

Papyrus to Pad: An Evolution of Menstrual Products

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ABSTRACT

Personal care items for women that are used during menstruation, vaginal discharge, and other body functions involving the vulva and vagina are known as feminine hygiene products. There are several products for women during menstruation to keep them feeling comfortable and dry. Choice of products depends on the cost of the product, convenience of use, traditional beliefs, and availability. Menstrual hygiene products such as sanitary napkins or towels, tampons, panty-liners, menstrual cups, menstrual sponges, and period panties are some of the products that may be utilized. Because the vagina naturally flushes away bacteria, feminine hygiene products that are supposed to cleanse may cause allergic reactions and irritation. The review is based on secondary sources available in esteem journals and web pages. The evolution of menstrual products has been a long pathway. Nowadays, these products are more user-friendly, which increases women's freedom and ability to work. However, it also carried specific health-related issues. Because menstruation has been a taboo subject from ancient past till today's life, it is critical to begin talking about periods and the products used by women. Knowing more about the materials used products is a step toward achieving both menstrual hygiene's, and it will also help avoid health-related issues and maintain environmental sustainability.

Keywords: Bamboo fiber pads, Menstrual cups, Menstruation, Reusable cloth pads, Tampons

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INTRODUCTION

Menstrual Hygiene Management (MHM) is an indispensable part of women's hygienic issues that begin from puberty and end up in menopause. Women and adolescent girls absorb or collect menstrual blood with specific material. Choice of products depends on the cost of the product, convenience of use, traditional beliefs, and availability. It is essential to ensure a safe and clean private place to change the product dignifiedly. Washing the genital organ with soap and water, having access to safe and convenient facilities to dispose of used menstrual management materials is also required. Women have a rudimentary understanding of the menstrual cycle and how to manage it in a dignified and fearless manner is essential from the grass-root level. To deal with menstruation, every woman has their techniques. Personal preferences, availability of resources, economic status, cultural customs and beliefs, education status, and understanding of menstruation all play a role in these methods. The primary purpose is to identify women's concerns about menstruation products and effective menstrual management alternatives.

METHODOLOGY

The discussion is entirely based on secondary sources available in esteem journals and web pages.

Significance of the Study

To avoid infections, frequently changing menstrual products is very much required. Poor menstrual hygiene is associated with several problems, including fungal or bacterial infections and skin irritation. If an individual wears a menstrual product for too long, it can lead to an illness, such as a yeast infection. As well as irritation, a wet pad and friction might increase susceptibility to infection. From ancient times till today, menstrual products have evolved according to its need. However, today, women in every society use the old and traditional methods, leading to some vaginal infections. This paper will give a brief view about the menstrual product available from the past toward modern times.

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History of Menstrual Products

Ancient time

Egyptian women used tampons with softened papyrus. In Greece, tampons were rigged out of lentils wrapped around small wood pieces. Pads and tampons in Rome are composed of soft woolen cloth. In addition, paper, moss, wool, animal hides, and grass were employed in various parts of the world to create menstrual flow containment devices.^[1]

Medieval age

In 1839, Charles Goodyear invented the technology for vulcanizing rubber used to manufacture condoms and the "womb veil." It was sometimes referred to as the diaphragm. In 1873, the "Comstock Act" was passed. According to this act, creating a "womb veil" was considered a federal crime. In reaction, the birth control industry invented "feminine hygiene" to advertise their repackaging.^[2] In 1896, a commercial sanitary pad was made by Johnson and Johnson company as "Lister's Towels."^[3]

The era of Victoria

Many American women used handmade pads in the early twentieth century. These cloths, or rags, were fixed to their underwear or

handmade muslin belts. Sanitary aprons and bloomers were also available to protect clothes from staining, not absorbing blood flow.^[4] In the environment of World War-I, when nurses in France discovered that the cellulose bandages they used as absorbed blood on wounded soldiers were much better than plain old cotton, they began to use them in their menstruation times.^[5] In the 1920s, Kotex introduced disposable belt pads. These napkins have been arranged with the aid of belts.^[6] In 1927, Johnson and Johnson launched "Modess," the sanitary pad manufacturers. In the 1940s, "Modess" launched excellent propaganda to introduce commercial sanitary pads.^[7] In 1969 Stayfree launched mini pads, the first sanitary pads with short adhesive strips.^[8]

Modern Era and Menstrual Products

Reusable cloth pads

They are considered a sustainable sanitary alternative but must be hygienically washed and dried in sunlight. Because they are reusable and do not arrive in or include plastic packaging, menstrual cloth pads are environmentally friendly and do not reduce waste. Blood washing water must be disposed of with proper safety is very important. Menstrual clothes need to be washed with bleach, thoroughly dried and taken care of. Special precautions should be taken if the user has an infection with the yeast. Pads can cause infection if they are not sterilized. Blood-borne pathogens, such as hepatitis C, are found in menstrual pads of infected patients and present a risk of infection if not sealed in leak-proof containers.^[9]

