



“A comprehensive analysis of the nursing pad types, materials and consumer preferences”

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Abstract: The development of nursing pads is influenced by material properties, comfort-related factors, and individual consumer preferences. Consumer feedback is scarce in relation to testing investigations, yet systematic analysis remains stagnant. This study employs a combination of experimental and survey methods to assess the types of nursing pads, including reusable and disposable variations. Both woven and nonwoven nursing pads made of cellulosic and its blends were evaluated for their functional and mechanical properties. A structured questionnaire survey was administered to 80 nursing mothers and working women to assess their comfort preferences, absorbency requirements, eco-friendliness, ease of use, reusability, and sustainability. Statistically objective parameters are correlated with the subjective user feedback. The study revealed that most of the cellulosic materials exhibited excellent comfort compared to the stiffer nonwoven alternatives. Therefore, the study concludes that consumers have a strong preference for reusable nursing pads due to their comfort and ecological benefits.

Index terms: Cellulosic, comfort, environment, sustainability, nursing pads.

I. INTRODUCTION

1.1. An overview of the importance of nursing pads for breastfeeding mothers.

Nursing pads are designed to manage milk leaks and keep the skin dry and clean. These pads are an essential accessory for nursing mothers. Especially, nursing or breast pads are absorbent items that are inserted into a regular or nursing bra. Their primary purpose is to absorb and contain any dripping breast milk (Barbara C. Wallace et al., 1997). These are commonly used by breastfeeding women or by women who have milk leaking from their breasts pre- or post-partum. Various types, shapes, sizes, and thicknesses of pads cater to users' needs (Pei et al., 2019). Some are single-use and disposable, whereas others can be washed and reused multiple times. Apart from preventing milk stains on clothing, these pads also help with comfort, preventing damp bras from irritating and chafing against the skin. Many types of nursing pads also feature additional benefits, such as cooling gels or soothing pads for sore nipples. The significance of usage is listed below.

1. **Leakage Prevention:** Milk leaking in between feeds or during breast engorgement is one of the most common problems for breastfeeding mothers. Nursing pads help counteract excess milk, preventing it from leaking through garments and avoiding embarrassing situations (Morse & Bottorff, 1989)
2. **Keeping the nipple and breast area clean:** They protect the nipple area and the surrounding skin from excessive moisture, helping to prevent skin irritation and reduce the risk of bacterial growth or mastitis. Dryer skin is less likely to break down, and the pads provide a barrier to moisture (Imran et al., 2020)
3. **Fending Off Sore Nipples:** Breastfeeding can leave some women with sore or cracked nipples. Nursing pads serve as a soft barrier between the skin and clothing, reducing friction and alleviating discomfort (Bogusławska-Bączek, 2012)
4. **Multiple Options for Personal Preference** Nursing pads come in disposable and reusable types, so you can choose whatever suits you. Mothers can choose a thickness based on varying grounds for leakage, ensuring a perfect fit for their lifestyle and needs (Özdil & Altaş, 2016)

1.2. Growth and evolution of the nursing pads market globally.

Locally and internationally, the nursing pad market has experienced steady growth over the past few years due to several key factors. With increased awareness of maternal health issues and the growth of online shopping, nursing pads have experienced a significant rise in demand, projected to reach USD 496.2 million by 2024. Moreover, it is expected to widen at a 6.1% CAGR from 2025 to 2033. Several challenging factors affect demand in the postpartum period, particularly for working mothers and educated women, who primarily use social media and online marketing to access convenient breastfeeding solutions, according to the Nursing Pads Market Research Report 2033.

The government takes significant steps to promote breastfeeding and maternal health and hygiene by providing various innovations in products. Different choices of nursing pads, including reusable, disposable, and silicone options, offer greater comfort and absorbency according to individual preferences, resulting in high-quality products. (Ridgway, 2023). Most women in developing countries are still unaware of the existence of nursing pads. There are side effects associated with prolonged use. Due to the growing awareness of personal hygiene and health, the market has experienced tremendous growth. The future of nursing pads is evolving rapidly, alongside advancements specifically designed for consumers.

1.3. The need for a comprehensive market analysis to understand consumer preferences and industry trends.

Nursing pads market research plays an important role in the apparel and textile research. Insights from this study can be invaluable in understanding consumer preferences and designing products that specifically address the needs of breastfeeding mothers. This can help us continually innovate products in design and materials, particularly when we seek new trends, such as reuse and sustainability. Such research not only aligns with but also contributes to and helps drive industry growth in maternal health initiatives, as well as the development of new educational resources for mothers. In addition to improving the effectiveness of the product, this targeted look can help consumers understand what is happening with their breastfeeding journey.

