



MENSTRUAL HYGIENE METHOD USE AMONG YOUNG WOMEN IN DISTRICTS OF UTTAR PRADESH

Healthcare

Dr. Ajay Pandey*	Assistant Director, Population Research Centre, University Of Lucknow *Corresponding Author
Prof. Vinod Singh	Director, Population Research Centre, University Of Lucknow
Richa Sharma	Deputy Director, NILERD, Delhi

ABSTRACT

Practicing hygienic methods during menstruation reduces health risks and improves overall well-being among women. This study examines the socioeconomic and geographic patterns, along with key predictors, of menstrual hygiene practices among women in districts of Uttar Pradesh, India. Using data from the National Family Health Survey 5, the analysis focuses on a sample of 35,479 young women aged 15–24 years. Descriptive statistics and multivariate analyses were applied to explore usage patterns and determinants of menstrual hygiene practices, including the estimation of age at menarche. Results indicate that the average age at menarche in Uttar Pradesh is 14.1 years, with approximately 71.2% of women using hygienic menstrual methods. Usage rates vary significantly across districts, ranging from 47.87% in Shravasti to 88.97% in Ghaziabad. Logistic regression analysis highlights education as the most influential factor, with educated women being far more likely to adopt hygienic menstrual practices. Economic status also plays a crucial role, as wealthier women have better access to menstrual hygiene products. Media exposure further enhances awareness and adoption of hygienic practices. Interventions should prioritize educational programs and media campaigns to raise awareness about menstrual hygiene. Additionally, affordable menstrual products must be made accessible to low-income women to improve adoption rates.

KEYWORDS

Menstrual Hygiene Methods; Age at Menarche; Uttar Pradesh

INTRODUCTION

Menstrual hygiene management (MHM) constitutes a fundamental, yet frequently overlooked, dimension of women's reproductive health, particularly in low- and middle-income contexts such as India, where deeply entrenched socioeconomic disparities, cultural stigmas, and infrastructural inadequacies coalesce to impede the adoption of safe menstrual practices (Anand et al., 2015). The management of menstruation, a biological inevitability occupying nearly five years of a woman's reproductive lifespan, extends far beyond personal health and hygiene, influencing educational trajectories, workforce participation, and overall gender parity (Roy et al., 2021). The use of hygienic menstrual products—such as sanitary napkins, tampons, menstrual cups, or properly washed and dried reusable cloths—has been strongly linked to reduced prevalence of reproductive tract infections (RTIs), urinary tract infections (UTIs), and sexually transmitted infections (STIs), underscoring the critical intersection between menstrual hygiene and broader sexual and reproductive health outcomes (Das et al., 2015; Karjee et al 2022). Conversely, the persistent reliance on unhygienic materials such as reused rags, which are often inadequately cleaned and dried away from sunlight, contributes to a disproportionate burden of infection and reproductive morbidity, particularly among socioeconomically disadvantaged women (Mudey et al., 2010).

A diverse body of literature consistently underscores the multifactorial determinants influencing menstrual hygiene practices, encompassing socioeconomic, educational, cultural, infrastructural, and policy-related factors. Socioeconomic status emerges as a particularly salient determinant, with women from wealthier households exhibiting a markedly higher propensity to adopt commercially available sanitary products compared to their lower-income counterparts (Johnson et al., 2020). High product costs and limited rural availability compound the economic barriers faced by low-income women, forcing them to rely on suboptimal absorbents (Taylor et al., 2019). Educational attainment likewise functions as a critical enabler of hygienic menstrual practices, as higher levels of formal education correlate with increased awareness, proactive health-seeking behavior, and improved menstrual hygiene management (Smith & Taylor, 2019). School-based interventions, particularly those integrated into adolescent health programs, have proven instrumental in fostering positive attitudes and breaking the culture of silence surrounding menstruation (Sharma et al., 2020).

