percent girls use computer or laptops for 2 to 4 hours a day on weekdays. Participants reported playing of handheld games in which 49.1 percent of them play with handheld games for less than one hour from Monday to Friday. Forty two percent of participants did not play with handheld games. Results of the study highlighted that five percent respondents play handheld games for 2 to 4 hours and four percent play games more than 5 hours during weekdays.

Findings revealed that 63.5 percent respondents were using digital devices for chatting less than one hour, 20% didn't use smartphone for chatting purpose, 12.6% use for 2-4 hours and 3.6 % chat on these devices for more than 5 hours on a working day.

More than half of the girls reported no use of facebook on weekdays followed by 27 percent participants use facebook for less than one hour and seven percent use facefook for 2 to 4 hours. It was observed that age also affects social media usage among children.

It was observed that 81.1 percent participants use whatsApp less than one hour, 10.9% do not use whatsApp on working days and 7.2% use whatsApp for a period of 2 to 4 hours. It was found that there were no participants who use whatsapp for more than 5 hours. Results exposed that eighty percent of respondents do not use instagram, 9.1% use instagram for less than one hour, 7.3% spent 2 to 4 hours on instagram and 3.6% spent more than 5 hours a day on instagram .

Besides using gadgets they also performed certain other activities on weekdays from Monday to Friday. It was observed that more than half of the girls spent 2 to 4 hours for home work.

Table: 2 Percentage distribution of social media usage among adolescents on weekends

Sr. No.	Types of Gadgets	Weekends (%)	Frequency (n=55)	Mean± SD
1.	**Watching Television**			
	None	20	11	**2.76± 2.04**
	Less than one hour	45.5	25	
	2-4 hours	30.8	17	
	5 or more than 6 hours	3.6	2	
2.	**Use of computers**			
	None	69.1	38	
	Less than one hour	29.1	16	**0.61±1.04**
	2-4 hours	1.8	1	
	5 or more than 5 hours	-		
3.	**Handheld games**			
	None	38.2	21	
	Less than one hour	51	28	**1.61±1.86**
	2-4 hours	7.3	4	
	5 or more than 5 hours	5.4	3	
4.	**Chatting**			
	None	12.7	**7**	
	Less than one hour	80	44	**1.98±1.42**
	2-4 hours	5.4	3	
	5 or more than 5 hours	1.8	1	
5.	**Facebook**			
	None	65.5	36	
	Less than one hour	30.9	17	**0.83±1.38**
	2-4 hours	3.6	2	
	5 or more than 5 hours	-	-	
6.	**What's app**			
	None	12.7	7	
	Less than one hour	78.2	43	**1.98±1.22**
	2-4 hours	9.1	5	
	5 or more than 5 hours	-	-	
7.	**Instagram**			
	None	69.1	38	
	Less than one hour	21.9	12	**1.10±1.93**
	2-4 hours	5.5	3	
	5 or more than 5 hours	3.6	2	

The above table 2 depicted the amount of time participants spent on different social media platforms on weekends. It summarized 45.5 percent participants watch television for less than one hour followed by 2 to 4 hours on weekends. It was observed that 69.1 participants don't use computer, 29.1 per cent children use computer for less than one hour and only 1.8 percent participant's use computer/laptop for a time period of 2 to 4 hours. On weekends, 51 percent

participants play hand held games, 38.2 percent don't play handheld games, 7.3 percent play games for 2 to 4 hours and 5.4 percent participants spent more than 5 hours for playing handheld games. They spent their time on various social media handles including whatsApp face-book, instagram and snapchat etc. Majority of the sample population chat on social media for less than one hour, 12.7 percent of participants do not use digital devices for chatting followed by 5.4 percent chat on social media for 2 to 4 hours and 1.8 percent participants spent more than 5 hours for chatting on digital devices. Findings indicated that 65.5 participants don't use digital devices for facebook on weekends, 30.9 percent use facebook for less than one hour, and 3.6 percent use facebook for 2 to 4 hours a day on holdidays. It was found that 78.2 participants use whatsApp for less than one hour, 12.7 participants do not use whatsApp on weekends and 9.1 percent participants use what'sapp for 2 to 4 hours during holidays. The outcomes showed that 69.1 percent participants do not use instagram, 21.9 percent use for less than one hour, 5.5 percent use for 2 to 4 hours and only 3.6 percent use instagram for more than 5 hours on weekends.

From the above two table it was concluded that there were differences on the usage of social media among adolescents during weekdays and weekends but these differences were not so much regarding the amount of time spent on different social media platforms.

Table: 3 Psychological well being of adolescent girls

Psychological well being	Frequency (n=55)	Percentage (%)
Low	29	52.7
Moderate	20	36.4
High	6	10.9

Table 3 depicted levels of psychological well being of participants. It was found that 52.7 percent girls had low level of psychological well-being, 36.4 percent had moderate and remaining 10.9 percent participants reported high levels of psychological well being.

Table 4 Relationship between social media Activities and psychological well being

	Weekdays	Weekends	Psychological Well-Being
Weekdays	1	.786*	.26*
Sig. (2-tailed)		.000	.04
N	55	55	55
Weekends	.786*	1	.085
Sig. (2-tailed)	.000		.539
N	55	55	55
Psychological	.26*	.085*	1
Sig. (2-tailed)	.04	.539	
N	55	55	55

*p< 0.05 level

**p< 0.01 level

Table 4 explained the role of social media usage on psychological well being of participants during their working days and on weekends. It was found that time spent on various

social media platforms on weekdays are positively correlated with psychological well being of students. However, there was no relationship between social media and psychological well being usage on weekends.

DISCUSSION

Mindful use of digital gadgets can be helpful for students in this digital world. User friendly technologies increase the screen time among youths and changes their lifestyle. Prolonged hours of exposure to screens result into physical as well as mental health hazards among people. From the present study it was found that due to the use of digital devices lifestyle of individuals has been significantly impacted. The study's findings revealed that more than half of the participants possessed personal smartphones, while the remaining participants utilized their family members' smartphones for social media engagement. Socio-economic factors were attributed to participants' lack of access to smartphones, as their parents were employed in the unorganized sector. Socioeconomic factors significantly influence access to digital devices among girls, contributing to disparities in device ownership and internet connectivity (Joshi et al., 2024). Participants reported acquiring smartphones during the COVID-19 pandemic. Access to smartphones among adolescents during COVID-19 was significant, with 51.02% of students using them daily for social interactions and learning, as activities shifted online, leading to increased smartphone dependency and reduced face-to-face social interactions (Indrasvari et al., 2021). They utilize their smartphones for various social platforms such as Facebook, WhatsApp, Instagram, etc. The study's outcomes indicated that participants spent 45 minutes to one hour daily on each social media platform. It was concluded from the participants' responses that, on average, they spent 3 to 4 hours daily engaging with digital devices. Television was the most frequently used digital device among participants. Supporting these findings, studies have explained that children having television access in their room is associated with higher levels of viewing for entertainment compared to children who do not have a television set in their room (Wiecha, et al., 2001; Saelens, et al., 2002; and Woodard, et al., 2000). Among various social media platforms, WhatsApp was the most popular. In line with the present study, Pandey et al., 2020; Dhanwal et al. 2022 found that WhatsApp and Facebook are the most preferred social networking sites among adolescents used for conversation. The findings revealed a low level of psychological well-being among respondents, which is not conducive to maintaining a healthy lifestyle. These findings support previous explorations that reported negative effects of sedentary lifestyles associated with television and/or other screen use on physical (Biswas et al., 2015) and mental health (Atkin et al. 2012; Dempsey et al., 2014, Vahedi and Saiphoo, 2018; Wang et al. 2019). Research on youth populations suggests restricted screen time for sustaining a healthy life (Li et al. 2020; Cartanya - Hueso et al. 2021). Khan et al. (2021) observed that teenagers using screens for more than one hour exhibit poor mental health. The outcomes expressed that excessive use of digital devices is associated to low levels of overall well-being among students. Sheoran et al. (2021) indicated that amount of time spend on mass media significantly associated with adolescents' seeing problem abilities and their unusual uses fluency. These findings suggest prolonged hours of screen time have potential negative effects on various aspects of development of an individual. An intervention study with experimental and control group carried out by Pedersen et al. (2022) revealed that experimental group with limited screen time exhibited improved emotional health than control group. Kircaburun and Griffiths (2018) highlights about the risk factors associated with the excessive use of social media. The outcomes of the study pinpointed that scrolling on digital devices leads to social isolation, loneliness, anxiety,

depression, insomnia, lower level of life satisfaction, lack of concentration, poor self-esteem and poor academic performances among people.

SUMMARY & CONCLUSION

From this study, it was concluded that time spent on digital devices is increasing among teenagers. Different social media platforms were used by adolescents for entertainment and conversation purposes. Among various social networking sites majority of the students use whatsApp on daily basis. It highlights that the young generation try to be active on all popular platforms such Facebook, Instagram, Snapchat and so on. Today's generation is more active on social media and they share their life on these platforms. The present study indicates that due to engagement of students with various social media platforms lowers the psychological well being of adolescents.

Implications

- The study highlights the growing psychological vulnerability of adolescents due to prolonged and unregulated social media use
- Findings indicate impact of social media on adolescents' well being, emphasizing the need for intervention on mental health.
- The research encourages educational institutions to adopt media literacy modules that empowers youths to critically evaluate and responsibly use social media.
- The study calls for collaborative efforts among parents, educators, policymakers, and tech companies to create a safer and balanced digital environment for youth.
- The outcomes contribute to the existing literature by proving empirical evidence on how social media shapes adolescent's behavior, motivating further research in this evolving area.

REFERENCES

- Andrew, K. P. & Amy, O. (2019). Screens, Teens, and Psychological Well-Being: Evidence from Three Time-Use-Diary Studies. *Psychological Science,* 30**(5),** 1-15.
- Atkin, A.J., Adams, E., Bull, F.C. , & Biddle, S.J.H. (2012). Non-occupational sitting and mental well-being in employed adults. *Annals of Behavioral Medicine Published by Society of Behavioral Medicine,* 43, 181-188.
- Cartanyà-Hueso, À., Moyano, C. L., & Sánchez, J.M. (2021). Tiempo y uso de pantallas en niños y adolescents: revisión y comparación de las guías de cinco instituciones sanitarias. *Boletin de Pediatria*, 61, 174-179.
- Chatterjee, S. (2020). Antecedents of phubbing: from technological and psychological perspectives. *Journal Systems and Information Technology*, 22, 161–118.
- Dempsey, P.C., Howard, B.J., Lynch, B.M., Owen, N., & Dunstan. D.W. (2014). Associations of television viewing time with adults' well-being and vitality. *Preventive Medicines,* 69, 69-74,
- Dhanwal, S., Kundu, P., Malik, J. Dangi, P. and kumara, N. (2022). Usage Pattern of Social Media among Higher Secondary School, Haryana. *Indian Journal of Extension Education,* 58**(3),** 78-82.

- Gökçearslan, S., Uluyol, Ç., & Sahin, S. (2018). Smartphone addiction, cyberloafing, stress and social support among University students: a path analysis. *Children Youth Services Review*, 91, 47–54.
- Guazzini, A., Duradoni, M., Capelli, A., & Meringolo, P. (2019). An explorative model to assess individuals' phubbing risk. *Future Internet*, 11-21.
- Indrasvari, M., Harahap, R. D., & Harahap, D. A. (2021). *Analysis of the Impact of Smartphone Use on Adolescent Social Interactions during COVID-19. Journal of Research in Science Education, 7***(2),** 167–172.
- Joshi, B. M., Khatiwada, S. P., & Pokhrel, R. (2024). Influence of Socioeconomic Factors on Access to Digital Resources for Education. *रुपान्तरण, 8**(1),*** 17–33.
- Khan, E., Lee, Y. Rosenbaum, S., Khan, S.R., & Tremblay, M.S. (2021). Dose-dependent and joint associations between screen time, physical activity, and mental wellbeing in adolescents: an international observational study. *Lancet Child Adolescent. Health*, 5, 729-738.
- Kircaburun, K., & Griffiths, M. D. (2018). Instagram addiction and the Big Five of personality: The mediating role of self-liking. *Journal of Behavioral Addictions*, 7**(1),** 158-170.
- Lee, L. (2018). Screen time changes brain structure of kid's , 60 minutes says, Bloomberg wire service Retrieved from https:// liproxy. Wlu.ca/login? url=http://search-prorequest.com liproxy.Wlu.ca/docview/2153743397?accountid=15090
- Maras, D. Flament, M. Murray, M. Buchholz, A. Henderson, K. Obeid, N. & Goldfield, G. (2015). Screen time is associated with depression and anxiety in Canadian youth. *Preventive Medicines*, 75,133-138.
- Pandey, D.K., De, H.K. and Dubey, S.K. (2020). Social Media Usage among Agriculture Collegian in North-Eastern India. *Indian Journal of Extension Education*, 56**(2)**, 26-30.
- Pandey, N., and Pal, A. (2020). Impact of Digital Surge during Covid-19 Pandemic: A Viewpoint on Research and Practice. *International Journal of Information and Management*, 55, 102-171.
- Pedersen, M.G.B. Rasmussen, S.O. Sørensen, S.R. Mortensen, L.G. Olesen, S. Brage, P.L. Kristensen, & Puterman, A. (2022). Effects of limiting digital screen use on well-being, mood, and biomarkers of stress in adults. *Nature partner Journal on Mental Health Research*, 1**(1),** 14.
- Saelens, B.E., Sallis, J.F., Nader, P.R., Broyles S.L., Berry C.C., & Taras, H.L. (2002). Home environmental influences on children's television watching from early to middle childhood. *Journal* of *Developmental* and *Behavioral Pediatrics*, 23,127–32.
- Schaeffer, K. (2019). Most U.S. teens who use cellphones do it to pass time, connect with others, learn new things. Pew Research Center, https://www. pewresearch.org/fact-tank/2019/08/23/most-u-s-teens-who-use-cellp hones-do-it-to-pass-time-connect-with-others-learn-new-things/
- Schinka, K. C., VanDulmen, M. H., Bossarte, R., & Swahn, M. (2012). Association between loneliness and suicidality during middle childhood and adolescence: longitudinal effects and the role of demographic characteristics. The journal of Psychology, 146**(1-2)**, 105-118.

