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Menstrual hygiene management practices among schoolgirls in resource-limited settings of Bahir Dar City administration, Northwestern Ethiopia

Yimenu Adane[1], Argaw Ambelu[1], Muluken Azage Yenesew[2] and Yalemtsehay Mekonnen[3]

Abstract

Background: Schoolgirls in resource-limited settings encounter significant challenges in maintaining proper menstrual hygiene management practices. Studies on associated factors in menstrual hygiene management practices among schoolgirls in Bahir Dar City are limited.

Objectives: The study aimed to evaluate the menstrual hygiene practices of schoolgirls and identify factors that influence these practices in the limited settings of Bahir Dar City.

Design: This study was a school-based, analytical, cross-sectional study conducted among schoolgirls between the ages of 11 and 25.

Methods: A total of 701 schoolgirls, selected at random based on their consent, participated in this school-based, analytical, cross-sectional study. The data collection process was comprehensive, involving a self-administered questionnaire and 5 rounds of observations at 10 schools using the Joint Monitoring Program for Water, Sanitation, and Hygiene monitoring tool. The study used a binary logistics regression model to determine the strength of the association between predictor and outcome variables, ensuring a rigorous analysis with a p-value < 0.05.

Results: In this study, 375 (53.50%) participants were found to have good menstrual hygiene practices. Factors such as the mothers' education (diploma and above vs not read and write (AOR = 26.29, 95% CI: 11.69–59.12), fathers' education (diploma and above vs not read and write (AOR = 19.21, 95% CI: 8.51–43.32), having access to basic water service (AOR = 14.62, 95% CI: 5.12–41.73), having access to basic sanitation services (AOR = 21.02, 95% CI: 7.87–56.15), being older among the schoolgirls (AOR = 19.69, 95% CI: 10.18–38.07), having private work (AOR = 15.58, 95% CI: 6.99–34.73), having open discussions with sisters (AOR = 27.01, 95% CI: 11.45–63.73), having friendly discussions about menstrual hygiene with schoolgirl friends (AOR = 18.67, 95% CI: 8.45–41.24), and residing in urban areas (AOR = 6.43, 95% CI: 3.52–11.73)) were significantly associated with good menstrual hygiene practices.

Conclusion: The schoolgirls in the study area had good menstrual hygiene practices. However, uneducated parents, inadequate facilities, limited access to absorbent materials, and lack of support were challenges that affected proper menstrual hygiene management practice. To improve menstrual hygiene practices, it is crucial to address these identified modifiable factors and consider education programs, better facilities, community support, and policy changes that prioritize menstrual hygiene management in schools for schoolgirls to manage menstruation.

[1]Water and Health Division, Ethiopian Institute of Water Resources, Addis Ababa University, Addis Ababa, Ethiopia
[2]Department of Environmental Health, School of Public Health, College of Medicine and Health Sciences, Bahir Dar University, Bahir Dar, Ethiopia
[3]College of Natural and Computational Sciences, Addis Ababa University, Addis Ababa, Ethiopia

Corresponding author:
Yimenu Adane, Water and Health Division, Ethiopian Institute of Water Resources, Addis Ababa University, P.O. Box 1176, Addis Ababa 1000, Ethiopia.
Email: yadane2011@gmail.com

Plain language summary

Menstrual hygiene management practices among schoolgirls

Menstruation poses challenges for schoolgirls in resource-limited settings. Cultural norms, lack of proper infrastructure, limited access to affordable products, and insufficient education hinder the practice of proper menstrual hygiene practices. These challenges can lead to health risks, absenteeism, and decreased academic performance. For instance, in the Oromia region, only 35% of the schoolgirls used sanitary pads, while in the Amhara region, 44.9%–33% used sanitary pads. A school-based analytical cross-sectional study was conducted in Bahir Dar City from March 2022 to August 2023 to evaluate the menstrual hygiene practices of schoolgirls and identify the factors that influence these practices in the schools of Bahir Dar City, located in Northwest Ethiopia. The mean age of schoolgirls was 16.82 years (SD = ±1.60), and the age of 8 years was the first menarche experience in 7 (1%) schoolgirls. The overall practices showed that 375 (53.50%) schoolgirls exercised good MHM, and the remaining 326 (46.50%) exercised poor MHM. The study revealed that schoolgirls whose mothers' and fathers' had a college education and above, older schoolgirls, schoolgirls with parents working in private, those attending schools with basic water and sanitation facilities, and those who openly discussed menstruation with their sisters and friends tended to have better MHM practices. Parental education levels, WASH facilities, and schoolgirls' residence areas have been identified as factors affecting schoolgirls' menstrual hygiene practices. The identified modifiable factors are the areas of intervention to increase proper menstrual hygiene practices. Concerned bodies should create a supportive and safe environment to help schoolgirls manage their monthly menstruation safely and comfortably.

