



An Assessment on Use of Feminine Hygiene Materials among Students & Requirements for Product Development

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Abstract:

The most popular feminine hygiene material is disposable sanitary napkins, which is made to catch menstrual fluid. Out of all feminine products, the users mostly utilize disposable napkins for many reasons. An extensive survey was conducted through the questionnaire about feminine products exclusively on disposable sanitary napkins. Based on the study, awareness needs to be given to manufacturers for including the number of layers in a napkin and their significant role. From the population about 82% are using disposable sanitary napkins out of which 65% population know the proper disposable method. Most users felt at least one of the side effects, such as rashes and allergies, by using disposable napkins. Natural fibers usage in disposable napkins is more likely accepted by the users, and suggested to develop 100% natural. Almost all the users are very much interested in the use of natural products, mainly absorbent layers.

Key words: Feminine hygiene, disposable sanitary napkins, natural fibers, hygiene, tampons

Introduction

Hygiene refers to conditions and practices that help maintain health and prevent the spread of diseases (*Hygiene - Wikipedia*, n.d.). Textile materials are used very frequently in

healthcare and hygiene applications. To be comfortable for surgeons, healthcare materials should have a high-filter capacity and a high level of air permeability and be lightweight and non-allergic(Qin, 2016)(Chilukoti & Mandapati, 2020).The hygiene sector is an essential area of medical textiles, among other medical applications. Out of all hygiene applications, sanitary application is one of the major and used in day-to-day life by girls and women. There are number of products available for feminine hygiene products, these are classified according to the choice of end-user as given in Figure1. These products could be washable or disposable for specific towards the viability of end users. Also, the materials used to produce hygiene products should be biocompatible, non-allergic and not give the wearer any side effects. Basically, hygiene products are made from natural and synthetic materials such as wood-pulp, cotton linter, wool, linen, super absorbent polymers (SAP) and/or super absorbent fibers (SAF).

Wood-pulp, cotton, wool, and linen absorbents absorb approximately six times their mass in water, whereas Superabsorbent fibers can absorb up to 50 times their mass in water. Superabsorbent fibers are also advantageous compared to superabsorbent powders. Due to their small diameter ($\approx 30 \mu\text{m}$) and high surface areas, they typically absorb 95% of the ultimate capacity within 15s(Qin, 2016).The manufacturing process of each product differs in their design; usually fabrics used for these products are made from woven, knitted and nonwoven processes. Absorbents, as well as fabrics, are given antimicrobial treatment to prevent the attacks of bacteria.