2. Literature Review

Research studies from 2021 to 2025 depict a notable increase in innovative designs, advancements in material construction, and a shift in the market. Compared to previous years, the changes reflect shifts in consumer preferences and evolving consumer needs.

Modern Design Innovations:

The nursing pad market is shifting towards more comfortable yet functional designs. The modern nursing pads are made of lightweight materials for a discreet fit under clothing.(Gowsalya & Ramakrishnan, 2022) This includes recently developed styles that cater to a range of breast sizes and sensitivities. Nursing pads are available in various shapes, including round, contoured, and teardrop, allowing for a perfect fit as shown in Fig. 1. These bio-shapes are designed to fit the breast and remain discreet under garments, allowing them to be worn regularly.

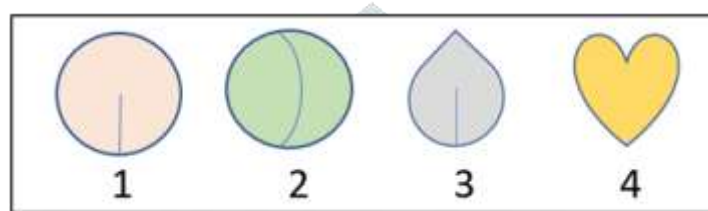


Fig 1: Different shapes of nursing pads

Nursing pads are composed of multiple layers, each serving its own individual purpose. If we take the milk catcher apart, the inner layer pulls moisture away from the skin to keep it comfortable, while the middle layer absorbs the milk. The outer layer serves as a barrier that prevents any milk from leaking through to the clothing. Nursing pads come in various absorbencies to address different amounts of milk leakage. Some are designed with thicker absorbent cores to help with heavy leakage, while others are thinner to accommodate lighter use. There are various types of nursing pads.(Malgorzata Agata Kowalska et al, 2024) Designed to meet the specific needs or preferences of breastfeeding mothers, as shown in Fig. 2.

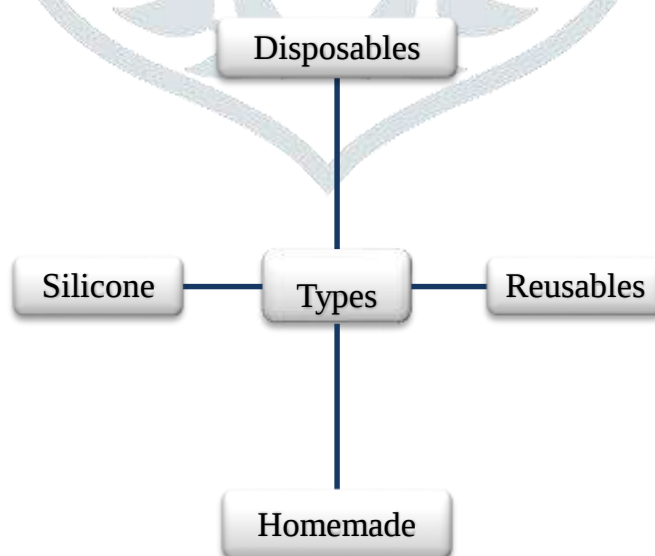


Fig 2: Types of Nursing Pads in the market

Disposable nursing pads are convenient and hygienic, especially when we are on the go, making them ideal during the early postpartum period when leakage is most common. (Özdil & Altaş, 2016). Reusable nursing

pads, typically made from washable materials such as cotton or bamboo, may also appeal to environmentally minded mothers and can ultimately prove more economical over time. Silicone nursing pads offer a discreet, ultra-thin solution that adheres directly to the skin, so they are barely visible under clothing. For the budget-minded or crafty mom, nursing pads can be made DIY (Do-It-Yourself) from repurposed fabrics or even natural materials. Hydrogel nursing pads are less common but are used to soothe sore or cracked nipples by providing cooling relief while promoting healing.(Gowsalya & Ramakrishnan, 2022). Each type of nursing pad offers its own benefits, allowing mothers to choose one based on their lifestyle, skin sensitivity, milk supply, and personal preferences regarding sustainability and convenience.

