JOURNAL OF HEALTH PROMOTION
Volume 13, 2025, **pp:** 31-44
ISSN: 2631-2441 (Print)
ISSN: 2822-1591 (Online)

Research Article

Education and Menstrual Hygiene: Practice and Awareness among Women in Ramechhap District

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Abstract

Menstrual hygiene is a fundamental right in women's reproductive health influenced by several factors. This study examines the influence of education on menstrual hygiene and awareness among women in Ramechhap District. It specifically analyses the relationship between educational level and menstrual hygiene behaviors while taking into account control variables such as caste-ethnicity and religion. The study area comprised six wards in Khandadevi Rural Municipality, Ramechhap District, Nepal, and the sample comprised 351 female respondents. The secondary data were adopted from a 2025 baseline study report of the Community Development Society (CDS), Manthali, Ramechhap. The analysis employs binary logistic regression, which is fitted to the model at $p<0.001$. This analysis attributes 10 percent of the variance in the dependent variable to education, while also including control predictors such as caste-ethnicity and religion. The major findings reveal significant associations between education and several aspects of menstrual hygiene: access to adequate sanitation facilities, awareness of risks associated with poor menstrual hygiene, adequate information from Health Professionals, schools, or community programs, and comfort in discussing menstruation and menstrual hygiene. Higher levels of education increase menstrual hygiene awareness and practices, making individuals more aware than illiterate ones. Therefore, the study concludes that education exerts a more decisive influence on menstrual hygiene practices than other variables. It highlights the importance of policymakers and planners prioritizing women's education in rural areas to improve menstrual hygiene practices and overall reproductive health.

Article History

OPEN ACCESS

Received: 04 September 2025

Accepted: 12 October 2025

Published: December 2025

DOI:

https://doi.org/10.3126/jhp.v13i1.87161

Keywords:

Health rights; Sanitation; Reproductive health; Access; Information

Introduction

Menstrual hygiene is a fundamental component of women's reproductive health, aligning with the WHO's definition of mental and physical well-being (Hennegan, 2021). It is essential for women's health, but menstrual hygiene programs in schools are often isolated within the Water, Sanitation, and Hygiene (WASH) framework and limited to a community development perspective (Sommer et al., 2021). Nevertheless, awareness plays a critical role in promoting health, dignity, and agency, particularly in menstrual hygiene, which is not only a health issue but also a human rights issue, essential to the dignity and equality of women and girls (UNICEF, 2019). Therefore, every woman has an equal right to access facilities for

menstrual hygiene; it is the state's obligation and duty to ensure this right. In Nepal, many rural women face systemic challenges in managing menstruation due to socio-cultural stigma, lack of access to sanitary products, and limited knowledge/awareness about managing it (Sharma et al., 2022). Such barriers unduly affect adolescent girls, leading to school absenteeism, compromised health, and social exclusion. Therefore, it is essential to determine whether barriers can be broken by promoting awareness, challenging taboos, and encouraging safe hygiene practices through education (Sommer et al., 2016).

Every month, nearly 1.8 billion women menstruate globally, and nearly 23 percent of girls drop out of school after reaching puberty due to inadequate menstrual hygiene facilities in South Asia (UNICEF, 2019; UNESCO, 2014), which is directly associated with their reproductive health. Such a huge population represents a mix from the Northern and Southern Hemispheres, based on development perspectives. Therefore, most people in the least developed countries do not have proper access to menstrual products due to a lack of information, and an estimated 500 million people lack access to menstrual products and adequate facilities for Menstrual Health Management (MHM) (UNICEF & WHO, 2021). It indicates an emerging issue and is alarming to the global community on menstrual hygiene.

Evidence shows that most of the adolescent girls have socio-cultural restrictions; therefore, they have an unsatisfactory level of knowledge about menstruation (Parajuli et al., 2016), which is a serious issue among this Gen Z group who have regular access to digital platforms and information. Nevertheless, 75 percent of the sample of adolescent girls have an average knowledge score of 100 out of 100 regarding menstruation (Ghimire, 2017). In such a situation, education may unlock the door to knowledge. However, formal and informal education systems sensitize people to particular areas of interest. Additionally, education is closely linked to health, particularly women's health, which includes menstrual hygiene. However, in many rural areas, limited access to educational opportunities can lead to health and well-being issues for women (UNICEF, 2018). In terms of women's health, education is the most significant contributing factor, with an interrelationship that can lead to reciprocal changes. Specific menstrual education can influence people's attitudes although menstrual hygiene in rural Nepal is a key concern (Shrestha et al., 2025). Therefore, both holistic and specific education can play a vital role in changing knowledge.

A good understanding of menstruation can positively influence menstrual hygiene practices. In the context of Nepal, many cities (urban areas) offer people access to various facilities, making everything readily available. Additionally, people in highly educated areas have a higher level of awareness compared to those in outlying areas. People outside Nepal's core urban areas lack access to basic education, health facilities, and economic resources. Rural people generally have lower socio-economic well-being than those in urban areas or core cities. Interestingly, women face discrimination, cultural superstitions, and gender inequality in the Kathmandu valley perspective on menstrual taboos or discrimination as well (Mukherjee et al., 2020). It suggests that a standard lifestyle and urban residence do not necessarily contribute to better menstrual hygiene practice.