The cultural dimensions of menstrual hygiene practices are equally profound. In many regions, menstruation continues to be framed within a discourse of impurity, resulting in extensive social restrictions on menstruating women, including exclusion from religious activities,

domestic kitchens, and communal spaces (Singh et al., 2018). These entrenched socio-religious taboos not only restrict women's agency but also foster a culture of secrecy, wherein menstrual management decisions prioritize concealment over hygienic efficacy (Kumar & Srivastava, 2011). Such secrecy drives the continued preference for materials that can be discreetly hidden and disposed of, even when these materials pose significant health risks (Narayan et al., 2001).

Inadequate WASH (Water, Sanitation, and Hygiene) infrastructure exacerbates these challenges, particularly in rural areas where safe and private sanitation facilities remain scarce (Brown et al., 2021). The absence of gender-sensitive facilities—both in homes and educational institutions—creates substantial barriers to proper menstrual hygiene management, especially for adolescent girls, many of whom miss school during menstruation due to inadequate facilities (Sharma et al., 2020). This infrastructure gap, coupled with a lack of affordable menstrual products, perpetuates poor menstrual health outcomes and educational inequity (Shannon et al., 2021).

The timing of menarche also plays a pivotal role in shaping menstrual hygiene behaviors. Girls who experience early menarche often enter this biological transition with little or no preparatory education, rendering them particularly vulnerable to misinformation and unsafe practices (Kumar et al., 2020). Conversely, late-maturing girls tend to benefit from peer observation and exposure to school-based health education, which fosters better-informed and safer practices (Patel & Desai, 2019).

Recognizing the multifaceted barriers to menstrual hygiene, the Government of India has initiated several programs aimed at improving access to sanitary products and menstrual education. The National Menstrual Hygiene Scheme (NMHS), launched in 2011, facilitates the distribution of subsidized sanitary napkins through Accredited Social Health Activists (ASHAs) and self-help groups, with a particular focus on rural adolescent girls (National Health Mission, 2017). Evaluations of these programs have noted significant improvements in product accessibility and awareness, although spatial and socioeconomic disparities in impact remain evident (Rajan & Desai, 2021). Complementary initiatives by non-governmental organizations (NGOs) have further contributed to awareness-raising efforts, with participatory community-based programs proving especially effective in fostering local ownership and dismantling menstrual taboos (Garg et al., 2012).

Digital and social media platforms have also emerged as influential channels for menstrual health education, particularly among younger populations with increasing digital access. Mobile health (mHealth)

apps, social media campaigns, and influencer-driven content have been shown to enhance menstrual knowledge and destigmatize menstruation in urban and peri-urban contexts (Smith et al., 2020). However, the digital divide continues to limit the reach of these platforms among rural populations, where cultural silences and technological barriers inhibit widespread engagement (Chaturvedi & Chandra, 1991).

Achieving sustained improvements in menstrual hygiene requires a multi-sectoral, equity-driven approach that integrates comprehensive menstrual education within health and education systems, ensures the affordability and accessibility of safe menstrual products, enhances gender-sensitive sanitation infrastructure, and actively dismantles the deep-rooted cultural taboos that perpetuate menstrual stigma. Only through such holistic and contextually responsive strategies can menstrual hygiene management be mainstreamed into India's broader public health and gender equity agendas, ultimately safeguarding the health, dignity, and agency of women and girls across the country.

In response to these multifaceted challenges, the Government of India has implemented a suite of policy interventions, most notably the National Menstrual Hygiene Scheme (NMHS), which seeks to enhance the accessibility of subsidized sanitary products through community health networks such as Accredited Social Health Activists (ASHAs) and self-help groups (SHGs). Complementary efforts by non-governmental organizations (NGOs) have further contributed to awareness generation and product dissemination, albeit with significant spatial and socioeconomic heterogeneity in impact. Additionally, digital platforms and social media campaigns have increasingly emerged as influential conduits for menstrual health education, particularly among digitally connected youth demographics, though these initiatives remain unevenly distributed across urban-rural divides.