Commercial sanitary pads

They are costly, non-reusable, and not very eco-friendly as cloth pads. Pads require underwear to hold the product in place. It has a medium absorbent layer made of cellulosic material. Often they are combined with super-absorbent polymers to improve absorption and make the pad thin. The upper layer may be made of woven or unwoven fabrics, while the lower, leak-proof layer may be made of plastic and glue [Figure 1].^[10]

Tampons

Tampons primarily provide internal security. This sort of absorbent provides internal protection. They are soft cotton plugs put into the vaginal canal to absorb the menstrual flow before leaving the body. They are costly, difficult to degrade in nature, and unfriendly to the environment. Sea sponge tampons, a natural alternative to synthetic tampons, are now available on the market. They are costly, not easily degradable and therefore, not very environment friendly.^[14]

Reusable tampons

They are washable commodities made of raw, bio-friendly materials. They are often composed of 100 per cent organic cotton and are chemical-free. Tampons that are used more than once are made differently from disposable tampons.^[15]

Menstrual cups

They are like cups made of medical-grade silicone rubber. They are reusable, environmentally friendly, safe, realistic and cost-effective. They could be a new technology for disadvantaged women and girls and substitute sanitary pads and tampons. They

resemble cups made of medical-grade silicone rubber that folds easily and can be put into the vaginal canal to collect menstrual blood. Women can be worn for up to 12 h, needing less frequent removal and emptying depending on the amount of menstrual blood flow [Figure 2].^[16]

Bamboo fiber pads

These pads are inexpensive, easily decomposed, and environment-friendly with antibacterial properties. Banana Fiber Pads are eco-friendly and decompose within 6 months of use. Bamboo pulp is

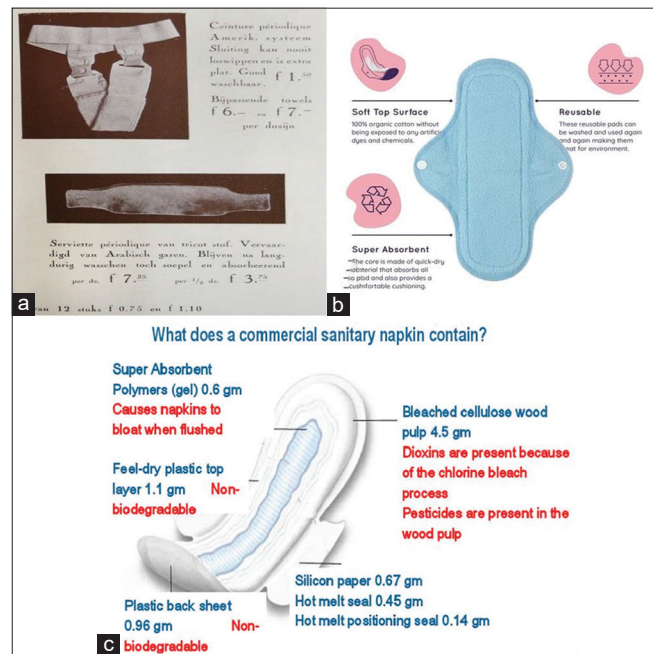


Figure 1: Types of absorbents used during menstruation. Handmade Muslin Sanitary belt (a), Picture source: Sanitary Napkins and Girdle,^[11] Reusable Cloth Pad (b), Picture source: Sanfte Reusable Sanitary Pads,^[12] Commercial Sanitary Pad (c), Picture source: Envo Tech's Changemakers^[13]

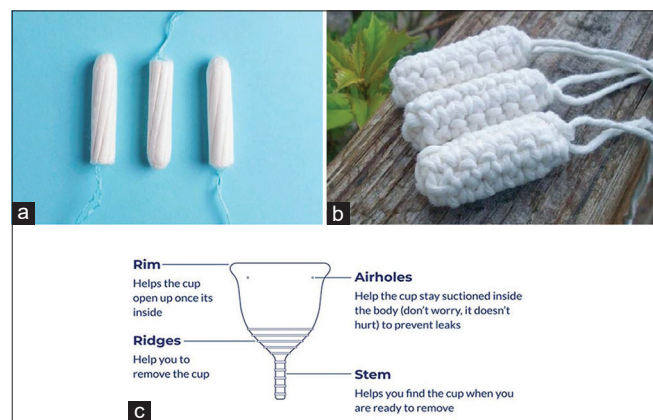


Figure 2: Types of absorbents used during menstruation. Tampon (a), Picture source: Tampons Benefits how to use and Complications,^[17] Reusable Tampon (b), Picture source: Green with These G,^[18] Menstrual cup (c), Picture source: Menstrual Cup: What is it and how to Use it^[19]

employed as an absorbent material in these sanitary pads instead of wood pulp. It has a higher absorption capacity and is, therefore, safer to use. They are cost-effective, easily decomposable, and environmentally friendly pads with antibacterial qualities. In addition, it ensured that menstruation was free of infection and discomfort. Bamboo charcoal pads are also available on the market, which cannot show blood stains and are reusable.^[20]