Another empirical study found that 75 percent of products were disposed improperly after use of sanitary pads (Agarwal et al., 2024), indicating poor knowledge of menstrual hygiene. Menstrual hygiene involves not only sanitizing the individual throughout the entire

cycle but also applying knowledge and proper disposal processes after use. If not properly disposed, it harms the surrounding environment, and there is a high risk of contamination to others if the used menstrual products are infected.

Furthermore, the media is one of the most effective influencers in breaking down taboos and promoting awareness. In addition, the media plays a role in eradicating the social stigma regarding the menstrual taboos (Islam et al., 2018). Menstruation is not only a natural process in women's health, which is safely managed and associated with dignity (WHO/UNICEF, 2024). According to Amatya et al. (2018), most of the rural area girls/women are segregated from the mainstream social function during menstruation time. According to the study, 3.9 percent of respondents reported living in a Chhau Shed (separate hut), 81.8 percent in a livestock shed, and 14.3 percent in a courtyard, among 77 respondents. Girls from Sindhuli and Udaypur schools said their experiences were shaped by their family's guidance in Hindu religious philosophy. As a result, they escaped the outside environment and lived in a cowshed or a separate room in a neighbor's house, where they had no opportunity to see the sun or the faces of their fathers and brothers. It shows social restrictions during menstruation due to a lack of proper information and awareness at the community level. Therefore, the media can transform attitudes and beliefs by providing accurate information, thereby promoting safety and dignity.

Similarly, the combination of Social Cognitive Theory (SCT) and the Health Belief Model (HBM) provides a practical framework for enhancing menstrual hygiene through education and awareness. While the HBM focuses on factors such as perceived vulnerability, seriousness, benefits, and obstacles, SCT adds the concept of self-efficacy—the belief in one's ability to take action—as a vital factor in changing behavior. In the context of menstrual hygiene, educational initiatives should not only convey information but also foster girls' confidence in managing their menstruation. This can be achieved through techniques such as peer modeling, skill development, and creating supportive environments. By integrating the motivational aspects of HBM with the behavioral encouragement of SCT, programs can more successfully empower adolescent girls to practice safe, consistent, and respectful menstrual hygiene (Janz & Becker, 1984; Rosenstock et al., 1988).

According to Marshall Becker's use of the Health Belief Model (HBM) to explore sick role behavior, individuals' perceptions—including their views on susceptibility, severity, benefits, and barriers—along with motivation and interactions with healthcare providers, are crucial to adherence to health recommendations. This model emphasizes that personal beliefs, rather than solely medical information, are key drivers of behavior and that these beliefs can be changed through focused initiatives. Relating this to menstrual hygiene, education and awareness campaigns should highlight girls' perceived risk of infection, the seriousness of inadequate hygiene, and the advantages of proper practices, while also addressing obstacles like stigma, costs, and limited access. By creating motivation and fostering trust through culturally relevant teaching and supportive settings, educators can improve adherence and empower young girls to adopt and maintain healthy menstrual hygiene habits (Becker, 1974).

In addition, empirical research shows that training based on the Health Belief Model (HBM) significantly improves self-efficacy and self-compassion in premenopausal women, enabling them to navigate better the physical and emotional difficulties that arise during hormonal changes. By focusing on essential HBM elements—such as perceived susceptibility,

severity, benefits, barriers, and self-efficacy—the program led to meaningful behavioral changes and improved quality of life. Relating this to menstrual hygiene, education, and awareness initiatives rooted in HBM can effectively encourage safe practices among adolescent girls. When girls are aware of their susceptibility to infections, understand the seriousness of inadequate hygiene, recognize the advantages of healthy behaviors, and feel empowered to overcome social or logistical challenges, they are more likely to adopt and maintain respectful menstrual hygiene practices. Therefore, incorporating HBM into educational programs in schools and communities can enhance menstrual health outcomes by using structured, supportive, and empowering strategies (Jones et al., 2015). So, conceptually, education level determines both menstrual hygiene awareness and practices.

Besides, the gradual spread of menstrual hygiene awareness as a human right globally is the duty of states, established through national and international treaties, declarations, and policies. Therefore, it legally attempts to recognize and address menstrual health, including reproductive health, as a fundamental right (Article 35, Right to Related Health, Section 3, and Equal Access to Health Services) in the Constitution of Nepal (Constitution of Nepal, 2015). As an implementation of a fundamental right, ensure reproductive health, and plan to improve and amend the relevant policies in the national population policy of Nepal. It identified a gap in appropriate policies regarding menstrual hygiene and the changing patterns of reproductive behaviour among people (MoHP Nepal, 2025). The Safe Motherhood and Reproductive Health Rights Act 2018 emphasizes equal rights and treatment for reproductive health and every institution. Budget allocations from the province and local governments are crucial for the reproductive health program (MoHP Nepal, 2018).