This study aims to reassess the levels, patterns, and key determinants of hygienic menstrual practices among young women in Uttar Pradesh, drawing on data from the most recent nationally representative survey — the fifth round of the National Family Health Survey (2019–21). In addition to analyzing district-level spatial variations in menstrual hygiene practices, the study's findings will provide valuable insights to support policymakers in designing targeted interventions and informing future research.

Objectives

The main objective is to study the hygienic menstrual practices adopted by young women in Uttar Pradesh

The Specific Objectives Are As Follows:

- To estimate levels of age at menarche in Uttar Pradesh
- To estimate the levels & patterns of hygienic menstrual practice use among young women in Uttar Pradesh
- To study the determinants of hygienic menstrual practices among young women in Uttar Pradesh.

METHODS

NFHS-5 dataset from Uttar Pradesh was used in the analysis. Female participants between the ages of 15–24 years were used in the analysis as the information on use of hygienic menstrual practice was available only from these women. The sample consisted of 35479 women. The outcome variable of this study was constructed based on the responses to the questions asked in the survey such as; what method or methods young women used for menstrual protection. The responses were captured (a) cloth, (b) locally prepared napkins, (c) sanitary napkins, (d) tampons, (e) menstrual cups (f) others, and (g) nothing. In order to construct the dependent variable responses pertaining to sanitary napkins, locally produced napkins, menstrual cups, and tampons were coded as using hygienic method while the remaining were clubbed as not using hygienic method.

RESULTS

Table 1 (annex.) provides insights into the distribution of the age at menarche (first menstruation) among women in Uttar Pradesh. The findings indicate that the majority of respondents experienced their first menstruation between 12 and 15 years of age, which is consistent with global biological norms. The most commonly reported age of menarche is 14 years, with 39.14% of respondents experiencing their first period at this age, followed by 13 years (33.17%) and 15 years (14.82%). This suggests that puberty onset for most adolescent girls in

Uttar Pradesh occurs within this typical range, supporting prior studies that associate menarche with hormonal development, genetic predisposition, and environmental influences such as nutrition and health status.

A small proportion of respondents experienced early menarche (before 12 years), with 0.26% of the population reporting menarche between 7 and 10 years, while 0.69% experienced menarche at 11 years. Early onset of menstruation has been linked to improved nutritional intake, increased body fat composition, and endocrine-disrupting environmental factors, as suggested by previous research. Studies have shown that urbanization, dietary changes, and obesity can contribute to a declining age of menarche, raising concerns about associated health risks, including polycystic ovary syndrome (PCOS), early puberty-related psychological stress, and increased long-term risks of cardiovascular and metabolic disorders.

Conversely, late menarche (after 16 years) is observed in a smaller proportion of the population, accounting for less than 5% of cases. Among these, 3.08% of respondents attained menarche at 16 years, while less than 1% reported menarche beyond 17 years. A few extreme cases of menarche occurring between 20 and 24 years were reported, although these may represent either outliers or cases of delayed puberty caused by malnutrition, chronic illness, excessive physical activity, or endocrine disorders. Late menarche is often associated with undernutrition, low body weight, and socio-economic disparities affecting health and diet, which aligns with findings from other low-income settings where food insecurity and inadequate healthcare access contribute to delayed puberty.

Additionally, 0.41% of respondents reported that they did not remember their age at menarche, which could introduce recall bias into self-reported data. This is especially relevant for older respondents, where memory limitations may affect the accuracy of reporting. This finding suggests that retrospective data on menarche should be interpreted with caution, particularly in large-scale surveys.

From a public health perspective, the observed distribution of menarche age highlights the critical importance of adolescent health interventions, including menstrual hygiene education, improved nutrition programs, and access to reproductive health services. Since the majority of girls experience menarche between 12 and 15 years, it is imperative that menstrual health awareness campaigns and school-based education programs target girls before this age range, ensuring they have the necessary knowledge and resources to manage menstruation hygienically and confidently. The presence of early and late menarche cases further underscores the need for medical screening programs to identify at-risk populations and address underlying nutritional or hormonal deficiencies.