2.1. Importance of nursing pads in breastfeeding and their impact on maternal health and well-being.

Several reviews have emphasized the importance of nursing pads in breastfeeding and their association with maternal health and well-being. These studies highlight nursing pads (also known as breast pads) as an essential accessory for nursing mothers, helping to prevent leakage and maintain hygiene. (Ridgway, 2023). According to Barbara C. Wallace et al. (1997), Suggestions for using nursing pads provide encouragement and confidence to prevent milk leakage. Proper use can reduce sore nipples, cracked nipples, issues of breast tissues, and mastitis, etc, to mention a few, where others are not documented regarding the excessive use of nursing pads. Results indicated nursing pads bring comfortable experiences and emotional security in public environments. Whereas Bogusławska-Bączek (2012) stated that using nursing pads, which keep the woman's skin dry, clean, and hygienic, is beneficial. Physiologically and psychologically, nursing mothers feel more comfortable when they have good air permeability and resistance to milk leakage. Despite nursing pads having many advantages, they should be selected, used, and frequently changed to maximize beneficial aspects and minimize potential side effects related to the accumulation of moisture during use (Manoj Sharma, 2024). Environmental research implications on nursing pads were also explored. Despite their convenience, pads are regarded as garbage for landfills. Therefore, reusable nursing pads offer an eco-friendly alternative to disposable ones, which contribute to pollution. However, reusable pads require regular washing and proper hygiene maintenance to remain effective. Further studies should explore sustainable methods and alternatives for biodegradability. Finally, nursing pads are a modest yet vital accessory that can make a significant difference in how well a mother nurses and how comfortable she is.

Fabric Properties of Various Materials Relevant for Nursing Pads

- 1) Though Linen exhibits good absorbency and wicking properties, linen fiber is less absorbent than cotton fiber.
- 2) Cotton terry cloth, due to the looped fibers, is more absorbent than regular cotton, as the increased surface area enhances liquid absorption. Factors such as weight, thickness, and the twist of the pile yarn influence absorption.
- 3) Hemp is antibacterial and provides better absorbency than cotton.

- 4) Bamboo fiber wicks moisture more effectively than cotton. It contains a natural antibacterial and bacteriostatic bio-agent known as 'Bamboo Kun,' which inhibits bacterial growth over extended wear. Fabrics with a high absorption index include bamboo wadding fabric.
- 5) Woven Fabrics: Fabric weave design and picking sequence significantly impact wetting time, water spreading speed, and air permeability. Compared to plain-woven fabrics, twill-weave fabrics offer better air permeability, shorter wetting times, and a higher water spreading rate.
- 6) Nonwoven Fabrics: Commonly used in disposable diapers and feminine hygiene products.

Impact of Fabric Weave on Air Permeability

- 1) Air Permeability: Twill weave fabrics allow greater air permeability than plain-woven fabrics. Higher inter-yarn spacing and increased air permeability result from fewer interweaves per fill area, which occurs due to longer weave floats in twill fabrics.
- 2) Plain Woven Fabrics: These fabrics are more densely woven and firmer than twill weaves, making air passage more difficult.
- 3) Picking Order: Air permeability varies with the picking order, where single pick insertion (SPI) < double pick insertion (DPI) < three pick insertion (3PI) within the same weave. In 3PI, consecutive floats prevent yarns from remaining in their original positions, creating additional space for airflow.
- 4) Porosity: Air permeability correlates with fabric porosity. Higher porosity leads to better air permeability. The air permeability of woven fabrics depends on the fabric's shape and size, which are determined by its structural parameters.
- 5) Fabric Structure: The structure of a fabric influences permeability, which varies with pressure. Fabric permeability is strongly affected by inter-yarn porosity.
- 6) Finishing Treatments: Treatments applied to linen fabrics can alter air permeability. Untreated fabrics exhibit higher air permeability compared to treated fabrics, as dyeing and finishing processes tighten the fabric structure, leading to shrinkage and reduced permeability.

3. METHODOLOGY

In this section, the outline for the data sources and sampling techniques used for the survey and interviews is discussed.

Primary Research Question:

How do linen-cotton, pure cotton, and pure linen fabrics compare in terms of comfort, durability, and absorbency for nursing pads?

Secondary Research Questions:

- 1) What are the preferences of Indian mothers regarding fabric types for nursing pads?
- 2) How do comfort ratings differ among pure cotton, pure linen, cotton-nylon, and linen-cotton blend nursing pads?
- 3) How does the absorbency of linen-cotton blend nursing pads compare to that of pure cotton and pure linen options?

- 4) What is the relationship between fabric type and overall user satisfaction in nursing pads?
- 5) Are there any correlations between comfort, durability, and absorbency ratings for each fabric type?
- 6) How do the performance ratings of linen-cotton blend nursing pads justify further research and development in this fabric combination?