- Sheoran, S., Dhanda & Malik, J. (2021). Mass Media Variables for anticipating creativity among academically bright rural adolescents. *Indian Journal of Extension Education*, 57**(3),** 53-56.
- Tonacci, A., Billeci, L., Sansone, F., Masci, A. Pala, A. P., Domenici, C., et al. (2019). An innovative, unobtrusive approach to investigate smartphone interaction in non addicted subjects based on wearable sensors: a pilot study. *Medicina (Kaunas)*, 55, 37.
- Vahedi, Z., & Saiphoo, A. (2018). The association between smartphone use, stress, and anxiety: A meta-analytic review. Stress and Health: *Journal of the International Society for the Investigation of Stress*, 34 **(3),** 347–358.
- Vallespín, M., Molinillo, S., & Muñoz-Leiva, F. (2017). Segmentation and explanation of smartphone use for travel planning based on sociodemographic and behavioral variables. *Industrial. Management &. Data Systems*, 117, 605–619.
- Wang, X., Li,Y. , & H. Fan, (2019). The associations between screen time-based sedentary behavior and depression: a systematic review and meta-analysis. *BMC Public Health*, 19, 15-24.
- Wiecha, J.L., Sobol, A.M., Peterson, K.E., & Gortmaker, S.L. (2001). Household television access: associations with screen time, reading, and homework among youth. *Ambulatory Pediatrics*, 1, 244–51.
- Woodard, E.H., & Grindina, N. (2000). Media in the Home 2000. University of Pennsylvania; Report No.: 7.

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LOOKING BACK, MOVING FORWARD: STUDENTS' EVALUATION OF TEACHING STRATEGIES USED IN A HOME SCIENCE DEGREE PROGRAMME

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ABSTRACT

This study aimed to explore enjoyability and effectiveness ratings of students for innovative teaching strategies used by Human Development Lecturers in the Home Science Degree Programme in Goa. Earlier studies highlighted that conventional methods of teaching are dominant in schools (TOI-Goa, 4th September 2011) and institutes of higher education (Coelho, Kanwar & Divecha, 2007). The COVID-19 pandemic heralded a paradigm shift in pedagogy as educational institutes were forced to switch to virtual teaching (Zhao & Watterston, 2021). In this study, the researchers simulated a previous study done by them a decade ago, evaluating 24 innovative teaching techniques by adding the option of virtual class as a new technique post-covid. Students rated each technique on the degree of enjoyability and effectiveness in learning. The sample consisted of 62 female degree-college students who had attended Human Development classes as part of the Course for at least one semester. Data for the research was collected using a self-constructed questionnaire with four-point rating scales used for each technique along with four open-ended questions. The scales were analyzed using descriptive statistics (means) and the open-ended questions were analyzed both quantitatively (category percentages) and qualitatively (theme extraction & thick descriptions). Techniques that received highest ratings on both enjoyability and effectiveness were vignettes/real life examples and movies. The least-liked and also least-effective technique was virtual classes. Qualitative analysis revealed that the qualities of the teacher were as important as the method used. Implications for policy makers, educationists and educational pedagogy are discussed.

Keywords: Innovative Teaching-Learning, Enjoyable Learning, Effective Learning, Post-Covid, Virtual Class

INTRODUCTION

The 21st century has seen rapid transformations, particularly in higher education, where student populations are more diverse in terms of life circumstances, economic and cultural backgrounds, and learning styles (Hogan, 1996). A majority of teachers, however, still continue to use conventional methods of teaching (TOI-Goa, 4th September 2011; Coelho, Kanwar & Divecha, 2007), which may not be relevant or in tune with student mentality. The COVID-19 pandemic further resulted in a paradigm shift in education, bringing in a whole plethora of online tools including those relying on artificial intelligence. Subsequently, education was forced to shift to

virtual platforms (Stecuła & Wolniak, 2022; Zhao & Watterston, 2021). The world and India applauded the merits of the virtual learning space as a new form of reaching populations unreached before and greatly praised the opening up of the 'borderless' world as an oyster of educational opportunities. Is this the ground reality today? Do students prefer virtual methods of teaching-learning? Which methods of teaching do students enjoy and perceive as effective to their learning? What are the reasons behind students' choices? This research study seeks to answer these relevant questions in the context of undergraduate students of Home Science in Goa.

REVIEW OF LITERATURE

Students today are more 'active' than students of the past, who had a capacity to sit for many hours and listen avidly and in awe to a 'guru's' narrative wisdom. They are now exposed to a technologically proliferate and fast-paced world, especially after COVID-19. Keeping this in context, teachers were expected to change with the times and cater to the changing needs of their 'clientele'.

An article on innovative teaching methods (Singh, 2010) stated that many students in schools and colleges alike complain that their classes are "insipid" and that teachers are unable to express themselves well (http://readersquotient.com/india/innovative-teaching-methodologies-and-india). He further reiterated that teachers tend to 'stick to the book', refusing to look beyond.

The COVID-19 pandemic heralded a paradigm shift in pedagogy as educational institutes were forced to switch to virtual teaching, regardless of the outcome (Zhao & Watterston, 2021). However, teachers took several of the same classroom methods to the online platform resulting in a traditional-virtual technique of teaching. A few others responded to various trainings provided and tried innovative methods on the online platform.

Research points out that students are good sources to report about the extent to which a learning experience has been productive, informative, satisfying or worthwhile. Although students' ratings are not direct measures of teacher or course effectiveness, they are credible indicators of student satisfaction, which is in turn linked to effectual teaching and learning (Theall & Franklin, 2001, in Sajjad, 2010; Murray, 1994, in Sajjad, 2010). In one study (Coelho, Kanwar, & Divecha, 2007), students desired changes in the system of education and opined that education should be more practical than theoretical. However they stressed that the method of teaching mattered more than the content.

A research study by Sajjad (2010), explored students' ratings on different teaching strategies, and revealed that most students found the lecture method and group discussions most conducive to learning. Students however expected the lecture to allow for questions and some amount of interaction, which again highlights that they do not appreciate being 'passive' recipients of information. These findings are in contradiction to other researches, which indicate that students find the theoretical lecture method boring (Singh, 2010; Rajgopal, 2008). Singh (2010) went on to point out that students appreciate teachers who use real-life examples, group discussions, quizzes, and most importantly humour to liven up the teaching of a subject. Aujla (2009) revealed that all the teachers nominated for "Professor of the Year" across the United States in 1999, had gone out of their comfort zone to involve students by using innovative methods such as field trips, outdoor teaching, real-life situations, or real-life research projects.

Home Science, as a discipline, includes multifaceted subjects aimed to equip a person with life-skills and career skills. In Goa, the Home Science Degree Programme covers five focal domains of knowledge, namely, Nutrition & Dietetics, Human Development & Family Studies,

Textiles & Fashion Studies, Resource Management, and Extension Education, with specializations currently permitted under the first three domains. The domain of Human Development, mainly involves the study of Lifespan Development, Theories & Contemporary Social Issues, Marriage & Family Relations, Special Education, Counselling, and Human Resource Management. The researchers have, over the years developed various creative, interactive methods of teaching suited to the relevant subjects. In a previous study ten years ago, they elicited students' opinions about these methods used by them. The current study attempts to re-assess whether students found these methods of teaching enjoyable as well as effective in overall learning and retention. Since most of the students had experienced the pandemic and the drastic change to virtual learning just recently, the researches added this new technique to elicit feedback on the same.

OBJECTIVES

The study had the following objectives:

a) To examine the teaching technique(s) students found the most enjoyable and most effective.
b) To assess the teaching technique(s) students found the least enjoyable and least effective.
c) To explore the differences (if any) in the students' opinions post-covid.

METHODOLOGY

Participants & Sampling

Using purposive sampling, 62 female degree college students, who had completed at least one semester, were invited to participate in the study. Informed consent was obtained, anonymity was assured, and participants were asked to complete a self-report tool.

Data Collection & Tool

Data was gathered using a self-constructed questionnaire with four-point rating scales on enjoyability and effectiveness in learning for each teaching learning technique. The questionnaire also had four open-ended questions. In the previous study 24 innovative teaching techniques were analyzed and in the current study an additional technique of virtual class was added to the list.

Analysis

Data obtained from the scales of enjoyability and effectiveness were analyzed quantitatively through descriptive statistics (means and standard deviations) and the open-ended questions were analyzed quantitatively (frequency) and qualitatively (theme extraction and thick descriptions).

RESULTS

Enjoyability and Effectiveness Ratings: Analysis of Quantitative and Qualitative Data

Each teaching technique was rated on two dimensions, the extent of enjoyability and the effectiveness in learning. Each was rated on a four-point scale from not enjoyable/effective (1) to enjoyable to a great extent/highly effective in learning (4). The mean scores were arbitrarily classified into five levels: Very High (above 3.50), High (3.00 to 3.49), Moderate-High (2.50 to 2.99) Moderate-Low (2.00 to 2.49) and Low (Below 2).

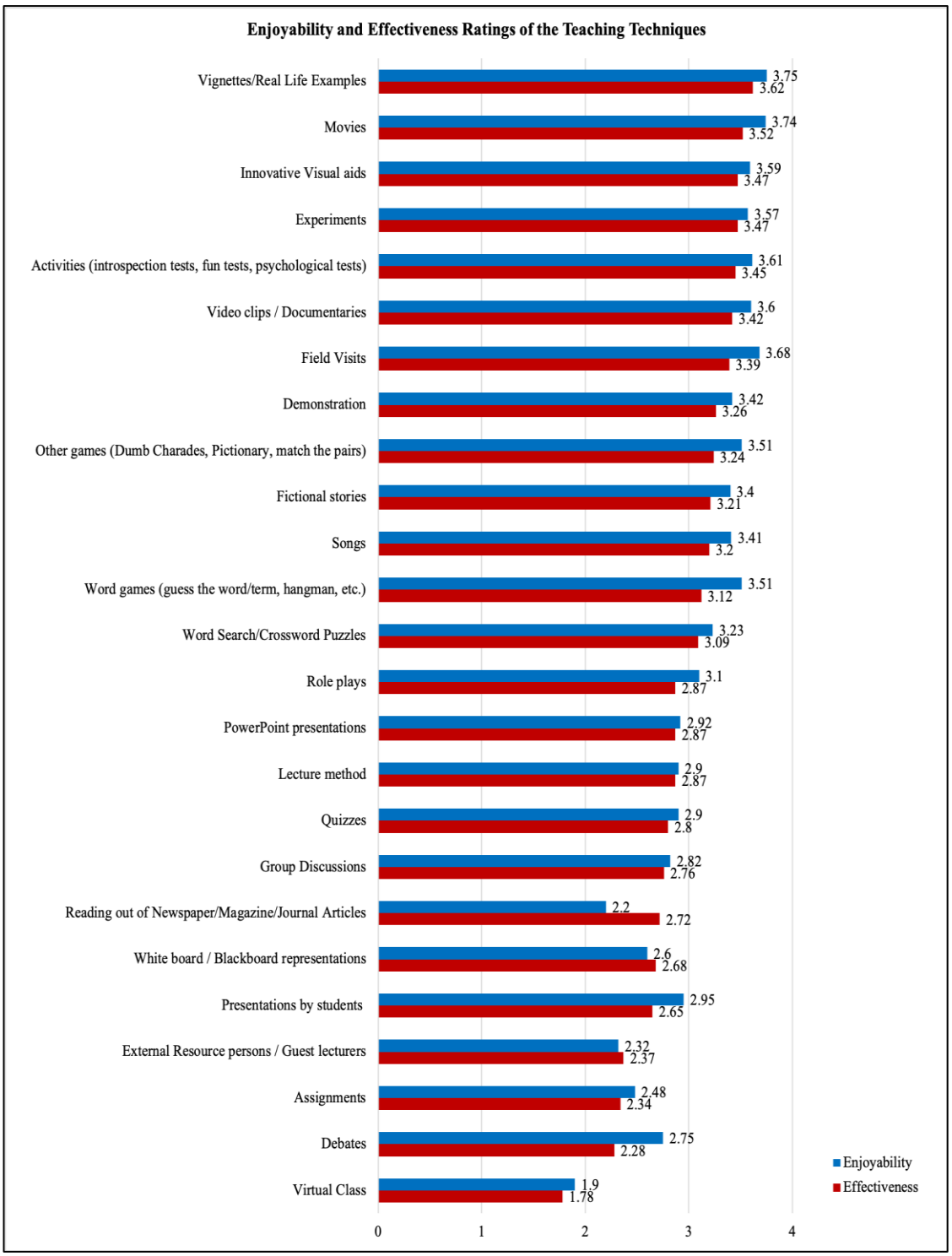


Figure 1: Enjoyability and Effectiveness Ratings of Teaching Techniques (Mean Scores)

In the quantitative analysis, it was noted that the teaching techniques that were enjoyed the most by the participants of the study were Vignettes/Real Life Examples (M = 3.75, SD = .567), (Refer to Figure 1 and Table 1).

Table 1: Enjoyability Ratings on Teaching Techniques

Technique	Mean (N = 50)	Std. Deviation
Very-High		
Vignettes/Real Life Examples	3.75	.567
Movies	3.74	.579
Field Visits	3.68	.765
Activities (introspection tests, fun tests, psychological tests, imagination etc.)	3.61	.582
Video clips / Documentaries	3.60	.664
Innovative Visual aids (real objects/pictures/storybooks/mobiles/puppets, etc.)	3.59	.642
Experiments	3.57	.673
Word games (guess the word/term, hangman, etc.)	3.51	.804
Other games (Dumb Charades, Pictionary, match the pairs, etc)	3.51	.829
High		
Demonstration	3.42	.758
Songs	3.41	.811
Fictional stories	3.40	.756
Word Search/Crossword Puzzles	3.23	.926
Role plays	3.10	.960
Moderate-High		
Presentations by students (formal, skits, ads, fashion show)	2.95	.998
PowerPoint presentations	2.92	1.013
Lecture method	2.90	.881
Quizzes	2.90	.960
Group Discussions	2.82	.914
Debates	2.75	1.074
White board / Blackboard representations	2.60	.862
Moderate-Low		
Assignments	2.48	1.097
External Resource persons / Guest lecturers	2.32	1.004
Reading out of Newspaper/Magazine/Journal Articles	2.2	.879
Low		
Virtual Class	1.90	1.011

The teaching techniques that were rated as most effective in learning were found to be Vignettes/Real Life Examples (M = 3.62, S.D. = .710), and Movies (M = 3.52, S.D. = .800) while

Virtual Class was rated as least effective in learning (M = 1.78, S.D. = .852) (Refer to Figure 1 and Table 2).