Overall, the findings reflect a broadly normal distribution of menarche age in Uttar Pradesh, with a peak around 14 years. However, the presence of early and late outliers necessitates further investigation into their underlying causes, including genetic, socio-economic, and environmental factors. Future research could explore regional disparities in menarche age, the role of socio-economic status in menstrual health access, and long-term health outcomes associated with early or delayed menarche. These insights can inform targeted interventions aimed at improving adolescent health outcomes in Uttar Pradesh and beyond.

Table 2 (annex.) provides the district-wise estimates of mean age at menarche in Uttar Pradesh. The data indicates that the majority of districts report menarche between 13.5 and 14.5 years, which aligns with global trends in pubertal onset. However, substantial deviations exist, with some districts reporting significantly earlier or delayed menarche, reflecting disparities in health conditions, lifestyle factors, and access to nutrition and healthcare services.

In districts such as Bareilly (13.46 years), Meerut (13.54 years), and Ghazipur (13.54 years), the mean age at menarche is among the lowest, suggesting that girls in these regions experience puberty earlier than their counterparts in other districts. Several factors could contribute to this trend, including better nutritional intake, higher urbanization rates, and exposure to environmental factors that accelerate puberty. Research has shown that improved food security, higher BMI, and increased consumption of protein and fat-rich diets can lead to an earlier onset of menarche. Additionally, exposure to endocrine-

disrupting chemicals, often found in urban and industrialized environments, has been linked to early puberty in several studies. This trend is consistent with findings in other urbanized and economically developed regions, where better living standards and access to healthcare contribute to early pubertal onset.

Conversely, several districts report delayed menarche, with the mean age extending beyond 15 years, significantly higher than the state average. Allahabad (18.21 years), Kanpur Dehat (17.28 years), Lucknow (17.26 years), and Kaushambi (16.35 years) are among the districts where menarche occurs much later. Delayed puberty in these regions may be attributed to low caloric intake, high physical activity levels, and inadequate access to reproductive healthcare services. Studies indicate that chronic malnutrition and low body fat percentages can delay the onset of menarche, as the body requires a minimum energy threshold for initiating pubertal changes. In these districts, higher levels of food insecurity, poor dietary diversity, and limited healthcare facilities could contribute to later menarche among adolescent girls. Additionally, rural lifestyles, involving high levels of physical labor and lower fat reserves, can further delay the onset of menstruation. This aligns with previous research highlighting that girls from economically disadvantaged backgrounds and agrarian communities experience delayed menarche due to energy deficiency and inadequate healthcare access.

A notable trend emerges when comparing the geographic distribution of early and late menarche across Uttar Pradesh. Western Uttar Pradesh (including districts like Meerut, Ghaziabad, and Gautam Budh Nagar) generally shows earlier menarche, likely due to better economic conditions, higher urbanization, and improved access to healthcare and education. In contrast, Central and Eastern Uttar Pradesh, particularly districts such as Allahabad, Kanpur Dehat, and Kaushambi, experience significantly delayed menarche, indicating that socioeconomic deprivation and poor nutritional status play a critical role in delaying puberty. This trend suggests that regional disparities in health, education, and economic development directly influence reproductive health outcomes in adolescent girls.

Beyond nutrition and healthcare, socio-cultural factors may also play a role in shaping the age at menarche. Certain communities, particularly in more conservative or rural settings, may have limited awareness and discussions around menstruation and reproductive health, leading to delayed recognition and reporting of menarcheal age. Additionally, high levels of stress, social stigma surrounding menstruation, and psychological factors may influence the timing of puberty. Research suggests that girls exposed to higher levels of childhood stress, poverty, and adverse living conditions may experience either early or delayed menarche, depending on nutritional status and genetic predisposition.

