

From ‘Use’ to ‘Disposal’: Evaluating the Environmental Effects of Plastic based Sanitary Pads and Mitigation Strategies in Srinagar City

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Abstract

Women comprise about half of the world's population and have unique biological requirements. The need to manage menstrual blood throughout their lives is one of them. For generations menstruation has been clouded by myths, stigma, and widespread misinformation. Since the 2030 agenda of Sustainable Development, terms like “Sustainable Menstruation” have gained recognition. Sustainable Menstruation emphasizes the importance of choosing menstrual products that are beneficial or less harmful for the health of environment. Conventional sanitary pads, for example take approximately 600-800 years to decompose. In India, about 12 billion sanitary pads are discarded annually, generating nearly 113000 tons of waste. This indicates a lack of awareness and an urgent need for attention and action. Considering these issues, this paper seeks to explore the idea of sustainable or Green menstruation. Additionally, it seeks to assess the usage of plastic based sanitary pads, accessibility to sanitary pads, usage of eco-friendly menstrual products, awareness regarding eco-friendly menstrual products, recycling processes and disposal facilities of sanitary pads in the study area. Results indicate that majority of respondents in the study area use sanitary pads having plastics content and have never used any eco-friendly alternative. Also there is a lack of proper disposal facilities in the area.

Keywords: Sustainable menstruation, Eco-friendly menstrual products, Menstrual hygiene, Plastic based sanitary pads, Menstrual product awareness.

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I. Introduction

Mensuration is a natural biological process occurring in females marked by the monthly discharge of blood and tissue from the uterus through the vagina when pregnancy does not happen. This cycle typically starts during puberty (12-13 years) (Khan Nabeela., 2019). On average an individual menstruates monthly for about 40 years, using around 10,000 pads. (ASAN, 2022). Feminine hygiene products like Sanitary pads are an important requirement for women's healthy life and use of it makes it easy to carry day to day activities. When a woman is on periods their widespread use comes with *heavy environmental price tag* and leads to environmental degradation (yadav & Goel 2017).

As the world is striving towards becoming greener to achieve 2030 agenda of sustainable development “Green menstruation” is of utmost significance which refers to the practice of adopting environmentally sustainable menstrual hygiene products to reduce the environmental impact caused by conventional, disposable menstrual products, which minimize waste generation and the harmful effects of plastic based items commonly found in disposable feminine products. It aligns with broader environmental movements advocating for sustainable living and highlights the need for eco-friendly solutions in personal hygiene practices.

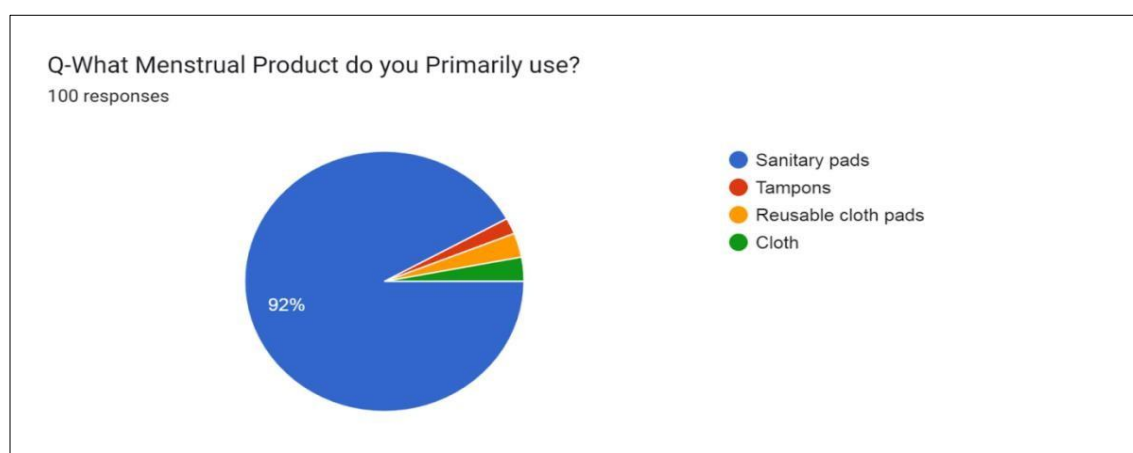
According to menstrual health Alliance India, it takes 500-800 years for a single pad to be decomposed and each pad carries 2 grams of non-biodegradable plastic and is equal to four plastic bags. (Swati et al., 2019) Data on menstrual waste management from the ministry of drinking water and sanitation shows that 28% are thrown in open 33% are buried and 15% are burnt openly. (Swati et al., 2019). Hence there is a dire need to decompose sanitary napkins properly in India. As it degrades environment at various stages from its production, consumption and disposal. Even products that are labeled as recyclable end up in landfills because of the presence of some organic matter due to which they become non acceptable in some recycling facilities. Due to lack of advanced municipal management facilities and lack of consensus about the classification of women hygiene products contributes to unsafe menstrual disposal practices.