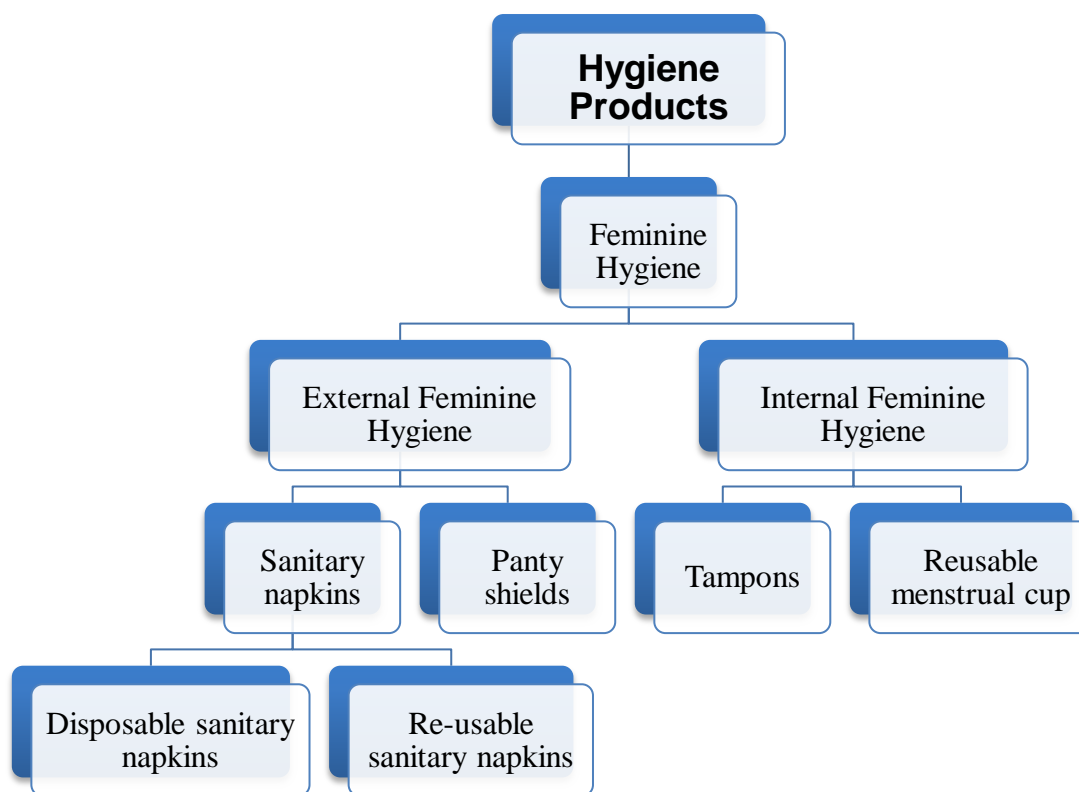


Figure 1: Classification of Feminine Hygiene Products

The female population in India with the age group of 15-19 years consists of 9.7%, and the 20-24 years age group is 8.7% of the country's female population; together 18.4% (Ministry of Home Affairs, n.d.). Moisture behavioral properties of napkins in specific to liquids, such as spreading rate, retention, holding capacity, and absorption capacities, were evaluated for performance (Rai et al., 2019) (Rajesh Kumar et al., 2020). The effect of wetting and absorbent layer compression and recovery time was evaluated (Kara, 2021).

This paper aims to know the opinion on feminine hygiene materials in specific disposable sanitary napkins used by young girls between 17 - 23 years and suggestions & requirements for product development.

Result: Survey on Disposable Sanitary Napkins

The survey was carried out on the usage of sanitary napkins by 500 students of Andhra Pradesh, India. Ages from 17 to 23 years and 90% survey population are of 18, 19 & 20 years

undergraduate girl students (figure2). The main reason for selecting the students are to get valuable information on the napkin performance without hesitation(Doh et al., 2013).

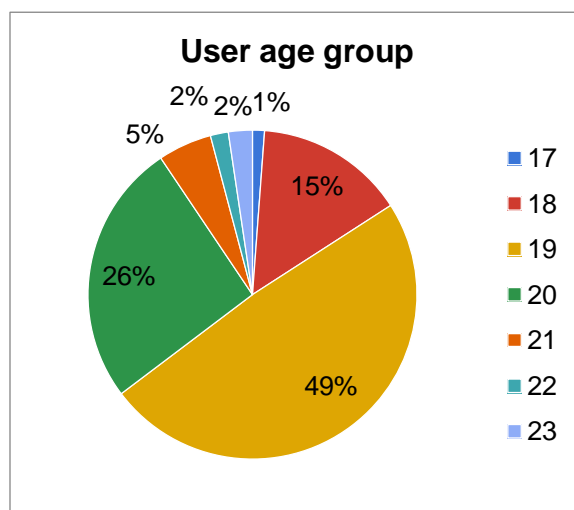


Figure 2: Survey population age and percentage

Criteria for selection of sanitary napkin

The selection of sanitary napkins for usage is essential since they will be directly and very close to the sensitive private parts of girls/women. Necessary and desired properties that women prefer to choose sanitary napkins are no leakage, no unaesthetic appearance or color, no odor, stay in place, comfortable to wear, and most importantly, hygiene. In our survey (figure3), we get to know that 46% preferred to have hygiene in their choice, 41% were preferred to feel comfort with their choice, 6% were preferred the availability of the product in their locality, 4% were preferred according to the performance in their choice and rest 3% were preferred the price of the product. The majority of population i.e. around 87% preferred hygiene and comfort.

