



# Microbes Involved in Women Hygiene: Improving Women's Health and Hygiene

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## Abstract:

This comprehensive review examines the development, efficacy, and potential benefits of antibacterial sanitary napkins in promoting women's health and hygiene. Menstrual hygiene management is a critical aspect of women's well-being, and the use of sanitary napkins is widespread. However, traditional sanitary napkins may pose a risk of bacterial growth and subsequent infections. In recent years, innovative approaches integrating antibacterial properties into sanitary napkins have gained attention. This review explores the various antibacterial technologies employed, including the use of silver nanoparticles, natural antimicrobial agents, and other emerging materials, also evaluates the effectiveness of antibacterial sanitary napkins in inhibiting bacterial growth and reducing the risk of infection. Additionally, this white paper describes possible considerations such as safety, environmental impact, and user satisfaction. Overall, this review provides valuable information on advances and challenges related to antibacterial sanitary napkins, contributing to improving menstrual hygiene practices and women's overall well-being.

## Introduction:

The menstrual cycle is a regular, fit young adult female and prior to menopause mature woman's biological procedure that happens once every 28 days. Typically, girls start their period around the years of early teenage. A female will deal with periods about hundred months throughout her entire life [1]. There have been recent campaigns aimed at promoting the use of sanitary napkins among women of rural areas in developing countries [1]. The social stigma surrounding menstrual hygiene has led to inadequate awareness being given to reproductive health care as well as other related problems [2]. Women and adolescent girls were surveyed regarding their knowledge of antibacterial sanitary pads and their usage during menstruation [2]. While menstruating, a woman uses 15,000 pads on average. In India, you will pay nearly 28 to 150 Indian rupees for a packet of sanitary napkins consisting of 8 or 10 napkins. Since many women in India are poor and cannot afford sanitary napkins every month because of unemployment, they use old clothes for sanitary napkins while their periods. This leads to poor hygiene and infection [3]. Tests against *Escherichia coli* and *Staphylococcus aureus* declared that the antibacterial pads inhibit their growth [4]. Women are required to replace their disposable products between every three and four hours, apart from owing to their hectic schedules, whether they are working in the

corporate world or the home, they often fail to do so, which may result in diseases such as cancer, infections, and cysts [3]. The antibacterial cotton pads absorb nanoparticles of some metals like zinc, copper, and silver. A standard cotton pad infused with nanoparticles was effective in opposition to infectious bacteria such as *Listeria monocytogenes*, *Escherichia coli*, *Staphylococcus epidermis*, and *Staphylococcus aureus* [5]. A wound dressing and antibacterial food packaging application could be attained with the developed cotton pads with nanoparticles adsorbed [5]. Reproductive well-being most notably has been inhibited by a lack of knowledge of fundamental uterine and menses physiology, even though health issues of women are often depreciated in translational and basic studies [6].

Menstrual cramps have the potential to increase intrauterine pressure by over 60 mmHg, which causes agony [7]. Pain is often felt in the suprapubic region, but it may additionally reach the lower back or the lower part of the legs and accompany other symptoms including nausea, diarrhea, and headaches [7]. In 71.6% of reported monthly bleeding, there was periodic discomfort, which frequently started on the initial days of menstruation. The average time frame was a couple of days. 60% of women said they felt intense discomfort more than once, and 13% of them had it more often than that. The frequency, length, and intensity of discomfort



were all raised by early menarche ages and lengthy cycles of menstruation [23].

None of the schools had lavatories with a continual stream of clean water, a viewing area for women to check their clothes for bloodstains or soap in the toilet supplies for cleaning your hands after use [21]. Studies on bleeding should be introduced within the regular curriculum starting in the primary grades to assist students prepare for menarche, enhance knowledge of their monthly cycles, and teach boys how to support girls throughout these periods. This can also remove societal beliefs regarding menstruation [21]. Girls were prevented from going to classes by ineffective absorbents, especially if they were relying on old or rejected clothes. Girls without sanitary napkins were not present. Many females said they knew people who had trouble finding absorbent materials and sat in their homes because of this [26]. Girls whose moms are educated are more likely to practise excellent sanitation during their periods, as do girls who are in grades higher than X, have prior awareness of having periods earlier than menarche, use suitable sanitation facilities at their homes, and are exposed to television commercials that encourage the use of sanitary napkins [25].