Similarly, it emphasizes Sustainable Development Goals (SDGs) No. 5, Gender Equality, and No. 10, Reduce Inequalities, which are more relevant to menstrual hygiene (UN, 2014). These are interconnected and make significant contributions to reproductive health. In the meantime, the 16 Periodic Plan prioritized the Safe Motherhood and Reproductive Health Program, which is also associated with menstrual hygiene (NPC, 2024). In this context, this study examines the influence of education on women's menstrual hygiene practices and awareness in rural Nepal, and assesses contributing cofactor variables that have not yet been explored. Moreover, it shows the importance of education in menstrual hygiene practices.

Although the study contributes to menstrual hygiene management by addressing education levels in the rural hill region, most scholars have focused on school and workplace-level absenteeism due to menstrual issues, with the importance of education in menstrual hygiene receiving less attention. Therefore, this study explores how education levels contribute to community-based menstrual hygiene awareness and practices.

Methods and Materials

Research Methods

The paper has adopted secondary data from the Community Development Society, Manthaly, Ramechhap. They have conducted a baseline study in technical support of Global Research and Development Center Pvt. Ltd., Kathmandu, Nepal. The baseline study methodology followed a systematic and structured approach to ensure reliable data collection and analysis. The process began with a comprehensive desk review, which informed the design

of the survey questionnaire. A pilot of the survey instrument was conducted to refine its clarity and relevance, incorporating feedback from peers and experts. The population housing census, which included 5,501 households, served as the sampling frame. From this population, 352 households (6.4%) were selected purposively to ensure representation from key demographic groups and areas of interest. The selected households were chosen to achieve a sample that reflected the community's diversity, taking into account factors such as geographic location and household characteristics.

Data were collected over 7 days under the supervision of trained enumerators, who had been thoroughly briefed on the survey procedures to maintain accuracy and ethical standards. Six enumerators were deployed in each ward to collect data, and only female respondents were included in the interview. The study used a structured questionnaire that underwent pilot testing to ensure data reliability and accuracy, thereby enhancing data validity.

Study Area and Population

Ramechhap District is located in the Himalayan region of the Bagmati Province of Nepal. The district has a total population of 170,302, with 52.54% females, and a female literacy rate of 59.4%. The literacy rate for the entire district is 68.1 percent, with an annual population growth rate of -1.67 percent (NSO, 2021). Khandadevi Rural Municipality is a drought-affected area associated with community health issues due to desertification. Therefore, since 2014, the Community Development Society has been implementing menstrual hygiene projects at the community level, along with other water, sanitation, and hygiene programs at the school, public institution, and household levels. They have already implemented such a project in wards no. 1, 2, and 7; therefore, the study comprises six wards (3, 4, 5, 6, 8, and 9) of Khandadevi Rural Municipality in Ramechhap District, Nepal, representing a diverse mix of caste, ethnicity, and religions.

Sample Size

According to the baseline study data sheet provided by the organization for further academic study, only 351 female respondents from households were recorded. All respondents were women from each household, selected purposively.

Nature of Data and Source

The data are quantitative and secondary, sourced from the Community Development Society (CDS) survey report for Manthali, Ramechhap, Nepal. The survey was conducted between December 15, 2024, and January 10, 2025, in the respective area to analyze the situation and further expand their WASH program.

Data Cleaning and Management

The organization has provided data organized in a Microsoft Excel worksheet, which has been cleaned as needed for analysis in this study and uploaded into SPSS. Similarly, data were recoded according to the valid distribution for further analysis.

Data Analysis

Univariate data on education level, religion, and caste-ethnicity were presented descriptively. Binary Logistic Regression was used to assess the influence of education (independent variable) on multiple dependent variables, which are access to adequate sanitation, awareness of the risks associated with poor menstrual hygiene, receiving sufficient information

from health professionals, schools, or programs, and feeling comfortable discussing with friends or family members, while controlling for education, caste-ethnicity, and religion.

The dependent variables were measured dichotomously (Yes=1, No=0). Similarly, contributing variables were recoded from ordinal and ratio scales due to distributional imbalance across separate themes. This was done to prepare for the multivariate analysis of logistic regression results. For instance, education, which was on an ordinal scale, had secondary and Bachelor's levels merged into the 'Secondary level and Above' category due to the low representation at the Bachelor's level. Caste-ethnicity, on a nominal/category scale, was simplified into a dichotomy of indigenous vs. non-indigenous groups (Indigenous: Tamang, Newar, Magar, and Sunuwar; Non-indigenous: Brahmin, Kshetri, and Dalit). Similarly, religion, also measured in a nominal/category scale, was converted into Hinduism vs Other religions (Buddhism, Kirat, and Christianity).

Ethical Consideration

The study adhered to research ethics and obtained approval from the organization that provided the data for analysis and the production of an academic paper. Moreover, personal privacy was maintained and individual human rights was protected. Similarly, the organization had obtained approval from the rural municipality for a baseline study in the respective ward and had also obtained informed consent during data collection at each level. In addition, the study team leader organized an orientation program to ensure privacy and data security for enumerators before their deployment in the field.

