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Original Research Article

Menstrual hygiene practices and WASH practices among women residing in an urban slum in Delhi: a community-based study

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ABSTRACT

Background: Menstrual hygiene management (MHM) is a vital component of women's health, yet it remains a neglected issue in low-resource settings. Despite improved product availability, women in urban slums continue to face challenges related to sanitation, privacy, and hygiene. This study aimed to assess menstrual hygiene practices among women in an urban slum of Delhi and examine their association with WASH (water, sanitation, and hygiene) behaviours.

Methods: A community-based cross-sectional study was conducted among 307 women of reproductive age residing in an urban slum of Delhi. Data were collected using a pretested, semi-structured questionnaire based on the menstrual practice questionnaire (MPQ) and WASH indicators. Descriptive and inferential statistics were applied to analyse menstrual hygiene practices and their association with hygiene-related outcomes.

Results: Of the 307 participants, 60% were below 30 years and 81.4% were literate. Use of disposable sanitary pads was nearly universal- 93.5% at home and 95.1% outside- while 2.6% used cloth. Only 66.1% reported washing hands before changing menstrual materials compared to 92.8% after. Most women (94.1%) used soap or detergent, and 90.6% practiced daily genital washing. Household garbage was the most common disposal method (69.7%), while 8.1% used unsafe methods. Symptoms suggestive of urinary tract infection (UTI) were significantly associated with inadequate handwashing ($p<0.05$). Cultural restrictions were reported by 85.3% of women.

Conclusions: Despite high adoption of sanitary pads, gaps remain in hygiene behaviour, disposal practices, and cultural attitudes. Improving WASH facilities, waste management, and menstrual health education is essential for ensuring safe and dignified menstruation in urban slum communities.

Keywords: Hand hygiene, Menstrual hygiene, Urban slum, WASH, Waste disposal

INTRODUCTION

Menstrual hygiene management (MHM) is a fundamental aspect of health for adolescent girls as well as adult menstruating women, which affects them every month. It includes the use of clean menstrual materials to absorb or collect blood, the ability to change these materials in privacy as often as necessary, access to soap and water for body washing, and facilities for safe disposal of used menstrual material. However, MHM practices vary widely depending on an individual's socioeconomic status, personal preferences, local traditions and beliefs, and access to essential water, sanitation, and hygiene (WASH) resources.[1]

In many low and middle-income countries (LMICs), MHM practices can be unhygienic and inconvenient, especially in poorer households. These challenges are

caused by a lack of adequate knowledge, limited access to quality sanitary materials, poor WASH facilities, and cultural taboos surrounding menstruation. Qualitative studies highlight girls' fears and humiliation from blood leakage and body odour, which can lead to school absenteeism. In India, for instance, a significant proportion of girls, between 43% and 88%, still wash and reuse cotton cloths instead of disposable pads.[2,3] This reusable material often lacks proper sanitization because cleaning is frequently done without soap and with unclean water, and social restrictions often force drying indoors, away from sunlight and open air. Such unhygienic washing practices are particularly common in rural areas and among women and girls in lower socioeconomic groups.

Poor MHM practices are directly linked to an increased susceptibility to urogenital infections, such as bacterial vaginosis (BV), urinary tract infection (UTI), and other reproductive tract infections (RTIs). Bacterial vaginosis, characterized by an imbalance in vaginal flora, and UTIs is believed to be exacerbated by unhygienic practices, and is among the most common infectious diseases in women of menstruating age. Studies show that women with BV may face a higher risk of adverse pregnancy outcomes, acquisition of sexually transmitted infections (STIs), and pelvic inflammatory disease (PID). In Odisha, India, the prevalence of RTIs and STIs in women aged 15-44 increased by 126% between 1998-99 and 2002-04, reaching 35.2%. While the exact biological mechanism is not fully clear, it is hypothesized that poor MHM creates abnormally moist conditions in the urogenital area, fostering opportunistic infection and microbial imbalance.[4]

Despite the growing recognition of MHM as a critical public health issue, there remain significant knowledge gaps regarding the specific association of MHM practices with laboratory-confirmed urogenital infections, especially when controlling for environmental factors.[5] Previous studies often relied on self-reported symptoms, which can be less reliable than clinical or laboratory confirmations. Furthermore, qualitative studies suggest that school absenteeism among girls is associated with poor MHM interventions, and cultural taboos hinder girls from seeking help or openly discussing menstruation.[6] Given that interventions ensuring access to private facilities with water for MHM and education on safer, low-cost MHM materials could significantly reduce urogenital disease, there is a clear need for further research.