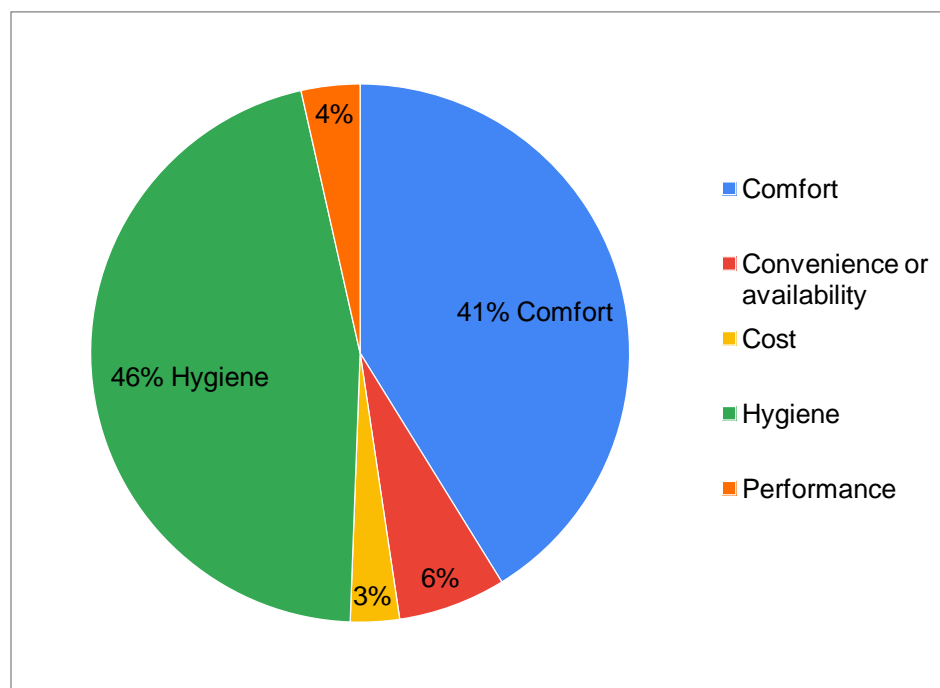


Figure 3: Preferred characteristics by the population

Type of feminine products used at menstrual period

Women use different types of pads/feminine materials according to their preferences on menstrual period. Different types of pads available in the market are organic, overnight, ultra thin, disposable, reusable, etc. The survey posed a question about the use of feminine products such as disposable sanitary napkins, panty shield, reusable cloth, reusable menstrual cup, reusable sanitary napkins and tampons. From the survey (figure4) 82% of girls are using disposable sanitary pads, 5% of girls are using panty shield, 5% of girls are using reusable cloth, 5% of girls are using reusable sanitary napkins, 2% of girls are using tampons and 1% of girls are using reusable menstrual cups in their menstrual period.