Menstrual product packaging alone contributes heavily to waste, adding up to approximately 400 pounds per woman throughout her life. (wiley, 2022).

II. LITERATURE REVIEW

House et al: (2012)“ Menstrual Hygiene Matters” First edition. This study highlights women experiences of menstruation, basics of menstrual hygiene, cultural and social beliefs regarding it, sanitary pads disposal, challenges to menstrual hygiene in marginalized areas and concluded it with some steps for supporting females in vulnerable or special circumstances etc..Yadav and Goel .,(2017) in their study “Disposable sanitary pads and sustainable environment” case study of Delhi- NCR region found that the cloth during menses has lowered a lot and the women have switched to the use of sanitary pads . Though this practice elevates the reproductive health and hygiene of women, it also raises a major problem to the environment as it is openly dumped in landfills. This process also generates diseases specially among rag pickers. one sanitary pad contains the equivalent of about four plastic bags. *Hence this study concluded with some alternative options to sanitary pads which are less harmful to environment e.g Menstrual cups, reusable sanitary pads , biodegradable pads (“Anandi”) sea sponges* . Choudhary & Bhattacharjee.,(2018) in a research paper “A Study on consumption pattern of sanitary napkin and environment Degradation” highlights the issue of women hygiene products that are becoming a serious environmental issue due to non-biodegradable raw materials . In the manufacturing of most sanitary pads raw materials like wood pulp, polyethylene etc. are used consisting high carbon footprints habitat. The paper uses primary data to analyze the women preference among synthetic and organic sanitary napkin and it has been found that only $\frac{1}{4}$ of women population uses organic napkins and women prefer synthetic napkins more than organic sanitary napkins .Further it uses municipal solid waste act to highlight the insufficiency of government in this context. *The study concluded about 99% of women throws sanitary pads in open by wrapping it and dumping in household garbage which degrade environment.* Central Pollution Control Board: (2018).“ Guidelines For Management Of Sanitary Waste”It has addressed the issue of segregation and categorization of sanitary waste and has shown that only 12% of the 335 million menstruating women have access to disposable sanitary napkins. Environmental portal estimated that 432 million pads are disposed every month. It has suggested options for disposal of sanitary waste at various levels: consumer level , producers level, private agencies, village level/ local levels..

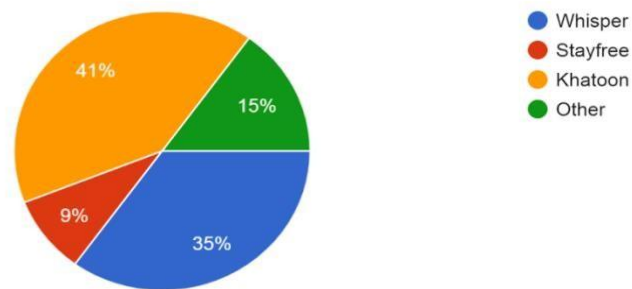
Data Analysis



When respondents Given 4 options of menstrual products, we get to infer that 92% of females use sanitary pads, only 3% uses reusable cloth, 3% uses cloth ,2% uses tampons. By this we can conclude that maximum females use plastic based pads which harm environmental health as well as female health.

Q- What brand of sanitary pads do you commonly use?

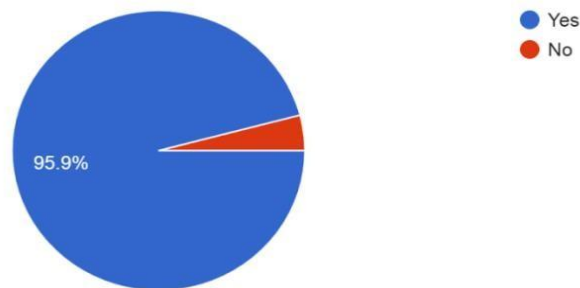
100 responses



Majority of females 41% of our sample uses “Khatoon” sanitary pads, and 35% females use whisper brand, 9% uses stayfree and 15% uses others

Q-Are menstrual products available and accessible for you?

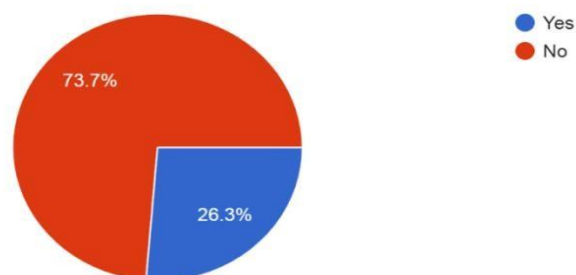
98 responses



About 95.9% of the women in our sample have accessibility to menstrual products and only 4.1% does not have proper accessibility.

