

# Menstrual Hygiene Practices and Government Programme Awareness Among Adolescent Girls in Rural Bareilly: A Cross-Sectional Study

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DOI: <https://doi.org/10.52403/ijhsr.20260311>

## ABSTRACT

**Background:** Adolescence marks a pivotal phase during which girls begin menstruating and must acquire knowledge about appropriate hygiene. In rural India, however, adoption of safe menstrual hygiene management (MHM) practices continues to be suboptimal, with implications for reproductive health, school participation, and overall quality of life.

**Objectives:** To characterise menstrual hygiene behaviours and evaluate the extent of awareness regarding government-led MHM programmes among school-going adolescent girls residing in a rural block of Bareilly, Uttar Pradesh.

**Methods:** A community-based cross-sectional study was carried out in Meerganj block, Bareilly, enrolling 274 adolescent girls aged 10 to 19 years through cluster sampling from two randomly selected schools. The validated Menstrual Practices Questionnaire version 1.1 (MPQ v1.1) served as the primary data collection instrument, supplemented by questions on socio-demographic background and government scheme awareness. Associations were examined using the chi-square test.

**Results:** Disposable sanitary pad use was reported by 78.8% of girls at home and 87.9% at school. Significant determinants of material choice included maternal education ( $p<0.001$ ), awareness of government programmes ( $p<0.001$ ), information source ( $p<0.001$ ), and cultural constraints ( $p<0.001$ ). Nearly two-thirds (66.4%) dried reusable materials in concealed locations. Awareness of any government menstrual health initiative was present in only 41.2% of participants.

**Conclusion:** While disposable pad uptake is encouraging, critical gaps remain in hand hygiene, genital care, disposal, and sterilisation of reusable materials. Maternal literacy and programme exposure are key determinants of better practice. Low government scheme awareness underscores the urgency for structured school-based menstrual health education and more effective community outreach.

**Keywords:** Menstrual hygiene, Adolescent girls, Sanitary pads, Periods, Hygiene Practices, MPQ

## INTRODUCTION

Menstruation is a universal physiological event that signals the onset of reproductive capacity and recurs throughout a woman's fertile years. Globally, approximately 300 million women and girls manage their periods on any given day, yet adequate materials, privacy, sanitation, and supportive social norms are far from universally available. (1,2)

The WHO/UNICEF Joint Monitoring Programme defines menstrual hygiene management as a state in which women and adolescent girls have access to clean materials to absorb or collect menstrual blood, can change those materials in privacy as frequently as needed, and have soap, water, and facilities for disposal of used materials. (3)

National Family Health Survey 5 (NFHS-5) data indicate that around 77.3% of Indian women between 15 and 24 years of age employ hygienic menstrual protection methods, leaving a substantial proportion reliant on unhygienic alternatives.(4) In rural settings, this gap is shaped by intersecting barriers such as economic constraints, lack of private facilities, cultural prohibitions, inadequate school infrastructure, and limited exposure to government schemes.(5,6)

Situated on the peri-urban edge of Bareilly, headquarter of the Rohilkhand division in Uttar Pradesh, Meerganj block is characterised by predominantly lower-to-middle socioeconomic households, restricted maternal literacy, and deeply entrenched social norms around menstruation. While national initiatives such as the Menstrual Hygiene Scheme (MHS) and the Rashtriya Kishor Swasthya Karyakram (RKSK) have been implemented to address these challenges, (7) their grassroots reach in this locality remains poorly understood.

The present investigation was designed to provide a systematic, evidence-based picture of menstrual hygiene practices across multiple behavioural domains including material selection, hand hygiene,

genital care, waste disposal, and drying of reusables and to quantify awareness of government-sponsored MHM initiatives among school-attending adolescent girls in rural Bareilly. Findings are intended to guide targeted health education initiatives and support evidence-informed policy decisions for this underserved population.

## MATERIALS & METHODS

### *Study Design and Setting*

This community-based cross-sectional investigation was conducted in Meerganj block, Bareilly district, Uttar Pradesh, India, from October 2024 through January 2025. Meerganj is a predominantly rural locality on the outskirts of Bareilly city, with a population that is largely lower-to-middle socioeconomic.

### *Study Population and Sampling*

Eligible participants were adolescent girls aged 10–19 years who were enrolled in school, had attained menarche, and had lived in the study area for a minimum of six months. A two-stage cluster sampling approach was used, two schools in Meerganj block were chosen by random selection, and all qualifying girls within those institutions were invited to take part. Girls absent on both scheduled visit days or who withheld consent were not included.