Cotton-Linen Fabric

Cotton-linen fabric is a hybrid textile that combines the natural fibers of cotton and linen, resulting in a material that offers numerous benefits for various applications, including apparel technology and the design of nursing pads. This blend combines the softness and breathability of cotton with the durability and textured appearance of linen, making it a versatile choice for comfortable and functional garments. (Özkan, 2024; Ramadan et al., 2008).

Characteristics of Cotton-Linen Fabric

Cotton-linen fabric is lightweight and breathable, which enhances comfort during wear. The natural moisture-wicking properties of this blend help keep the skin dry, making it particularly suitable for nursing pads where breathability and comfort are crucial (Ramadan et al., 2008). Additionally, the fabric exhibits a charming, textured appearance and excellent draping qualities, allowing for fluid movement and creating a relaxed aesthetic. Its resistance to wrinkling and durability further contribute to its suitability for everyday use (Özkan, 2024)—sustainable and Eco-Friendly Aspects. One of the standout features of cotton-linen fabric is its eco-friendliness. Both cotton and linen are derived from natural sources, and the production of these fabrics generally consumes less water and energy compared to synthetic alternatives. This aspect aligns with contemporary trends towards sustainability in fashion and textile production. Further, cotton-linen fabric is biodegradable, which minimizes its environmental impact once disposed of (Rani et al., 2019)

Care and Maintenance: Caring for cotton-linen fabric is straightforward. It typically requires gentle washing and low-heat drying to preserve its quality and longevity. Proper maintenance ensures that the fabric remains soft and comfortable through multiple washes, making it an ideal choice for items like nursing pads, which may require frequent laundering. (Hamada et al., 2020).

Comparative Analysis: Fabric Comfort and Properties. The choice of fabric is crucial in designing nursing pads, as comfort plays a significant role in user satisfaction and overall satisfaction. Cotton-Nylon blends are known for their durability and moisture-wicking properties, making them suitable for products that require both comfort and functional performance. The nylon component enhances the fabric's strength and elasticity, contributing to a better fit and increased longevity of the nursing pads. On the other hand, cotton-Linen blends provide a more breathable and natural feel, which may enhance comfort for the wearer due to cotton's inherent softness and Lennon's unique moisture absorption capabilities. (Özkan, 2024).

Environmental Impact: Sustainability is a growing consideration in textile production. Cellulosic fabrics tend to have a lower environmental impact because they are made from natural resources. (Adine Gericke et al, 2007). Linen is in high demand in India due to its sustainable, anti-allergenic, and antibacterial features. They bring future scope towards eco-friendliness and the zero-waste concept. (Madhuri Nigam and Vibha Yadav, 2019)

Performance Features: When evaluating the performance of nursing pads, moisture management is a key factor. Cotton-Nylon fabrics excel in moisture wicking, drawing sweat away from the body, which can keep the skin dry and comfortable. This is particularly important for nursing pads, as leakage is a common concern for breastfeeding mothers. However, cotton-Linen blends also possess moisture absorption properties that can be beneficial for comfort during prolonged wear. (Islam Rofi, 2025)

Consumer Preferences: Consumer preferences may lean towards one fabric type over another, depending on individual priorities such as comfort, sustainability, and performance. While users prioritize the durability and moisture management of Cotton-linen blends, others may prefer the natural feel and eco-friendliness of cotton-nylon fabrics. Research suggests that the tactile qualities of fabrics can significantly influence consumer satisfaction and decision-making, thereby highlighting the importance of considering fabric characteristics when designing nursing pads.

Cotton-linen Fabric

Cotton-nylon blends combine the beneficial properties of both natural and synthetic fibers, making them suitable for various applications, including the design of nursing pads or breast pads in apparel technology. This hybrid fabric combines the comfort and breathability of cotton with the durability and wrinkle resistance of nylon, resulting in a versatile textile suitable for a wide range of functional garments.

Properties and Advantages

Cotton is a popular material for apparel worn against the skin, such as nursing pads, due to its softness, absorbency, and breathability. Its ability to efficiently absorb moisture is crucial for preserving comfort when nursing. Additionally, cotton is hypoallergenic, which reduces the likelihood of skin irritation for individuals with sensitive skin. Linen, on the other hand, provides strength, durability, and a lightweight feel. This synthetic fiber resists wrinkles and maintains its shape, which is particularly advantageous for products like nursing pads that require frequent washing and handling. The blend of nylon enhances the fabric's overall performance by increasing its longevity and resistance to wear and tear, making it suitable for everyday use. (Islam Rofi, 2025).