Q- Have you ever tried alternatives to disposable sanitary pads(menstrual cups, reusable pads)?

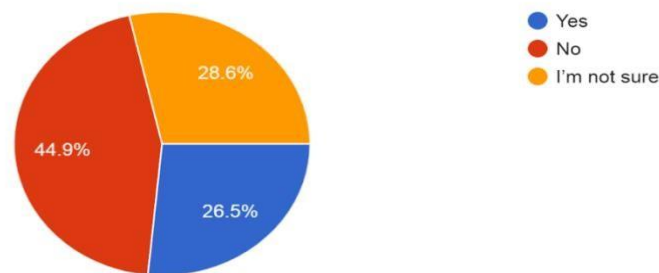
99 responses



About 73.7% females of our sample have never used any alternative to sanitary pads, and 26.6% have tried alternatives to sanitary pads.

Q- Do you believe there is enough information available about eco-friendly menstrual products?

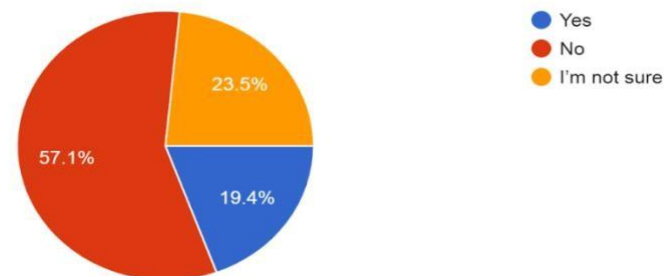
98 responses



About 44.9% females of our survey believes that there is not much information available regarding eco-friendly menstrual products, 28.5% believes that there is information available and 28.6% are not sure about it.

Q- Are you aware of any recycling or disposal programs for sanitary pads in your area?

98 responses



About 57.1% of females of our survey are not aware about recycling or disposal programs for sanitary pads, 23.5% are not sure and 19.4% are aware about it.

1 used sanitary pad = 2 gram non-biodegradable waste (Arena et al 2016)

Correlation Between Usage Of Sanitary Pads With Non-biodegradable Waste Accumulation

The collected primary data from sample sites was tabulated and analyzed to examine the relationship between the average number of sanitary pads used per girl per month (X) and waste generated from pads in grams per month (Y).

Karl Pearson's coefficient of correlation (r) was used to determine the strength and direction of the linear relationship between these two variables. The formula applied is:

$$r = \frac{\sum DXDY}{\sqrt{\sum dx^2 \sum dy^2}}$$

Sample villages	X (average no. of pads used by one girl/ month)	Y (waste generated from pads in grams/month)	Dx (x- \bar{x})	Dx ²	Dy (y- \bar{y})	Dy ²	$\sum dX dY$
Karannagar	9	9×15=135	1	1	15	225	15
Lalchowk	8	8×15=120	0	0	0	0	0
Gogjibagh	7	7×15=105	-1	1	-15	225	15
Hazratbal	7	7×15=105	-1	1	-15	225	15
Nigeeen	9	9×15=135	1	1	15	225	15

$$r = \frac{\sum DXDY}{\sqrt{\sum dx^2 \sum dy^2}}$$

$$r = \frac{60}{\sqrt{4 \times 900}}$$

$$r = \frac{60}{\sqrt{3600}}$$

$r=60/60$

$r=+1$

The Karl Pearson's correlation coefficient between the average number of pads used and waste generated per girl per month was found to be +1, indicating perfect positive linear relationship. This suggests that as the number of pads used per girl increases, the non-biodegradable waste generated from sanitary pads also increases significantly.

III. Result And Discussion

The data collected from the online questionnaire survey respondents depicts that when comparing between various disposable Menstrual products maximum female population prefer use of sanitary pads during menstruation than other menstrual products. It is also revealed that almost whole female population of sample villages uses those brands of sanitary pads which has shown content of plastics in their composition. It is clear from the respondents answer that menstrual products are within reach of majority of female population, results suggest good accessibility of sanitary pads in the area. Which depicts flow of plastic based sanitary pads are good towards these areas to cater the huge demand. The sample study also shows that 73.7% female population have never used any ecofriendly alternative like menstrual cups during menstruation, results suggest either there is unavailability of alternative eco-friendly menstrual products in the market, or if it is available it is too expensive that maximum people can't afford to purchase it. About 50% of female population believes that there is not much information available regarding eco-friendly menstrual options, by which we can conclude that there is lack of menstrual education and level of awareness is lowest in concerned area regarding ecofriendly menstrual options may be because of lack of knowledge among people about sustainability. About 57.1% females are unaware about recycling and disposal programs of sanitary waste, so results suggest that there is lack of proper disposal management facilities in this district, lack of menstrual education and lack of proper waste management facilities lets people to go for unsustainable menstrual options which degrades environment tremendously.