Keywords

Bahir Dar City administration, menstrual hygiene management, Northwestern Ethiopia, schoolgirls, water, sanitation and hygiene

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Introduction

Menstruation is a natural process, but it is still stigmatized and associated with dirtiness and uncleanliness.[1] About 1.8 billion girls, women, and gender non-binary persons menstruate globally[2]; millions of menstruators worldwide are unable to manage menstruation every month in a dignified and healthy manner. Approximately 335 million females Worldwide attend schools where they do not have access to water or soap.[3] From these numbers, over half of the schoolgirls were unable to access proper menstrual hygiene management (MHM) facilities for good MHM practices.[4] As a result, more than a quarter of the schoolgirls stay home from school during their monthly period due to a lack of adequate absorbent materials and cultural restrictions.[5]

In many parts of developing countries like Ethiopia, schoolgirls have faced several challenges in maintaining the recommended MHM practices.[6] The challenges are linked to cultural and social norms that hinder-free discussion with their families and school communities, inadequate access to comprehensive menstrual health education, limited access to affordable and hygienic products, insufficient water supply, sanitation, and hygiene (WASH) infrastructure, gender inequality, and discrimination.[7–9] Poor MHM practices have an impact on "dignity, well-being, school attendance, and academic performance, resulting in school dropout and health problems."[10]

According to studies conducted in the urban slum of Madhya Pradesh, India, more than 50% of schoolgirls miss their classes during their menstrual periods.[11] The main reason behind this is poor MHM practices in schools, which lead to fear, shame, stress, and humiliation among schoolgirls. This, in turn, results in poor academic performance.

Additionally, studies indicate that in most developing countries, more than 50% of girls practice poor MHM, with the majority of them coming from rural areas.[12] In Ethiopia, almost all adolescents (96.9%) were engaged in very poor menstrual management,[12] and studies conducted in different areas of Ethiopia revealed that the recommended MHM practices among schoolgirls was low and varied significantly. For instance, in the Oromia region, only 35% of the schoolgirls used sanitary pads.[13] In the Amhara region, 44.9%–33% of schoolgirls used sanitary pads.[14,15]

Moreover, other studies indicated that mothers' and fathers' education level,[16] water supply, and sanitation facilities,[17] schoolgirls, age,[18] and schoolgirls' residence area,[19] parents' occupational status,[20] and open discussion on menstruation and MHM before and after attaining menarche with sisters and schoolgirl friends[21] were factors associated with good MHM practices.

Studies on the practices of schoolgirls on MHM and its influence on girls' education, health, and daily lives are limited and scarce in Ethiopia, particularly in Bahir Dar city administration. Access to water, sanitation, sanitary

pads, and information for proper implementation of MHM in schools of Bahir Dar city administration is the lowest, and existing sociocultural beliefs are the center of the challenge they face daily. Thus, this study aimed to evaluate the MHM practices of schoolgirls and identify the factors that influence these practices in the resource-limited settings of Bahir Dar City, located in Northwest Ethiopia.

Methodology

Study setting

The study was conducted in Bahir Dar city administration, the capital city of Amhara regional state. It is located at 11°14′60.00″ N, 37°09′60.00″ E, and found at 565 km in the northwest direction of Addis Ababa, Ethiopia. The city has six sub-city administrations and 38 kebeles, the lowest administration levels. The study site was primary and secondary schools in urban and satellite-urban kebeles. The study population comprised 705 schoolgirls registered in the 2021–2022 academic year. Conducting this study in such poor settings is important because most schools in study areas often lack adequate and safe WASH facilities, challenged with persistent sociocultural behaviors linked with menstruation, and inaccessibility to menstrual absorbent products have impacts on schoolgirls' health, education, and well-being. This study helps to identify gaps, inform policies, promote equality, and empower schoolgirls.