### *Sample Size*

The required sample size was calculated using the standard formula  $n = z^2p(1-p)/e^2$ , with a 95% confidence level, a reference prevalence of sanitary pad use of 77% derived from NFHS-5 data, (4) and an acceptable margin of error of 5%. The resulting minimum sample size was 272 participants.

### *Data Collection Instrument*

Information was gathered using the Menstrual Practices Questionnaire (MPQ, Version 1.1), an internationally validated and standardised instrument developed by Hennegan et al. for assessing MHM practices across multiple domains, including

material type at home and away, changing frequency, hand hygiene, genital washing, disposal, storage, reusable material care, and latrine access during menstruation.(8) The questionnaire was rendered into Hindi and piloted with 20 girls before field deployment. Supplementary items covering socio-demographic particulars, cultural and religious practices, information sources, and government scheme awareness were appended to the core instrument.

### Statistical Analysis

Data entry and cleaning were performed in Microsoft Excel and statistical analysis used Jamovi 2.6.2. Descriptive measures including frequencies, proportions, means, and standard deviations were computed for all variables. Chi-square tests were used to examine associations between socio-demographic factors (maternal literacy, government programme awareness, information source, cultural restrictions, and socioeconomic status) and key hygiene outcomes. Statistical significance was set at  $p \leq 0.05$ . Socioeconomic status was categorised using the modified B.G. Prasad scale into Class 1–3 (upper and middle) and Class 4–5 (lower-middle and lower).

## RESULTS

### Socio-demographic Profile

A total of 274 adolescent girls completed the study. Ages ranged from 11 to 17 years (mean  $14.6 \pm 1.2$  years), the 15-year age group was most represented (33.2%), followed by 14 years (29.6%) and 16 years (25.9%). Nuclear families were reported by 62.0% of participants, joint families by 25.5%, and three-generational households

by 12.4%. Maternal education levels were, up to Class V (44.5%), Class X - XII (24.8%), graduate level (2.2%), and illiterate (28.5%).

### Menstrual Characteristics

The mean age at menarche was  $13.2 \pm 1.0$  years, with 13 years being the most common onset age (44.5%), followed by 14 years (29.9%) and 12 years (13.5%). Menstrual flow lasted between 3 and 7 days in 82.1% of girls, two days or fewer in 13.1%, and eight or more days in 4.7%.

### Menstrual Material Used and Socio-demographic Correlates

At home, 78.8% ( $n = 216$ ) of girls used disposable sanitary pads while 21.2% ( $n = 58$ ) relied on cloth. Pad use was even higher at school (87.9%,  $n = 241$ ), with 11.7% using cloth and 0.4% paper. Among cloth users, 90.9% did not wash and reuse materials during their last period.

Table 1 displays associations between socio-demographic variables and material type. Maternal literacy was strongly associated with pad use ( $p < 0.001$ ), daughters of literate mothers used disposable pads at a rate of 88.8% (174 out of 196), compared with 53.8% (42 out of 78) among daughters of illiterate mothers. Girls aware of government programmes also showed significantly higher pad uptake (92.0%, 104 out of 113) relative to unaware peers (69.6%, 112 out of 161,  $p < 0.001$ ). Information source ( $p < 0.001$ ) and cultural restrictions ( $p < 0.001$ ) were equally significant. Socioeconomic class alone did not reach significance ( $p = 0.474$ ).

**Table 1: Association between socio-demographic variables and menstrual material used (N=274)**

Variable	Category	Cloth (n)	Disposable Pads (n)	Total	p-value
Mother Literacy	Illiterate	36	42	78	<0.001
	Literate	22	174	196	
Programme Awareness	No	49	112	161	<0.001
	Yes	9	104	113	
Source of Information	Family	36	184	220	<0.001
	Outside	22	32	54	
Cultural Issues	No	53	151	204	<0.001
	Yes	5	65	70	
Socioeconomic Status	Class I, II, III	23	97	120	0.474
	Class IV, V	35	119	154	

### Change Frequency and Location

On the heaviest day of their period, 41.2% of girls changed their material twice daily, 24.8% three times, 21.5% once, 9.9% four times, and 2.6% more than four times. The home latrine was the most common change location (80.7%). At school, 40.5% changed material on every day of their period, 24.8% on one day only, 19.3% never, and 15.3% on some days.