Table 2: Effectiveness in Learning Ratings on Teaching Techniques

Technique	Mean (N = 50)	Std. Deviation
Very High		
Vignettes/Real Life Examples	3.62	.710
Movies	3.52	.800
High		
Innovative Visual aids (real objects/pictures/storybooks/mobiles/puppets, etc.)	3.47	.828
Experiments	3.47	.832
Activities (introspection tests, fun tests, psychological tests, imagination etc.)	3.45	.782
Video clips / Documentaries	3.42	.758
Fieldtrips	3.39	.845
Debates	2.28	5.135
Demonstration	3.26	.904
Other games (Dumb Charades, Pictionary, match the pairs, etc)	3.24	.906
Fictional stories	3.21	.994
Songs	3.20	1.030
Word games (guess the word/term, hangman, etc.)	3.12	1.001
Word Search/Crossword Puzzles	3.09	.987
Moderate-High		
Powerpoint presentations	2.87	.966
Lecture method	2.87	.819
Role plays	2.87	1.007
Quizzes	2.80	.996
Group Discussions	2.76	.935
Reading out of Newspaper/Magazine/Journal Articles	2.72	2.952
White board / Blackboard representations	2.68	.803
Presentations by students (formal, skits, ads, fashion show)	2.65	1.086
Moderate-Low		
External Resource persons / Guest lecturers	2.37	1.011
Assignments	2.34	.974
Low		
Virtual Class	1.78	.852

The Pearson's Correlation Test was employed to verify if Enjoyability ratings and Effectiveness ratings were positively correlated as this would indicate that the methods enjoyed by students, also proved effective for their learning. The test yielded highly significant positive

correlations, between enjoyability and effectiveness, in all the techniques except for Vignettes/Real Life Examples, Reading out of Newspaper/Magazine/Journal Articles and Activities (introspection tests, fun tests, psychological tests, imagination etc.) as depicted in Table 3. However, the mean scores on enjoyability and effectiveness were very high for Vignettes/Real Life Examples, and for Activities.

Table 3: Correlation Coefficients of Enjoyability & Effectiveness Ratings of Teaching Techniques

Teaching Method/Technique (Enjoyability & Effectiveness)	r
Lecture Method	.572**
Whiteboard/Blackboard representation	.452**
Powerpoint Presentation	.609**
Visual Aids	.685**
Fictional Stories	.670**
Vignettes	.221
Reading of Newspaper Articles	.192
Role Plays	.633**
Demonstrations	.437**
Experiments	.609**
Songs	.641**
Movies	.521**
Video clips / Documentaries	.504**
Group Discussions	.620**
Debates	.281*
Quizzes	.675**
Word Search/Crossword Puzzles	.622**
Word games (guess the word/term, hangman, etc.)	.608**
Other games (Dumb Charades, Pictionary, match the pairs)	.696**
Activities (introspection tests, fun tests, psychological tests, etc.)	.174
Fieldtrips	.564**
Presentations by students (formal, skits, ads, fashion show)	.796**
Assignments	.657**
External Resource Persons / Guest lecturers	.638**
Virtual Class (Google Meet, Zoom, etc.)	.753**

* Correlation is significant at the 0.05 level (2-tailed) ** Correlation is significant at the 0.01 level (2-tailed)

Analysis of qualitative data indicated that most of the participants preferred Vignettes/Real Life Examples as a teaching technique, followed by Innovative Visual Aids, Demonstrations, Fictional Stories, Movies, Videos and Practical Methods such as Activities and Field Trips. The reasons for the same are given in Table 4 in *verbatim* (thick descriptions).

Table 4: Qualitative Responses about Techniques Most Liked

Technique	Reasons
Vignettes/Real Life Examples	*"Sharing personal experiences shows reality and I can relate to stories which helps me learn better."* *"I love listening to life stories as I connect to these situations the most."* *"When teacher shares her own experiences it is very easy to remember the points."*
Innovative Visual Aids	*"Because it is fun and interesting and helps you enjoy your studies and learn better."* *"I like the puppet shows."*
Demonstrations	*"Because you get to study about things step-by-step."* *"Because it is a practical live example. Helps you to remember."*
Fictional Stories	*"Makes you interested in topics you may otherwise feel bored about."*
Movies	*"Because it is fun and interesting and helps you enjoy your studies and learn better."*
Video Clips/Documentaries	*"Makes the subject interesting."*
Activities (introspection tests, fun tests, psychological tests)	*"Because it is interactive, relatable, better to understand and practical."*
Fieldtrips	*"Field trips are the best because we get to explore physically and practically, look the at the things which directly go in our memory."*

The techniques least liked by the participants were Virtual Classes, Assignments, Presentations by Students and PowerPoint Presentations, the reasons for which are elaborated further in Table 5.

Table 5: Qualitative Responses of Techniques Least Liked

Technique	Reasons
Virtual Class	*"Virtual classes are the worst because I don't stay focused."* *"Virtual classes are the most boring lectures as you tend to get distracted after a certain point of time."* *"Because I can't connect with the teacher properly."*
Assignments	*"As most of the time I just copy paste from the internet and don't learn anything."*

PowerPoint Presentations by Students	*"Some exceptional presentations may be interesting but most are boring." They (students) don't explain properly*

The participants were also asked to mention any teaching techniques that they enjoyed but which may not have been mentioned in the questionnaire. Some suggestions that came up were outdoor teaching, friendly chats, drawing, art and craft, doing creative things and having question and answer sessions with points and prizes. Incidentally, one of the faculty members had tried out the idea of outdoor teaching during a non-sunny day, with a smaller group of students, teaching in a conversational way while walking in the College campus, and stopping at intervals to discuss what was seen. This was enjoyed by most of the students and could be one of the reasons for the suggestion, as it was not part of the study tool.

When asked about suggestions they could provide to make teaching more enjoyable and effective, they offered a range of responses. One of the interesting themes that evolved was that, if the teacher possessed certain qualities, any teaching method would be enjoyable and effective. Another suggestion was to give short breaks every 20 minutes to refresh the students' attention-capacity. Some suggestions given by the participants are summarized in Box 1.

Box 1: Suggestions from Students for More Enjoyable and Effective Learning

Suggestions from Students *for More Enjoyable and Effective Learning*

- Interact with each student individually
- Conduct experiments/tests to understand students
- Take students' interest and capacity into consideration
- Use a variety of teaching techniques
- Encourage students to participate in activities
- Make games (on apps like Kahoot) and give points to students
- Reward the students for right answers/certain number of points with small gifts
- Give small breaks within the lecture
- Have interesting activities in between topics
- Teach things which are related to the self and useful in life

DISCUSSION

The teaching technique that received the highest ratings on both enjoyability and effectiveness were Vignettes/Real Life Examples, which confirms the observations made by Singh (2010) and Aujla (2009) that teachers who were appreciated, used this technique in the teaching-learning process. This validates that students "connect" with what is being taught when they find its application to life. As one of the participants said, it relates to personal life and keeps the student "involved" in the learning.

Both quantitative and qualitative data revealed that Movies and Video-clips/ Documentaries were teaching techniques that participants enjoyed the most. Considering that this is the era of technology, it seems like students find Audio-Visual techniques more attention-grabbing and appealing.

Participants also gave higher ratings to Innovative Visual Aids which consisted of real objects/pictures/storybooks/mobiles/puppets, and so on. Visual aids help keep the attention focused on something that they can "see". Kesting (2012) writes that about 60% of people are visual learners. Hence using visual aids as a teaching technique would not only be enjoyable but effective for learning as well.

Fieldtrips were also cited as a technique enjoyed the most. Many adolescents like to travel and move around. If this is called "studies" then studies are enjoyed as well (Aujla, 2009). Involving movement and practical exposure are also beneficial to students who may be 'kinesthetic' learners.

Activities such as introspection tests, fun tests, psychological tests, and Games such as Dumb Charades, Pictionary, match the pairs, were also found both enjoyable and effective as resonated in the writings of Singh (2010) and Aujla (2009).

The results of this study demonstrate that students prefer the use of methods that allow active involvement between the student and teacher. This contrasts from other studies (e.g. Singh & Thurman, 2019), which showed that student preferences were for independent learning, apart from teachers and their peers.

The quantitative analysis revealed that the least-liked as well as least effective teaching techniques were Virtual Class, Assignments, and External Resource Persons. Virtual Class received the lowest rating comparatively, and was reported to be boring and distracting as students get a sense of being invisible. Ratten (2020), also reported that students were not able to connect with the teacher. This resonates with findings of other Indian studies (e.g. Sharma & Alvi, 2021). Thus, virtual classes have to be more personalized and interactive (Ratten, 2023; Mukhtar, Javed, Arooj, & Sethi, 2020). However, virtual classes usually lack the tangible aspect of sensorial learning.

Assignments, like home-work were looked upon as a burden. Often they are completed with just a click on the internet, with the matter presented to the teacher, hyperlinks and all! Apps like Chat GPT and Google Gemini make doing assignments even more easy, defeating their purpose.

External Resource Persons were viewed as boring as students do not like their teaching techniques. Some of the resource persons are sent to deliver sessions as part of other compliance activities. Given small bands of time, they deliver lectures, which don't seem relevant to students. Similarly reading Newspaper/ Magazines/ Journal Articles was viewed as boring perhaps because this technique calls for passive reading/listening, unless supplemented with an interactive component.

Lecture method was least-liked in the qualitative responses, when they were only auditory and with no involvement of the student. However several participants rated it highly and mentioned that if they are interactive lectures then it is very effective in learning. A few students stated that with so-and-so teacher's style all lectures are interesting and effective. This not only emphasizes the qualities and special abilities of the teacher as an important factor in teaching techniques, but also indicates that teachers must possess/acquire the qualities required to use these techniques in a student-friendly way.

The key take-away for educators is that students prefer teaching methods that are interactive and relational. The use of senses, through audio-visual aids or activities, make the learner feel involved and "seen" as opposed to virtual learning where one is behind a 'one-way screen'. Students today also prefer being active, and this calls for educational institutes to organize more field trips, field-work, on-site training, and simulated learning opportunities. Teachers are

also called upon to develop qualities such as empathy, openness, flexibility and humility to ensure that students find them approachable and accommodating. Adoption of methods that are multi-sensorial and/or experiential would not only cater to multiple learning styles/intelligences, but also meet the criteria of inclusiveness.

CONCLUSION AND IMPLICATIONS

This study highlights that innovative teaching techniques are much appreciated in learning. Students prefer methods involving practical application and sensorial stimulation as compared to virtual classes or passive lectures, demonstrating a shift in educational paradigms. It also highlights that 'how' something is taught is as important as 'what' is taught, indicating the need for teachers to transform from within (skills, qualities) and without (teaching strategies). With multiple changes permeating the education system, it is imperative that teachers make 'lectures' more enjoyable by using innovative methods to make students *active partners* in the teaching-learning process. Only then will education in the 21st century be what it claims to be.

SUGGESTIONS FOR FUTURE RESEARCH

Future research could explore challenges of teachers in adopting creative methods, or use qualitative approaches like focus group discussions to understand students' preferences or gather suggestions for more engaging teaching.

REFERENCES

- Ahmad, (2010). Effectiveness of Innovative and Traditional Methods of Teaching Biology in Junior College. *International Referred Research Journal, 18* (2), 35-36.
- Aujla, S. (2009). Professors of the Year are Celebrated for Innovative Teaching. The Chronicle of Higher Education. Retrieved, 30th December, 2023 from http://chronicle.com/article/Professors-of-the-Year-Are/49208/
- Bora, B., Bora, M.K., Saharia, D., Gogoi, J. (2009). *Innovative Teaching-Learning Process in the Undergraduate Colleges in Assam, India.* Unpublished Dissertation. Gauhati University.
- Coelho, N., Kanwar, A. & Divecha, R. (2007). *The Factors Affecting the Quality of Higher Education in India: A Comparison of the Perspectives Held By Teachers, Students and Parents.* Paper presented at The XXVII Biennial Conference 'Expanding Horizons for Professionals in Family & Community Sciences.' Jabalpur Chapter: Home Science Association of India.
- Damodar, V.S. & Rengarajan, V. (2003). Innovative Methods of Teaching. Unpublished Article.
- Heredia, R. C. (1981). *Structure and Performance of College Education*. Bombay: Somaiya Publications Private Limited.
- Hogan, P. M. (1996). The Ethics of Innovative Teaching in Higher Education. *The Journal of General Education, 45(4),* 270-294.
- Høgdal C., Rasche A., Schoeneborn D., Scotti L. Exploring student perceptions of the hidden curriculum in responsible management education. *Journal of Business Ethics.* 2021;168(1):173–193.

- Lieb, S. (1991). Principles of Adult Learning. *Vision.* Retrieved 10th October, 2011 from http://www2.honolulu.hawaii.edu/facdev/guidebk/teachtip/adults-2.htm
- Mukhtar, K., Javed, K., Arooj, M., & Sethi, A. (2020). Advantages, Limitations and Recommendations for online learning during COVID-19 pandemic era: Online learning during COVID-19 pandemic era. *Pakistan Journal of Medical Sciences*, *36*(COVID19-S4). https://doi.org/10.12669/pjms.36.COVID19-S4.2785
- Rajgopal, (2008). *Innovative Teaching Practices in Management Education.* Document prepared for discussion in the Teaching Effectiveness Seminar, Florida.
- Ratten V. (2020). Coronavirus (Covid-19) and the entrepreneurship education community. *Journal of Enterprising Communities: People and Places in the Global Economy, 14*(5), 753–764. https://doi.org/10.1108/JEC-06-2020-0121
- Ratten V. (2023). The post COVID-19 pandemic era: Changes in teaching and learning methods for management educators. *The International Journal of Management Education, 21*(2),100777. doi: 10.1016/j.ijme.2023.100777.
- Sajjad, S. (2010). *Effective Teaching Methods at Higher Education Level.* Unpublished Study. University of Karachi, Pakistan. Retrieved on 30th December 2023, from https://www.schoollearningresources.com/PDF/_1.Effectiveteachingmethodsathighereducationlevel.pdf
- Sharma, A. & Alvi, I. (2021). Evaluating pre and post COVID 19 learning: An empirical study of learners' perception in higher education. *Education and Information Technologies, 26*, 7015-7032. doi: 10.1007/s10639-021-10521-3.
- Singh, S. (2010). *Innovative Teaching Methodologies and India.* Reader's Quotient. Retrieved, 30th August, 2011from http://readersquotient.com/india/innovative-teaching-methodologies-and-india on.
- Singh, V., & Thurman, A. (2019). How Many Ways Can We Define Online Learning? A Systematic Literature Review of Definitions of Online Learning (1988-2018). American Journal of Distance Education, 33, 289-306. https://doi.org/10.1080/08923647.2019.1663082
- Kesting, S. (2012). Sensory Learning Styles. Retrieved, 30th December, 2023 from http://www.grapplearts.com/Learning-Styles-in-Grappling.htm
- Stecuła, K., & Wolniak, R. (2022). Advantages and Disadvantages of E-Learning Innovations during COVID-19 Pandemic in Higher Education in Poland. *Journal of Open Innovation: Technology, Market, and Complexity*, *8*(3), 159. https://doi.org/10.3390/joitmc8030159
- *Times of India, Goa,* 4th September, 2011, p.2. Schools Still Using Dated Methods.
- Xu, D. & Jaggars, S.S. (2013). The impact of online learning on students' course outcomes: Evidence from a large community and technical college system. *Economics of Education Review, 37*(1), 46-57. doi10.1016/j.econedurev.2013.08.001
- Zhao Y, Watterston J. (2021). The changes we need: Education post COVID-19. Journal of Educational Change, 22(1), 3–12. doi: 10.1007/s10833-021-09417-3.
- http://serc.carleton.edu/NAGTWorkshops/coursedesign/tutorial/strategies.html retrieved on 30th December, 2023.