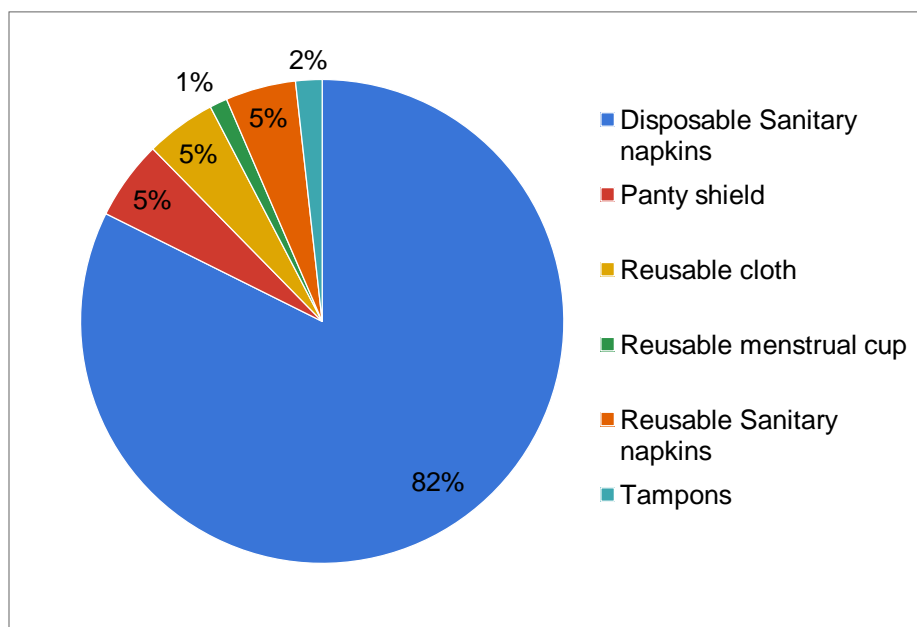


Figure 4: Type of feminine products used in percentage by user

Brand/Non-brand preference

Customer preferences are based on factors like brand image, price, quality, availability of the product, etc. Mostly women follow their family using from the past. Almost everyone i.e. about 95% survey population, uses branded disposable sanitary pads, and the remaining 5% use locally made napkins of their choice.

Opinion and use of reusable cloth

Reusable sanitary cloths were the best practice in olden days, i.e., before disposable sanitary napkins' commercial availability (Budhathoki et al., 2018). Still people are using reusable hygienic napkins to reduce plastic usage, reduce the energy use, it contains fewer toxins, it saves money, it will save water, they perform better than disposable sanitary napkins (opinion of few populations), will not show an impact on future generations. But it is not as comfortable as disposable sanitary napkins (view of little population). It will cause problems like rashes, allergies, etc on repeat usage due to rough fabric surface. Almost 80-85% population prefers disposable sanitary nappies. The following were the opinions (15-20%) on reusable cloth given by the people through the survey:

- As it can be reused and to save money, more over its comfort than a sanitary napkin
- Because it is hygienic, comfortable & reusable
- Low chemical presence since it was already washed
- Comfort and it's good for health and alsoprevents rashes. Suggests cotton cloth due to their availability in almost all the individual houses andfor more observe overflow fluids.
- Using it sometimes when necessary, also most economically poor people use clothes because of lack of money.
- Using cloth diapers is good because its low impact on the environment

Where do you buy sanitary napkins?

Women donot have access to sanitary essentials at the beginning of the periods andfeel uncomfortable buying them with other customers around. The survey reveals that 46% of girls are buyingin the supermarkets near their locality, 30% are buying in fancy stores, 15% are buying in pharmacies, and 8% prefer other modes like online.

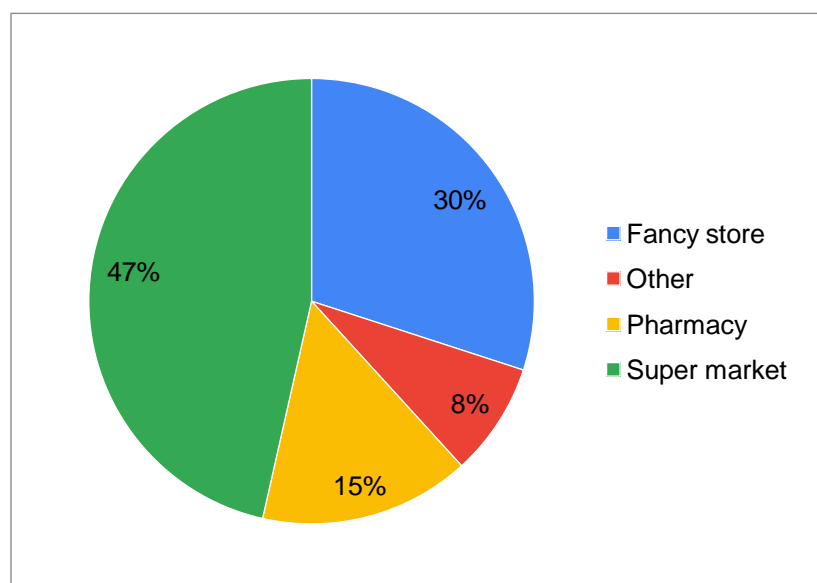


Figure 5: Different purchase source locations

Pad size required

It is important to wear long-lasting, good quality that will take care of your menstrual period and with safety. There are many sizes available. A few are given in table1:

Table 1: Sanitary disposable pads details

Sl. No.	Size	Absorbency	Width(inches)
1	Small pad	Light	2
2	Bitsy pad	Medium	2.25
3	Medium pad	Medium	2.50
4	Jetty pad	Medium	2.50

Based on the comments given by the users, it was suggested that purchasing pads with different sizes will help cater to different flow levels during 3-4 days. Also, it feels comfortable to carry them in small size.