Banana fiber pads

Banana fiber has outstanding absorption capabilities and can produce hygienic pads. It is easy to wash and quick to dry using composite banana fiber. They are eco-friendly and will degrade in 6 months after being used. The longer life of these sanitary napkins can significantly reduce the environmental impact of discarded sanitary pads.^[21]

Water hyacinth pads

These pads are cost-effective, conveniently biodegradable, and eco-friendly. Water hyacinth creates an environmentally friendly sanitary napkin that can absorb 12 times more water than a standard sanitary pad [Figure 3 and Table 1].^[22]

Benefits of Using Reusable Cloth

One of the main advantages of reusable cotton pads is that they may be used again. This product is made from biodegradable and eco-friendly materials that can be significant as low waste generation. Therefore, they have a long service time and are cost-effective. Natural napkins are more breathable and skin-friendly. Intimate areas may protect from contamination by using cloth as a sanitary napkin. An added benefit of these pads is their softness and breathability. Reusable cotton pads can

be manageable in various thicknesses and sizes as required. In addition, it is less toxic.^[26]

Re-usable Cloth and Health Related Issues

Reusable pads may not be the best option for women who bleed a lot during menstruation. Bloodstains can sometimes be difficult to remove from the cloth. In addition, reusable cotton pads need to be cleaned, dried, and cured correctly. A vaginal infection is more likely to occur if not cleaned properly or dry in sunlight as germs and fungus can thrive in the intimate area. On the other hand, travellers will need an extra bag to keep used reusable menstrual pads because cloth pads are difficult to change, dispose, or carry.^[27]

Benefits of using Commercial Sanitary Napkin

When it comes to foul odor, sanitary pads are always a good choice. According to one theory, sanitary pads protect women against allergic reactions. Cloths and other fabrics cannot hold up to them. A person can relax and unwind during these stressful times. It is easy to use and remove.^[28]

Commercial Sanitary Napkin and Health Related Issues

Due to their super-absorbent characteristics, one-time use synthetic pads are a popular choice for many. Structure-wise, sanitary napkins can be broken down into four distinct layers. Nonwoven Polypropylene or polyethylene is used as the outermost layer in direct contact with the skin. This layer absorbs the fluid and sends it to the inner layers to prevent it from leaking back into the system. There might be an optional acquisition layer (also known as the distribution layer). In addition, this layer aids in the even distribution of fluids within the napkins. This layer is primarily composed of cellulose and nonwoven polyester. Sodium Polyacrylate is used to make the sanitary pad's core, which is responsible for absorbing liquids. A collection of volatile organic compounds known as Phthalates is accountable for increasing the plastic layer's flexibility, while dioxin is utilized as a bleaching agent. Because of the Sodium polyacrylate granules in the pad's core, it has a high absorption capacity. Sodium Polyacrylate is a powdered chemical that absorbs liquids to form a gel-like substance. This chemical has a remarkable potential to absorb liquids up to 30 times their weight. The napkin's back sheet is water-resistant, prevents leakage, and helps keep the pad in contact with the body. The composition of the synthetic sanitary napkins is,

- Fluff pulp – 48%
- Polyethylene, Polypropylene, Polyethylene tetraphthalate – 36%
- Adhesives – 7%
- Sodium polyacrylate – 6%
- Release paper – 3%^[29-31]

Fetal damage can result from ingestion of the plastic used to produce the pads. Radium emits dioxin when bleached and poses a health and environmental risk when utilized. In addition, it can have far more devastating effects on the human body than discomfort and allergies. Toxic substances like dioxin can be absorbed straight into the bloodstream because of the mucous membranes high permeability. As an immunosuppressant, dioxin can also disrupt the hormonal system. These substances interfere



Figure 3: Types of absorbents used during menstruation. Bamboo Fiber Pad (a), Picture source: Bamboo Fiber Sanitary Pads,^[23] Banana Fiber Pad (b), Picture source: Staygreen Regular Pads Banana Fibra Sanitary Pads,^[24] Water Hyacinth Pad (c), Picture source: pinterest.com^[25]

Table 1: Comparative study between the two most common products (Disposable sanitary pads and Reusable Cloths)