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CORRELATION BETWEEN STRESS LEVEL AND BEHAVIOUR PROBLEMS AMONG ADOLESCENT GIRLS

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ABSTRACT

Adolescent age is marked by a rapid and potentially stormy transition, including biological, social, and psychological changes and unstable self-concepts, and their experience during this time makes them especially vulnerable to stress. Adolescents' aggressive behaviour and having fewer coping skills have become a crucial concern and certainly need vigilant attention. The present study aims to assess the correlation between stress levels and behavioural problems among adolescent girls. The study was conducted among 14-17-year-old female students from various schools in Deoria District, Uttar Pradesh. Data was collected with the help of the Adolescent Behaviour Questionnaire. Statistical analysis was performed using SPSS version 20. Findings reveal that the maximum behavioural problem among adolescent girls was frustration (2.4±0.72), followed by confusion (2.36±0.71), mood swings (2.36±0.61), being easily upset (2.36±0.70), a reserved nature (2.3±0.66), and a lack of confidence (2.23±0.77), respectively. The minimum behavioural problem was daydreaming (0.3 ± 0.466). 43% of adolescent girls were found to have a low level of stress, while 26.7% had a moderate level, followed by 16.7% with a high level, and 13.3% had a very high level of stress, respectively. The present study also demonstrates a significant correlation between family type and the family environment of adolescent girls. A significant correlation was found between stress level and family environment, school environment, daydreaming, feeling puzzled or confused, frustration, lack of confidence, mood swings, being easily upset, and a reserved nature among adolescent girls at a p-value of 0.01. From the above result, it can be concluded that high levels of stress are significantly correlated to behavioural problems and the need to prevent mental health problems at an early stage and promote mental well-being.

KEYWORDS: Adolescent stress, Behavioural problems, Psychological well-being

INTRODUCTION

Stress is a state of mental strain on a specific person dealing with issues related to their social and environmental well-being, which can result in a variety of illnesses. Early in life is a crucial time because a student's life is undergoing significant changes. The modern student lives in a highly competitive world that places considerable pressure on pupils to succeed today. Stress is a natural occurrence for everyone a characteristic of human existence. Stress is an emotional dysregulation that can occur for several reasons, including exams, workloads, and assignments, as well as the

competitive nature of one's chosen field and concerns about financial support for education and the future.

Adolescence is a stage that occurs between childhood and adulthood. Due to the rapid changes in physical and mental growth during this stage, adolescents may encounter incompatibilities with their social environment or cognitive development, leading to issues resulting from insufficient adaptation. These issues could potentially result in deviant actions and further psychological problems. Young individuals are most vulnerable during adolescence. Feel disoriented and confused about their role. The primary sources of stress are exams, relationships, life transitions, and job exploration. Psychological, physical, and behavioural issues are frequently caused by such stress.

Stress is an emotional imbalance that can be triggered by various factors, including exams, papers, projects, the competitive nature of one's chosen field, financial concerns related to education, and future job prospects (Ross *et al.,* 1999). It is crucial to remember that students require a certain amount of stress to be motivated to pursue their academic goals actively; without stress, they would be passive and uninteresting (Nandamuri *et al.,* 2011). These differences occur because significant variations exist in the new tertiary educational system's teaching methodologies, academic requirements, faculty connections, and even student-student relationships (Thawabieh and Qaisy, 2012). People's adaptive and healthy response to a threat can be stress, which mobilises them. In today's highly competitive world, students face various behavioural challenges, including exam anxiety, disinterest in attending class, and difficulty understanding the material. As a result, they may not put forth their best effort on tests. Many teenagers also experience depression, fatigue, panic attacks, and nervous breakdowns. Since students are viewed as the future pillars responsible for leading our country into the next phase, they should receive better support and treatment. To keep this in mind, the present study aims to assess the correlation between stress levels and behaviour problems among adolescent girls.

OBJECTIVE

The study aims to assess the correlation between stress level and behavioural problems among adolescent girls.

METHODOLOGY

The study was conducted among 14- to 17-year-old girls from various schools in the Deoria district, Uttar Pradesh. Data collection was carried out using two standardised instruments: the M. Singh Stress Scale and the Newcastle Adolescent Behaviour Questionnaire (Place *et al.,* 1987). These tools were chosen for their reliability and validity in assessing stress and adolescent behaviour, respectively. The M. Singh Stress Scale measures the levels of stress experienced by individuals, while the Newcastle Adolescent Behaviour Questionnaire evaluates various aspects of adolescent behaviour, including emotional and social functioning. Data analysis was done using SPSS version 20.

FINDINGS AND DISCUSSION

Table 1 Mean ± SD Of Behavioural Problems Among Adolescent Girls

Behavioural problem	Mean ± SD
Day Dreaming	0.3±.466
Frustration	2.4±0.72
Confusion	2.36±0.71
Mood Swings	2.36±0.61
Easily Upset	2.36±0.70
Reserved Nature	2.3±0.66
Lack of Confidence	2.23±0.77

Table 1 shows the Mean ± SD of behavioural problems among adolescent girls. Findings reveal that the maximum behavioural problem among adolescent girls was frustration (2.4±0.72), followed by confusion (2.36±0.71), mood swings (2.36±0.61), being easily upset (2.36±0.70), a reserved nature (2.3±0.66), and a lack of confidence (2.23±0.77), respectively. The minimum behavioural problem was daydreaming (0.3±0.466).

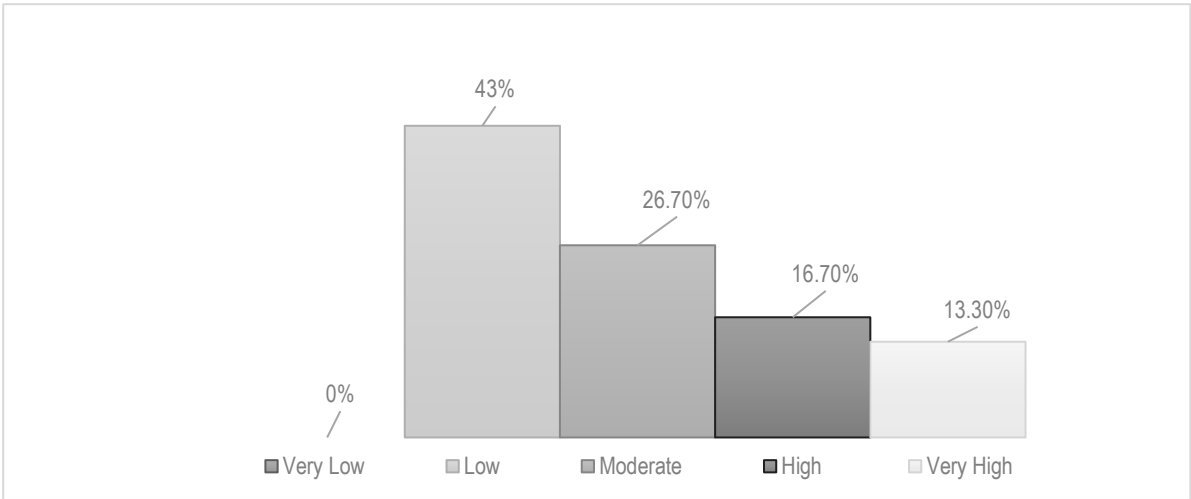


Figure No. 1 Level of Stress Among Adolescent Girls

Figure 1 demonstrated that 43% of adolescent girls had a low level of stress, while 26.7% had a moderate level, followed by 16.7% a high level and 13.3% very high level of stress, respectively.

		Type of Family	Family environment
Type of Family	Pearson Correlation	1	-.155
	Sig. (2-tailed)		.414
	N	30	30
Family environment	Pearson Correlation	-.155	1
	Sig. (2-tailed)	.414	
	N	30	

Table – 2 Correlation Between Family Environment and Type of Family

The findings of Table 2 reveal a significant correlation between family type and family environment at the 0.05 level. Findings suggest a statistically significant relationship between family type and family environment.

Table 3 Correlation Between School Environment And Stress Level

		School environment	Stress level
School environment	Pearson Correlation	1	.05
	Sig. (2-tailed)		.794
	N	30	30
Stress level	Pearson Correlation	.05	1
	Sig. (2-tailed)	.794	
	N	30	30

The findings in Table 3 show a significant correlation between the school environment and stress level at the 0.05 level.

Table 4 Correlation Between Family Environment And Stress Level

		Family environment	Stress level
School environment	Pearson Correlation	1	.148
	Sig. (2-tailed)		.436
	N	30	30
Stress level	Pearson Correlation	.148	1
	Sig. (2-tailed)	.436	
	N	30	30

Table no. 4 A significant correlation is observed between family environment and stress level at $p < 0.01$.

Table - 5 Correlation Between Stress Level And Day Dreaming

		Stress level	Day Dreaming
Stress level	Pearson Correlation	1	.177
	Sig. (2-tailed)		.350
	N	30	30
Day Dreaming	Pearson Correlation	.177	1
	Sig. (2-tailed)	.350	
	N	30	30

Table 5 shows a significant correlation between stress level and daydreaming at 0.05.

Table – 6 Correlation Between Stress Level And Confusion

		Stress level	Confusion
Stress level	Pearson Correlation	1	.197
	Sig. (2-tailed)		.297
	N	30	30
Confusion	Pearson Correlation	.197	1
	Sig. (2-tailed)	.297	
	N	30	30

Table 6 shows a significant correlation between stress level and confusion at a 0.05 level.

Table – 7 Correlation Between Stress Level And Frustration

		Stress level	Frustrated
Stress level	Pearson Correlation	1	.186
	Sig. (2-tailed)		.326
	N	30	30
Frustrated	Pearson Correlation	.186	1
	Sig. (2-tailed)	.326	
	N	30	30

Table 7 shows a significant correlation between stress level and frustration at 0.05 level

Table -8 Correlation Between Stress Level And Lack Of Confidence

		Stress level	Lack of Confidence
Stress level	Pearson Correlation	1	.207
	Sig. (2-tailed)		.273
	N	30	30
Lack of Confidence	Pearson Correlation	-.207	1
	Sig. (2-tailed)	.273	
	N	30	30

The significant correlation between stress level and lack of confidence in adolescent girls is indicated in Table 8 at the 0.05 level.

Table –9 Correlation Between Stress Level And Mood Swings

		Stress level	Mood Swings
Stress level	Pearson Correlation	1	.018
	Sig. (2-tailed)		.924
	N	30	30
Mood Swings	Pearson Correlation	.018	1
	Sig. (2-tailed)	.924	
	N	30	30

Table 9 Significant Correlation between stress level and mood Swings at 0.05 level.

Table 10 Correlation between stress level and easily upset

		Stress level	Easily upset
Stress level	Pearson Correlation	1	-.491
	Sig. (2-tailed)		.006
	N	30	30
Easily upset	Pearson Correlation	-.491	1
	Sig. (2-tailed)	.006	
	N	30	30

Table 11 Correlation Between Stress Levels And Reserved

		Stress level	Reserved
Stress level	Pearson Correlation	1	.199
	Sig. (2-tailed)		.291
	N	30	30
Reserved	Pearson Correlation	.199	1
	Sig. (2-tailed)	.291	
	N	30	30

Table 11 shows a significant Correlation between stress levels and reserve at 0.05 level.

DISCUSSION

Behavioural problems among adolescents could be a result of the psycho-social and psycho-sexual development that occurs during the adolescent period and causes issues in their lives (Kumar,2013). Adolescent behavioural problems are related to several factors, including gender, a family history of mental health issues, involvement in bullying, problematic social media use, excessive emotional expression in the home, and living in a metropolitan or urban area (Angsukiattitavorn *et al.,* 2020). Studies conducted by (Harikrishnan and Sailo, 2021; Adhikari *et al*., 2015) which are in accordance with the present findings, also suggest that adolescent girls experience a range of behavioural challenges related to family dynamics, emotional regulation, self-perception, and social interactions during adolescence.

Various factors influence stress, including individual resilience, coping mechanisms, social support, family dynamics, school environment, and personal experiences. It's when the combination of internal and external pressures exceeds the individual's resources to cope with their situation. It may be due to the impact of media, gender norms, exposure to adversity, peer pressure, social expectations, hormonal changes, and identity discovery, which can contribute to the gap between an adolescent's actual reality and their perceptions or desires for the future (WHO, 2021). Many studies also noticed that the risk of behavioural issues in adolescents increases when they experience stress (Elgar *et al.,* 2003; Krapić, *et al.,* 2015).

A person's family type can significantly influence their life, as families are the primary settings where social development occurs. Every family has a unique history, as well as social and economic factors that influence its dynamics (Roostin, 2018). An unfriendly family environment might cause stress among adolescents. A study conducted by Binuraj & Chitra (2022) also found significant mean differences between nuclear and joint families regarding the family environment.

The quality of the school environment, encompassing academic pressure, social dynamics, and teacher support, is linked to variations in stress levels among adolescents. Present observations suggest that the school environment can influence students' stress levels. Most of the research observed that stress level among adolescents was affected by their school environment, which involves things like tackling challenging subjects, having teachers with unreasonable expectations, struggling academically, having to wake up early for school, having to take public

transportation, not getting accepted by teachers, not being listened to, and having to deal with bullying and awkward situations (Byrne *et al*., 2022; Moya *et al.,* 2022; & Caldarella *et al.,* 2021).

Stress and confusion are closely linked in adolescents, with one potentially influencing the other. It highlights the importance of addressing both stress and confusion in adolescent development to promote overall well-being. Adolescence can be a challenging time with lots of changes happening physically (bodily changes and awakening sexuality), emotionally/psychologically (Personality/identity development, personal values, commitments and expectations, and emerging desires for autonomy and independence), and socially (like role ambiguity (child vs. adult), the influence of peer-group, and sexual relationships) (Schraml *et al.,* 2011). Stress and confusion often arise when plans conflict. It is essential to offer support and understanding during this crucial stage of development.

The relationship with family members or family environment plays a vital role in an adolescent's behaviour and emotional development (Repetti, 2002). Studies conducted by Auerbach & Ho (2012), Hughes *et al.* (2008), and Knappe *et al*. (2009) also revealed that family environment is closely connected with adolescents' behaviour and emotional problems such as anxiety, anger issues, etc. It also suggests that variations in the family environment are highly predictive of differences in stress levels among adolescents. Therefore, a positive family environment, characterised by strong communication, support, and healthy relationships, is associated with lower stress levels. In contrast, a hostile family environment may contribute to higher stress levels in adolescents. The present finding highlights the significance of supportive family dynamics in fostering mental well-being among young people.

Adolescents may use daydreaming as a coping mechanism to alleviate the symptoms of stress by shifting their attention from unpleasant to enjoyable thoughts (e.g., fantasising about scenarios that offer self-reward, such as futuristic, opulent lifestyles or hero worship). It could be because daydreaming is linked to mind wandering, a condition in which people struggle to focus or concentrate, which causes their brains to drift from unpleasant or neutral thoughts to more pleasant or neutral ones. Prior researchers also found a significant association between daydreaming and stress among the adolescent population (Conte *et al.,* 2023; Giambra, 1979).