1. **Comfort:** Cotton-nylon blends offer a balance of softness and flexibility, making them an ideal choice for nursing pads.
2. **Breathability:** While cotton provides natural ventilation, the addition of nylon enhances moisture-wicking properties, ensuring a dry and comfortable experience for breastfeeding mothers.

3. Softness: The blend retains the softness of cotton while adding a slight stretchability from nylon, allowing for a better fit and reduced friction against the skin.
4. Lightweight Feel: Compared to thicker materials, cotton-nylon blends provide a lightweight alternative that remains comfortable even when saturated.
5. Durability: Durability is a key factor for reusable nursing pads, and cotton-nylon blends excel in this aspect.
6. Strength and Elasticity: Nylon reinforces the cotton fibers, improving their tensile strength and resistance to wear and tear.
7. Washability: The blend can withstand multiple wash cycles without significant degradation, making it a cost-effective option for reusable nursing pads.
8. Shape Retention: Unlike pure cotton, which can shrink after washing, the presence of nylon helps maintain the original shape and structure of the pads.
9. Absorbency: A crucial property of nursing pads is their ability to absorb and retain moisture effectively.
10. Fast Absorption: Cotton fibers rapidly draw in moisture, while nylon aids in distributing it evenly, preventing localized wet spots.
11. Moisture Management: The combination minimizes leakage by quickly transferring milk away from the surface layer.
12. Quick Drying: Nylon accelerates the drying process, reducing the risk of bacterial growth and skin irritation.
13. Maintenance and Care: In terms of maintenance, cotton-nylon blends are relatively easy to care for. While cotton alone may require special handling to avoid shrinking and wrinkling, the addition of nylon makes the fabric more resilient. The blend can typically withstand machine washing and drying, thus saving time and effort in garment care. This practicality is essential for nursing mothers who may prioritize convenience in their clothing choices.
14. Comfort and Performance: The combination of cotton and nylon yields a fabric that balances comfort with performance. Cotton's natural fibers ensure a soft and gentle touch against the skin, while nylon adds flexibility and stretchability, catering to the active lifestyle of nursing mothers. The moisture-wicking properties of nylon also enhance the fabric's ability to keep the wearer dry and comfortable, making it suitable for use in warmer conditions.
15. Environmental Considerations: While cotton is biodegradable, nylon's synthetic nature raises environmental concerns regarding its decomposition and impact on sustainability. However, ongoing efforts in the textile industry aim to produce more eco-friendly nylon alternatives, such as recycled nylon from post-consumer waste, thereby mitigating some of its environmental footprint. Designers need to consider these factors when selecting materials for nursing pads and similar applications (Adine Gericke et al, 2007).

Challenges in Data Collection

Collecting data for this nursing pad research presented several significant challenges and limitations, particularly due to the sensitive nature of the subject and the privacy concerns of participants. One of the primary hurdles was gaining access to and trust from nursing mothers, many of whom were hesitant to share personal experiences related to breastfeeding. To respect privacy and ethical considerations, personal details of participants were not collected, which, while necessary, limited the ability to conduct follow-up studies or analyze demographic correlations.

The recruitment process was complicated by the need to reach a diverse group of mothers across different regions of India, taking into account cultural sensitivities and varying levels of openness regarding breastfeeding topics. Many potential participants declined involvement due to discomfort discussing intimate aspects of postpartum life.

Language barriers and varying levels of literacy among participants posed challenges in ensuring a uniform understanding of survey questions. To mitigate this, surveys were translated into multiple regional languages, but nuances may have been lost in translation. The taboo nature of discussing breastfeeding openly in some communities led to potential response bias, where participants might have provided socially desirable answers rather than their actual experiences.

Lastly, the time constraints of new mothers made it challenging to secure extended periods for in-depth interviews or product testing, which potentially limited the richness of the qualitative data. These challenges collectively underscore the complex nature of conducting research in this sensitive area and highlight the need for innovative, culturally sensitive approaches in future studies on maternal health products.

Methods

A comprehensive research approach was employed, integrating both secondary data analysis and primary data collection. The results are tabulated in the results and discussion section.

The secondary data analysis involved an extensive literature review of existing studies on nursing pad materials, their properties, and user preferences. This review provided a foundational understanding of the current state of nursing pad design and highlighted the potential benefits of combining different fabric types. For primary data collection, a survey was conducted among 500 Indian mothers to assess their preferences and experiences with different nursing pad materials. The survey focused on three fabric types: Pure Cotton, Pure Linen, and a Linen-Cotton Blend. Participants rated each fabric type on three key parameters: Comfort, Durability, and Absorbency, using a scale of 1 to 5.