Study design

This school-based analytical cross-sectional study was conducted among schoolgirls. It used a self-administered questionnaire and an observational survey. The study design allowed participants access, supported the collection of numerical data, maintained consistency, was cost-effective, and ensured the privacy of schoolgirls for this sensitive topic. By combining observational and quantitative methods, the study provided a comprehensive understanding of MHM in schools. Observational studies on WASH facilities have complimented the self-reported data.

The study involved schoolgirls aged 11–25 who had menstruated at least twice and consented to participate after being informed of the study's objectives and expressing interest. Schoolgirls who had not started menstruating or had started menstruating but were unwilling to participate or were absent from school during the data collection days were not included in the study. To determine the number of schoolgirls to be included in the study, the sample size was calculated from the known (finite) population formula.[22,23]

To have an adequate sample size, the proportion of the desired outcome (p) was used to be 50% since there was no prior national or local data on MHM practice among schoolgirls in a similar setting. A non-response rate of 15% was anticipated, and based on this, the sample size (n) was calculated to be 705. The decision was made based on the representativeness of the sample size used in the study.

Study variables

In this study, the researchers examined the relationship between the MHM practices of schoolgirls (categorized as either good or poor) and several independent variables. The MHM practice was the dependent variable, while the independent variables included the age and residence of the schoolgirls, the education status and occupation of their parents, the school's WASH facilities, the age of menarche (onset of menstruation), and the extent of the open discussion on menstruation among schoolgirls, school communities, and families.

Data collection tools and procedures

A questionnaire was designed and developed to assess menstrual hygiene practices among schoolgirls. The questionnaire was self-administered and translated into the local Amharic language. It was developed based on a standardized questionnaire from previous studies of United Nations International Children's Fund (UNICEF) and EMORY-University, available at www.unicef.org/wash/schools. The JMP WASH monitoring tool core questions and indicators, available at https://washdata.org/sites/default/files/documents/reports/2018, were also used for observational assessment.[24] This combined approach provides a robust understanding of MHM practices in schools, balancing data obtained from self-administered questionnaires and observational surveys.

The questionnaire was used to collect information on sociodemographic, sociocultural factors, school WASH facilities, and MHM practices. The questionnaire covered demographic details, age at first menstruation, sociocultural behaviors related to menstruation, such as open discussions among schoolgirls, seeking behaviors of schoolgirls in accessing MHM facilities, types of menstrual absorbent materials used, and disposal practices of used absorbents. The study lasted a year and a half, from March 2022 to August 2023. This included data collection, compilation, clearing, and entry. A self-administered, pretested questionnaire in the local Amharic language was used to collect data from 701 schoolgirls in 10 schools in Bahir Dar city administration.

The researchers, along with school principals, gender club leaders, and health professionals, validated the questionnaire after providing them with training on the research tool. In addition to the self-administered survey, an observational survey of WASH facilities in 10 schools using the JMP WASH monitoring tool was conducted. The investigator and trained supervisors provided oversight and safety monitoring. The researchers

also followed the Strengthening the Reporting of Observational Studies in Epidemiology guideline during the preparation of article.[24]

Statistical analysis

All individual answers were summed up for total scores and calculated for mean value. The sum score of MHM practice was calculated to be between 29 and 48, with a range of 19. The mean value was calculated, and the mean score of 39.64 was designated as the cut-off point. The questionnaire used to collect data for this research has been coded into a format suitable for entering data into Statistical Package for the Social Sciences version 27.0 (SPSS Version, 27). A preliminary analysis was performed to identify potential outliers and anomalous results. Based on the preliminary analysis, data cleaning was performed. Descriptive and inferential statistical analysis methods were employed to analyze the data. The descriptive statistics were presented using frequencies, percentages, means, standard deviations, and charts, while a binary logistic regression model was used to conclude MHM practices.