Stressful psychological reactivity, emotional regulation, social comparison, environmental influences, academic pressure, and peer relationships can lead to frustration in adolescents as they navigate stress and strive to maintain emotional balance in the face of obstacles (Thaqib and Dubey, 2019) All these experiences that influence each other through emotional, cognitive, physiological, and behavioural mechanisms in adolescents could cause frustration. Combination of psychological impact, mental processes, social influences, developmental factors, gender-specific challenges, academic stress, and individual coping differences. Stressful experiences during adolescence can diminish confidence levels, affecting various aspects of their lives, as observed by Jeslin and Thephilah (2023). They may employ various psychological responses or coping mechanisms to deal with stress, which may also affect their mood, and mood disruptions have been reported in stressful adolescents (Schraml *et al.,* 2011).

The significant correlation between stress levels and being easily upset likely arises from stress's disruptive effects on emotional regulation, cognitive function, and physiological responses.

In high-stress situations, adolescents may struggle to manage their emotions effectively, leading to heightened sensitivity and reactivity, thus making them more prone to being easily upset.

Stress levels and reserve arise from complex interactions between physiological, psychological, behavioural, and biological factors. Dong & Liuna, 2023) also observed a significant correlation between nature deficit and adolescents' mental health in accordance with the present result.

SUMMARY AND CONCLUSION

Recent research suggests that the majority of school students experience high levels of stress. Explicitly daydreaming, lack of confidence, confusion, Frustration, mood swings, being easily upset, difficulty in dealing with behavioural problems, and family type, family environment, and school environment of instructors were among the academic stressors that inflict high stress. From the above findings, it can be concluded that high levels of stress are significantly correlated to behavioural problems and the need to prevent mental health problems at an early stage and promote mental well-being.

SUGGESTIONS

According to the results, it is essential to assess whether alternative behavioural selections can enhance therapeutic interventions aimed at supporting adolescents' mental health. Select a stress alleviation method that is effective for you, such as massage, yoga, meditation, or deep breathing.

REFERENCES

- Adhikari, R. P., Upadhaya, N., Gurung, D., Luitel, N. P., Burkey, M. D., Kohrt, B. A., & Jordans, M. J. D. (2015). Perceived behavioural problems of school-aged children in rural Nepal: A qualitative study. Child and Adolescent Psychiatry and Mental Health, 9(1). https://doi.org/10.1186/s13034-015-0061-8
- Angsukiattitavorn, S., Seeherunwong, A., Panitrat, R., & Tipayamongkholgul, M. (2020). Prevalence and distribution pattern of mood swings in Thai adolescents: A school-based survey in the central region of Thailand. BMC Psychiatry, 20(1). https://doi.org/10.1186/s12888-020-02605-0
- Auerbach, R. P., & Ho, M. H. R. (2012). A Cognitive-Interpersonal Model of Adolescent Depression: The Impact of Family Conflict and Depressogenic Cognitive Styles. Journal of Clinical Child and Adolescent Psychology, 41(6), 792-802. https://doi.org/10.1080/15374416.2012.727760
- Binuraj A, & Chitra, L. (2022). Comparison Of Family Environment Of Higher Secondary Students Based On Family Type, Locality And Socio-Economic Status. Journal of Positive School Psychology, 2022, 8, 6085-6095. http://journalppw.com
- Byrne D.G., Davenport S.C., & Mazanov J. (2007). Profiles of Adolescent Stress: The Development of the Adolescent Stress Questionnaire (ASQ) - ScienceDirect. Journal of Adolescence, 30(3), 393-416. https://doi.org/10.1016/j.adolescence.2006.04.004

- Caldarella, P., Larsen, R. A. A., Williams, L., Wills, H. P., & Wehby, J. H. (2021). "Stop Doing That!": Effects of Teacher Reprimands on Student Disruptive Behavior and Engagement. Journal of Positive Behavior Interventions, 23(3), 163-173. https://doi.org/10.1177/1098300720935101
- Conte, G., Arigliani, E., Martinelli, M., di Noia, S., Chiarotti, F., & Cardona, F. (2023). Daydreaming and psychopathology in adolescence: An exploratory study. Early Intervention in Psychiatry, 17(3), 263-271. https://doi.org/10.1111/eip.13323
- Dong Xia, & Geng Liuna. (2023). Nature deficit and mental health among adolescents: A perspective from the conservation of resources theory. Journal of EnvironmentalPsychology, 87. https://doi.org/https://doi.org/10.1016/j.jenvp.2023.101995
- Elgar F. J., Arlett C., & Groves R. (2003). Stress, Coping, and Behavioural Problems among Rural and Urban Adolescents. Journal of Adolescence, 26(5), 574-585. https://doi.org/https://doi.org/10.1016/S0140-1971(03)00057-5
- Giambra, L. M. (1979). Sex differences in daydreaming and related mental activity from the late teens to the early nineties. International Journal of Ageing and Human Development, 10(1), 1-34. https://doi.org/10.2190/01bd-rfne-w34g-9eca
- Harikrishnan, U., & Sailo, G. L. (2021). Prevalence of emotional and behavioural problems among school-going adolescents: A cross-sectional study. Indian Journal of Community Medicine, 46(2), 232-235. https://doi.org/10.4103/ijcm.IJCM_451_20
- Hughes, A. A., Hedtke, K. A., & Kendall, P. C. (2008). Family functioning in families of children with anxiety disorders. Journal of Family Psychology, 22(2), 325-328. https://doi.org/https://psycnet.apa.org/doi/10.1037/0893-3200.22.2.325
- Jeslin, R., & Thephilah, C. R. (2023). A Correlational Study to Assess the Relationship Between Academic Stress and Level of Self-esteem Among Adolescents in Selected Settings. Journal of Pharmaceutical Negative Results ¦, 14(2(Sp)), 1979-1987. https://doi.org/10.47750/pnr.2023.14.S02.237
- Knappe, S., Beesdo, K., Fehm, L., Lieb, R., & Wittchen, H. U. (2009). Associations of familial risk factors with social fears and social phobia: Evidence for the continuum hypothesis in social anxiety disorder? Journal of Neural Transmission, 116(6), 639-648. https://doi.org/10.1007/s00702-008-0118-4
- Krapic, N., Hudek-Knežević, J., & Kardum, I. (2015). Stress in Adolescence: Effects on Development. In International Encyclopedia of the Social & Behavioral Sciences: Second Edition (pp. 562-569). Elsevier Inc. https://doi.org/10.1016/B978-0-08-097086-8.23031-6
- Kumar. (2013). Adolescence Behaviour Problems: How to Tackle or Prevent? I-Manager's Journal on Educational Psychology, 6(4), 13-17.
- Moya, M. S., Caldarella, P., Larsen, R. A. A., Warren, J. S., Bitton, J. R., & Feyereisen, P. M. (2022). Addressing Adolescent Stress in School: Perceptions of a High School Wellness Center. Education and Treatment of Children, 45(3), 277-291. https://doi.org/10.1007/s43494-022-00079-1
- Nandamuri, P. P., & C H, G. (2011). Sources of academic stress - a study on management students. Journal of Management and Science, 1(2), 95-106. https://doi.org/10.26524/jms.2011.12
- Place, M., Kolvin, I., & Morton, S. M. (1987). The Newcastle Adolescent Behaviour Screening Questionnaire. British Journal of Psychiatry, 151(JULY), 45-51. https://doi.org/10.1192/bjp.151.1.45

- Repetti, R. L., Taylor, S. E., & Seeman, T. E. (2002). Risky families: Family social environments and the mental and physical health of offspring. In Psychological Bulletin (Vol. 128, Issue 2, pp. 330-366). American Psychological Association Inc. https://doi.org/10.1037/0033-2909.128.2.330
- Roostin, E. (2018). Family Influence on The Development of Children | 1 Family Influence on The Development of Children. Journal of Elementary Education, 2(1).
- Ross, S. E., Niebling, B. C., & Heckert, T. M. (1999). Sources of stress among college students. College Student Journal, 33(2), 312-318
- Schraml Kari, Perski Aleksander, Grossi Giorgio, & Simonsson-Sarnec Margareta. (2011). Stress symptoms among adolescents: The role of subjective psychosocial conditions, lifestyle, and self-esteem. Journal of Adolescence, 34(5), 987-996. https://doi.org/https://doi.org/10.1016/j.adolescence.2010.11.010
- Thaqib Afeefa, & Dubey, G. (2019). THINK INDIA (Quarterly Journal) A Study of Frustration Tolerance among Adolescents. THINK INDIA (Quarterly Journal), 22(4), 5753-5760.
- Thawabieh, A. M., & Qaisy, L. M. (2012). Assessing Stress among University Students. In American International Journal of Contemporary Research (Vol. 2, Issue 2). www.aijcrnet.com
- WHO. (2021). Mental Health of Adolescents. https://www.who.int//news-room/fact-sheets/detail/adolescent-mental-health/?gad_source=1

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FINANCIAL INSECURITY AND UNDERUTILISATION OF ASSISTANCE SCHEMES: A STUDY OF SENIOR CITIZENS LIVING IN INSTITUTIONAL CARE HOMES

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ABSTRACT

The National Policy for Older Persons 1999 was designed for the welfare and well-being of senior citizens in India. An important component of this policy is to promote older persons with adequate financial resources and access to pension schemes, social security benefits, and all other financial support to meet their basic needs. Goa accounts for 11.2% of the elderly population, out of which a significant number of the aged population lives in institutional care facilities. The financial needs of the elderly living in institutional care facilities are different from those of the elderly who stay with family. This paper focuses on the accessibility, awareness, and utilisation of the financial welfare of the elderly in institutional settings. This study surveyed four private institutional care facilities. Data was collected using a structured questionnaire. The results show that elderly individuals in institutional care homes are either unaware of their eligibility for these schemes or face challenges that prevent them from accessing the benefits of these schemes. Also, those elderly who avail of these financial schemes showed that the amount is insufficient to meet basic medical and clothing needs, increasing their dependency on the institution for survival. In conclusion, the study suggests adopting welfare policies that are an elderly-centred approach, particularly for those living in institutional care.
Keywords: Older Adults, Old Age Homes, Problems, Schemes, Utilisation

INTRODUCTION

As India moves towards its vision of a *Viksit Bharat* by 2047, the rapidly growing ageing population is a critical challenge that requires urgent attention. Advancements in Healthcare and quality services significantly impact life expectancy in India, facilitate better health outcomes, reduce mortality rates and enhance overall well-being (Patel, 2024; Lau et al., 2012). This demographic transition poses significant economic and social challenges, necessitating comprehensive national and state-level policies. The elderly population faces diverse needs, including financial security, healthcare, social inclusion, and support systems (Saini & Gambhir, 2024; Chithra et al., 2021). Addressing these concerns is essential for their well-being and sustainable development by balancing economic growth with social equity.

Recognising the challenges an ageing population poses, the Government of India has implemented several policies and legal frameworks to safeguard the rights and welfare of senior citizens. The National Policy on Older Persons (2011) and India's commitment to the Madrid International Plan of Action on Ageing underscore the country's efforts in promoting social security for the elderly. The Maintenance and Welfare of Parents and Senior Citizens Act, 2007, further empowers elderly individuals by allowing them to seek legal action against neglectful children. Additionally, the Indian Constitution, under Article 41, mandates the state's responsibility to secure public assistance for senior citizens. Despite these initiatives, gaps remain in ensuring the holistic well-being of the elderly, as reflected in the rising number of old-age homes, indicating the inadequacy of family-based care and state support.

Goa has one of the highest proportions of elderly citizens in India. The 2011 Census recorded 11.2% of Goa's total population (approximately 1,63,357 individuals) as senior citizens, with around 89,000 females and 74,000 males. However, awareness of elderly welfare laws remains low. According to the India Ageing Report 2023, only 22% of elderly individuals in Goa are aware of the 'Maintenance and Welfare of Parents and Senior Citizens Act, 2007', indicating a significant gap in policy outreach and implementation.

Challenges of the elderly

India's family structure has changed due to urbanisation, migration, and smaller family sizes, reflecting changing fertility and age dynamics. The elderly population grows significantly, creating economic challenges (Chakravorty et al., 2021). A growing elderly population means an increased dependency ratio, where fewer working-age individuals support a larger retired population. The financial support given to the elderly depends on the earning capacity of adults (Bhagat & Unisa, 2006). This dependency on adults can restrict the elderly from asking for personal needs, as they fear it will lead to conflict. The health of older adults plays a vital role. If an older adult has Poor health, it reduces life satisfaction, increases family stress and makes elderly individuals more dependent on others. (Chokkanathan & Mohanty, 2017). Therefore, this study delves into the importance of Social welfare schemes in addressing the issues of the elderly in Goa.

OBJECTIVE OF THE STUDY

- To know about the awareness of financial security schemes among the senior citizens.
- To assess the accessibility of financial welfare schemes that benefit the elderly in institutional care homes.
- To discern the challenges senior citizens face in utilising the schemes.

RESEARCH METHODOLOGY

This study has focused on the most marginal group, older adults living in old-age homes. Ageing challenges, along with financial dependency, have affected well-being and status. This study used an exploratory and descriptive research design to understand the scheme's accessibility, utilisation, and awareness.

Study setting:

The study is conducted in four institutional care homes in Bardez. Non-government organisations managed these homes. Prior permission was obtained to conduct interviews at the facility. The institution was informed about the purpose of the study, and an appointment was made to visit and conduct the study. These four institutions are very new in their structure and functioning.

Methods and tools:

The purposive sampling method is used to identify these homes. The homes were selected based on their locality (within the jurisdiction of Bardez). A structured questionnaire is used to collect the profile of respondents and their awareness and utilisation of national and state schemes for the elderly. Interviews were conducted to gather data. The respondents were made aware of the purpose of the study.

Sample size:

A simple random sampling method is used to collect data. From four institutions, a total of 45 respondents volunteered for the interviews. Most respondents in these homes were very old, and some did not want to participate in the study.

Limitations of the study:

- The study is conducted in four institutional care homes for the elderly. More institutions can be studied.
- Senior citizens living with family can also be studied to understand their needs and utilisation of schemes.