This study investigated menstrual hygiene practices among women residing in an urban slum in Delhi, addressing the specific challenges and contexts faced by this population. By assessing current MHM practices, understanding the factors that influence them, and exploring their potential health implications, this study seeks to contribute to a more comprehensive understanding that can inform targeted interventions and policies for improved menstrual health and well-being in similar resource-limited settings.

METHODS

Study design and population

This was a community-based cross-sectional study conducted over 4 weeks (01 August 2025 to 30 August 2025) in Nehru Ekta Vihar, an urban slum in Delhi. The study population comprised females who had attained menarche through menopause and provided informed consent to participate in the study.

Inclusion criteria

All the women from menarche to menopause residing in Nehru Ekta Vihar, who give consent to participate in the study.

Exclusion criteria

There were no exclusion criteria.

Sample size and sampling technique

The required sample size was determined based on prevalence of sanitary pad use of 59.09%, reported by Das et al in a study conducted in similar population.[7] Taking this prevalence, with a 95% confidence interval, 10% relative error, and adding a non-response rate of 10%, the sample size was calculated to be 300. A convenient sampling technique was employed to recruit eligible participants until the required sample size was achieved.

Study tools

Data were collected using a pretested, semi-structured interview schedule based on the menstrual practice questionnaire (MPQ) and WASH practices questionnaire. The MPQ, a validated tool, was used to assess menstrual practices. The questionnaire elicited information on the type of absorbent material used, frequency of change, washing and reuse practices, genital hygiene, disposal methods, and storage of menstrual materials. Additional questions were included to assess awareness and myths regarding menstruation. To evaluate associated factors, a WASH (water, sanitation and hygiene) practices questionnaire was also administered, which gathered information on household water source, sanitation facilities, and hand hygiene practices.

Data analysis

The data was entered into Microsoft Excel and analysed using SPSS version 21.0. Continuous variables were summarized as means with standard deviations, while categorical variables were expressed as frequencies and percentages. The prevalence of key menstrual hygiene

practices was estimated with 95% confidence intervals. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated to quantify associations. A p value <0.05 was considered statistically significant.

Ethical considerations

Ethical approval was obtained from the Institutional Ethics Committee, VMMC and Safdarjung Hospital, New Delhi (IEC No. IEC/VMMC/SJH/CERT./July-2025/04). Written informed consent was obtained from all study participants. Anonymity and confidentiality were ensured throughout the study.

RESULTS

The study included 307 women residing in an urban slum of Delhi. The majority of participants (60%) were below 30 years of age, while 40% were aged 30 years or above. Most respondents (91.2%) were above the poverty line (APL), and 8.8% were below (BPL). Educational attainment was relatively high for the study setting, with 81.4% being literate and 18.6% illiterate. This profile indicates a predominantly young, literate population with modest economic stability, providing a favourable background for menstrual hygiene awareness and adoption.

Table 1: Distribution of study participants according to practices regarding menstrual material (n=307).

Variables	Categories	Number	Percentage
Menstrual material used at home	Cloth/towel	8	2.6
	Disposable sanitary pad	287	93.5
	Both	12	3.9
Menstrual material away from home	Cloth/towel	8	2.6
	Disposable sanitary pad	292	95.1
	Both	7	2.3
Place of changing menstrual material	Bedroom	11	3.5
	Bathroom	179	58.3
	Latrine	117	38.2
Method of Disposal	Household rubbish	214	69.7
	Community rubbish	68	22.2
	Buried/waterway	25	8.1

Table 2: Distribution of study participants according to hand washing during menstruation (n=307).

Variables	Categories	Number	Percentage
Hands washed before changing menstrual material	Every time	203	66.1
	Never	64	20.8
	Sometimes	40	13.1
Hands washed after changing menstrual material	Every time	285	92.8
	Never	2	0.7
	Sometimes	20	6.5
Handwashing Material	Water	18	5.9
	Soap/detergent	289	94.1
Washing of genitals during menstruation	Everyday	278	90.6
	At the end of period	29	9.4

Table 3: Association of material used to absorb menstruation with WASH practices (n=307).