The survey results strongly support the potential benefits of a linen-cotton blend for nursing pads. Out of 500 participants, 185 preferred the linen-cotton blend, compared to 172 for pure cotton and 143 for pure linen. More importantly, the linen-cotton blend received significantly higher ratings across all three parameters:

Notably, the Nylon-cotton blend received no ratings below 3 for any parameter, indicating a consistently positive user experience. In contrast, both pure cotton and pure linen received some lower ratings, suggesting potential issues with comfort, durability, or absorbency for some users.

These findings justify further research into the linen-cotton blend for nursing pads. The combination appears to synergize the beneficial properties of both fabrics, potentially offering superior comfort, durability, and absorbency compared to single-fabric options. The linen component likely contributes to improved breathability and moisture-wicking properties, while the cotton provides softness and absorbency.

This research approach, which combines secondary data analysis with a targeted primary survey, provides a strong foundation for developing linen-cotton blend nursing pads. The clear preference and higher ratings across all parameters suggest that this combination could address current limitations in nursing pad design and offer an improved product for breastfeeding mothers.

SWOT analysis framework used to assess the nursing pads market on Lenin and cotton mix fabric.

Table 1: SWOT Analysis of Nursing Pads Market

	<i>STRENGTHS</i>	<i>WEAKNESSES</i>
<i>Internal</i>	Highly effective & reliable product Innovative design & packaging Affordable pricing High demand from customers	Unavailability of raw materials Low production capacity Lack of skilled personnel Limited distribution network
	<i>OPPORTUNITIES</i>	<i>THREATS</i>
<i>External</i>	Growing awareness of health & hygiene Expansion of distribution networks Growing demand from customers Increasing market share	Competition from other brands High cost of raw materials Change in customer preferences Volatility of prices

Strengths: Comfort Meets Sustainability

These pads shine where it matters most: comfort and eco-friendliness. The mix of linen and cotton creates a soft, breathable fabric that's gentle on sensitive skin—a big win for nursing moms. The materials naturally wick moisture, keeping skin dry and reducing irritation. Additionally, their sustainable appeal resonates with eco-conscious parents. They are biodegradable, making them a guilt-free choice compared to plastic-heavy alternatives.

Weaknesses: Cost and Practical Hurdles

However, there are trade-offs. Natural fibers are more expensive to produce, which often results in higher prices for shoppers. For budget-minded buyers, especially in tougher economies, this could be a dealbreaker. Stains appear more easily on these pads, and they may require extra care during washing. While they are absorbent, heavy flow could mean changing them more often than synthetic options—something busy moms might find annoying.

Opportunities: Riding the Green Wave

The timing could not be better. The demand for sustainable baby products is growing as parents increasingly prioritize environmentally friendly choices. Expanding into reusable versions could further tap into this

trend. Markets in developing regions, where birth rates are rising, offer fresh audiences. There is also room to position these pads as a premium wellness product, aligning with the growing focus on maternal health.

Threats: Competition and Unpredictability

Not all smooth sailing, however. Big brands with cheaper synthetic pads dominate shelves, backed by strong marketing and distribution. Supply chain hiccups—like linen shortages or climate impacts on cotton crops—could disrupt production. Additionally, if new high-tech materials enter the market, offering improved absorbency or convenience, linen-cotton blends may struggle to keep pace.

The Big Picture

For brands, this SWOT analysis is a roadmap. Highlight the natural, earth-friendly benefits while addressing cost concerns—perhaps through bulk discounts or loyalty programs. Innovating with reusable designs or partnerships with eco-influencers could carve out a niche. Staying ahead means balancing what makes these pads special (comfort and sustainability) with practical improvements (durability and affordability).

In short, linen-cotton nursing pads have a strong story to tell in today's eco-aware world. By playing to their strengths and smartly addressing their flaws, companies can become a go-to choice for parents who want both comfort and a clear conscience.

4. RESULTS AND DISCUSSION

4.1 Primary Research Question:

How does a linen-cotton blend fabric compare to pure cotton and pure linen fabrics in terms of comfort, durability, and absorbency for nursing pads?

Table 2: Comparison table showing the average ratings for each fabric type:

Fabric Type	Comfort	Durability	Absorbency
Linen-Cotton Blend	81.60%	85.20%	84.40%
Pure Cotton	60.40%	62.80%	62.80%
Pure Linen	65.20%	59.60%	61.20%

From Table 2, the linen-cotton blend outperforms both pure cotton and pure linen in all three categories.