RESULT AND DISCUSSION

I. BACKGROUND OF THE RESPONDENTS

1. Age Category of the Respondents (Fig. No. 1)

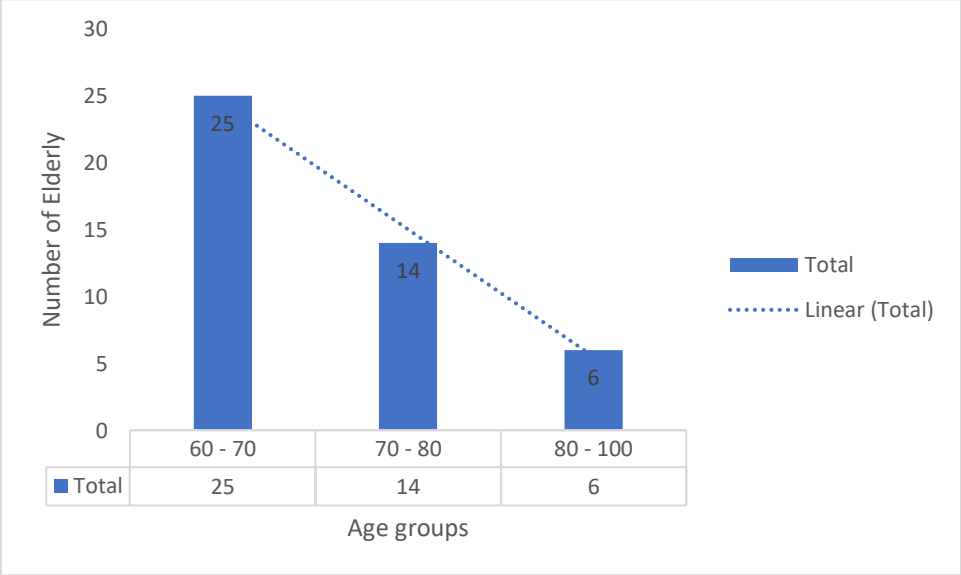


Fig. No. 1: Age Groups of the Respondents of this study. Recorded from four institutional care homes.

In Figure No.1, a total of 45 respondents were studied in this paper; the paper tried to look into the financial status of the elderly and their utilisation of schemes, especially those living in old-age homes. This study showed that more older citizens of 60-70 years (55.56%) and above reside in old age homes. This shows that as older adults, as soon as they turn 60 years old, they are admitted into old-age homes, as the requirement to be declared a senior citizen is 60 years of age. The elderly in this age category are neither fragile nor physically dependent on others. The study shows a progressive decline in the age group above 70 years old. It may imply that elderly individuals in the oldest age groups, who are likely to require more support and care due to age-related health and mobility issues, rely more on institutional care. As people age significantly beyond 70, health problems like reduced mobility, chronic illnesses, or cognitive decline increase, necessitating more extensive assistance. Families may find it challenging to provide constant care, leading to institutionalisation as a viable option for those in advanced age groups. Many younger elderly (60–70) may reflect changing family structures and weakening intergenerational ties in Goa, where migration, urbanisation, and tourism-related economic shifts have altered traditional caregiving patterns. Sociologically, this distribution mirrors life course transitions where elderly individuals are institutionally segregated soon after retirement, experiencing a shift from family/community roles to passive roles within a total institution (Goffman, 1961). Elderly individuals in their 60s may benefit from active engagement programs. At the same time, those 80+ may need medicalised and assisted living support, which is possibly lacking.

2. **Family Structure of the Respondents (Fig. No.2)**

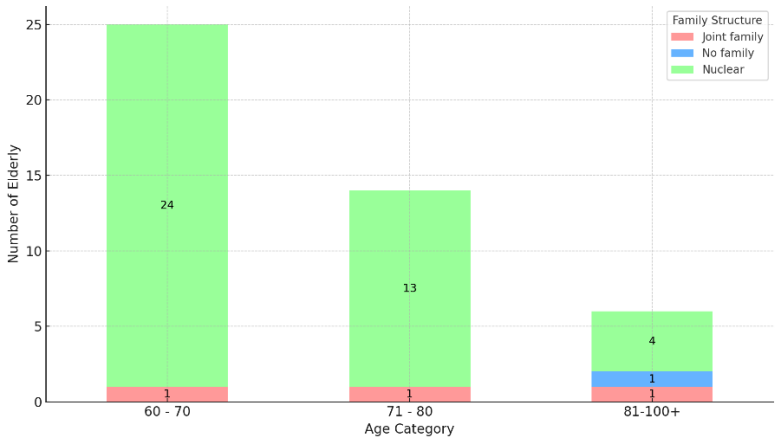


Fig.No.2: Family structure of the respondents in this study.

As shown in Figure 2, out of 45 respondents, 42 came from nuclear families, and only 3 had joint families in each age group. This highlights the family structure of the respondents. The decline of joint families reflects shifts in power dynamics within the structure of families, where elders may have reduced authority and economic dependence, leading to potential neglect or marginalisation. Economic pressures in nuclear families may cause intergenerational tensions, making old-age homes a practical choice. The meaning of family and elder care is evolving; younger generations may view individual independence and institutional care as acceptable alternatives to intergenerational co-residence. Elderly individuals in nuclear families might experience a sense of isolation or emotional detachment, influencing their decision or need to move into old age homes.

3. Status of Respondents' Children

A total of 25 respondents stated that they have children, reflecting a transformation in family structures, caregiving norms, and intergenerational relationships in 21st-century society. Sociologically, this trend can be understood as the traditional role of the family as the primary caregiver being outsourced to institutions due to changes in economic and social structures. The nuclearisation of families, increased mobility for employment, and dual-income households have reshaped caregiving dynamics, making it difficult for children to accommodate elderly parents within their homes. The study shows a fascinating result: the age group between 60 and 70 has around 25 respondents, 15 of whom did not have children. There are two things to know here: They have no children, which means they have no one to depend on in old age. They came from nuclear families, where they became a burden on other family members. Second, the families waited for these older adults to turn 60 and then shifted them to old homes.

4. Educational Background and Occupations of the respondents (Figure No. 3)

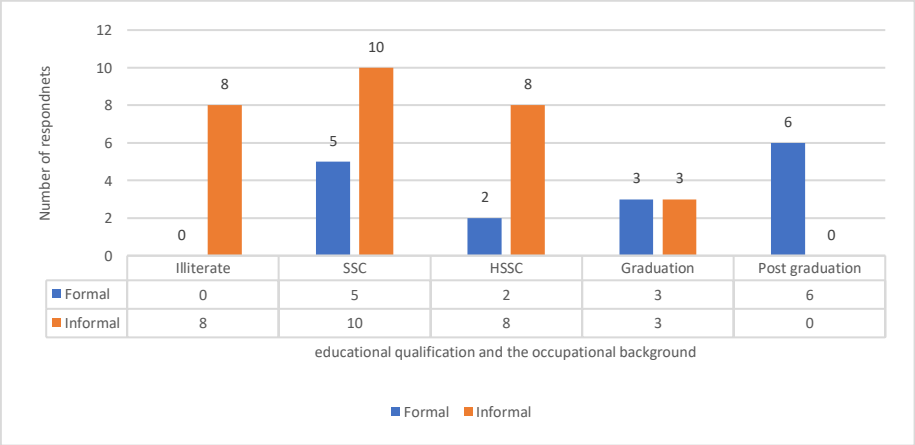


Fig.no.3: Represents data of the study indicating the educational qualification of the respondents.

The figure no. 3 shows the study data collected indicating the relationship between education and occupation among elderly women in Goan old age homes, which reflects gendered social structures. Women with higher education (postgraduates) predominantly worked formal jobs like teaching. Compared to those with lower education (illiterate, HSSC), they were confined to informal roles or unpaid domestic work. Despite educational qualifications, many women remained housewives, showing how patriarchal norms limited their economic participation. This highlights the unequal conversion of educational capital into employment, shaped by age, gender, and class. The data reveals how societal expectations historically restricted women's access to formal work, making their contributions invisible and undervalued within the labour market.

The majority being illiterate or having education below SSC highlights how low levels of education contribute to their financial dependence on government schemes. Individuals with limited education often lack access to formal employment opportunities, which means they are less likely to have pensions, savings, or stable income sources in their later years. Without the financial security

from higher-paying jobs or long-term employment benefits, these elderly individuals rely heavily on social welfare schemes for their basic needs and survival.

II. FINANCIAL DEPENDENCY

5. Awareness of schemes (Figure No.4)

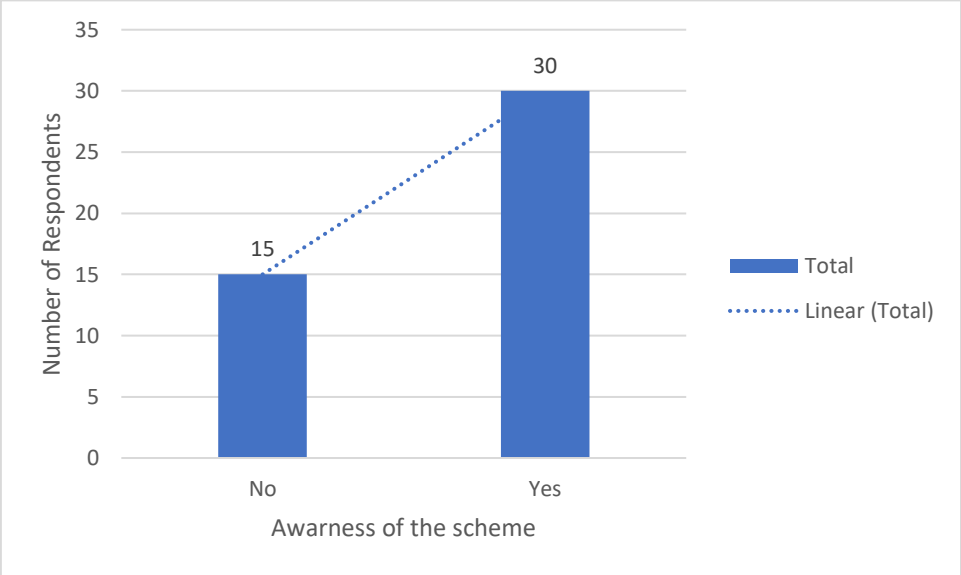


Fig. 4: The bar graph represents the data collected in this study about the inmates' awareness of schemes.

Figure No.4 reflects a significant gap in awareness that directly impacts the ability of the elderly to access social welfare programs. A total of 30 respondents were aware of the schemes that they were utilising. The most common one was the Dayanand Social Security Scheme (DSSS). This state programme provides a monthly pension of ₹2,000 to senior citizens, with additional financial support for those requiring prolonged medical treatment. The respondents of the age group between 60-70 highlighted that this group had the highest number of elderly women aware of this scheme. The two reasons are that many families of elderly persons have availed of the benefit whenever they go to sign the documents to withdraw the money, and the second is public awareness of the scheme in Goa. The state government have digitalised some schemes and advertised through banners, which the literate elderly can avail easily.

A total of 15 respondents showed that they are unaware of the scheme, which leads to its under-utilisation. Combined with the earlier findings of low educational attainment, highlights a systemic issue in the awareness of social schemes and accessibility of resources for vulnerable elderly populations in Goa's old age homes. Sociologically, it points to the marginalisation of the elderly in Goa's institutional care homes. This gap in awareness reflects broader social inequalities where certain groups, due to age, education, and lack of formal inclusion, are systematically disadvantaged. It underscores the need for targeted outreach, educational programs, and better access to financial services.

6. **Utilisation of the schemes** (Figure No. 5)

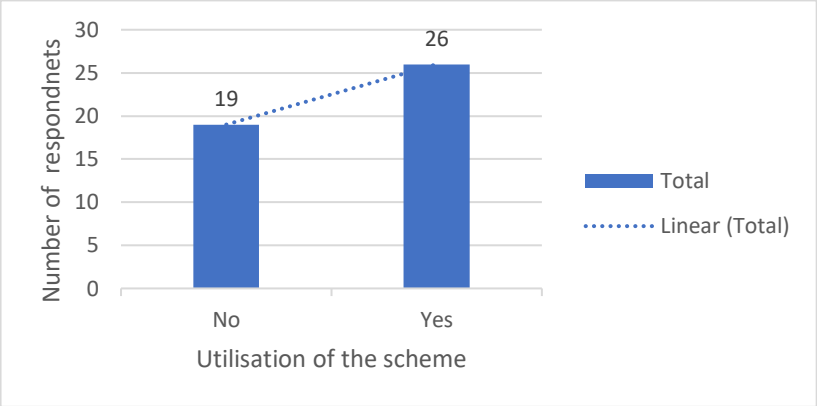


Fig. No. 5: Represents the data of the respondents utilising the scheme.

Figure No.5 reveals a concerning gap in utilising available schemes among elderly respondents, with active engagement with these resources. Despite being aware of the schemes, a significant number are not utilising them, indicating potential barriers such as complex application processes, distrust in the effectiveness of the schemes, and a lack of supportive networks to facilitate access. Four respondents showed awareness of the scheme but could not access it due to the lengthy formalities and ineligibility of documents. The elderly have no social support to fill out the forms; they do not know where to go to avail themselves of these schemes. The linear line projects an upward line, indicating that most respondents were aware of the scheme. At the same time, a significant number of the elderly who are aware of the scheme sponsored by the state government are being utilised by them. This utilisation is in the form of cash directly transferred into their bank accounts.

7. **Bank Account Holder**

In the second objective to understand the accessibility of financial welfare schemes, a bank account plays a key role. Many government schemes, including pension programs like the Dayanand Social Security Scheme (DSSS) and other financial assistance initiatives, require beneficiaries to have a bank account for direct benefit transfers (DBT). The fact that more than a quarter of the respondents do not have a bank account indicates a significant barrier to accessing these benefits, as they are excluded from the primary method of disbursing financial support. When related to the educational data, it becomes evident that low education levels and financial illiteracy could contribute to the lack of access to formal banking services. Individuals who are illiterate or have not completed basic schooling may find it challenging to understand the banking system, navigate bureaucratic processes, or feel comfortable opening and managing a bank account. This gap in banking access, coupled with limited education, leaves a significant portion of the elderly population dependent on informal support or entirely excluded from government welfare schemes. As a result, these individuals are more vulnerable to financial Insecurity and less likely to benefit from the schemes designed to aid them, exacerbating their economic and social dependence.

All the institution inmates fully or partially rely on others for their basic financial needs. For inmates who are unable to, including age, illness, physical or mental disability, or old age, institutional care facilities offer a structured living environment. In these environments, they entirely or partially depend on other people for their basic financial needs. Since the study was conducted in institutional care homes, the institution takes care of the daily food, medicines, and clothing. Some

inmates with family members also pay the institution for their monthly expenses. Some families contribute cash to the care facility to help with their loved one's expenses. This can entail giving the organisation a monthly payment to help cover the expenses of housing, food, medical attention, and other services rendered. Some Inmates have personal money or income from savings, pensions and some money given to them by their family members. The dependency rate is high among older women in old age.

Along with financial dependency, they depend on the institution for all their basic needs. 37.78% of respondents have some sources of income from family members giving some money on their visits or some get-through schemes, but 62.22% are dependent directly on the institution for their survival, with no social and financial support from outside. Therefore, society needs old-age homes to look after the marginalised elderly population.