The time interval for pad changes

According to health experts, changing sanitary pads will relieve us from uncomfortable feelings and keep us hygienic during menstrual. Changing pads often also helps to prevent accidental leaks. From the above survey, 56% of girls change their pads every 4-8 hours, 30% every 3-4 hours, 13% every 8-12 hours, and finally, 1% of them change their sanitary pads after more than 12 hours. As per the expert's and manufacturer's perspective, bleeding more heavily need to change in 2-3hrs (Carefree, n.d.), 3-4 hrs regular days, and at least 4-8 hrs light days (Healthline, n.d.). Many factors decide the pad change, pad, i.e. age, body type, heavy days and light days, whenever it feels uncomfortable etc. (Stayfree, n.d.).

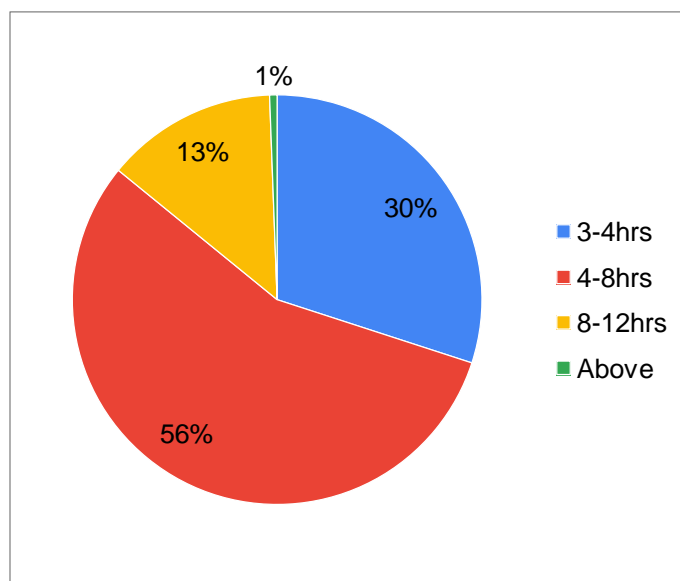


Figure 6: % population for disposable pad change time intervals

Per one menstrual period, how many napkins are required

Many factors will affect the number of napkins required for one menstrual period, such as age and body type, number of days bleeding and frequency of pad change etc. Answering this question is quite tricky because many parameters influence performance and change in time intervals. Understanding the consumption posed a question number of pads used per menstrual period. From the information given by the population, a minimum of 8 pads to a maximum 25 pads were consumed by the users. The maximum group of people i.e. approximately 80%, are consuming 8, 10, 12 & 15 pads per cycle.