### Hand Hygiene

Washing hands before material change was a consistent practice in only 47.8% (n = 131) of girls, 31.8% did so occasionally and 20.4% never. Post-change hand hygiene was better observed as 59.5% (n = 163) always washed hands after changing, 24.5% sometimes, and 16.1% never. Poor hand hygiene during menstrual management is a recognised risk factor for reproductive tract infections (RTIs) and urinary tract infections (UTIs).

### Genital Hygiene and Association with Cultural Issues

During their most recent period, genital washing frequencies reported were, once daily (25.2%, n = 69), every 2–3 days (24.1%, n = 66), only at the end of the period (21.5%, n = 59), three or more times daily (15.0%, n = 41), and twice daily (14.2%, n = 39). Soap was routinely used for genital washing by 49.3%, occasionally by 29.2%, and not at all by 21.5%.

Table 2 presents genital hygiene associations with socio-demographic variables. Cultural restrictions were significantly linked to lower genital washing frequency (p = 0.016), suggesting that taboos concerning bodily contact during menstruation directly reduce hygienic genital care. Socioeconomic class did not show a significant association.

**Table 2: Association between socio-demographic variables and genital hygiene practices (N=274)**

Variable	Category	End of period	Every 2-3 days	1x/day	3+x/day	p-value
Mother Literacy	Illiterate	21	14	14	5	0.016
	Literate	38	52	55	36	
Cultural Issues	No	45	51	54	30	0.016
	Yes	14	15	15	11	
SES	Class I, II, III	15	25	27	21	NS
	Class IV, V	44	41	42	20	

### Disposal of Menstrual Materials

At home, the predominant disposal method was a dedicated bin within or immediately adjacent to the latrine (41.6%, n = 114), followed by disposal directly into the latrine or toilet (26.6%, n = 73), household bin outside the latrine (13.1%, n = 36), burial or

disposal in bushes or waterways (8.4%, n = 23), burning (5.8%, n = 16), and community rubbish heaps (4.4%, n = 12). Before disposal, 44.9% (n = 123) wrapped used material in a plastic bag, 24.5% in paper, 9.5% in cloth, and 21.2% did not wrap at all.

**Table 3: Disposal methods and wrapping practices for used menstrual materials (N=274)**

Disposal Method (at home)	n	%
Separate bin (in/adjacent to latrine)	114	41.6
Into the latrine/toilet	73	26.6
Household bin (not in latrine)	36	13.1
Buried/bush/waterway	23	8.4
Burned	16	5.8
Community rubbish	12	4.4
Wrapping material used for disposal		
Plastic bag	123	44.9
Paper	67	24.5
None	58	21.2
Cloth	26	9.5

### Drying Practices for Reusable Materials

Among girls who washed reusable cloth, the predominant drying location was outdoors but concealed from view (48.2%, n = 132), followed by outdoor open hanging (21.9%, n = 60), indoors and hidden (18.2%, n = 50), and indoors with open hanging (11.7%, n = 32). In total, 66.4% dried materials in

concealed spots, a stigma-driven behaviour that substantially reduces UV sterilisation. Only 38.3% of girls consistently dried materials in direct sunlight, 40.5% did so sometimes, and 21.2% never. Ironing cloth before reuse was practised consistently by just 8.4%, sometimes by 33.9%, and never by 57.7%.

**Table 4: Drying and sterilisation practices for reusable menstrual materials (N=274)**

Variable	Response	n	%
Drying location (reusables)	Outside (hidden)	132	48.2
	Outside (hanging)	60	21.9
	Inside (hidden)	50	18.2
	Inside (hanging)	32	11.7
Dried in sunlight	All the time	105	38.3
	Sometimes	111	40.5
	Never	58	21.2
Iron used before reuse	Never	158	57.7
	Sometimes	93	33.9
	Every time	23	8.4

### Awareness of Government Menstrual Health Programmes

Only 113 of 274 girls (41.2%) could identify any government-sponsored programme relating to menstrual health. Among those with awareness, information had reached them through parents or relatives (13.9%), peers (11.7%), and teachers or school channels (6.9%). The vast majority 175 girls (63.9%) had received no structured

menstrual health information from any formal source. Regarding the ASHA-facilitated subsidised napkin distribution under the National Health Mission (7), only 66 participants (24.1%) regularly received napkins, leaving 75.9% (n = 208) without access through this channel. The family unit remained the primary menstrual health educator for 80.3% of girls.