From a public health perspective, these findings emphasize the need for targeted interventions to ensure that adolescent girls receive adequate nutrition, healthcare, and menstrual hygiene education. The presence of early menarche cases in districts like Meerut, Bareilly, and Ghazipur necessitates increased awareness about the risks of early puberty, including hormonal imbalances, increased vulnerability to reproductive health issues, and higher risks of early marriage and pregnancy. On the other hand, late menarche cases in districts like Allahabad, Kanpur Dehat, and Lucknow highlight the urgent need for nutritional interventions, improved healthcare services, and school-based adolescent health programs to address delayed puberty caused by malnutrition and chronic health issues. In nutshell, the district-wise distribution of mean age at menarche in Uttar Pradesh highlights substantial variations across the state, reflecting underlying nutritional, healthcare, and socio-economic disparities.

The table 3 (annex.) presents the sample distribution of women aged 15–24 years in Uttar Pradesh based on NFHS-5 (2019–21), highlighting their demographic, socio-economic, and hygiene-related attributes.

The data shows that 71.2% of women use hygienic menstrual methods, while 28.8% still rely on unhygienic practices, highlighting a substantial gap in menstrual hygiene adoption. This suggests that while awareness and accessibility of sanitary products have improved, nearly a third of young women still lack proper resources, putting them at risk of infections and other health complications.

The age distribution of respondents is fairly balanced, with 54.55% belonging to the 15–19 age group and 45.45% in the 20–24 range. The higher proportion of adolescents is particularly significant, as this group is at a crucial stage of reproductive health education and menstrual hygiene adoption. Additionally, a stark rural-urban divide is evident, as 82.12% of the sample resides in rural areas, while only 17.88% live in urban settings.

Religious composition largely mirrors the demographic structure of Uttar Pradesh, with 81.84% of respondents identifying as Hindu, 17.81% as Muslim, and 0.35% belonging to other religions. Since cultural and religious beliefs often shape menstrual practices and taboos, interventions must be community-specific and culturally sensitive to ensure effective adoption of hygienic practices across different groups. Caste distribution further underscores socio-economic disparities, with 27.13% of the sample belonging to SC/ST groups, 54.85% from OBC backgrounds, and 17.88% from the General category.

Education levels among respondents indicate that 9.06% are illiterate, 8.94% have incomplete primary education, 64.24% have completed secondary education, and 17.76% have attained higher education. The high percentage of women with secondary and higher education suggests progress in female education attainment, which is a crucial factor in menstrual health awareness. However, the presence of nearly 18% of women with no or incomplete primary education signals a need for targeted awareness campaigns for less-educated populations, ensuring that menstrual health education reaches all women, regardless of their literacy levels.

Economic disparities are evident in the wealth quintile distribution, where 22.84% of women belong to the poorest category, 26.98% to the poorer category, 20.56% to the middle, 16.11% to the richer, and 13.51% to the richest group. This suggests that nearly half (49.82%) of the women come from the poorest and poorer backgrounds, emphasizing the role of financial constraints in menstrual hygiene accessibility.

Sanitation access remains another significant concern, as 57.38% of women use flush toilets, 19.74% rely on pit/dry/compost toilets, and 22.88% practice open defecation. Women without private toilets may struggle to manage their periods hygienically, increasing their risk of infections and discomfort. This highlights the urgent need for improved sanitation infrastructure and dedicated menstrual hygiene-friendly facilities in rural areas and low-income communities.

Media exposure also plays a crucial role in menstrual health awareness, yet 58.3% of women report no exposure to mass media, while only 41.7% have access to media platforms such as television, radio, newspapers, or the internet. The lack of media exposure among a majority of respondents limits their access to important health information, including menstrual hygiene practices and available resources. Expanding awareness campaigns through television, radio, social media, and community-based programs can help bridge this information gap, particularly in rural and disadvantaged areas.

Overall, the sample distribution reveals critical disparities in menstrual hygiene adoption, education, economic status, and access to sanitation and media exposure among young women in Uttar Pradesh. While there has been progress in improving menstrual hygiene awareness, significant gaps remain, particularly among rural, less-educated, and economically disadvantaged women.

Table 4 (annex.) highlights the percentage distribution of women aged 15–24 years using hygienic menstrual methods in Uttar Pradesh by different socio-economic and demographic groups. Age appears to play a role in menstrual hygiene adoption, with 69.27% of women aged 15–19 years using hygienic methods compared to 73.51% of those aged 20–24 years. This suggests that older women may have better awareness, financial independence, or access to sanitary products, whereas younger adolescents may still face challenges in adopting proper menstrual hygiene practices.