Do you know what are the chemicals used in the preparation of sanitary napkins

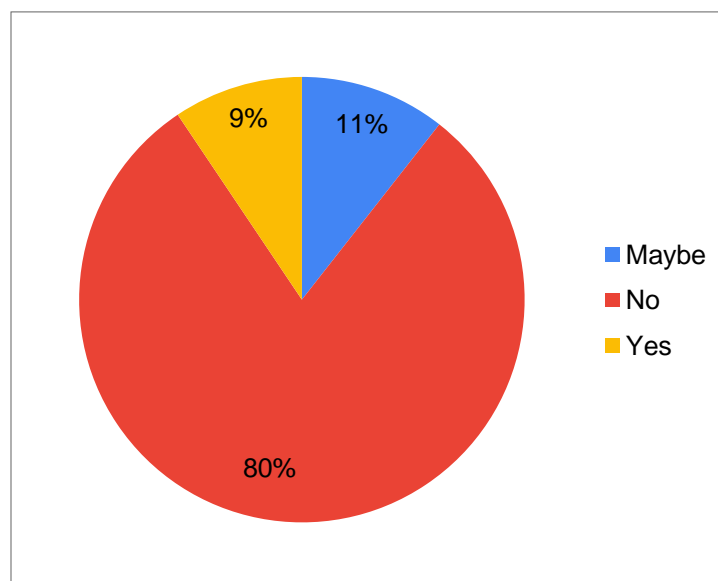


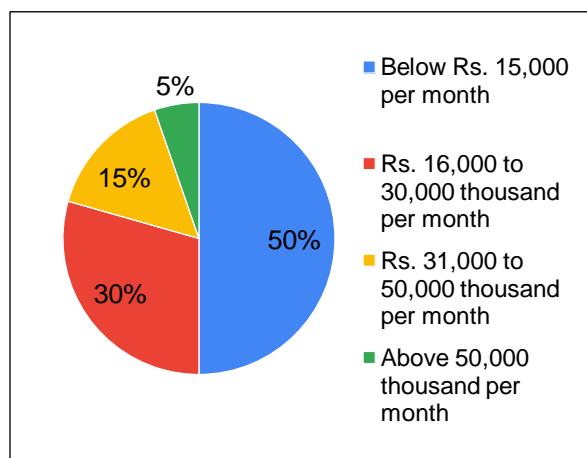
Figure 7: %awareness on chemicals used in pads preparation

The pie chart represents (figure7) that 80% of the teenagers, i.e., the selected age group, are unaware of the composition/materials/chemicals used in the sanitary napkins and the side effects caused by using the chemicals. Around 11% of girls were slightly aware of the composition used in the sanitary napkins, and only 9% of women were aware of the composition and its effect. The findings showed that many women are unaware of the risks associated with sanitary napkins and don't have adequate knowledge of the impact of chemicals used in the preparation of sanitary napkins. The material composition must be explained to the end users through publicity/awareness camps so that end users can take precautions, like the time intervals of pad change.

Income level of parents and the price of pads available in the market

Based on the studies of income groups, the middle class defines earning lies between US \$10 to US \$100 per day as expressed in the year 2015 (*Association for Asian Studies*, n.d.). From the survey of the income level of the majority of families, which is up to 50% of their families are below Rs. 15,000/- per month only, 29% of the families income between Rs. 16,000/- – Rs. 30,000/- per month, 15% of their families having income between Rs. 31,000/- – Rs. 50,000/- per month and 5% of their families income above Rs. 50,000/- per month given in figure8. Also, in the present study, 90% population falls under the middle class category.

a]



b]

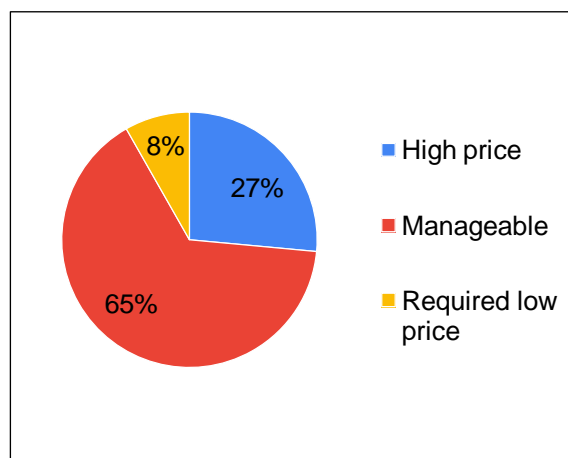


Figure 8: a] Income range of family b]Opinion on napkin price

The biggest barrier to use a sanitary napkin is affordability, considering middle class and economically low-income families. The average market price of a pack of four sanitary napkins is Rs. 32/- branded pads. In India, 27% of the population thought the price was high, 65% said it's manageable since it is necessary, and 8% required low-price napkins to manage their income. Hence the majority of people cannot afford the high price sanitary napkins. Low-cost pads may be developed and can be afforded by all income levels without compromising the quality.