		Material used during menstruation (%)			Total	P value
		Disposable pads	Cloth	Both		
Hand washing before changing material	Every time	190 (93.6)	8 (3.9)	5 (2.5)	203	0.11
	Never	60 (93.8)	0 (0.0)	4 (6.2)	64	
	Sometimes	37 (92.5)	0 (0.0)	3 (7.5)	40	
Hand washing after changing material	Every time	269 (94.4)	8 (2.8)	8 (2.8)	285	<0.001
	Never	2 (100.0)	0 (0.0)	0 (0.0)	2	
	Sometimes	16 (80.0)	0 (0.0)	4 (20.0)	20	
Use of soap/detergent while washing hands	Soap	272 (94.1)	8 (2.8)	9 (3.1)	289	0.01
	Water	15 (83.3)	0 (0.0)	3 (16.7)	18	

Menstrual hygiene practices showed widespread use of disposable sanitary pads both at home and outside (Table 1). At home, 93.5% of participants used disposable pads exclusively, 3.9% used both pads and cloth, and only 2.6% used cloth alone. A similar trend was observed outside the home, with 95.1% using pads exclusively. Most women reported changing menstrual materials in bathrooms (58.3%), followed by latrines (38.2%), indicating reliance on shared facilities with varying privacy and water access. Disposal practices primarily involved household rubbish (69.7%) or community bins (22.2%), though a small proportion (8.1%) still resorted to unsafe methods such as burying or discarding in waterways.

Hand hygiene practices during menstruation were generally good but showed room for improvement (Table 2). About two-thirds (66.1%) washed their hands every time before changing menstrual materials, while one-fifth (20.8%) never did so, and 13.1% washed only sometimes. Post-change handwashing was almost universal (92.8%), suggesting stronger adherence after handling used materials. Nearly all participants (94.1%) used soap or detergent for handwashing, and 90.6% reported washing their genitals daily during menstruation. These findings highlight overall good hygiene awareness but reveal gaps in pre-change handwashing practices that could increase infection risk.

The choice of menstrual material was moderately associated with certain hygiene behaviours (Table 3). Although most participants across all handwashing categories reported using disposable pads, use of cloth and combined materials was slightly higher among those who did not wash hands regularly or used only water. A statistically significant association was observed between material use and handwashing after changing pads (p value <0.001) and use of soap/detergent (p value 0.01). Women who used only water had notably higher use of both cloth and combined materials than those who used soap, suggesting that better hygiene practices may influence the preference for disposable products.

Beyond these observations, additional results revealed that the majority of respondents were Hindu (93.5%), with 6.5% identifying as Muslim. Family members served as the main source of menstrual information for 83.1% of participants, followed by schools (12.3%) and friends (4.6%). Cultural or social restrictions during menstruation remained highly prevalent, affecting 85.3% of women, while 14.7% reported no such restrictions. About one-third (30.9%) experienced symptoms suggestive of urinary tract infection (UTI) within the past six months. Access to sanitation facilities was limited- 85.7% relied on public toilets, while only 14.3% had private ones. The use of disposable sanitary pads was common across all age groups, with the highest proportion among adolescents (<18 years: 97.4%), gradually decreasing among women over 30 years (83.7%). A statistically significant association was observed with educational status (p=0.05), where literate women predominantly used disposable pads (94.8%), while illiterate women demonstrated higher usage of cloth (7%) and combined materials (5.3%). Participants above the poverty line (APL) showed slightly more diverse usage patterns compared to those below the poverty line (BPL), where 100% reported using disposable pads. Religious affiliation and source of menstrual information showed minimal variation in material use. No significant association was observed between the type of menstrual absorbent used and self-reported symptoms of burning sensation (p=0.36) or dysmenorrhea (p=0.58). However, a statistically significant association (p=0.01) was found between the type of material used and the presence of genital itching. Among participants reporting genital itching, only 50% used disposable pads, while 20% used cloth and 30% used both materials. In contrast, among those without itching, disposable pad use was much higher (94.3%). This indicates a potential link between poor menstrual hygiene practices and genital discomfort. Dysmenorrhea was significantly associated with handwashing behaviour before changing menstrual material (p=0.001), with those washing sometimes (72.5%) reporting higher prevalence of dysmenorrhea than those who washed every time (43.8%). However, no statistically significant associations were observed between dysmenorrhea and handwashing after changing (p=0.118) or the material used for handwashing (p=0.382). These findings suggest that inconsistent or poor hand hygiene before changing may contribute to menstrual discomfort, but further investigation is required to establish causality. Statistically significant associations were found between symptoms of urinary tract infections (UTIs) and all three WASH variables: handwashing before changing material (p=0.031), handwashing after changing (p=0.002), and the material used for handwashing (p=0.001). Participants who reported irregular or no handwashing were more likely to experience UTI symptoms. Notably, 50% of those using only water for handwashing reported UTI symptoms, compared to 29.8% among soap users. These results underscore the importance of consistent and proper hygiene practices in the prevention of UTIs during menstruation.