Results

The results are presented in two parts: first, a descriptive and bivariate analysis of the variables; and second, a multivariate analysis using logistic regression in SPSS application. The descriptive and bivariate results were presented in a table showing percentages and frequencies, along with the association between the predictor and outcome variables and their statistical values. Similarly, the results of logistic regression are shown in a table with their statistical measurement value. The dependent variables are: access to adequate sanitation facilities, awareness of the risks associated with poor menstrual hygiene, receipt of sufficient information from health professionals, schools, or programs, and feeling comfortable discussing menstrual hygiene with friends or family members. Independent variables include education as well as cofactor variables such as caste-ethnicity and religion.

Table 1. *Distribution of Socio-Demographic Information*

Predictor variables	**Distribution area (%)**			
Caste-Ethnicity	Brahman	Dalit	Indigenous	Kshetri
Percentage of Respondents	4.3	14.8	39.6	41.2
Types of Religions	Buddhist	Christian	Hindu	Kirat
Percentage of Respondents	14.2	1.1	84.3	1.3
Education Level of Respondents	No Formal Education	Primary	Secondary	Bachelor
Percentage of Respondents	36.8	23.1	35	5.1

There is a diverse mix of caste and ethnicity, with Kshetri leading at 41.2 percent, followed by Indigenous groups (including Tamang, Newar, Magar, and Majhi) at 39.6 percent,

Dalit at 14.8 percent, and Brahman at 4.3 percent. In addition, 84.3 percent of respondents had a Hindu background, a high proportion among the other respondents, followed by Buddhists at 14.2 percent, Christians at 1.1 percent, and Kirat respondents with a religious background at 0.3 percent. Similarly, respondents with no formal education were the highest, at 36.8 percent, followed by those with a secondary education at 35 percent, a primary education at 23.1 percent, and a Bachelor's degree at 5.1 percent.

In summary, Kshetri caste respondents comprised 41.2 percent of the highest rank, while Brahmin caste respondents accounted for only 4.3 percent at the lowest level. However, there is a mixed caste-ethnicity, including Tamang, Newar, Magar, Sunuwar, and Dalit. In terms of caste and ethnicity, Hindu religious followers rank highest at 84.3 percent, and Kirat ranks lowest at 0.3 percent among the study respondents. Additionally, the education level of respondents with no formal education is high, at 36.8 percent, and the Bachelor's level is the lowest among the interviewees, at 5.1 percent.

Table 2. *Response Distribution in Each Dependent Variable*

Outcome variables	Yes (%)	No (%)
Access to adequate sanitation facilities for menstrual hygiene	39.3	60.7
Aware of the risks associated with poor menstrual hygiene	42.7	57.3
Receive adequate information on menstrual hygiene from health professionals, schools, or community programs	33.9	66.1
Feel comfortable discussing menstruation and menstrual hygiene with friends or family members	37.6	62.4

As the table shows, 39.3 percent of respondents answered "yes," indicating that fewer than fifty percent have access to adequate sanitation facilities for menstrual hygiene. This indicates that most rural women lack access to sanitation facilities for menstrual hygiene, with the highest proportion of respondents lacking adequate facilities. In addition, fewer than 50 percent of respondents were aware of the risks associated with poor hygiene, at 42.7 percent.

Information is crucial for making decisions and being aware of others. Thus, one-third of the respondents answered 'yes' (33.9%) to receiving adequate information on menstrual hygiene from health professionals, schools, and community programs. It indicates that the fewest people are getting proper information from respected sources in rural areas. Similarly, most women hesitate to discuss menstruation and hygiene practices openly in rural areas. The survey responses show that 37.6 percent of participants discuss menstruation openly, while the majority of respondents do not want to talk about it. It indicates that the majority of respondents have a social or cultural barrier or other social restrictions to discussing menstruation openly.

As shown in Table 2, most of the rural women do not have good signs regarding menstrual hygiene, which is a serious issue to the dignity of menstruation of all women as their right.

Table 3. *Bivariate Analysis between the Predictor (Education) and Outcome Variables*

Outcome \ Predictor	Response	No Formal Education	Primary	Secondary and Above
Access to adequate sanitation facilities for menstrual hygiene (351)	Yes (%)	24.8	35.8	54.6
	No (%)	75.2	64.2	45.4
	Pearson Chi-square	25.626***		
Aware of the risks associated with poor	Yes (%)	21.7	45.7	60.3
	No (%)	78.3	54.3	39.7

menstrual hygiene (351)	Pearson Chi-square	41.342***		
Receive adequate information from health professionals, schools, or programs (351)	Yes (%)	16.3	32.1	51.1
	No (%)	83.7	67.9	48.9
	Pearson Chi-square	36.528***		
Feel comfortable discussing with friends or family members (351)	Yes (%)	20.2	42	51.1
	No (%)	79.8	58	48.9
	Pearson Chi-square	28.285***		

Note: ***=p<.001

In this table, the education variable is categorized into three groups: no formal education, primary and secondary education, and higher education. The bachelor's level respondents portion was very low, around 5 percent, making it the smallest of the categories; therefore, that group has been merged with the secondary-level group. Their result has been presented as follows.