8. **Needs of the Elderly in Care Homes**

All 45 respondents of this study stated that they are satisfied with the services provided by the old age homes in Goa. The residents are provided with food, clothing, basic medicines in the old age homes, and social care. In question about any other needs of the elderly, the following was known.

Need Category	Responses from the inmates of old age homes
Health & Medical Care	Diabetes, Body ache, Insomnia, Alzheimer's, Joint Pain, Medication need
Food/nutrition	Extra food items, snacks, and nutritional food items
Emotional Support	Loneliness, Missing family, Emotional/Mental abuse, Feeling neglected
Financial Security	Lack of pension, not financially independent, Lack of family support
Social Inclusion	Talking to others, Reading, Praying, Watching TV, Yoga, Music
Family Connection	Rare visits from family, missing children, and Affinal obligations
Proper Care	Feeling looked after, Complaint resolution, Activity engagement.
Awareness & Access	Lack of knowledge about schemes, Unawareness of pension/benefits

Fig No. 6, graphical representation of the common needs of the respondents.

This study highlights the primary needs of the elderly, indicating that medicines and health services are the most significant areas requiring financial support. Additionally, food items and clothing are also mentioned as essential needs. One respondent said, "Sometimes whoever comes to visit me brings me some new clothes or gives *money for medicines to buy, but it is occasional"* The lack of adequate financial support for these essentials can have serious consequences, potentially leading to worsened health outcomes and low quality of life. Another respondent said, "*I contact my children who are out of India to send some money; they have friends here in Goa who bring and give me money"*. Access to a nutritious diet is vital for maintaining health and well-being, particularly for the elderly, who may have dietary restrictions or increased nutritional needs. Similarly, clothing is

essential for comfort and dignity, especially in social settings where other inmates judge and sympathise with them on their conditions. Insufficient financial support for these basic needs can lead to food insecurity and inadequate living conditions, intensifying feelings of isolation and neglect among the elderly.

The data indicates that the existing schemes providing financial assistance are insufficient to cover the essential needs of the elderly. The limited amounts allocated often fail to address the cumulative costs of healthcare, food, clothing, and other necessities. This shortfall highlights the need for policymakers and community organisations to reassess funding mechanisms and enhance financial support programs tailored to the elderly population. Ensuring that the financial aid provided is adequate and comprehensive would not only improve the day-to-day lives of elderly individuals but also foster a sense of security and well-being, enabling them to maintain their dignity and autonomy as they age. Enhanced support structures promote better health outcomes and prevent the further marginalisation of this vulnerable population.

III. Suggestions based on results for the inmates' well-being in institutional care homes.

1. **A Monitoring Committee for Regular Resident Assessments:** The government should mandate a committee that will conduct interval assessments in public and private old age homes to identify the specific problems each resident faces in the care facility. This includes financial Insecurity, healthcare needs, emotional well-being, and social isolation.
2. **Regular Audits:** This committee can further conduct audits of old age homes across the state to check if the infrastructural and functioning facilities are according to the guidelines laid by the act with all requirements for the well-being of the elderly.
3. **Data Management:** Private old age homes can collaborate with government-run old age homes that are Provedoria to collect and share data on their inmates' challenges to build a unified welfare strategy.
4. **Integrated Online Platform**: Develop a common online platform for public and private institutions to apply for government schemes such as the old age pension scheme or Senior citizen schemes on behalf of those elderly inmates who have no family and are solely dependent on the old age home.
5. **Institutional Aided Homes:** Introduce partial or complete subsidies for elderly residents in private homes who cannot afford the fees, ensuring financial equality across public and private facilities. Some older adults prefer private old-age homes due to various preferences such as religion, locality, and facilities. The government should consider subsidising private old age homes for electricity, water and other needs.
6. **Health Accessibility and Partnership:** In partnership with private hospitals, regular visits to public and private old-age homes are made to provide essential check-ups, vaccinations, and health screenings, and records of all the elderly are kept in a unified portal on mental, physical, and emotional health. This will help to track the well-being of the elderly in old-age homes.
7. **Feedback system**: Feedback from the elderly living in private and government-run old age homes is needed because the policy needs to be elderly-centred. This will help to modify the present policies for the future of other older citizens.

To conclude, this study shows a very low utilisation of social schemes compared to awareness. Government initiatives often rely on online portals and official notifications, which may not effectively reach elderly populations. Due to a lack of knowledge about applying for the schemes, many older adults do not utilise the benefits of the schemes. Most of the elderly are unaware of the National schemes. The study shows that more financial support is needed for the elderly living in institutional care homes, which can reduce their stress about their health. The lack of bank accounts also reflects broader issues of social inequality, where the elderly, without proper documentation or awareness of formal systems, are systematically left out of welfare programs. This highlights the need for targeted interventions, such as financial literacy programs and support for opening bank accounts, to ensure that elderly citizens can fully utilise the benefits intended for their well-being. To assess the social security programmes and their implications in a better way, it is important to have an understanding of the living arrangements. Goa needs a state policy that will focus on the needs of the elderly population, which is characterised by particular cultural values, social dynamics, and health needs that differ significantly from those in other parts of India. By only providing schemes, the status of the elderly will not improve. Goa's ageing population is experiencing specific challenges, including inadequate access to healthcare facilities and financial Insecurity. A state policy can focus on addressing these localised issues more effectively than a one-size-fits-all national framework.

REFERENCES

- Bhagat, B.R., & Unisa, S.(2006).Ageing and Dependency in India: A New Measurement. *Asian Population Studies*. *2*(2). https://doi.org/10.1080/17441730600923133
- Chakravorty, S., Goli, S., & James, K. S. (2021). Family demography in India: Emerging patterns and its challenges. https://doi.org/10.1177/21582440211008178
- Chithra, N. K., Harbishettar, V., Gowda, G. S., Srinivasa, P., & Gowda, M. (2021). Assessment of the Financial Capacity in Elderly: Approach and Challenges in Indian Scenario. *Indian Journal of Psychological Medicine*, *43*. https://doi.org/10.1177/02537176211038024
- Chokkanathana, S., & Mohanty, J. (2017).Health, family strains, dependency, and life satisfaction of older adults.*Archives of Gerontology and Geriatrics,71. 129-135.* https://doi.org/10.1016/j.archger.2017.04.001
- Lau, R. S., Johnson, S., & Kamalanabhan, T. J. (2012). Healthy life expectancy in the context of population health and ageing in India. *Asia-Pacific Journal of Public Health, 24*(1), 195–207. https://doi.org/10.1177/1010539510376663
- National Policy for Older Persons Year 1999. (2009). MINISTRY OF SOCIAL JUSTICE AND EMPOWERMENT GOVERNMENT OF INDIA. https://socialjustice.gov.in/writereaddata/UploadFile/National%20Policy%20for%20Older%20Persons%20Year%201999.pdf
- Patel, S. (2024). *Analysis of Factors Influencing Life Expectancy in Developing Countries in India. Journal of Statistics and Actuarial Research*.*8*(2), 11–21. https://doi.org/10.47604/jsar.2758
- Saini, M., & Gambhir, I. S. (2024). Geriatric Research – Indian Perspective. *Journal of the Indian Academy of Geriatrics*, *20*(4), 203–206. https://doi.org/10.4103/jiag.jiag_6824

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INTERVENTION OF PRANAYAM ON ACHIEVEMENT MOTIVATION OF ADOLESCENT GIRLS

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ABSTRACT
In the contemporary world of intense competition, individuals are relentlessly pursuing their goals. Incorporating the practice of pranayama into one's daily routine can significantly enhance a one's work capacity and efficiency. The present study was Pre and Post experimental design. The effective sample was confided to 200 college going girls of 17-19 years. Deo - Mohan Achievement Motivation Scale was employed for data collection. The specially designed Pranayama module was used as an intervention technique. Initially, the data was treated by descriptive statistical analysis including mean and standard deviation. For further analysis data was subjected to paired t-test. The intervention group showed statistically significant positive improvement in achievement motivation among college going girls.
Keywords: achievement motivation, college going girls, pranayam

INTRODUCTION
India, as an emerging nation, aims to boost its production and foster scientific progress. The onus of this endeavor falls upon the younger generation, who are pivotal in driving the country forward across all sectors. Consequently, the responsibility of preparing the youth to shoulder these new roles has increased significantly, placing parents and educational institutions in a crucial position to provide the necessary training. While physical health is undoubtedly a priority, mental and emotional well-being often languishes.

अभ्दिः गात्राणि शुध्यन्ति मनः सत्येन शुध्यति।
विद्यातपोभ्यां भूतात्मा बुध्दिज्ञाम्पर:ानेन शुध्यति॥

(मनुस्मति ५/१०९)

The above shlok means "Water purifies body, truth cleanses mind, penance purifies the soul and the gain of knowledge purifies as well develops our intellect" (Manu - Seer and Philosopher). Thus, pranayama serves as a holistic practice that purifies not only the external aspects of our being

but also cleanses and revitalizes our internal states, fostering a harmonious balance in both body and mind.

It is often asserted that humans are crafted in the likeness of their creator – possessing inherent qualities of health, happiness, vibrancy, and wisdom. Living positively and continually striving for self-improvement are considered fundamental aspects of human existence. The state of being healthy in both body and mind, brimming with vitality, is regarded as the inherent entitlement of every individual. Nevertheless, it is evident that humanity has veered off its intended path. The prevalent human lifestyle reflects an acceptance of disease and suffering whether physical, mental, or psychological - as an inescapable and ordinary part of life. This acceptance has been perpetuated by negative conditioning, ingrained habits, and thought patterns, resulting in a reduction of life expectancy. When the mind is at a standstill, neither thought processes nor emotional disturbances can flourish.

योगश्चित्तवृत्तिनिरोधः ।।2।।

The above Patanjali yoga sutra of Samadipada 1.2, suggests that by practicing yoga and pranayama, the mind-stuff (Chitta) restrains from taking various forms (Vrittis). The practice of pranayama enhances the ability to perceive and comprehend reality. By training the mind and inducing a state of steadiness and tranquility, pranayama prepares the mind for the concentration process, known as dharana and make one able to stay focused.

A connection between a specific personality type and a characteristic breathing pattern has been established. The practice of pranayama involves consciously slowing down, deepening, and regulating the breath. This intentional modulation induces a tangible sense of relaxation, tranquility, equilibrium, and overall well-being for the mind. At the core of a satisfying and meaningful life, lies the concept of achievement motivation. Individuals with an inclination towards achievement tend to derive enjoyment from life and experience a sense of control. The presence of motivation imbibes individuals with dynamism and fosters self-respect. Those with a motivation for achievement exhibit a preference for actively engaging with challenges rather than leaving outcomes to chance. Furthermore, it is observed that such individuals are more focused on personal accomplishment than on the external rewards of success.

Sharma and Mishra (2018) investigated the effects of pranayama on students' psychological well-being and achievement motivation. The results of the study revealed that regular practice of pranayama significantly enhanced students' motivation to achieve academic and personal goals, attributing these benefits to improved mental clarity and reduced stress levels.

Gupta and Mehta (2017) explored the relationship between pranayama practices and academic performance among college students and concluded that students who practiced pranayama regularly showed higher levels of achievement motivation, which they linked to increased concentration and emotional stability.

Singh and Jain (2016) examined the effects of various yogic breathing techniques, including pranayama, on students' motivation and academic success. Their findings indicated that pranayama practices helped students develop a more positive attitude towards their studies and enhanced their intrinsic motivation to excel academically.

Kumar and Sinha (2015) focused on the adolescent population and found that pranayama significantly improved achievement motivation. They suggested that the calming and focus-enhancing effects of pranayama could be instrumental in helping adolescents set and achieve higher academic and personal goals.

SIGNIFICANCE OF THE STUDY

Achievement Motivation is an important factor in student's life. Our basic behaviors and feelings are affected by our inner drive to succeed over life's challenges while we set goals for ourselves. It also promotes our feelings of competence and self-worth as we achieve our goals. It provides us with means to compete with others in order to better ourselves and to seek out new information to learn and absorb.

A progressing society necessitates the cultivation of individuals who are not only physically fit but also mentally healthy, aligning with standards of excellence. While physical health receives due emphasis, the aspect of mental health often remains overlooked. Consequently, this study was conceived with the aim of enlightening adolescents about the significance of pranayama in their daily lives. Additionally, the research sought to evaluate the influence of intervention practices involving pranayama on achievement motivation.

OBJECTIVES

1. To assess the level of achievement motivation of college going girls.
2. To find out the impact of pranayama on the level of achievement motivation of college going girls.

METHOD

The sampling technique adopted for this study was convenience random sampling because it comprised of those adolescents studying in 11th and 12th who were voluntarily ready to attend intervention of pranayama module for two and a half months. The effective sample was confided to 200 subjects. The age group of these subjects was of 17 and 18 years. The girls were studying in 11th and 12th standard belonging to various streams of arts, commerce and science. First a list of various art of living centers located in Nagpur city was made. Out of them, seven centers were selected which permitted easy accessibility. Scrolls of the girls who registered themselves for the art of living course were gathered with the help of trainers. The list of the selected sample is as follows:

Sr.No.	Center	Total No. of Girls
1	Surya Nagar	37
2	Wardhaman Nagar	48
3	Hiwari Layout	45
4	Queta Colony	39
5	Nandanvan	42
6	Gandhibagh	38
7	Itwari	51
	TOTAL	300

Thus, the initial sample comprised of 300 college going girls. From the sample some subjects were deleted for the following valid reasons like few subjects found to be very irregular in attending yoga sessions and some of the data was found with extreme scores. In this process, 100 subjects got deleted and the sample was confided to 200 subjects. The final distribution of the sample according to the Center was as follows:

Sr.No.	Center	Total No. of Girls
1	Surya Nagar	18
2	Wardhaman Nagar	27
3	Hiwari Layout	39
4	Queta Colony	21
5	Nandanvan	31
6	Gandhibagh	26
7	Itwari	38
	TOTAL	200

Design of Yogic Practices: The intervention practices were scheduled for a period of two and a half months. The scheduled program lasted approximately half an hour each day. The following sequence of events outlines the activities undertaken during the practice period- Beginning with Prayer, then Pranayama and then Discussion and Guidance was done with practitioners.

अथ कुंभकभेदाः ।

सूर्यभेदनमुज्जायी सीत्कारी शीतली तथा ।
भस्त्रिका भ्रामरी मूर्च्छा प्लाविनीत्यष्टकुंभकाः ॥ ४४ ॥

Verse 44 of Hatha Yoga Pradipika emphasized the eight types of Kumbhakas namely- bhastrika, bhramari, murchha, playini, plasurya bhedan, sitkari, sitali and ujjayi.

Kumbhaka is a term in yoga that refers to the practice of breath retention, either after inhalation (antara kumbhaka) or after exhalation (bahya kumbhaka). This technique is a crucial part of pranayama (yogic breathing exercises) and is believed to enhance concentration, control prana (vital energy), and improve overall health.