Schoolgirls were asked 12 questions to assess their practice on MHM, with each question having two to seven alternatives. The responses from each schoolgirl were aggregated to classify the MHM practice as good or poor. The schoolgirl's MHM practice was considered good when the mean score was 39.641 or higher and poor when it was below 39.641. A similar classification method was used in other studies made in Ethiopia.[14,18]

Operational definitions

JMP: Joint monitoring program.

Kebele: The lowest level of local government structure with limited autonomy.

MHM practice: These are the actions and behaviors that schoolgirls adopt to manage their menstruation safely and with dignity. The schoolgirl's MHM practice was considered good when the mean score was 39.641 or higher and poor when it was below 39.641.

MHM: It is the process of managing menstrual blood produced during menstruation by schoolgirls and women until perimenopause. The UNICEF and World Health Organization definition highlights "clean menstrual management material to absorb or collect menstrual blood" and the need for these to be "changed in privacy as often as necessary" "during a menstrual period as well as privacy and access to" "soap and water for washing the body as required," and "access to facilities to dispose of used menstrual management materials."

Menstruation: It is the regular discharge of blood and mucosal tissue from the inner lining of the uterus through the vagina.

Primary school: According to the Ministry of Education Ethiopia, it consists of six grades in primary level (Grades 1–6) and two grades in Middle-level education (Grades 7–8).

Table 1. Sociodemographic characteristics of schoolgirls and families in schools of Bahir Dar city administration ($n = 701$).

Variables	Categories	Frequency	%
Age in years	11–18	306	43.70
	19–25	395	56.30
	Mean (±SD)	16.80 (±1.60)	
Residence	Satellite-urban	288	41.10
	Urban	413	58.90
Mothers' education	Not read and write	209	29.80
	Regular education (primary and secondary)	284	40.50
	Higher education (diploma and above)	208	29.70
Fathers' education	Not read and write	197	28.10
	Regular education (primary and secondary)	272	38.80
	Higher education (diploma and above)	232	33.10
The occupation of the parents	Farmer	197	28.10
	Government employees	292	41.70
	Private work	212	30.20
MHM practice level	Good	375	53.50
	Poor	326	46.50

Satellite-urban: They are smaller cities/municipalities/ located around the Bahir Dar City Administration.

Secondary school: According to the Ministry of Education Ethiopia, Secondary education covers from Grade 9 to 12.

WASH sector offices: Stands for Water, Education, and Health offices.

WASH: Water supply, sanitation, and hygiene.

Results

Sociodemographic characteristics of schoolgirls and families in schools of Bahir Dar City

Out of 705 study subjects, 701 (99.43%) schoolgirls participated in all MHM practice questions. The majority of the participant schoolgirls, 395 (56.30%) were aged 19–25 years, with the age of study participants ranging from 11 to 25 years and a mean age of 16.82 years (SD = ±1.60). In the study area, some schoolgirls started menarche at 8 years, and the mean age of menarche was 13.86 years (SD ± 1.46). Overall, 413 (58.90%) were residing in urban settings, and 288 (41.10%) schoolgirls were from satellite-urban areas (Table 1).

Societal behaviors and open discussion toward MHM among schoolgirls

The finding of this study showed that 170 (24.30%) of the participants responded that deep-rooted cultural and religious

beliefs in their society hinder the proper management of menstruation. Additionally, 152 (21.70%) of them stated that there is societal resistance to changing existing behaviors toward menstruation, while 149 (21.30%) of them pointed out that lack of education on MHM is due to taboos in their societies. A small number of respondents, 20 (2.9%), reported that their society considers menstruation dirty and polluting.

The study examined the schoolgirls' discussions on MHM within their families and school communities. Out of the total 701 schoolgirls surveyed, 292 (41.70%) openly discussed MHM with their mothers, 233 (33.20%) with their sisters, and about 176 (25.10%) discussed it with their fathers. In addition, 270 (38.50%) of the participants openly discussed MHM issues with the gender club leaders, and 249 (35.50%) had open discussions with their schoolgirl friends.