A significant disparity is observed between urban and rural women, as 85.98% of urban women use hygienic menstrual methods compared to only 67.98% of rural women. This stark contrast underscores urban advantages in terms of product availability, financial access, and awareness, whereas rural women may struggle with affordability, cultural taboos, and a lack of access to sanitary products.

When examining menstrual hygiene usage by religion, Hindu women (71.67%) and Muslim women (68.89%) show relatively similar adoption rates, with slightly higher usage among women from other religious groups (79.67%). While religion itself may not be a major determining factor, cultural norms and beliefs surrounding menstruation could still influence hygiene practices in certain communities.

Caste-based disparities further highlight socio-economic inequities in menstrual hygiene adoption. General category women report the highest usage of hygienic menstrual methods (79.53%), followed by OBC women (70.60%) and SC/ST women (66.92%). The lowest reported usage is among those who responded as 'DK' (60.78%), possibly indicating lack of awareness, extreme marginalization, or economic hardship.

Education strongly correlates with menstrual hygiene adoption, as only 46.50% of illiterate women report using hygienic methods, compared to 88.00% of those with higher education. Even among women with incomplete primary education (52.69%), the adoption rate remains low, while those with secondary education (72.62%) exhibit a significant increase in hygienic practices.

Economic status is another major determinant, with menstrual hygiene adoption increasing progressively with wealth. Only 51.76% of women in the poorest wealth quintile use hygienic menstrual methods, compared to 91.49% in the richest group. The 40-percentage-point gap between the poorest and richest women highlights affordability as a major barrier, forcing lower-income women to rely on unhygienic alternatives like cloth. Expanding subsidized or free sanitary product distribution programs, particularly in low-income areas, is essential to ensuring that economic constraints do not prevent women from accessing hygienic menstrual care.

Sanitation infrastructure also plays a crucial role, as 76.54% of women with access to flush toilets use hygienic menstrual methods, compared to 68.73% of those using pit/dry/compost toilets and only 59.93% of those practicing open defecation. The fact that women without private toilets have the lowest adoption of hygienic menstrual practices underscores the critical need for improved sanitation infrastructure. Women who lack safe and private toilets may struggle to manage menstruation hygienically, leading to discomfort, infections, and restricted mobility. Expanding sanitation facilities and ensuring access to menstrual hygiene-friendly toilets in schools and public spaces can significantly improve menstrual hygiene management.

Media exposure also influences menstrual hygiene adoption, as 76.71% of women with media exposure use hygienic methods compared to 67.26% of those with no exposure. This highlights the role of mass media in spreading awareness about menstrual hygiene and breaking taboos surrounding menstruation. Increasing awareness campaigns through television, radio, and social media, especially targeting rural and marginalized women, can help bridge the information gap and encourage better menstrual hygiene practices.

In summary, the data reveals significant socio-economic and regional disparities in menstrual hygiene adoption among young women in Uttar Pradesh. While urban, wealthier, and more educated women have higher access to hygienic menstrual methods, rural, lower-income, and less-educated women face substantial barriers due to affordability, lack of awareness, and inadequate sanitation facilities. Addressing these disparities requires a multi-faceted approach, including education programs, expanded sanitation infrastructure, subsidized sanitary products, and media-driven awareness campaigns. Ensuring that rural and economically disadvantaged women have equal access to menstrual hygiene products and information is crucial to achieving menstrual health equity across Uttar Pradesh.

Table 5 (annex.) presents the district-wise distribution of hygienic menstrual method usage among women aged 15–24 years in Uttar Pradesh, as reported in NFHS 2019–2021. Table reveals significant regional disparities, with the overall state average standing at 71.2%. Usage varies widely across districts, highlighting differences in access to menstrual hygiene products, awareness levels, and socio-economic conditions. The lowest adoption rates are observed in Shravasti (47.87%) and Bahraich (48.09%), where more than half of young women do not use hygienic menstrual methods. Other districts with similarly low adoption rates include Banda (52.96%), Balrampur

(53.21%), and Sitapur (54.90%), suggesting that economic hardship, limited awareness, and inadequate infrastructure are key barriers to menstrual hygiene adoption in these areas.