As shown in Table 3, there is a statistically significant association between respondents' education level and their access to adequate sanitation facilities for menstrual hygiene (χ^2=25.626, p<.001). Respondents with higher education had greater access to adequate sanitation facilities for menstrual hygiene than those with no formal education (24.8 percent), primary education (35.8 percent), or secondary education and above (54.6 percent). It indicates that higher education affects menstrual hygiene. Similarly, another outcome variable is awareness of the risks associated with poor menstrual hygiene, and education is strongly associated with this (χ^2 = 41.342, p < .001). It also increased with the respondent's higher educational background compared to those with no formal education. Similarly, both receiving adequate information from health professionals, schools, or programs and feeling comfortable discussing with friends or family members are associated with respondents' education level.

In conclusion, the bivariate analysis model is statistically fit (p<.001), and education influences menstrual hygiene across its various indicators. It refers to further advanced analysis, such as logistic regression, to explore relationships and associations, including variations in the outcome variables.

Findings of Multivariate Analysis among the Dependent and Predictive Variables

The binary logistic regression results were used in a multivariate analysis, in which education, including caste-ethnicity and religious affiliation, was analyzed as a dependent variable in SPSS. The results are used to calculate Adjusted Odds Ratios (AORs) with 95 percent Confidence Intervals (CIs). The results are presented in Table 4, which includes the predictive variable and the output variables separately.

Table 4. *Multivariate Analysis with Use of Logistic Regression Results (Adjusted Odds Ratios)*

Measures (N=351)	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Chi-square	26.87***	46.21***	40.09***	33.13***
Adjusted R^2	0.10	0.166	0.149	0.123
Constant (Intercept)	2.56***	2.90***	4.25***	5.74***
Education Level of Respondents (Reference: No formal education)				
Primary Level	0.591(.321-1.089)+	0.340 (.184-.627)***	0.424 (.218-.825)*	0.357 (.191-.666)***
Secondary Level and above	0.270 (.160-.456)***	0.181 (.105-.311)***	0.185 (.104-.329)***	0.249 (.144-.429)***

Caste-Ethnicity of Respondents (Reference-Indigenous)				
Non-Indigenous	1.288 (.761-2.178)	1.47 (.860-2.510)	1.397 (.803-2.431)	0.618 (.355-1.078)+
Religion of Respondents (Reference-Hinduism)				
Other religious	1.160 (.574-2.345)	0.921 (.453-1.873)	0.935 (.454-1.924)	0.561 (.273-1.154)

***=p<.001, **=p<.01, *=p<.05, +=p<.10. Note: Odds Ratios are reported with 95% confidence intervals in parentheses.

Model:

1: Access to adequate sanitation facilities for menstrual hygiene (Exp. β)
2: Aware of the risks associated with poor menstrual hygiene (Exp. β)
3: Receive sufficient information from health professionals, schools, or programs (Exp. β)
4: Feel comfortable discussing with friends or family members (Exp. β)

As shown in Table 4, the Chi-square values from all models are statistically significant at p <.001, indicating that each model fits significantly better than the null model. Similarly, access to adequate sanitation facilities for menstrual hygiene has explained 10 percent by independent variables (χ^2=26.87, R^2 = 0.10), awareness of health risks due to poor menstrual hygiene has explained 17 percent by independent variables (χ^2=46.21, R^2=0.166), and access to reliable information from health workers/schools has explained 15 percent by independent variables (χ^2=40.09, R^2=0.149). Comfort discussing menstrual health explained 12 percent of the variance in the data using independent variables (χ^2 = 33.13, R^2 = 0.123). Additionally, the predictor variables significantly explained the dependent variable. Specifically, Model 2 accounts for the most variation (R^2 = 0.166), followed by Model 3 (R^2 = 0.149), Model 4 (R^2 = 0.123), and Model 1 (R^2 = 0.123). It shows that more independent variables need to be explored to influence the dependent variable, due to the study's coverage limitations.

Furthermore, education level is a key independent variable, with respondents having a primary level education being more likely than those with no formal education. Respondents with primary-level education are marginally significant (p<.10) and have access to adequate sanitation facilities compared to those with no formal education. Similarly, primary-level education is strongly associated with awareness of the risks of poor menstrual hygiene (Model 2) and with feeling comfortable discussing these issues with friends or family (Model 4) (p<.001). With the receipt of sufficient information from health professionals, schools, or programs, there is a significant (p < .05) statistical difference, as well as a difference between respondents from a primary level of education and those with no formal education.

Additionally, respondents with secondary education or higher are highly likely to have a strong association (p < .001) with all outcome variables. Therefore, as the education level increases, the likelihood of the outcome also increases. In the meantime, the caste-ethnicity and religious cofactor variables have no statistically significant effects and need to be explored further. Finally, the education predictor variable impacted menstrual hygiene awareness and practices in the rural hill community of Nepal. Similarly, we are continuing to analyze another cofactor variable, which may show more variation in the output variable than caste-ethnicity and religion.

Discussion

The study is limited to the secondary data collected by the organization to expand its WASH program at the community level. Therefore, we could not consider the cofactor variable

sufficient or appropriate for this study. However, it can suggest future studies and analysis beyond this study.