#### **Problems associated with Menstrual Hygiene:**

In underdeveloped nations, poor hygiene practices during menstruation have an impact on the dignity of school-going girls, their well-being, and health as well as their academic performance and chances of dropping out of school. Even this, educational programs do not adequately address feminine hygiene behaviours or have a good understanding of them [10]. Considering the reality that poor feminine hygiene has an enormous chance to harm the health of adolescents, the issue of personal hygiene practices in teenage females has been neglected in the research [8]. Having the information, resources, and cultural setting to handle bleeding properly as well as with respect is an essential issue for females [9].

As health instruction and outreach are essential components of learning, issues may develop if favourable attitudes and behaviour towards the usage of feminine hygiene products in periods are not attained and hygiene products have not been available, particularly in sooner menarche [27]. Disposable sanitary napkins customers reported improved ease and dependability. This resulted in less worries about clothing stains and associated absences from class. Additional problems with feminine hygiene, such as cleaning, airing out, and secrecy, persisted. Courage of

females to talk about their periods increased thanks to menstrual studying, which were also helped by friends and instructors [26].

#### **Socio-economic Relations with Menstruation:**

There are several period sanitary items on the market nowadays. On the other hand, menstruation sanitation and wellness continue to be a worldwide problem linked to financial disparity, learning, and our surroundings [30]. A feminine hygiene product is a multilayer piece of fabric that is utilised to soak up and hold period fluids. Leakage testing, excellent physique, dehydration, and softness and cleanliness are all required for efficiency. The introduction of wholesale recyclable napkins with a material such as polyethylene rear layer and extremely absorbing polymeric substance has sparked worries about hazardous chemicals and damage to the environment [30].

Girls and women across the world have created individual coping mechanisms to deal with periods. These rely on someone's tastes, the assets at hand, their financial situation, regional customs and traditions, cultural statistics or learning, and the differences between and among nations [11]. Reproductive tract infections (RTI) are a significant global healthcare problem, and they are especially prevalent in communities with limited resources [11]. Considering the scarcity of data on Menstrual Health Management (also called period poverty) worldwide, the anticipated sensitivity surrounding the subject, and the absence of techniques and methodologies that are uniform, documentary proof is mostly presented through subjective, participative, and illustrative techniques [12]. The avoidance of RTI and cervical cancer in females will greatly benefit from the acceptance of high-quality sanitation during their periods. Thus, it is imperative that teenage females are encouraged to adopt an optimistic mindset about managing their periods and other associated issues [25].

#### **Microbes and Disease infection associated with Menstrual Hygiene:**

Healthy teenage girls and pre-menopausal adult women get impacted by their menstrual hygiene on a monthly schedule. A woman's vulnerability to RTI may rise if her Menstrual Hygiene Management (MHM) is inadequate [13]. India discovered that women who used washable absorbent materials were prone to experience urogenital symptoms of infection, but they also found that access to personal restrooms with running water and a shortage of information were contributing reasons [14]. Lactobacilli



that make hydrogen peroxide comprise most of the typical vaginal flora. In Bacterial Vaginosis (BV), a broad community of bacteria, such as *Gardnerella vaginalis*, *Prevotella* sp., *Bacterioides* sp., *Peptostreptococcus* sp., *Mycoplasma hominis*, *Ureoplasma urea*, *Mobiluncus* species (spp.), and other species of bacterial organisms are growing while the overall count of lactobacilli is declining [13]. An essential component of medical instruction is awareness of how teenagers attending schools perceive and act about the usage of disposable napkins throughout the cycle [27].