**Table 5: Awareness of government menstrual health programmes and sources of menstrual education (N=274)**

Variable	Response	n	%
Aware of any government programme	Yes	113	41.2
	No	161	58.8
Source of awareness	No formal information	175	63.9
	Parents/relatives	38	13.9
	Friends/peers	32	11.7
	Teachers/school	19	6.9
	Social media/news	6	2.2
	Other education	4	1.5
ASHA provides napkins monthly	Yes	66	24.1
	No	208	75.9
Primary menstrual educator	Family	220	80.3
	Outside sources	54	19.7

### Cultural and Religious Practices

Cultural and religious constraints during menstruation were near-universal. Prohibitions on entering places of worship, touching certain foods, or joining religious

ceremonies were observed by 79.2% (n = 217) of girls. Dietary restrictions were noted by 14.2% (n = 39), whereas only 6.6% (n = 18) reported no restrictions of any kind. When asked directly, 70 girls (25.5%)

acknowledged facing specific cultural problems around menstruation, the remaining 74.5% had normalised such practices within their family context.

## DISCUSSION

This cross-sectional investigation of 274 school-going girls in Meerganj, Bareilly, utilised the MPQ v1.1(8) to generate a multidomain, evidence-based profile of menstrual hygiene behaviours. Employing an internationally benchmarked standardised instrument permits direct comparisons with analogous research conducted across India and in other low- and middle-income settings.

Sanitary pad use at home (78.8%) and at school (87.9%) exceeded national averages from NFHS-5 data. (4) Singh et al., in a multistate cross-sectional study of rural Indian adolescents, documented considerable variability in pad use across states, driven heavily by social factors including maternal schooling and household income. (1) Our results echo that finding: maternal literacy was the strongest single determinant of material choice ( $p < 0.001$ ), with daughters of literate mothers using pads at 88.8% versus 53.8% for daughters of illiterate mothers. Maternal education functions as a composite indicator for health literacy, financial access to commercial products, and receptiveness to modern hygiene norms. (9)

Programme awareness was independently associated with higher pad use ( $p < 0.001$ ). Girls who had heard of a government scheme adopted disposable pads at 92.0%, considerably above the 69.6% among uninformed peers. This gradient implies that even modest exposure to MHM communication campaigns can meaningfully shift hygiene behaviour, underscoring the value of strengthened programme visibility and last-mile outreach. Information source followed a parallel pattern ( $p < 0.001$ ), girls drawing knowledge from outside the family, teachers, health workers, or peers demonstrated higher pad uptake than those reliant solely on family

guidance, where traditional cloth use tends to persist. (10)

Cultural constraints were significantly associated with both material selection ( $p < 0.001$ ) and genital washing frequency ( $p = 0.016$ ). Borkar et al., studying adolescent girls in a tribal belt of central India, similarly identified cultural taboos as significant suppressors of hygienic behaviours. (2) Garg and Anand catalogued the breadth of menstruation-related myths still prevalent across India and their direct inhibitory effect on protective hygiene behaviours. (11) These findings collectively argue that menstrual health interventions must couple practical guidance with culturally sensitive messaging that actively challenges stigma.

Hand hygiene before material change was practised consistently by fewer than half the participants (47.8%), while post-change handwashing was more prevalent (59.5%). These deficits carry direct clinical risk, Das et al. demonstrated in Odisha that handwashing behaviour during menstruation was significantly associated with the incidence of urogenital infections. (13) Torondel et al. similarly established a link between poor hygienic practices and lower reproductive tract infections. (12)

Genital washing patterns ranged widely, with a notable proportion of girls (21.5%) washing genitals only at the end of the period. The significant association with cultural restrictions ( $p = 0.016$ ) points to taboo-driven avoidance of body contact as a proximate cause. Singh et al. in rural Patna, Bihar, found that fewer than two-fifths of girls washed genitalia more than once daily and only one-fifth used soap for external genital cleansing. (17) Vagha et al. in central India noted that just 26.9% cleaned the external genitalia with each pad change and only 39% used soap, attributing this to family-transmitted norms and the absence of formal school-based instruction. (16) Prasad et al. documented similar gaps in urban Jaipur slums, suggesting that poor genital hygiene knowledge is a pan-Indian challenge not confined to rural settings. (18)

The convergent evidence across these geographically diverse cohorts reinforces the need for structured menstrual health curricula that address genital hygiene explicitly and with evidence-based guidance.