Opinion on the sanitary pad you are using

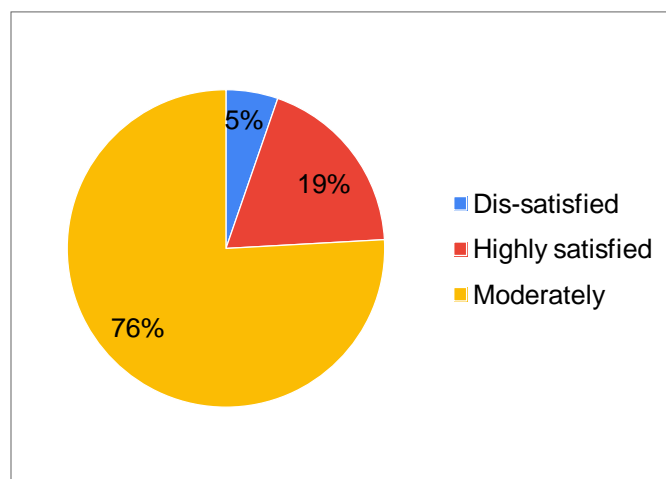


Figure 9: End user opinion on present disposable pads

In considering the parameters of sanitary pads like preventing odor and having fragrance, brand, price, and comfort properties, prefer to use sanitary napkins. Considering all aspects, 5% of the study population were unsatisfied, 76% of women were moderately satisfied and 19% were highly satisfied with the performance of sanitary napkins they are using.

What is the correct method for disposal in your opinion?

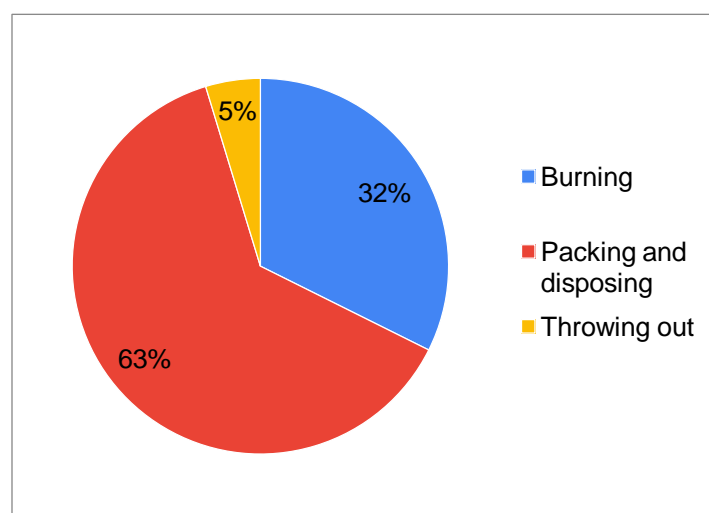


Figure 10: Various disposal methods using by users

Most women dispose of their used sanitary napkins into domestic solid wastes or garbage bins that ultimately become a part of solid waste. Almost 63% of women considered packing and disposing of the correct method for disposing of sanitary napkins, 32% of women considered

burning the correct method, and 5% of women considered throwing out. Due to lack of knowledge, few are throwing out causes of pollution and diseases. Whenever developing new products, everyone needs to understand best practices to dispose to control environmental pollution, which directly influences the disease spread.

What are the common health concerns on using sanitary napkins?

Sanitary pads can cause many health problems by prolonged use of menstrual pads will lead to toxic shock syndrome(Mayo Clinic, n.d.), less, dizziness, yeast infection, rashes, etc. From this survey, 50% of residents are mostly suffering from rashes, 20% are getting skin reactions, 18% think fungal infections are occurring, and 12% are getting allergies.