WASH services in school settings and the preferences of schoolgirls when WASH facilities are inadequate to manage menstruation

The study assessed the condition of school WASH facilities using the JMP service ladder tool. The observational study found that 332 (47.40%), 250 (35.70%), and 119 (17%) schoolgirls attended schools with limited, basic, and no water supply services, respectively. Out of all the schoolgirls, 407 (58.10%), 157 (22.40%), and 137 (19.50%) attended schools with basic, no service, and limited sanitation services, respectively. However, none of the schoolgirls attended schools with basic hygiene services.

When school WASH facilities are inadequate or inaccessible, 48.10% of schoolgirls reported that they only manage their menstruation at home, about 27.50% use only one sanitary pad for the entire day without changing and washing, 8.00% use bush areas, and 4.30% stay at home until the end of the period.

MHM practice level and associated factors

The study found that 408 (58.20%) of participants dispose of used menstrual absorbent products in the garbage, while 246 (35.10%) of them dispose of them in the pit latrine. Additionally, 360 (51.40%) store menstruation products inside the house, and 157 (22.40%) store it away from visibility from people. Overall, about 53.50% of schoolgirls have good MHM practice levels, while 46.50% have poor MHM practice levels (Table 1).

Schoolgirls of older age were 19.69 times more likely to have good MHM practices (AOR = 19.69, 95% CI: 10.18–38.07) than younger schoolgirls. Additionally, schoolgirls living in urban settings were 6.43 times more likely to have good MHM practices (AOR = 6.43, 95% CI: 3.52–11.73) than those living in satellite-urban settings.

Furthermore, schoolgirls whose mothers had a diploma or higher education were more likely to have good MHM practices (AOR = 26.29, 95% CI: 11.69–59.12) than those whose mothers could not read and write. Similarly, schoolgirls whose fathers had attained a diploma or higher education were significantly more inclined to demonstrate good MHM practices (AOR = 19.21, 95% CI: 8.51–43.32) compared to those whose fathers could not read and write. Schoolgirls who had open discussions with sisters and schoolgirl friends were 27.01 times more likely to have good MHM practice (AOR = 27.01, 95% CI: 11.45–63.73).

Additionally, schoolgirls who attended schools with basic water and sanitation services were 14.62 and 21.02 times more likely to have good MHM practices (AOR = 14.62, 95% CI: 5.12–41.73; AOR = 21.02, 95% CI: 7.87–56.15) compared to those attending schools with no water and sanitation services, respectively (Table 2). Furthermore, the predictor variables in the regression model explained 56.90% of the variance in the outcome variable, that is, MHM practices.

Discussion

In this study, the menstrual hygiene practices of schoolgirls was assessed, and the factors that influence these practices in the schools of Bahir Dar City, located in Northwest Ethiopia, were identified. The study considered sociodemographic factors such as the mothers' and fathers' education status, the age of the schoolgirls and age at menarche, the parents' occupation, the schoolgirls' place of residence, as well as sociocultural factors such as discussing menstruation and MHM with family members and school communities, and WASH factors including water and sanitation facilities at basic service levels.

The results of the study showed that good MHM practices among schoolgirls were above average at 53.50%. The MHM practice level in this study was higher compared to a similar study done in Ethiopia, such as in Bahir Dar (24.50%),[15] Ambo (46.70%),[25] Harari region (44.20%),[19] Southern Ethiopia (39.70%),[20] Western Ethiopia (43.10%),[26] Holeta (34.70%),[21] Indonesia (52.30%),[27] Buraidah City, Pakistan (39.50%),[28] and it is comparable with the findings in North-eastern Ethiopia (52.90%),[26] but lower than the findings reported in Addis Ababa (75%),[6] in Northeast Ethiopia (62.40%),[29] and in Harare (58.30%)[27] in the Savannah Region of Ghana (84.90%),[30] and rural Northern Ghana (61.40%).[31]

The observed differences in MHM practices could be due to a combination of factors, such as sociocultural norms and beliefs, inadequate knowledge and awareness before menarche, inadequate WASH facilities, limited access to menstrual absorbent materials, and lack of support. In the study area, some schoolgirls experienced menarche at the age of 8 years; this was lower than the age of menarche reported in Sawla town, south Ethiopia (10 years),[32] Eastern Ethiopia (9 years),[3] and Nepal (10–13 years).[33]

Table 2. Factors associated with MHM practice levels.