The findings underscore the pivotal role of education in shaping menstrual hygiene practices and awareness (p<.001). Educated women were more likely to use sanitary products (OR=0.591), seek health advice (OR=0.340), and talk openly about menstruation (OR=0.357). Education not only improves knowledge but also enhances confidence and decision-making abilities. At the same time, caste, ethnicity (OR=0.618), and religion (OR=0.561) have not had a significant impact. However, they are more likely than the reference variable to be indigenous rather than non-indigenous, and Hinduism rather than other (Buddhist, Christianity, and Prakrity), respectively. Studies across South Asia have shown that literate women are more likely to practice hygienic behaviors during menstruation, access healthcare when needed, and challenge harmful traditions (Thakur et al., 2014; Sapkota et al., 2013). However, religious superstition and cultural norms often overrule the highly educated in most rural areas, limiting behavioral change (Upadhyay, 2017).

Notably, in rural areas, most girls and women have low access to adequate sanitation facilities. However, according to a study, individuals with higher levels of education have greater access to and use of sanitary products compared to those with no formal education (OR=0.270). In rural Nepal, a very low percentage of females have good knowledge of menstrual hygiene (9.3% out of 400 females), and fewer than 50% practice it correctly (46.7%) (Sanjeev et al., 2019). In Bhutan, among the 1010 participants, 35.5 percent have low comprehensive knowledge of menstruation (Tshomo et al., 2021). Similarly, the schoolgirls' study found that 57.7% of the 400 respondents had an unsatisfactory level of knowledge; however, they demonstrated a significant improvement ($p < .001$) after receiving health education on menstruation (Khanal et al., 2023).

Nevertheless, Nepal is still facing challenges of insufficient knowledge in urban areas. For example, among the 193 schoolgirls from urban schools, one-third of adolescent girls have an inadequate understanding of menstruation, and one-fourth have poor menstrual hygiene practices (Neupane et al., 2020). Additionally, 39.9 percent of respondents demonstrated good knowledge and practice of menstrual hygiene among the 504 sample (Upashe et al., 2015). It indicates a limited understanding of menstrual knowledge and practices. In contrast, the media's role is crucial in promoting menstrual hygiene awareness among Bangladeshi females, as it has played a significant role in educating them and is associated with reducing social stigma and enhancing women's dignity. Therefore, to educate women and raise awareness, the media profession is also crucial (Islam et al., 2018). This aspect has not been incorporated into this study and perspective in the rural hills of Nepal; it may be a topic for future research.

In Nepal, most urban and rural women used reusable materials during their menstrual period, with 53.5 and 71.5 percent respectively. Similarly, 40.8 percent of urban and 21.5 percent of rural women used non-reusable menstrual materials. In addition to other materials used, 5.6 percent of urban women and 7 percent of rural women were identified in multiple survey indicators (Central Bureau of Statistics, 2019). According to a study conducted in Udaypur and Sindhuli districts of Nepal, 83.8 percent of girls used cloth, 15.4 percent had access to disposable sanitary pads, 0.4 percent had reusable sanitary pads, and 0.4 percent did not use any material during their menstrual periods (Morrison et al., 2016). In India, the use of

menstrual hygiene methods remains low, with only 42 percent of adolescent women in rural areas reporting exclusive use of a sanitary hygiene kit (Singh et al., 2022). Besides, in the mainstream issue, disabled women are excluded from being incorporated in addressing their problem, which is different from that of the general female population, where among 151 disabled women, 83.44 percent used sanitary pads (Pokhrel et al., 2020). It shows that most women with disabilities have access to resources for menstrual hygiene.

Essentially, individuals with higher levels of education can challenge social taboos and discrimination related to menstrual restrictions. However, studies show that individuals who are aware of menstrual hygiene and practices face challenges when visiting holy places and when using the kitchen at home (Sapkota et al., 2013). In Nepal, especially in rural communities, a strong belief system and religious practices are considered divine. Additionally, Menstrual Hygiene Management was found to be associated with ethnicity, family type, number of close female friends, school type, and mothers' education (Khanal et al., 2023). However, the study found no statistical association between menstrual hygiene practice and awareness, nor with cofactors such as caste, ethnicity, and religion. It may be necessary to analyze the issue qualitatively to explore the contributing factors, including caste, ethnicity, and religion, in menstrual hygiene.

Conclusion

This study concludes that educational attainment significantly enhances menstrual hygiene awareness and practices among rural hill women ($p < .001$). Mainly, education has a strong statistical association with access to and use of sanitary products, proper information about menstrual hygiene, awareness of risks associated with poor hygiene, and confidence in opening discussions on menstrual hygiene ($p < .001$). Therefore, the importance of education is more evident in this study in rural areas than in other cofactor variables, such as caste-ethnicity and religion.

Moreover, education has an impact of around 17 percent on the outcome variables, so it remains essential to explore the other control variables that significantly influence the dependent variables regarding menstrual hygiene awareness and practices. Besides, the local government and civil organizations must prioritize enhancing women's formal education through structural policy reform and planning. This may achieve dignified menstrual hygiene and establish equity in rural communities, thereby promoting reproductive health.