In districts such as Sant Kabir Nagar (62.08%), Siddharth Nagar (62.57%), Hardoi (63.36%), and Unnao (64.01%), menstrual hygiene adoption falls within a moderate range of 60%–75%, indicating that some progress has been made in awareness and product availability, but challenges remain.

A significant number of districts, including Agra (75.27%), Bijnor (75.82%), Deoria (76.30%), Mau (76.72%), and Allahabad (78.86%), report higher than average adoption rates, exceeding 75%. This suggests that women in these regions benefit from better access to information, healthcare services, and economic resources, allowing them to make informed choices about menstrual hygiene.

The highest adoption rates are concentrated in economically developed districts, where access to education, healthcare, and menstrual hygiene products is more widespread. Districts such as Varanasi (85.37%), Gautam Budh Nagar (86.86%), Kanpur Nagar (87.30%), Hapur (87.74%), and Ghaziabad (88.97%) report the highest levels of menstrual hygiene adoption, indicating strong awareness, affordability, and availability of products in these areas. The urban advantage is clear, as cities like Lucknow (83.28%) and Meerut (82.44%) also show higher adoption rates compared to other districts, further emphasizing the role of infrastructure, economic stability, and healthcare access in promoting hygienic menstrual practices. Overall, the findings highlight significant inequalities in menstrual hygiene adoption across Uttar Pradesh.

Table 6 (annex.) provided the logistic regression model estimates the odds of using menstrual hygienic methods among women aged 15–24 in Uttar Pradesh, based on NFHS-5 (2019–2021) data. The odds ratios (OR) indicate how different demographic, social, and economic factors influence menstrual hygiene practices. Below is a detailed interpretation of each predictor.

Age wise differentials in use of hygienic method suggests that women aged 20–24 have a slightly higher likelihood (2%) of using menstrual hygienic methods compared to those aged 15–19. However, the effect is not statistically significant ($p > 0.05$), indicating that age alone does not play a crucial role in determining menstrual hygiene practices in this group.

Women living in rural areas are 38% less likely to use hygienic menstrual products compared to urban women. The result is highly significant ($p < 0.01$), indicating that access to menstrual hygiene products is lower in rural settings. This could be due to limited availability, affordability, and awareness regarding hygienic methods.

Muslim women are 22% less likely to use hygienic menstrual products compared to Hindu women, and this difference is statistically significant ($p < 0.01$). This may be due to cultural taboos, limited discussions on menstruation, or economic disparities affecting access. For women from other religious groups, the odds ratio is 0.99, but the result is not statistically significant ($p = 0.98$), suggesting no meaningful difference compared to Hindu women.

Women from the General caste have 19% higher odds of using menstrual hygienic methods compared to SC/ST women. The effect is significant ($p < 0.01$), possibly due to higher socio-economic status, better education, and improved access to resources. OBC women show no significant difference compared to SC/ST women ($p = 0.33$), suggesting similar menstrual hygiene practices between these two groups.

Education is one of the most powerful predictors of menstrual hygiene practices. Women with higher education are 357% more likely to use hygienic menstrual methods compared to illiterate women. Even secondary education significantly improves hygiene practices, with a 138% increase in odds. Illiterate women are at the highest risk of not using hygienic methods, highlighting the role of education in menstrual health awareness.