Two-thirds of girls (66.4%) dried reusable cloth in hidden locations, forgoing sunlight exposure and the UV sterilisation it provides. Only 38.3% consistently sun-dried materials, and a mere 8.4% regularly ironed cloth before reuse. Kuhlmann et al. highlighted that concealed drying substantially elevates microbial contamination risk for reusable materials in resource-limited environments. (14)

The disposal landscape in Meeraganj reflects a largely informal system as 41.6% used a latrine-adjacent bin, 26.6% disposed directly into the toilet, while 8.4% buried or discarded materials in waterways and 5.8% burned them. Panda et al. in Odisha documented that rural participants frequently flushed pads in school toilets without awareness of sanitation consequences, or disposed of them using burial or burning alongside ponds. (15) Vagha et al. found that 47.6% of girls burned used pads on family instruction, 22.8% flushed them, and 14.4% buried them near fields, with very few using a dedicated dustbin. (16) Singh et al. in rural Bihar reported comparatively better disposal behaviour, with 80.7% using dustbins and 92.7% wrapping before disposal, suggesting the positive influence of school-based education in that cohort. (17) Across all these settings, the absence of designated disposal infrastructure covered bins in latrines, functional school incinerators emerges as a key structural barrier that behavioural education alone cannot overcome.

Storage of menstrual materials is an underexamined dimension of MHM that carries real infection risk. Prasad et al. found that urban slum girls stored pads in bags near toilets without protective covering, contributing to pre-use contamination. (18) Panda et al. noted that

some participants stored used pads collectively until period's end before disposing of all at once, escalating odour and microbial load. (15) These converging observations indicate that MHM education must extend beyond absorbent choice to encompass hygienic interim storage of both clean reserves and used materials pending disposal.

Government programme awareness reached only 41.2% of participants, and just 24.1% regularly received ASHA-facilitated subsidised napkins despite the National Health Mission's scheme mandate. (6) These implementation shortfalls reflect documented systemic weaknesses in Uttar Pradesh, including irregular ASHA supply chains, insufficient frontline training, and inadequate monitoring mechanisms. With 80.3% of girls identifying family as their primary source of menstrual education and 28.5% of mothers in this sample being illiterate the information reaching adolescents is frequently incomplete and culturally filtered. Dasgupta and Sarkar previously observed that family-transmitted menstrual knowledge commonly fails to equip girls with evidence-based hygiene guidance. (9)

This study's strengths include the use of a validated internationally benchmarked tool (MPQ v1.1), (8) an adequately powered sample, and the identification of actionable socio-demographic determinants through systematic chi-square analyses. Limitations include the cross-sectional design which precludes causal inference, restriction to school-enrolled girls (likely more advantaged than out-of-school peers), potential social desirability bias in self-report, and the absence of laboratory-confirmed health outcomes.

## CONCLUSION

Menstrual hygiene practices in rural Bareilly present a transitional picture, while disposable pad uptake has increased, substantial deficits in hand hygiene, genital care, waste disposal, and reusable material sterilisation persist. Maternal literacy,

government programme awareness, information source, and cultural restrictions are all significant determinants of hygiene behaviours. (1,2) Coverage of government MHM schemes remains critically limited, (6) and family often characterised by low maternal education continues to be the main but inadequate channel for menstrual health knowledge. (9)

Comprehensive, multisectoral action is urgently required for incorporation of evidence-based menstrual health modules into school curricula, capacity building and supply chain strengthening for ASHA workers to enable consistent napkin distribution and counselling (6) community-level sensitisation to dismantle menstrual taboos (11) and investment in school WASH infrastructure with dedicated, private changing facilities. Policymakers must also establish robust monitoring and accountability mechanisms to close the gap between programme intent and service delivery at the grassroots level.

#### **Declaration by Authors**

**Ethical Approval:** None

**Acknowledgement:** The authors gratefully acknowledge the school principals, teachers, and all participating adolescent girls, as well as field investigators for their diligent contribution to data collection.

**Source of Funding:** None.

**Conflict of Interest:** The authors declare no conflict of interest.

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How to cite this article: Manvi Singh, Mukul Maheshwari, Yetnder Singh Patel, Rakesh Kumar. Menstrual hygiene practices and government programme awareness among adolescent girls in rural Bareilly: a cross-sectional study. *Int J Health Sci Res.* 2026; 16(3):91-99. DOI: [10.52403/ijhsr.20260311](https://doi.org/10.52403/ijhsr.20260311)

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