4.2 Secondary research questions:

What are the preferences of Indian mothers regarding fabric types for nursing pads?

Table 3: Fabric type

Fabric Type	Preference
Linen-Cotton Blend	39.50%
Pure Cotton	37.20%
Pure Linen	23.30%

Based on the frequency of each fabric type in the dataset:

How do comfort ratings differ among pure cotton, pure linen, and linen-cotton blend nursing pads?

This is addressed in the primary research question, as shown in Table 2. Linen-cotton blend has the highest comfort rating at 81.6%.

Is there a significant difference in the perceived durability of pure cotton, pure linen, and linen-cotton blend nursing pads?

Yes, there is a significant difference. Linen-cotton blend is perceived as the most durable (85.2%), followed by pure cotton (62.8%), and then pure linen (59.6%).

How does the absorbency of linen-cotton blend nursing pads compare to that of pure cotton and pure linen options?

Linen-cotton blend has the highest absorbency rating (84.4%), significantly higher than both pure cotton (62.8%) and pure linen (61.2%).

What is the relationship between fabric type and overall user satisfaction in nursing pads?

Assuming overall satisfaction is an average of comfort, durability, and absorbency: As shown in Fig. 3, Linen cotton blends show a maximum percentage of satisfaction when compared to pure cotton and pure linen types.

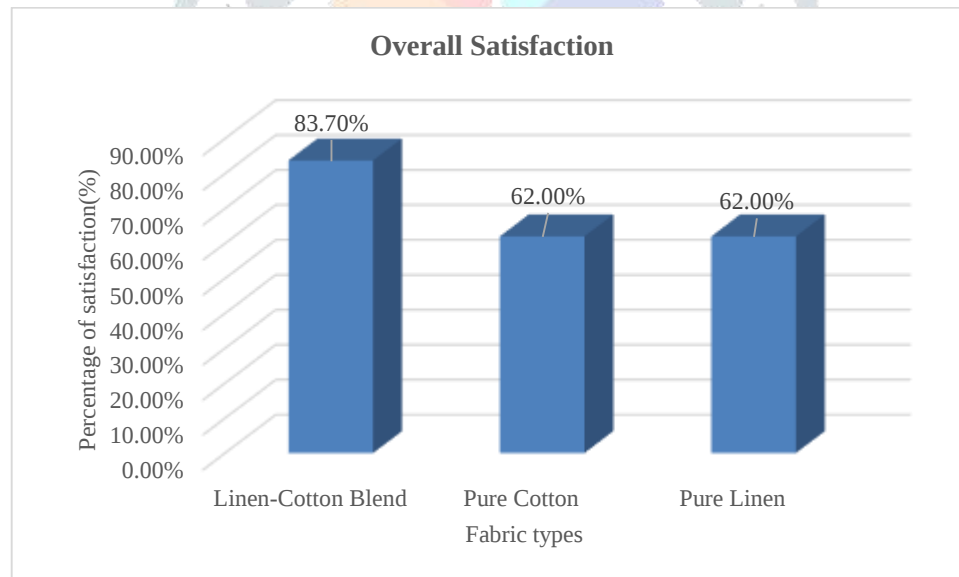


Fig.3 Overall percentage of satisfaction with fabric types

Are there any correlations between comfort, durability, and absorbency ratings for each fabric type?

Table 4: The correlation coefficients

Fabric Type	Comfort-Durability	Comfort-Absorbency	Durability-Absorbency
Linen-Cotton Blend	0.21	0.33	0.37
Pure Cotton	0.15	0.13	0.18
Pure Linen	0.18	0.24	0.2

From Table 4, it is clear that there are weak to moderate positive correlations between all parameters for all fabric types.

How do the performance ratings of linen-cotton blend nursing pads justify further research and development in this fabric combination?

The linen-cotton blend consistently outperforms pure cotton and pure linen in all categories, suggesting that further research and development could lead to even better nursing pad products.

What factors contribute to the higher ratings of linen-cotton blend nursing pads across all three parameters?

While the data does not provide specific reasons, the combination of linen and cotton likely combines the strengths of both materials, resulting in improved comfort, durability, and absorbency.

What implications do these findings have for the design and manufacturing of nursing pads in the Indian market?

Based on these findings, manufacturers in the Indian market should consider focusing on linen-cotton blend nursing pads, as they seem to be preferred and perform better across all measured parameters.