Following are the eight classical types of kumbhakas as described in Hatha Yoga Pradipika-

1. Sahita Kumbhaka: is the basic breath retention practice that can be performed after inhalation (antara) or exhalation (bahya). It establishes the foundation for other advanced kumbhakas. It helps in controlling the breath and calming the mind.
2. Surya Bhedana Kumbhaka: involves inhaling through the right nostril, retaining the breath, and exhaling through the left nostril. It activates the Pingala nadi (solar energy channel), increases body heat, and stimulates the sympathetic nervous system.
3. Ujjayi Kumbhaka: performed with Ujjayi breath (victorious breath) where the throat is slightly constricted to create a soft hissing sound during inhalation and exhalation. It increases oxygenation, enhances concentration, and has a calming effect on the nervous system.

4. Sitali Kumbhaka: involves inhaling through the rolled tongue (or pursed lips), retaining the breath, and exhaling through the nose. It cools the body, calms the mind, and reduces stress and anxiety.
5. Bhastrika Kumbhaka: performed after Bhastrika pranayama (bellows breath), which involves rapid and forceful inhalations and exhalations. It energizes the body, clears nasal passages, and increases oxygen supply.
6. Bhramari Kumbhaka: It involves Bhramari pranayama (humming bee breath) where a humming sound is made during exhalation, followed by breath retention. It promotes relaxation, reduces stress, and enhances concentration.
7. Murcha Kumbhaka: It is an advanced practice where breath is retained to the point of near-fainting. It induces a state of deep relaxation and heightened meditative awareness, often practiced by advanced yogis.
8. Plavini Kumbhaka:It involves the swallowing of air and retaining it in the stomach. It enhances buoyancy in water, detoxifies the digestive system, and is believed to have rejuvenating effects.

These various types of kumbhakas serve different purposes and benefits, ranging from increasing energy and concentration to promoting relaxation and cooling the body. For the present intervention module only three of the above viz; bhastrika, bhramari and ujjayi were chose as they were found to be related to motivation.

BHASTRIKA PRANAYAMA (bellows breath)

अथ भस्त्रिका ।

सम्यग्गात्रसमुद्भूतग्रंथित्रयविभेदकम् ।
विशेषेणैव कर्तव्यं भस्त्राख्यं कुंभकंत्विदम् ॥ ६७ ॥

The above kumbhaka called bhastrika allows the three granthis (the knot of Brahma, the knot of Vishnu and the knot of Rudra) to be broken. Thus, it is the responsibility of the yogi to practice bhastrika. (67). Bhastrika's primary physiological impact is on the brain and heart. Bhastrika pranayama, often referred to as "bellows breath," is a vigorous breathing technique in yoga that involves forceful inhalations and exhalations. This practice has several benefits that can significantly impact the motivation of adolescents. Here are some key ways:

1. **Increased Energy Levels**: Bhastrika pranayama boosts energy and vitality by increasing the oxygen supply to the brain and body. This heightened energy can help adolescents feel more awake and ready to tackle their daily tasks, thereby enhancing their motivation.
2. **Improved Mental Clarity**: Adolescents who practice Bhastrika pranayama may find it easier to concentrate on their studies and other activities, which can lead to a greater sense of accomplishment and motivation.
3. **Enhanced Mood and Positivity**: Bhastrika pranayama stimulates the release of endorphins, the body's natural "feel-good" hormones. This can lead to improved mood and a more positive outlook, which are critical factors in maintaining high motivation levels.
4. **Stress and Anxiety Reduction**: By helping to balance the autonomic nervous system, Bhastrika pranayama can reduce stress and anxiety. Thus, adolescents who are less stressed are more likely to feel motivated and engaged in their activities.

5. **Increased Self-Confidence**: As adolescents experience the physical and mental benefits of the practice, they may develop a stronger belief in their abilities, which can drive motivation and improve their self-confidence.
6. **Enhanced Emotional Regulation**: Bhastrika pranayama helps in regulating emotions and reducing emotional reactivity making them better equipped to stay motivated, even in the face of challenges.
7. **Improved Physical Health**: This pranayama technique strengthens the respiratory system and enhances overall physical health thereby are more likely to have the stamina and motivation to pursue their goals.
8. **Boosted Resilience**: The practice of Bhastrika pranayama can increase resilience by teaching adolescents to manage their breath, remain calm under pressure and stay motivated when encountering obstacles.
9. **Increased Motivation through Routine**: Incorporating Bhastrika pranayama into a daily routine can provide a sense of discipline and developing a habit of consistent effort.

Thus, its regular practice can help adolescents to stay focused, resilient, and motivated to achieve their goals.

अथ भ्रामरी ।

वेगाद्घोषं पूरकं भृंगनादं भृंगीनादं रेचकं मंदमंदम् ।
योगींद्राणामेवमभ्यासयोगाच्चित्ते जाता काचिदानंदलीला ॥ ६८ ॥

Bhramari-'the humming bee' pranayama, named so because the sound made during breathing mimics that of a black bee. Through this yogic technique, one attains mastery and the mind becomes immersed in bliss. It serves to awaken psychic sensitivity and an awareness of subtle vibrations. Hence, it is advisable to practice bhramari during the early hours of the morning or late at night. Bhramari has a calming effect, alleviating mental tension and anxiety. Moreover, it aids in reducing anger, enabling individuals to concentrate on their goals, aspirations, and achievements.

UJJAYI PRANAYAMA (psychic breath)
अथोज्जायी ।

मुखं संयम्य नाडीभ्यामाकृष्य पवनं शनैः ।
यथा लगति कंठात्तु हृदयावधि सस्वनम् ॥ ५१ ॥

Closing the mouth, inhale with deliberate control through the pathways of ida and pingala, ensuring that the breath is sensed from the throat to the heart, accompanied by a resonant sound (51). Ujjayi, derived from the root word "ujji," refers to conquer which signifies victory. Ujjayi is referred to as the 'psychic breath' due to its profound impact on the mind. The simplicity of the Ujjayi practice allows it to be performed in any posture and anywhere.

Above mentioned both the pranayama **viz bhramari pranayama**, or "humming bee breath," whereas **ujjayi pranayama**, often called "victorious breath" or "ocean breath," are the yoga

breathing exercise that has numerous positive effects on the adolescent brain. Here are some important impacts:

1. **Stress and Anxiety Reduction**: These pranayama techniques activate the parasympathetic nervous system, which help to reduce stress and anxiety. The humming sound vibrations in bhramari pranayam stimulate the vagus nerve, promoting relaxation and calmness.
2. **Enhanced Focus and Concentration**: Regular practice improves cognitive functions like focus and concentration, essential for adolescents dealing with academic pressures and distractions.
3. **Emotional Regulation**: Adolescents undergo significant hormonal changes that affect their emotions. Bhramari pranayama helps balance emotions, reducing irritability and mood swings.
4. **Improved Sleep Quality**: Practicing bhramari and ujjayi pranayama can alleviate insomnia and promote deeper, more restful sleep, crucial for brain development and overall health in adolescents.
5. **Reduced Aggression**: The calming effects of bhramari and ujjayi pranayama help reduce aggressive and impulsive behaviors in adolescents. This can lead to better interpersonal relationships and improved conflict resolution skills.
6. **Increased Mindfulness**: These pranayama techniques foster mindfulness and present-moment awareness, enhancing decision-making skills and providing a balanced approach to everyday challenges.
7. **Boosted Neuroplasticity**: Regular pranayama practices, including Bhramari, may enhance neuroplasticity, the brain's ability to adapt and reorganize itself.

Tool: Considering the nature of the problem, the researcher used the standardized tool viz; Deo - Mohan Achievement Motivation Scale (1985) by Pratibha Deo and Asha Mohan. This is a self-rating questionnaire. It has 50 items and has no time limit. There are 37 positive items and 13 negative items. The positive items has a response choice on a 5 point scale, given as always, frequently, sometimes, rarely and never which carries the scores as 4,3,2,1, and 0 ,whereas, the negative items has a response choice , given as similar to the positive items but the scoring is done as 0,1,2,3, and 4. There are two separate stencil keys provided for the scoring of positive and negative items scores. The minimum score obtained can be 0 and maximum score can be 200. The reliability coefficient is reasonably high (r = 0.69, 4 weeks interval) using the test-retest method and the item validity is established by high low discrimination method and it was accepted as the validity of the whole measure. The research design chosen for this study can be represented as,

$$G_1 \; X \; G_2$$

G_1 = Pre-test among the XI and XII College going girls.
G_2 = Post-test among the XI and XII College going girls.
X = Intervention of Pranayama module.

The benefit of using the pre-test post- test design is that the researcher collected useful information that allowed the researcher to examine the effect of the independent variable (pranayama) on the dependent variable (achievement motivation). The following illustrations were taken by the researcher during data collection and intervention practices:





HYPOTHESIS

The level of achievement motivation of the college going girls significantly increases with the intervention of pranayama.

RESULTS

Initially, the data was analyzed using descriptive statistics, including mean and standard deviation. The pre-test and post-test values are shown in table no1-

Table -1: Mean and Standard deviation of Pre and Post testing Scores of Achievement Motivation

Variable	Pre-Scores	Post-Scores
AMS	$\overline{X}$ = 134.12	$\overline{X}$ = 151.13
	SD = 20.30	SD = 17.14

An examination of Table 1 reveals that the data is normally distributed, as indicated by the standard deviations associated with the mean values. The mean scores for the measurement of achievement motivation of the college going girls before the intervention of yogic practices clearly signifies that the level of achievement motivation of the subjects is low.

The mean scores of pre-test of achievement motivation is 134.12 and post-test is 151.13. The computed standard deviations are 20.30 and 17.14 respectively. The obtained difference between the

pre and post scores appears to be large and shows enhancement of achievement motivation. However, drawing confident conclusions based solely on descriptive statistics is not possible. Therefore, the data was subjected to a paired t-test for further analysis. The values are displayed in table no.2.

Table -2: Mean, Standard deviation and t-value of Achievement Motivation of College going girls

Pre-Post AM SCORES	Paired Differences			t	df	Sig. (2-tailed)
	$\overline{X}$	SD	SEM			
	17.01	27.27	1.92	**8.82**	199	(p<0.01)

Table no. 2 reveals that the post test score is larger than the pre-test score. The difference in mean values comes out to be -17.01. The SD is 27.27. The computed 't' value is 8.82 which is highly significant at 0.01 level of confidence. Since, the t-value for testing the significance of mean difference of achievement motivation scores in pre-test and post-test among college going girls came out to be significant, it can be stated that the level of achievement motivation of the college going girls significantly increases with the intervention of pranayama. Thus, the difference in the scores can be attributed to the intervention of yogic practices.

DISCUSSION

The study demonstrated a noteworthy increase in achievement motivation levels following the implementation of yogic practices. Achievement motivation, a learned characteristic, involves finding satisfaction in the pursuit of and attainment of excellence.

Statler T.A. (2007) conducted research affirming that concentration and attention witnessed overall improvement with yoga. Students reported enhanced focus on relevant tasks and better filtering of extraneous information. Moreover, there was an observed increase in motivation to achieve success, coupled with a decrease in motivation to avoid failure. These changes indicated a heightened propensity to strive for success even in challenging situations.

Dr. Shiv Kumar (2014) also obtained similar results, highlighting the significant impact of pranayama on the educational achievement of undergraduate students. He emphasized that such practices help unveil the latent capabilities of human beings in a systematic and scientific manner, enabling intellectual elevation. The disciplined alignment of mind and body equips individuals to effectively confront the challenges of the modern technological era and soar higher.

CONCLUSION

Thus, it can be concluded that the level of achievement motivation is increased after the intervention of pranayama module.

RECOMMENDATIONS

1. Yogic practices should be made a part of school and college curriculum.
2. Educational institutes should organize conferences, seminars and workshops to educate parents regarding the significance of pranayama.
3. Workshops for adolescents should be organized to create awareness regarding yogic practices.
4. Doctors, counselors, social workers and other health professionals, should strive to create awareness about breathing exercises amongst the masses by small talks on radios, television and social media.

LIMITATIONS

1. The sample was delimited to 200 only.
2. The present study was conducted on female students only.
3. In the present study, the intervention practices included a set of selected pranayama only.

SUGGESTIONS

1. A comparative study amongst boys and girls can yield interesting results.
2. In the present study, subjects from colleges of urban area were selected. Study can be undertaken on colleges from sub-urban and rural area.
3. The study can be conducted by taking age as a variable i.e. primary school, middle school and high school children.
4. In the present study, the yogic practices included a set of selected yogic practices only. Other yogic practices like natrajasana, sirsasan, ujjayi pranayama, kapal bhati, pran-apan meditation, chakra meditation can be incorporated for better results.
5. The study used yogic practices as a method of study. Other upcoming therapies viz. Reiki, Magnetic therapy, Acupressure, etc. can be undertaken to study their effects.
6. The study can be undertaken on other variables like overall mental health, physical health and other similar related psychological and physiological states.

REFERENCES

- Deo, P., & Mohan, A. (2002). Manual for Deo-Mohan Achievement Motivation Scale, National Psychological Corporation, Agra.
- Gupta, R., & Mehta, A. (2017). Pranayama and its influence on academic performance. *International Journal of Health and Education*, *4*(1), 45-59.
- Joshi, B. P. (2003). Effect of Some Yogic Practice on Human Subjects (Physiological and Psychological). 14th International Conference on Prana- Anveshan, Bangalore.
- Kumar, N., & Sinha, P. (2015). Pranayama as a tool for enhancing achievement motivation in adolescents. *Journal of Adolescent Health and Wellness, 2*(4), 67-81.
- Muktibodhananda, Swami. (2004). *Hatha Yoga Pradipika*. India: Yoga Publication Trust.
- Patañjali., Sastri, G. D., & Ballantyne, J. R. (1971). *Yoga-sutra of Patanjali*. [2d ed.] Delhi, Indological Book House.
- Sharma, V., & Mishra, H. (2018). The impact of pranayama on psychological well-being and achievement motivation in students. *Journal of Yoga Studies, 5*(2), 112-126.
- Shiv Kumar (2014) Effect of Pranayama on the Educational Achievement of under graduate students. *International Journal of education and science* Research Review, 1(3).
- Singh, S., & Jain, M. (2016). Effects of yogic breathing techniques on motivation and academic success. *Educational Psychology Review, 3*(3), 98-110.
- Statler, Traci & Wheeler, Amy & Siegel, Shannon. (2007). The Effects of Yoga Practice on Psychological Well-Being: 2426. *Medicine and Science in Sports and Exercise* - MED SCI SPORT EXERCISE. 39. 10.1249/01.mss.0000274785.13794.75.
- Vineeta G. (2010). *The Big Benefit of Bhramari Pranayama*, Jagran City Plus.
- Yogeswar. (2004). *Textbook of Yoga* (2nd ed.). Penguin Books India.
- https://sa.wiktionary.org/s/5b
- https://sacred-texts.com/hin/hyp/hyp04.htm

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