Also The statistical analysis of sample by Karl-Pearson method demonstrates that there is perfect positive co-relation between usage of sanitary pads and non-biodegradable waste generation

GREEN PERIOD PRACTICES:

To address these challenges, we need to focus on menstrual education and rise it by emphasizing on environmentally sustainable alternatives, thus incorporating sustainable menstruation practices. Here are some green menstrual choices available:

- Reusable And washable cloth pads

Reusable cloth pads represent best example of eco-friendly menstrual products, and can contribute significantly to lessen the menstrual waste burden. These pads are sustainable sanitary napkin options but must be hygienically washed and dried in the sunlight. The heat from the sun works as a natural disinfectant, drying cloth pads, and preparing them for future use. These pads can be reused, so they are affordable, accessible and environment friendly.

- Bamboo Fiber Pads

These sanitary pads use bamboo pulp instead of wood pulp as the absorbent material. Bamboo pulp offers higher absorbency and provides a safer alternative. They are affordable, easily decomposed, generate negligible carbon footprints, are environment-friendly pads which also possess antibacterial properties. This provides infection and irritation-free menstruation. Also, bamboo charcoal pads are available in the market with advantage that blood stains are not clearly visible and are also reusable in nature. e.g. Carmesi

- Banana Fiber Pads

In India, affordable sanitary pads designed for rural women, made from waste banana tree fibre, are available under the brand name Saathi. They are environment friendly and decompose within 6 months after use. Apart from these products, women in distant rural regions sometimes use locally available natural materials like leaves.

- Water-Hyacinth pads

Water-hyacinth is a kind of weed. Fibre obtained from water hyacinth is used to make sanitary pads sold under the brand "Jani" these pads are low cost, biodegradable and eco-friendly.

- Biodegradable sanitary pads

Towns and villages few companies like Aakar Foundation produce biodegradable pads under the name "Anandi". This way there will be positive impact on soil, water, air, forests and thus, the health of people living in a city. The price of these pads is 40% lower than the other commercial pads and are mainly available in small.

- **Sea Sponges**

They grow naturally in oceans and can be cultivated like a crop. After, they have been harvested, they can be re-shaped to fit the vagina and used in a similar way as tampons (the keeper, 2008). The advantage of sea sponges is that they can be reused but only after proper disinfection, usually done by boiling. Companies like jade & pearl offer sustainably harvested sea sponge tampons.

- **organic cotton pads**

These pads are made from cotton that is grown without use of synthetic pesticides, herbicides, fertilizers. These are breathable, hypoallergenic as well as eco-friendly as organic farming practices tend to be more sustainable, reducing the environmental impact compared to conventional cotton farming. E.g organic, Rael, Cora, Avni etc.

- **Wood-pulp sanitary pads**

These are eco-friendly alternatives to conventional pads, made primarily from natural wood pulp fibers. These pads are fully compostable and break down more easily in the environment compared to plastic-based pads. E.g easytime, surakhsha etc.

IV. CONCLUSION

Green menstruation has become need of an hour because it not only takes attention towards environmental health degradation but also addresses the health issues among females caused by use of plastic based menstrual products. . Most countries including india evidently have shown major effects on the environment due to sanitary pad usage by female population upto 45-50 years of one's lifespan, therefore the concern towards the sustainable development and awareness regarding green menstrual products is important.

The study has shown that maximum female population uses sanitary pads and have great accessibility to sanitary pads in the concerned area and also reveals that they all uses plastic based brands of sanitary pads, and maximum population have never used any eco-friendly menstrual products which indicates the ignorance regarding green menstrual education. This study also highlights that there is very low level of awareness regarding the availability of ecofriendly menstrual products in the market, also having no awareness regarding recycling and proper disposal of sanitary waste in this area which indicates poor menstrual waste management system in srinagar.

This study mentions sustainable menstrual products have the potential to reduce waste, greenhouse gas emissions, and environmental impact, while also promoting women's health and well-being. Yet, even with increasing awareness of the need for sustainable menstrual products and eco-friendly disposal methods, various obstacles still hinder their widespread use. These challenges include limited availability of green alternatives, cultural and social barriers, issues of affordability and accessibility, and general reluctance to shift from conventional practices.

To promote the adoption of sustainable menstrual products, it is important to raise awareness among women regarding their health and environmental benefits, increase accessibility and affordability. With these efforts, we can increase the adoption of green menstrual products and can lessen the negative impacts of plastic based sanitary pads on environmental health and human health

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