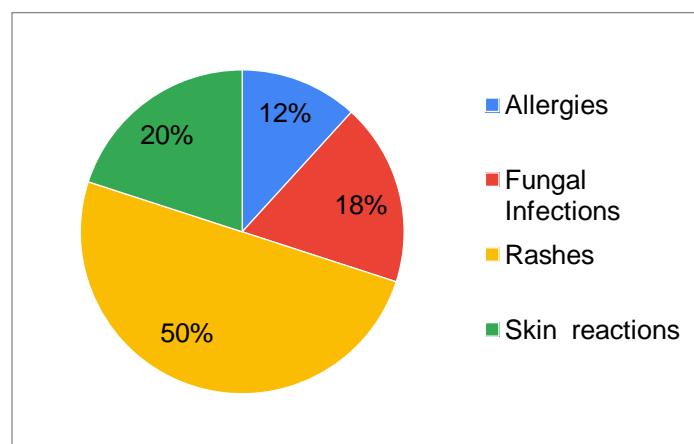


Figure 11: Common side effects on use of disposable pads

Are you interested in buying 100% natural sanitary pads

From the survey and comments from them, we knew that 84% of girls are willing to buy 100% natural sanitary pads, 12% said maybe used and 4% said not interested. If the given parameters like price of the pad, comfort on wearing it, performance of the pad, better odor, fragrances, etc. are controlled almost the majority of the end users choose the natural napkins.

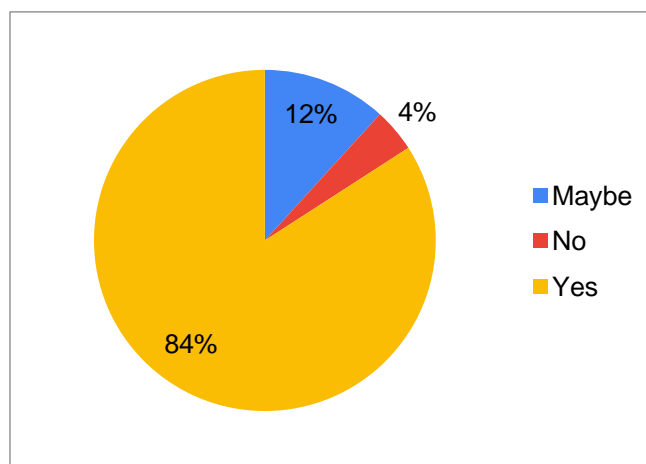


Figure 12: Poll towards use of sustainable natural fibers in pads

Requirements and suggestions of the users:

- As compared with available pads need low cost one.
- Need more soft and comfortable than available, few are having less absorption so they need deep absorbent sheet, have no chemicals, dryness, flexibility, last a long time, more layers, skin-friendly, and have less odor.
- Suggested to produce easily biodegradable pads, eco-friendly or 100% natural napkins
- Hygiene with zero side effects like rashes
- Some of the girls are suffering from leakage of sanitary pad, the material used inside of the pad gets pooled, and it comes out that will affect the inside uterus.
- Seeking help from the government to supply napkins at a low price or free of cost, because nearly Rs. 1260/- are spent per one year per person. This money can be spent on purchase of stationary materials such as books, pens, etc., for their studies, if available at less/subsidize price or free of cost.

Table 2: Example of approximate money spent (in rupees) per year per person

Sl. No.	If one pack cost (INR)	No. of pads per pack	Price per pad (INR)	No. of pads using per cycle (assumption)	Money spent per one month (INR)	Money spent per year per person (INR)
1	Rs. 42/-	7N	Rs. 6/-	15	Rs. 90/-	Rs. 1080/-
2	Rs. 42/-	6N	Rs. 7/-	15	Rs. 105/-	Rs. 1260/-
3	Rs. 32/-	7N	Rs. 4.6/-	15	Rs. 69/-	Rs. 828/-

SUMMARY

Feminine hygiene products are made to help women to maintain hygiene during their menstrual cycle. Many feminine product varieties are available in the market; based on the survey, most people were using disposable sanitary napkins. This is because of no further cleaning or maintains them for further use. However, 15 to 18% of the population are moving towards reusable and panty shield products. Out of the survey population, a very less percentage of users are aware of the product quality and its process since it is required to educate the users about the product. About 65% of people are disposing in right process. Most users felt at least one of the side effects, such as rashes and allergies, by using disposable napkins. Natural fibers usage in disposable napkins is more likely accepted by the users, and suggested to develop 100% natural.

Future scope:

Since the preference is given on hygiene and comfort, future research needs to focus on developing or improving the napkin performance as per the end user's requirements.

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