Variables	Categories	COR			AOR		
		Exp (B)	95% CI		Exp(B)	95% CI	
			Lower	Upper		Lower	Upper
Residence of the schoolgirls	Satellite-urban						1
	Urban	2.82	2.07	3.85	6.43	3.52	11.73*
Grade level of schoolgirls	7						
	8	3.29	1.38	7.82			
	9	3.59	1.68	7.67			
	10	8.1	3.72	17.65			
	11	20.31	9.00	45.82			
Age of the schoolgirls	11–18						1
	19–25	2.96	2.17	4.04	19.69	10.18	38.07*
Mothers' education	Not read and write						
	Regular education (primary and above)	1.77	1.23	2.55	3,69	1.89	7.18
	Higher education (diploma and above)	5.25	3.44	8.00	26.29	11.69	59.12*
Fathers' education	Not read and write						1
	Regular education (primary and above)	1.95	1.34	2.84	2.79	1.37	5.67
	Higher education (diploma and above)	4.37	2.91	6.57	19.21	8.51	43.32*
The occupation of the parents	Farmer						1
	Government employed	1.57	1.09	2.26	3.16	1.61	6.19
	Private work	2.45	1.65	3.66	15.58	6.99	34.73*
Water service ladder	No service						
	Limited service	6.3	3.82	10.39	2.89	0.95	8.76
	Basic service	5.64	3.38	9.44	14.62	5.12	41.73*
Sanitation service ladder	No service						1
	Limited service	1.52	0.94	2.46	8.6	3.00	24.61
Hygiene service ladder	Basic service	4.34	2.92	6.45	21.02	7.87	56.15*
	No service						1
	Limited service	3.12	2.26	4.33	6.65	2.04	21.72
Open discussion on MHM with family members	Father						1
	Mother	1.29	0.88	1.87	5.55	2.74	11.24*
	Sister	1.79	1.21	2.67	27.01	11.45	63.73*
Open discussion on MHM with school communities	Female teacher						1
	Gender club leaders	1.52	1.04	2.22	4.98	2.49	9.96*
	Schoolgirl-friends	2.42	1.63	3.58	18.67	8.45	41.24*

1 reference category. Cox and Snell $R^2 = 0.749$.
COR: crude odds ratio; 95% CI: 95% confidence interval; aOR: adjusted odds ratio.
*Significant at $p < 0.05$.

The mean age of menarche in this study was 13.86 ± 1.46, which was almost similar to studies in Addis Ababa (13.75 ± 1.30),[34] Gauteng, South Africa (13.36),[10] Taraba state, Nigeria (13.70),[35] and India (13.70).[36] It is noted that the age of menarche has declined over the past decade,[37] possibly due to environmental factors such as socioeconomic conditions, nutrition, genetics, and access to healthcare facilities, as well as physical and psychological problems.[38,39] Changes in living styles, living areas, diet, and psychological problems may be associated with changes in the age of menarche.

For instance, in Nigeria, schoolgirls living in urban settings experienced menarche 0.2 years earlier than schoolgirls living in rural settings.[38] The period of adolescence is of particular concern because, in resource-limited settings of schools, such as study areas, myths, taboos, and sociocultural restrictions create barriers for schoolgirls to acquire accurate information on MHM.[39] Open discussion about menstruation is a milestone for proper MHM and to break the taboo and stigma surrounding it. It is important to understand the naturalness of the menstruation process, the vital necessity of menstruation for the survival of the species, the value of women's bodies, and the need for care.

The study found that sociocultural behaviors, such as deeply rooted cultural and religious practices, as well as resistance to changing existing attitudes toward menstruation, hinder open discussions within families and school communities. These discussions are important for providing schoolgirls with the necessary knowledge about menstruation. In the study area, schoolgirls primarily received

information about menstruation and MHM from their sisters and mothers at home and from their schoolgirl friends, schoolteachers, and gender club leaders at school. In this study, less than half of the respondents reported having discussions about menstruation and MHM with their mothers before menarche.