<i>Characteristics</i>	<i>Disposable sanitary pads</i>	<i>Reusable Cloths</i>
Description	Disposable pads are worn externally into the underwear to absorb menstrual flow- Commercial Sanitary pads are composed of various sizes with or without wings. Absorbencies and materials consist of a layered design made of plastics, rayon, and cotton. Pads also include wings to prevent leakage and keep the pad more securely in place.	Cloths are reusable fabric worn externally to the body, underwear, or tied to the waist to absorb menstrual flow. They are made from either newly purchased fabric pieces (mostly cotton) or old fabric repurposed from clothing or another use. Unfortunately, there is no proper guidance on how long clothes can be reused.
Cleaning method	One time use	Proper washing and drying are essential, though this situation is often difficult due to a lack of stigma. Availability of appropriate washing and drying is space is necessary. Compared to reusable pads, the reusable cloth is often not recommended for MHM., associated with abnormal vaginal discharge, skin irritations and infections.
Health impact	There is various evidence that gives the information relates to the problem of disposable pad use. For example, bacterial infection in the vagina and reproductive tract infections, significantly prolonged wear timing are prevalent.	
Environment impact	Disposal of used pads in flush toilets can lead to clogged pipes and sewage backflow into buildings, creating severe health risks and maintenance problems. Therefore, proper disposal through waste management services is crucial.	Cloths are environment friendly as they can be reused and are mostly made from natural fabrics. However, with inadequate knowledge of a proper waste management system, they often dispose of the environment's materials. In addition, a lack of evidence is present about the disposal of used cloth.
Wear timing	2-3 h/napkin	2-4 h/cloth
Affordability	Relatively higher prices and reoccurring costs render disposable pads unaffordable for many.	Clothes are cheap to procure locally. It is essential to provide information on how to use correctly, wash, dry and store clothes and the means (e.g. soap and possibly underwear) because this contributes to recurrent costs.
Supportive supplies needed	Hand washing, underwear, lidded bins inside the toilet is required.	Hand washing, Laundry detergent, Bucket for washing, Clothesline, storage Bag, underwear, Scissors are required.
Supportive environment needed	A solid waste management system is required in place from on-site to the endpoint.	Sufficient water for washing (daily), private washing space, drying the room, solid waste management system essential.

Source: Guide to Menstrual Hygiene Materials^[26]

with the body's hormonal balance, resulting in reproductive issues. It is recommended that pads should be changed regularly to avoid irritations, allergies, and infections. The presence of plasticizers and synthetic linings in sanitary pads increases the risk of bacterial and yeast contamination. Bacteria multiply quickly in a moist environment, producing vaginal infections. Without treatment, these germs can enter the circulation and cause septic shock. In Pelvic Inflammatory disease, virginity can negatively affect a woman's reproductive ability. Artificial fragrances and odor neutralizers are added to synthetic sanitary napkins commonly. Despite their low cost, these chemicals can cause severe irritations and allergic reactions. Because of the ability to interfere with the reproductive system, these substances can cause infertility.^[32]

DISCUSSION

Feminine hygiene products are personal care items used during menstruation, vaginal discharge, and other body functions involving the vulva and vagina. Douches, feminine wipes, and soap are feminine hygiene items used to clean the vulva or vagina. Because the vagina naturally flushes away bacteria, feminine hygiene products that are supposed to cleanse may cause allergic reactions and irritation. Douching is discouraged by many health professionals because it alters the balance of vaginal flora and acidity. Various eco-friendly products are available, but

women cannot use them during menstruation due to their lack of popularity and high price. In addition, it does not regulate synthetic sanitary napkins for safety or toxicity. Biocompatibility, toxicological, and microbiological investigations are required in the preclinical phase to ensure that the product is safe for both women and the environment.

CONCLUSION

To develop menstrual hygiene, training on hygiene management should be implemented. Girls and women are also made aware of the latest menstrual products, different manufacturers, government legislation through social and electronic media. Subsidies for menstruation products should be provided so that every girl and woman can afford them. Non-governmental organizations should step up to teach rural residents about menstruation, MHM, the importance of house toilets, hand washing, diseases of the reproductive tract caused by inadequate cleanliness. To avoid disposal, it should emphasize the usage of reusable sanitary or cloth pads. Girls and women should understand the dangers of throwing discarded menstruation products out in the open or flushing them down the toilet. In the toilets, dustbins with suitable lids should be placed. Incinerators should be installed wherever practicable, including in homes, schools, and communities. Lack of privacy is a crucial worry in both households and schools,

according to this survey. Many issues are also caused by the mothers and child's misinformation, misconceptions, dangerous habits, and illiteracy about menstruation.

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