Overall, the findings depict a community where access to modern menstrual products is nearly universal, but infrastructural and behavioural gaps persist- particularly around privacy, sanitation facilities, and consistent hygiene practices. While literacy and pad availability are strengths, the results underscore the need for interventions that focus on improving WASH (water, sanitation, and hygiene) infrastructure and reinforcing hygiene behaviours at the time of menstrual management.

DISCUSSION

Our study, “menstrual hygiene practices among women in an urban slum of Delhi,” found that menstrual hygiene management (MHM) has improved substantially in terms

of product accessibility but remains limited by infrastructural, behavioural, and cultural constraints. Nearly all women in our study reported using disposable sanitary pads both at home (93.5%) and outside (95.1%), suggesting that awareness and product availability are no longer major barriers. However, only two-thirds (66.1%) consistently washed their hands before changing menstrual materials, while post-change handwashing was reported by almost all participants (92.8%). Around 69.7% disposed of menstrual waste with household garbage, 22.2% in community bins, and 8.1% through unsafe methods such as burial or waterways. Furthermore, 85.3% of participants reported experiencing social or cultural restrictions during menstruation, and 30.9% reported symptoms suggestive of urinary tract infection (UTI). These findings together indicate that while access to menstrual products has been largely achieved, WASH (water, sanitation, and hygiene) practices and social attitudes remain the primary barriers to safe and dignified menstruation in urban slum settings.

Comparable findings were reported in Bangladesh by Siddique et al, where women demonstrated moderate levels of menstrual knowledge, attitude, and practice, with mean practice scores of 8.8±1.87 out of 12. Their study revealed that education and family type were strongly associated with better hygiene behaviour, which parallels our finding that literacy was significantly linked to improved menstrual hygiene and pad use.[8] However, our population showed far higher pad use (over 93%) compared to the mixed absorbent use reported among Bangladeshi women, reflecting India's better access to low-cost commercial sanitary pads through government and private-sector initiatives. These differences may also stem from the rural composition of the Bangladesh sample compared to our urban population, where awareness campaigns and supply chains are stronger.

In contrast, the study by Shah et al in Gilgit, Pakistan, revealed poor menstrual hygiene knowledge and practices among young girls aged 13-24 years. Only 44.3% had attended any session on menstrual hygiene, and two-thirds of their mothers were uneducated. These findings stand in stark contrast to our population, in which 81.4% were literate and more than 90% used disposable pads.[9] This difference can be attributed to higher female literacy rates and greater availability of menstrual health education in India's urban areas. The Pakistan study underscores that education and information dissemination play a pivotal role in shaping hygienic practices- an observation consistent with our results, where literate women demonstrated better hygiene behaviours and disposal methods than their illiterate counterparts.

Findings from Nigeria by Hennegan et al further reinforce the importance of sanitation infrastructure. That study showed that women with access to basic sanitation facilities had significantly higher odds of using those facilities for menstrual management compared to those without access.[10] In our study, although 85.7% of participants depended on public toilets, the lack of privacy, water, and soap in these facilities was a recurrent theme influencing pre-change handwashing and disposal behaviours. The Nigerian findings, where even improved sanitation facilities did not always provide sufficient privacy or soap, mirror our observation that infrastructural adequacy- not merely access- is the determinant of safe menstrual hygiene.

A similar situation was observed in Indonesia by Davis et al, who found that 64.1% of adolescent girls practiced poor menstrual hygiene and 11.1% missed school during menstruation. Poor practices were associated with rural residence, low knowledge, and limited school WASH facilities.[11] While absenteeism was not a focus in our study, the role of WASH infrastructure and education parallels our findings. Despite the higher prevalence of pad use in our population, suboptimal handwashing and unsafe disposal suggest that knowledge alone is insufficient without enabling environmental conditions.

Within the Indian context, our findings closely align with the study by Garg et al conducted in Delhi, where 84.4% of adolescent girls used disposable pads, 13.3% used both cloth and pads, and 2.3% used only cloth. The high pad usage in both studies underscores Delhi's relatively advanced access to menstrual products and awareness programs compared to other regions.[12] However, cultural and religious factors still influence menstrual behaviours. Garg et al reported that Muslim participants and those with lower education were more likely to use cloth, reflecting how socioeconomic and cultural dimensions continue to shape menstrual practices even in urban areas.