Poor women are unable to purchase feminine hygiene items like feminine hygiene products, that must be

replaced within four occasions a day when a woman is menstruating. In some countries, a large proportion of females wear cloths instead [29]. These are commonly referred to as "neka" and are ripped from ancient saris. Rags are swiftly rinsed within the toilet (using a tiny pottery vessel or plastic container filled with water called a "bodna") and reused repeatedly. The cloths cannot be changed or cleaned privately, while there is frequently no access to clean water or detergent for laundering clothes completely. Women are compelled by an atmosphere of embarrassment to hang the scraps in secret locations even inside their houses. Such locations are frequently unclean, darker, and humid [29].

**Table:1.0 Role of Microorganisms during Menstrual Cycle**

Microorganisms	Functions in Menstruation
<i>Lactobacillus</i>	Bacteria dominate the vaginal microbiota, which helps maintain vaginal health.
<i>Escherichia coli</i>	May be present at menstruation due to microbial translocation.
<i>Staphylococcus aureus</i>	In certain circumstances, it may be associated with toxic shock syndrome.
<i>Streptococcus spp.</i>	May contribute to bacterial vaginosis or other infections.
<i>Gardnerella vaginalis</i>	Related to bacterial vaginosis.
<i>Candida albicans</i>	Fungal overgrowth, which can cause yeast infections.
<i>Prevotella</i>	It can be found in menstrual fluid and is associated with bacterial vaginosis.
<i>Atopobium vaginae</i>	It has been associated with bacterial vaginosis and other vaginal infections.
<i>Ureaplasma urealyticum</i>	It can be present in the genitals and contribute to: to infection.
<i>Mycoplasma hominis</i>	Other types of bacteria that may be present in the genitals.

#### Antimicrobial Sanitary Napkins – A Further Use:

To examine the antimicrobial properties of neem extract-treated by yarns which are not woven, an analytical antibacterial test technique designed to evaluate the defence of non-leaching antibacterial processed specimens to microorganism growth in evolving interacting situations. *S. aureus*, a gram-positive bacterium, and *E. coli*, a gram-negative bacterium, were tested for antimicrobial activity [15]. On the sanitary pad's filled sheet and support area, 70% aloe gel extraction has demonstrated adequate antibacterial and antifungal ability [16]. The already-

made serviette was then assessed based on several factors, including its shape, size, thickness, and porosity to sustain weight after being absorbed, and ease of disposal. The criteria connected to characteristics of sanitary napkin specimens, such as comfort, elasticity, and softness, were discovered in the findings [16]. Period absorbing materials are provided, aimed at solving one major hindrance to a healthy monthly cycle, however treatments targeting more fundamental requirements, like confidentiality, may be more beneficial. Courses on adolescent training ought to pay more consideration to body consciousness and



incorporate techniques for handling a larger variety of real-world period difficulties, such as managing cramps. In subsequent investigations, quantitative polls may be improved thanks to information from discussions [26].

Most of the sanitary pad research lately has concentrated on assessing the risks to the health of people posed by such goods, especially the impact of increasing phthalates content, which has raised concerns among consumers all over the globe [31].

### Case Study Shahana

In the Bangladeshi region of Sariatpur, an isolated hamlet was home to 11-year-old Shahana. She attended the fourth standard. She collected the blood from her period in cloth. She replaced the wet cloth once afterwards school, cleaned it, and dry beneath a coffee tree so that it could be reused [29]. The washcloth was invaded by a dangerous bug. She reused this cloth the following day, oblivious of the bug. It is a shame that the bug got inside her through the genital area. She was brought to the medical centre after experiencing excruciating stomach-ache. She passed away only seven days later [29].

### Discussion

The worldwide sales for feminine hygiene products just crossed the \$40 billion mark, and yet not much consideration has been given to the way marketing for these products could influence how women see periods [17]. The sort of period health training given to young girls in India is not well understood. Yet, preliminary evaluations of beliefs and understandings might help in the creation of strategies for menstruation learning [18]. This research focuses on the viewpoints of teenage girls from families with lower incomes and shows a dearth of fundamental knowledge that might promote proper development and growth [18]. Schedule restrictions, confusing information resulting in misunderstandings, unresolved information resulting in misunderstandings as well as the existence of companions in collaborative learning scenarios that cause shame were all listed as issues with menstrual-related training [19].