Economic status has a strong, positive association with menstrual hygiene usage. Women in the richest category are nearly six times more likely to use hygienic menstrual products than the poorest

[illegible]

Table 3: Sample characteristics of women aged 15–24 years in Uttar Pradesh, NFHS-5, 2019-21

Sample Characteristics	Frequency	Percentage
Using Hygiene		
No	10,218	28.8
Yes	25,261	71.2
Current Age		
15-19	19,353	54.55
20-24	16,126	45.45
Place of Residence		
Urban	6,343	17.88
Rural	29,136	82.12
Religion		
Hindu	29,037	81.84
Muslim	6,319	17.81
Others	123	0.35
Caste		
SC/ST	9,595	27.13
OBC	19,397	54.85
General	6,322	17.88
DK	51	0.14
Education		
Illiterate	3,215	9.06
Incomplete primary	3,173	8.94
Secondary	22,791	64.24
Higher	6,300	17.76
Wealth Quintile		
Poorest	8,104	22.84
Poorer	9,572	26.98
Middle	7,295	20.56
Richer	5,715	16.11
Richest	4,793	13.51
Toilet Type		
Flush	20,358	57.38
Pit/dry/compost	7,003	19.74
Open	8,118	22.88
Media Exposure		
No Exposure	20,683	58.3
Exposure	14,796	41.7

Table 4: Use of hygienic menstrual methods among women aged 15-24 years by Background Characteristics in Uttar Pradesh, NFHS 2019-2021

Background Characteristics	Percentage
Current Age	
15-19	69.27
20-24	73.51
Place of Residence	
Urban	85.98
Rural	67.98
Religion	
Hindu	71.67

Muslim	68.89
Others	79.67
Caste	
SC/ST	66.92
OBC	70.60
General	79.53
DK	60.78
Education	
Illiterate	46.50
Incomplete primary	52.69
Secondary	72.62
Higher	88.00
Wealth Quintile	
Poorest	51.76
Poorer	66.58
Middle	76.02
Richer	83.32
Richest	91.49
Toilet Type	
Flush	76.54
Pit/dry/compost	68.73
Open	59.93
Media Exposure	
No Exposure	67.26
Exposure	76.71

Table 5: District-wise Use Of Hygienic Menstrual Methods Among Women Aged 15-24 Years In Uttar Pradesh, NFHS 2019-2021

District	Percentage
Shrawasti	47.87
Bahraich	48.09
Banda	52.96
Balrampur	53.21
Sitapur	54.90
Chitrakoot	56.05
Kanshiram Nagar	56.28
Kheri	57.17
Barabanki	58.09
Budaun	58.71
Shahjahanpur	59.40
Sambhal	60.19
Farrukhabad	60.40
Gonda	61.38
Sant Kabir Nagar	62.08
Siddharth Nagar	62.57
Hardoi	63.36
Lalitpur	63.64
Unnao	64.01
Etah	64.24
Mahamaya Nagar	66.31
Kannauj	66.41
Kaushambi	66.89
Pratapgarh	67.58
Firozabad	68.59
Sonbhadra	68.75
Pilibhit	69.73
Mainpuri	70.22
Bareilly	70.43
Fatehpur	70.65
Faizabad	70.80
Amethi	70.88
Ballia	71.66
Jyotiba Phule Nagar	72.41
Shamli	73.37
Basti	73.45
Sultanpur	73.46
Sant Ravidas Nagar	73.49
Mathura	73.59
Mirzapur	74.06
Rampur	74.34
Agra	75.27
Kanpur Dehat	75.72

Bijnor	75.82
Etawah	76.12
Deoria	76.30
Auraiya	76.43
Mau	76.72
Hamirpur	77.29
Kushinagar	77.38
Ambedkar Nagar	77.66
Saharanpur	77.71
Ghazipur	77.86
Aligarh	78.04
Muzaffarnagar	78.24
Gorakhpur	78.28
Moradabad	78.37
Mahoba	78.57
Azamgarh	78.69
Allahabad	78.86
Jalaun	78.96
Raebareli	79.90
Mahrajganj	80.00
Bulandshar	80.16
Chandauli	80.52
Baghpat	80.87
Meerut	82.44
Jhansi	82.48
Lucknow	83.28
Jaunpur	83.36
Varanasi	85.37
Gautam Budh Nagar	86.86
Kanpur Nagar	87.30
Hapur	87.74
Ghaziabad	88.97

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