Paul et al in a study on women aged 15-49 years found that 91% used ready-made absorbents, comparable to our 93.5% pad use. However, their study also documented that 90% of participants practiced restrictions such as avoiding worship and certain foods, nearly identical to our finding of 85.3% facing social restrictions.[13] This persistence of menstrual taboos despite increased education and access to products suggests that behavioural change communication must go beyond hygiene instruction to target social norms and beliefs surrounding menstruation.

Das et al in Odisha demonstrated that women using reusable absorbent materials were significantly more likely to experience urogenital infections (AdjOR=2.8, 95% CI 1.7-4.5) than those using disposable pads.[14] Our findings echo this association, as women reporting UTI-like symptoms were more likely to have inconsistent handwashing or use water only, underscoring the connection between hygiene practices and infection risk. The Odisha study also highlighted that privacy and adequate space for personal hygiene were protective factors, emphasizing that environmental conditions play as crucial a role as individual behaviours- an insight mirrored in our findings from the Delhi slum.

Saini et al in Rishikesh found that only 29.6% of women practiced satisfactory menstrual hygiene, with cultural barriers and lack of privacy being key challenges. This low-rate contrasts sharply with our study, where over 90% used sanitary pads and most maintained regular genital hygiene.[15] The difference likely arises from the rural composition of their sample and the lower exposure to public health messaging. Nevertheless, both studies converge on the point that socio-cultural barriers and inadequate sanitation remain the major deterrents to optimal MHM.

In Karnataka, Yaliwal et al observed that 70.7% of adolescent girls used commercial sanitary napkins, 12.7% used cloth, and 15.3% used both. Although lower than our figures, this still reflects an encouraging trend toward pad adoption in South India. The Karnataka study also found that 43.3% avoided cultural functions and 38.5% avoided religious activities- comparable to the cultural restrictions we identified. Similarly, Shanbhag et al in Bangalore rural areas reported that only 44.1% used sanitary pads and that 56.8% used soap and water to clean genital organs.[16] Our results, showing 94.1% soap use, represent a much-improved scenario, possibly due to urban advantage and better WASH awareness in Delhi.

In Puducherry, Nandi et al found that 89.2% of adolescent girls used sanitary pads, with 19.1% changing absorbents only once per day and 40.2% cleaning genitals with water alone. Compared to their findings, our participants demonstrated better hygiene practices- higher pad use, more frequent changing, and greater use of soap. However, unsafe disposal practices (8.1%) remain comparable to those reported in their rural population, suggesting that waste management systems remain a weak link in both urban and rural contexts.[17]

Overall, the comparison across studies reveals that India, relative to neighbouring South Asian countries such as Bangladesh and Pakistan, has achieved commendable improvement in menstrual product use and hygiene knowledge. Yet, within India, regional disparities persist- urban centres like Delhi demonstrate higher pad usage and hygiene compliance, while rural and semi-urban areas lag due to socio-cultural barriers and infrastructural deficits. Cross-nationally, findings from Nigeria and Indonesia highlight that access to private, safe sanitation facilities continues to be the cornerstone for effective MHM outcomes.

Our study has several strengths, including a representative sample from an urban slum, use of standardized WASH and menstrual hygiene questionnaires, and analysis of both behavioural and environmental determinants. However, it has limitations: the cross-sectional design restricts causal inference, self-reported practices may be subject to reporting bias, and findings may not generalize to rural or higher-income populations. Additionally, UTI symptoms were self-reported rather than clinically verified, which could affect precision.

CONCLUSION

The present study demonstrates that menstrual hygiene management among women in an urban slum of Delhi has focused on enabling appropriate environment and behaviour. Nearly universal pad use reflects a major public health achievement, but inconsistent pre-change handwashing, inadequate disposal facilities, and persisting cultural taboos continue to undermine safe and dignified menstrual health. The findings underscore the need for interventions that go beyond product distribution- focusing instead on improving WASH infrastructure, ensuring privacy and soap availability in community toilets, establishing safe waste disposal systems, and addressing cultural stigmas through sustained community education. By integrating behavioural change communication with infrastructural improvements, policymakers can move closer to achieving equitable and sustainable menstrual hygiene for all women, particularly those in marginalized urban settings.

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