Declaration

The author has no competing interests and has analyzed and disseminated the information for academic purposes. In particular, gratitude is extended to the Community Development Society (CDS) for providing survey data for academic knowledge contribution.

References

Agarwal, A., Arora, S., Chawla, S., Kaur, A., & Saxena, S. (2024). Empowering rural women through sustainable menstrual hygiene practices for enhanced reproductive health. *Journal of Reproductive Healthcare and Medicine, 5*(15), 15. https://doi.org/10.25259/jrhm_20_2024

Amatya, P., Ghimire, S., Callahan, K. E., Baral, B. K., & Poudel, K. C. (2018). Practice and lived experience of menstrual exiles (Chhaupadi) among adolescent girls in far-western Nepal. *PLoS ONE, 13*(12), 1–17. https://doi.org/10.1371/journal.pone.0208260

Becker, M. H. (1974). The Health Belief Model and Sick Role Behavior. *Health Education Monographs, 2,* 324–508. heb.sagepub.com

Central Bureau of Statistics. (2019). *Multiple indicator cluster survey 2019, survey findings report*. In the Central Bureau of Statistics and UNICEF-Nepal.

Constitution of Nepal. (2015). *Constitution of Nepal 2015*. Government of Nepal. Retrieved from www.lawcommission.gov.np

Ghimire, S. (2017). Knowledge regarding menstrual hygiene among adolescent girls. *International Journal of Research in Medical Sciences, 5*(8), 3426. https://doi.org/10.18203/2320-6012.ijrms20173534

Hennegan, J., Winkler, I. T., Bobel, C., Keiser, D., Hampton, J., Larsson, G., Chandra-Mouli, V., Plesons, M., & Mahon, T. (2021). Menstrual health: a definition for policy, practice, and research. *Sexual and Reproductive Health Matters, 29*(1), 1911618. https://doi.org/10.1080/26410397.2021.1911618

Islam, H., Rodrick, S., Rahman, S., Rodrick, S. S., & Nusrat, K. (2018). The Role of Media in Creating Social Awareness about the Female Hygiene Practices during the Menstrual Cycle in Bangladesh. *IOSR Journal of Business and Management (IOSR-JBM), 20*(5), 4–15. https://doi.org/10.9790/487X-2005030415

Janz, N. K., & Becker, M. H. (1984). The Health Belief Model: A Decade Later. *Health Education & Behavior, 11*(1), 1–47. https://doi.org/10.1177/109019818401100101

Jones, C. L., Jensen, J. D., Scherr, C. L., Brown, N. R., Christy, K., & Weaver, J. (2015). The health belief model as an explanatory framework in communication research: Exploring parallel, serial, and moderated mediation. *Health Communication, 30*(6), 566–576. https://doi.org/10.1080/10410236.2013.873363

Khanal, G., Shrestha, N., Adhikari, K., & Ghimire, U. (2023). Menstruation hygiene management among secondary school students of Chitwan, Nepal: a cross-sectional study. *BMC Women's Health, 23*(1), 1–9. https://doi.org/10.1186/s12905-023-02494-x

MoHP Nepal. (2018). *Safe Motherhood and Reproductive Health Rights Act 2018*. Ministry of Health and Population, Nepal.

MoHP Nepal (2025). *National Population Policy 2025*. Ministry of Health and Population of Nepal.

Morrison, J., Basnet, M., Bhatta, A., Khimbanjar, S., Joshi, D., & Baral, S. (2016). Menstrual hygiene management in Udaypur and Sindhuli districts of Nepal. *In Water Aid*, 288701, July.

Mukherjee, A., Lama, M., Khakurel, U., Jha, A. N., Ajose, F., Acharya, S., Tymes-Wilbekin, K., Sommer, M., Jolly, P. E., Lhaki, P., & Shrestha, S. (2020). Perception and practices of menstruation restrictions among urban adolescent girls and women in Nepal: A cross-sectional survey. *Reproductive Health, 17*(1), 1–10. https://doi.org/10.1186/s12978-020-00935-6

Neupane, M. S., Sharma, K., Bista, A. P., Subedi, S., & Lamichhane, S. (2020). Knowledge on menstruation and menstrual hygiene practices among adolescent girls of selected schools, Chitwan. *Journal of Chitwan Medical College, 10*(31), 69–73. https://doi.org/10.3126/jcmc.v10i1.28075

NPC. (2024). *Sixteenth periodic plan 2081/2082-085/086 B.S.* National Planning Commission, Nepal

NSO. (2021). *National Population and Housing Census 2021*. In the National Statistics Office. www.censusnepal.cbs.gov.np

Parajuli, P., Paudel, N., Professor, A., & Shrestha, S. (2016). Knowledge and Practices Regarding Menstrual Hygiene among Adolescent Girls of Rural Nepal. *Journal of Kathmandu Medical College, 5*(1), 23–27. https://jkmc.com.np/ojs3/index.php/journal/article/view/590