However, in other studies conducted in the remote rural highlands of Eastern Indonesia, more than half of respondents were discussing their first period with their mothers,[40] and the finding was similar to the study made in the rural Tigray region, Ethiopia.[41] This similarity could be due to the schoolgirls' strong relationships with their sisters, mothers, and friends and the female teachers who led the Gender clubs in all the schools surveyed. It is important to note that for schoolgirls to confidently and comfortably manage their monthly menstruation and make informed decisions about MHM, they need accurate information about menstruation and MHM.[34]

The study revealed that MHM practice was significantly associated with the educational status of both mothers and fathers. A similar association was reported in other studies.[3,4,42] This might be that parents with higher education could have good incomes,[4] and somehow, schoolgirls could have a good relationship with their parents. Mothers with better education status are also a source of information about menstruation, probably because they are closest to their daughters and have lived the experiences of menarche and menstruation.[41,43,44]

The prevalence of good MHM practice was associated with the schoolgirls residing in urban settings rather than those in satellite areas.[45] The significant differences in MHM practices among schoolgirls between urban and satellite areas were also indicated in other studies conducted in different countries.[45–47] The study also showed a notable difference in MHM practices between urban and satellite areas. One possible explanation for this variation is that schoolgirls residing in satellite areas may share similar sociodemographic characteristics with rural areas.

Additionally, urban settings tend to have better accessibility to menstrual-absorbent materials, which contribute to more effective MHM practices. Another factor influencing the urban–rural disparity is the exposure of urban schoolgirls to media and their likelihood of engaging in open discussions with parents regarding menstruation. This creates a supportive environment that facilitates acquiring knowledge and pre-information about menstrual hygiene. In contrast, schoolgirls in rural areas may face challenges in accessing such resources and opportunities.

Furthermore, the presence of basic water supply and sanitation services within schools significantly affects MHM practices. Schoolgirls attending institutions with adequate water and sanitation facilities are more likely to maintain good MHM practices compared to those without such services. In areas where school WASH facilities are inadequate or inaccessible, schoolgirls tend to adopt different approaches to managing menstruation within the school setting. Most prefer to manage it at home, while others use one sanitary product for the whole day. Similar research conducted in other studies reported a lack of WASH facilities and a lack of hygienic products.[6,7,48] As a result of this, schoolgirls designed their method of management. For example, girls often prefer to use proxy materials such as mud, leaves, or animal skins to try to absorb the menstrual flow.[48]

These findings highlight the importance of addressing the urban–rural (urban–satellite) disparities in MHM practices. It is crucial to improve accessibility to menstrual absorbent materials, provide comprehensive MHM education, promote open discussion, and ensure the availability of basic water and sanitation services in schools. By doing so, it is possible to create a more equitable environment that supports all schoolgirls in practicing proper MHM.

Other studies suggested that using unclean latrines and not washing hands with soap before touching genitals, as well as washing genitalia only once per day during menses, was significantly associated with reproductive tract infections. Hence, many observational studies have described how MHM barriers in school impact schoolgirls' dignity, well-being, and engagement in school activities.[49]

To ensure regular school attendance and participation, schoolgirls require a supportive environment for MHM in schools.[50] The absence of adequate WASH facilities, coupled with the shame and fear of exposing their menstruation, means that schoolgirls in many resource-poor settings, like in study areas, who are already disadvantaged by social norms, miss a quarter of their education opportunities.[51] Improper MHM practices would impact school attendance, academic performance, and quality of education, resulting in psychological and health problems and increased dropout rates.[52]

This study revealed that parental educational levels, the parents' occupation, water and sanitation facilities, and open discussions with sisters and school girlfriends were predictors of good MHM practices. There should be an immediate necessity for early communication, discussion, and sensitization of schoolgirls within families and school communities as early as 7–11 years of age, and efforts should be made by concerned bodies to create a supportive and safe environment to help schoolgirls manage their monthly menstruation safely and comfortably.