Girls distinguish clearly among two types of menstrual awareness: realistic, pragmatic awareness of handling the real-life experience of periods and academic understanding regarding the body's anatomy and physiology of menstruation [20]. To talk about the interactions and pauses that characterise modern menstrual socialisation and to indicate potentials for

changing speech and behaviour, I use crucial feminist analytical methods to analyse cultural writings of period socialisation, such as girls' conversations regarding their period-related learning, the maternal conversations regarding the prep work for bleeding that girls acquired, and educational resources given in their medical classes [20]. Poor menstruation information was defended over by mothers being taught. Teenagers with basic education and those with higher levels of schooling were significantly less inclined to have an inadequate understanding regarding periods in comparison to those whose mothers remained uneducated [21]. Teenagers in families without televisions or FM radios had a higher likelihood of having inadequate understanding of the cycle of menstruation than teenagers in households with these devices. Our primary selection criteria for hygiene supplies included ease, security, and affordability [21]. Many of those instructors claimed that, despite dire situations, pupils do not have access to sanitation amenities in classrooms. We discovered that girls were not permitted to participate in cultural events or make certain regional delicacies when they began menstruating [21].

Having an upper sheeting layer made of plastic/polypropylene microfibre cloth, a cellulose interior made of a polymer foam called polyacrylate, with an impenetrable rear sheet made of plastic sticky sheet and just a little of fragrance in the fragrant variant, sanitary napkins feature a standard layered structure [31]. The utilization of organic fabrics to solve the issues of wellness effect, disposal of garbage, and cost is now the subject of active study. With every crop is harvested, the fruiting body of the banana plant is chopped off and largely thrown as garbage [30]. The fibres of bananas are powerful absorbent materials that are lighter. This initiative's primary goal is to conduct exploratory research on the possibility of creating a compostable antibacterial sanitary napkin using banana fibre [30].

Female hygiene-related behaviours are extremely important while menstruating since they affect the way they feel by making them more susceptible to RTI. It is clear how status in society, feminine cleanliness behaviours, and RTI interact. RTI and its consequences affect thousands of females currently, and the illness frequently spreads across the unborn child of the pregnant woman [22]. Adult females who possess more knowledgeable about safe practices for managing their periods have a lower risk susceptible to RTI as well as its effects. A greater understanding of menstruating at an early age might improve healthy practises and lessen





the pain of thousands of females [22]. A constant flow of water in restrooms, a reflection in the mirror for females to examine their outfits for blood spots or detergent in the lavatory services for washing your hands were not available in any of the institutions. Beginning in elementary school, lessons about menstruation might be incorporated into the usual educational programme to help get ready for menarche, increase one's awareness of their periods, and educate males ways to encourage women and girls during this time. Additionally, this can dispel the social myths about periods [21].

Among women living in low-income environments, managing periods offers substantial obstacles; the impact of inadequate MHM, however, is yet unknown. It is conceivable that MHM might have an impact on the genital system, but the precise diseases, the severity of the impact, as well as the mode of spread are yet unknown. To more fully comprehend the complex impact that enhancing MHM might having attendance of girls at school, there will be a need for excellent controlled clinical trials that integrate the use of both software and hardware treatments [24]. Feminine cleanliness instructions for teenage girls are essential because it reduces the incidence of RTI. The critical lesson of proper hygiene during menstruation may be communicated to the teenage girls of today through informative television programming, qualified institution nurses or health staff, enthusiastic instructors at schools, and informed guardians [22]. Teaching addressed topics such as menstruation, premature birth, interpersonal abilities, preventing infection with High Immunodeficiency Virus, how to prevent harassment sexually, how to develop positive connections, and how to achieve aims [28].

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