Pokhrel, B., Mahat, S., Parajuli, K., & Lama, N. (2020). Knowledge and practice regarding menstrual health among physically disabled women in Kathmandu, Nepal. *Journal of Karnali Academy of Health Sciences, 3*(1), 8–13. https://doi.org/10.3126/jkahs.v3i1.28836

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the Health Belief Model. *Health Education Quarterly, 15*(2), 175–183. https://doi.org/10.1177/109019818801500203

Sanjeev, K. S., Shristy, S., Purna, L. M., Upadhayay, A., Subedi, S., & Gurung, M. (2019). Knowledge and practice of genital health and hygiene among adolescent girls of Lalitpur Metropolitan City, Nepal. *American Journal of Public Health Research, 7*(4), 151–156. https://doi.org/10.12691/ajphr-7-4-4

Sapkota, D., Sharma, D., Budhathoki, S., Khanal, V., & Pokharel, H. (2013). Knowledge and Practices Regarding Menstruation among School-Going Adolescents of Rural Nepal. *Journal of Kathmandu Medical College, 2*(5), 122–128. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2784630/

Sharma, A., McCall-Hosenfeld, J. S., & Cuffee, Y. (2022). Systematic review of menstrual health and hygiene in Nepal employing a social ecological model. *Reproductive Health, 19*(1), 1–21. https://doi.org/10.1186/s12978-022-01456-0

Shrestha, S., Thapa, S., Bucha, B., Kunwar, S., Subedi, B., Singh, A. R., Chapagain, D. D., Dhital, R., & Caws, M. (2025). Effectiveness of menstrual hygiene management training to enhance knowledge, attitude, and practice among adolescents in Sindhupalchowk, Nepal. *PLoS ONE, 20*(1), 1–20. https://doi.org/10.1371/journal.pone.0313422

Singh, A., Chakrabarty, M., Singh, S., Chandra, R., Chowdhury, S., & Singh, A. (2022). Menstrual hygiene practices among adolescent women in rural India: a cross-sectional study. *BMC Public Health, 22*(1), 1–18. https://doi.org/10.1186/s12889-022-14622-7

Sommer, M., Caruso, B. A., Sahin, M., et al. (2016). A time for global action: Addressing girls' menstrual hygiene management needs in schools. *PLoS Medicine, 13*(2), e1001962.

Sommer, M., Caruso, B. A., Torondel, B., Warren, E. C., Yamakoshi, B., Haver, J., ... & Phillips-Howard, P. A. (2021). Menstrual hygiene management in schools: midway progress update on the "MHM in Ten" 2014–2024 global agenda. *Health Research Policy and Systems, 19*(1), 1.

Thakur, H., Aronsson, A., Bansode, S., Stalsby Lundborg, C., Dalvie, S., & Faxelid, E. (2014). Knowledge, practices, and restrictions related to menstruation among young women from low socio-economic communities in Mumbai, India. *Frontiers in Public Health, 2*, 1–7. https://doi.org/10.3389/fpubh.2014.00072

Tshomo, T., Singh Gurung, M., Shah, S., Cuesta, J. G., Maes, P., Wangdi, R., & Tobden, J. (2021). Menstrual Hygiene Management-Knowledge, Attitudes, and Practices Among Female College Students in Bhutan. *Frontiers in Reproductive Health, 3*. https://doi.org/10.3389/frph.2021.703978

UN. (2014). *Sustainable Development Goals 2030*. In UNDP. Retrieved from https://www.undp.org/sites/g/files/zskgke326/files/publications/SDGs_Booklet_Web_En.pdf

UNESCO. (2014). *Puberty education & menstrual hygiene management*. United Nations Educational, Scientific, and Cultural Organization (UNESCO). https://unesdoc.unesco.org/ark:/48223/pf0000226792

UNICEF & WHO. (2021). *Progress on drinking water, sanitation, and hygiene in schools: Special focus on COVID-19*. United Nations Children's Fund (UNICEF) and World Health Organization (WHO). https://data.unicef.org/resources/progress-on-drinking-water-sanitation-and-hygiene-in-schools-special-focus-on-covid-19/

UNICEF. (2018). *Menstrual hygiene practices in Nepalese schools and communities*. 1–9.

UNICEF. (2019). *Guidance on menstrual health and hygiene*. United Nations Children's Fund (UNICEF). https://www.unicef.org/documents/guidance-menstrual-health-and-hygiene

Upadhyay, P. (2017). Menstruation, pollution taboos, and gender-based violence in Western Nepal. *The NEHU Journal, 15*(2), 101–111. https://prakashanthro.wordpress.com/2018/11/03/menstruation-pollution-taboos-and-gender-based-violence-in-western-nepal/

Upashe, S. P., Tekelab, T., & Mekonnen, J. (2015). Assessment of knowledge and practice of menstrual hygiene among high school girls in Western Ethiopia. *BMC Women's Health, 15*(1), 1–8. https://doi.org/10.1186/s12905-015-0245-7

WHO/UNICEF. (2024). *Progress on drinking water, sanitation, and hygiene in schools 2015-2023: special focus on menstrual health*. In the UNICEF and the World Health Organization. https://www.who.int/publications/i/item/9789280651423%0Ahttps://washdata.org/reports/jmp-2024-wash-schools