Recommendations

The findings emphasize the importance of advocating for the effective implementation of proper MHM practices in schools. Addressing the current gaps and ensuring that schoolgirls receive the necessary support and guidance to adopt appropriate MHM practices is crucial. To accomplish this, practical approaches that help them build confidence and overcome the barriers associated with inadequate MHM are essential. Effective communication strategies are also important to support this process. In particular,

1. To reduce stigma and taboos related to sociocultural behaviors, comprehensive awareness creation and menstrual health education should be implemented through the school curriculum for both girls and boys.
2. It is crucial to openly discuss the topic, educate communities, and engage health extension workers and community leaders to break the silence on MHM.
3. School management should be advised to take responsibility for establishing, operating, and maintaining school WASH facilities in a timely manner.
4. WASH sector offices should prioritize integrating MHM in their annual work plan and advocate for policies that support MHM in schools, including funding for WASH facilities.
5. Older schoolgirls practicing proper MHM should be delegated the responsibility to teach others.
6. Good communication is crucial in empowering schoolgirls by giving them the knowledge and skills they need to handle the challenges related to MHM. By encouraging open and informative discussions, it is possible to break the taboos and misconceptions surrounding menstruation, ultimately creating an environment where schoolgirls feel at ease and self-assured in managing their menstrual health.

Strengths and limitations of the study

The research employed self-administered and observational studies with a suitable sample size. This methodology ensured a comprehensive examination of MHM practices among schoolgirls. Using such research methods, the study collected a wide range of information and validated its findings through comparison.

It is important to note that the study focused on schoolgirls in grades 7–11, potentially overlooking younger girls in lower grades who have recently started menstruating. As the study used self-administered questions, schoolgirls may have limited skills to understand and accurately respond to the questions. The subject of menstruation is taboo in the study area, so they may feel uncomfortable answering the questions. Additionally, girls may have difficulty recalling specific details about MHM practices. The self-administered questions may not capture the full context of the MHM practices.

Conclusion

Over half of the schoolgirls in Bahir Dar City, Ethiopia, practice good MHM. Older age, urban residence, higher parental education levels, and better school WASH facilities positively influence good MHM practices and are independent predictors of menstrual hygiene practices in schools of Bahir Dar City Administration. Sociocultural beliefs about menstruation, inadequate school WASH facilities, low parental education level, and parents' occupations being farmers make it difficult to practice good MHM.

There is a need to provide safe and adequate MHM facilities like WASH and absorbent materials. Additionally, safe and private MHM rooms are needed to ensure girls' privacy, safety, and comfort during their period. Community awareness initiatives are required to address misconceptions and stigma around menstruation. Health extension workers in the outreach programs are advised to raise awareness about proper MHM practices in families and communities, similar to what they do in family health programs.

Generally, school management, WASH sector offices, partners working on WASH, and families should make efforts to create a supportive and safe environment to help schoolgirls manage their monthly menstruation safely and comfortably.

Declarations

Ethics approval and consent to participate

The study was carried out under consideration of the Helsinki Declaration of Medical Research Ethics.[53] Ethical clearance was obtained from the Research Ethics Committee of the Ministry of Education (Ref. No. 712-219/m259/35). Data were collected after obtaining written consent from schoolgirls above 18 years old. For those below 18 years, permission was sought from the school administration, and a form was given to the school principal to be signed. Before administering the questionnaire, schoolgirls under 18 who participated in the study were informed about the research and their right to choose whether to participate or not. Parents or guardians were contacted through the school principals and gender club leaders, who explained the study and distributed information sheets and consent forms to their students to take home and inform their parents or guardians. Consequently, consent was obtained from the families or guardians of girls below 18 years of age. Furthermore, the school's consent was obtained before administering the questionnaire to the schoolgirls.

Consent for publication

Not applicable.

Author contribution(s)

Yimenu Adane: Conceptualization; Investigation; Writing – original draft; Methodology; Validation; Visualization; Writing – review & editing; Formal analysis; Project administration; Data curation.
Argaw Ambelu: Conceptualization; Methodology; Investigation; Validation; Supervision; Writing – review & editing.
Muluken Azage Yenesew: Conceptualization; Methodology; Validation; Supervision.
Yalemtsehay Mekonnen: Writing – review & editing; Conceptualization; Supervision; Methodology.

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Availability of data and materials

All data generated or analyzed during this study were included in this article, and its supplemental information files are in the hands of the corresponding author. They can be accessed without undue reservation upon your request for non-commercial purposes.

ORCID iDs

Yimenu Adane https://orcid.org/0009-0003-6786-3484
Muluken Azage Yenesew https://orcid.org/0000-0003-3222-0158

Supplemental material

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