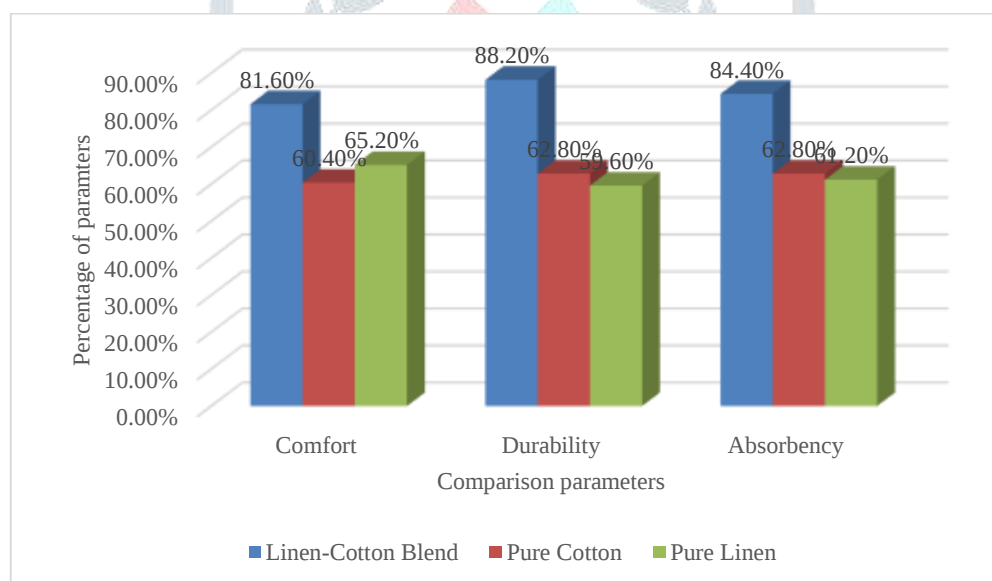


Fig. 4 Comparison of fabric types

As shown in Fig. 4, the analysis suggests that the cotton-linen blend offers notable improvements in comfort and absorbency while maintaining a high level of durability. Its elasticity and resilience make it particularly suited for reusable nursing pads. Whereas the cotton and linen blend offer a slight difference in durability and absorbency, the comfort parameter decreases on the other side.

5. Conclusions and recommendations

To optimize the performance of linen-cotton blend nursing pads, the following fabric treatments and additional layers can be considered:

1. Fabric Treatments for Enhanced Absorbency and Comfort: Brushed Cotton Finish: Softens the surface to improve skin comfort. Bamboo or Modal Infusion: Blending with bamboo or modal fibers

enhances moisture-wicking and antibacterial properties. Aloe Vera Treatment: Adds a soothing effect for sensitive skin.

2. Additional Layers for Functionality: Top Layer (Skin Contact): A soft, breathable fabric such as organic cotton or bamboo to prevent irritation. Core Layer (Absorbency): Multiple layers of linen-cotton blend or an additional absorbent material like hemp for enhanced moisture retention.

3. Design Considerations: Contoured Shape: Provides a better fit and reduces bulkiness under clothing. Edge Finishing: Use flat seams or serged edges to prevent chafing.

Recommendations for future research and industry developments in the nursing pads market.

Based on the SWOT analysis of the nursing pads market for linen and cotton mix fabric, here are some recommendations for future research and industry developments:

1. Research enhancing the absorbency of natural fibers to match or exceed synthetic alternatives while maintaining eco-friendliness.
2. Investigate cost-effective production methods to reduce the price point of linen and cotton mix nursing pads, making them more accessible to a broader consumer base.
3. Develop and test innovative washing and maintenance techniques to improve the durability and stain resistance of natural fiber nursing pads.
4. Explore the potential for creating reusable versions of linen and cotton mix nursing pads to cater to the growing demand for sustainable products.
5. Research the integration of antimicrobial properties into natural fibers to enhance hygiene and reduce the risk of bacterial growth.
6. Investigate alternative natural fibers or blends that could complement or enhance the performance of linen and cotton in nursing pads.
7. Conduct market research to understand regional preferences and tailor product offerings accordingly, especially in developing countries with rising birth rates.
8. Explore partnerships with maternal health organizations to promote the benefits of natural fiber nursing pads and gain credibility in the healthcare sector.
9. Investigate sustainable packaging solutions to enhance the eco-friendly profile of the product further.
10. Research and develop innovative designs that could improve fit, comfort, and discretion for nursing mothers.
15. Explore the development of innovative textile technologies that could be incorporated into natural fiber nursing pads to offer additional benefits, such as leak detection or moisture monitoring.

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