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Safe Menstrual Hygiene Management Practices and Associated Factors among Secondary School Female Students in Northern Ethiopia: A Cross-sectional Study

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ABSTRACT

Background & aim: Many women worldwide face challenges in managing menstrual hygiene due to inadequate facilities, high costs, and misinformation, which can increase the risk of health complications. Evidence regarding safe menstrual management practices among secondary school students in northern Ethiopia remains limited. This study aimed to assess menstrual hygiene management practices and their associated factors among secondary school female students in Northern Ethiopia.

Methods: A cross-sectional study was carried out among 834 female secondary school students from April 1 to 30, 2022, who were selected using a multistage random sampling. Data were collected using a self-administered questionnaire. The data were entered into EpiData version 3.1 and analyzed using SPSS version 26. Both bivariate and multivariable logistic regression analyses were performed.

Results: This study revealed that the proportion of students practicing safe menstrual management was 46.6% (95% CI: 43.2–50.0). Age at menarche (AOR = 6.4, 95% CI: 1.0–13.6), prior information before menarche (AOR = 3.0, 95% CI: 2.2–4.2), having pocket money (AOR = 2.6, 95% CI: 1.9–3.6), comfort with the school environment (AOR = 2.0, 95% CI: 1.5–2.8), and knowledge of menstrual management (AOR = 1.9, 95% CI: 1.1–3.1) were factors associated with safe menstrual hygiene practices.

Conclusion: More than half of the participants did not practice safe menstrual hygiene management. Hence, awareness about menstrual hygiene management should be enhanced among female students to improve safe hygiene practices.

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Introduction

Menstruation is a universal phenomenon unique to sexually mature females of reproductive age (1-2). The onset of menstruation represents a landmark event in female pubertal development, yet it is still considered unclean or impure in some societies (3-4). The onset of menstruation (menarche) represents not only **a** physiological event but also a psychological, social, and behavioral transition into womanhood (4).

The joint monitoring program of the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) defines menstrual hygiene management as the use of clean menstrual management materials by girls and women to absorb or collect menstrual blood, which can be changed in privacy as often as necessary during menstruation, along with the use of soap and water for washing the body as

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needed and access to facilities for disposing of used menstrual materials (2,4).

According to the 2024 WHO/UNICEF report, only 39% of schools worldwide provide menstrual health education, and fewer than one-third (31%) have menstrual waste bins in girls' toilets, highlighting persistent global gaps in menstrual health and hygiene support. This results in the use of unclean materials, which exposes young students and women to the risk of infection and other serious health consequences (5).

Developing countries, particularly Sub-Saharan Africa (SSA), host one of the world's fastest-growing populations of teenage girls, most of whom will begin menstruating (6). Moreover, 26% of the female population is of reproductive age and experiences menstruation monthly (7-8).

Safe menstrual hygiene management practices among girls and women are critical, as they significantly contribute to the achievement of multiple Sustainable Development Goals (SDGs) contained in the United Nations resolution (UNR), specifically Goal 4, which aims to ensure equitable and inclusive education while promoting ongoing learning access for all, and Goal 5, which aims to strive to achieve empowerment and gender equality for all women and girls (9-10).

Thus, safe menstrual hygiene management practices, such as the use of clean sanitary pads, are important reproductive health issues for women, especially in-school adolescents, and are significant for the holistic development of females, including promoting healthy lives, equitable education, gender equality and empowerment, and enhancing girls' confidence in many aspects (10-11).

Reproductive morbidity and mortality commonly affect the quality of women's lives, and millions of women in developing countries suffer from reproductive tract infections (RTIs) and their complications, which lead to pelvic inflammatory diseases, infertility, ectopic pregnancy, and death if left untreated, and are caused by poor safe menstrual hygiene management practices and other factors (8,10-11).

In India, 19% of girls with poor safe menstrual hygiene management practices reported reproductive tract infections and a history of excessive vaginal discharge, with or without lower back or abdominal pain (12). The prevalence of urinary tract infection is also significantly high (9.9%) in those girls using unsanitary pads during menstruation (10-11).

In Sub-Saharan African countries, including Ethiopia, between 39.5% and 70% of female students miss, on average 1 to 5 days of school each month because of menstruation-related difficulties, and those who attend during menstruation often experience low confidence and a diminished sense of dignity because of inadequate privacy and the lack of safe, clean toilets with washing facilities at schools, which are essential for safe menstrual hygiene management practices. They also reported a decline in their school performance after menarche (10,12–14).

Although several studies have examined menstrual hygiene practices in Ethiopia, the reported prevalence of safe menstrual hygiene management varies considerably across regions, ranging from 39.9% in Nekemte (13) to 80.6% in Addis Ababa (15), while evidence from northern Ethiopia remains limited. Furthermore, the factors associated with safe menstrual hygiene management have not been consistently identified across studies. Therefore, this study aimed to assess the prevalence of safe menstrual hygiene management practices and their associated determinants among female students attending secondary schools in Bahir Dar Town, Ethiopia, in 2022.

Materials and Methods

A cross-sectional study was conducted from April 1 to 30, 2022, among female secondary school students in Bahir Dar Town, the capital of the Amhara Regional State, located approximately 556 km northwest of Addis Ababa, Ethiopia. According to the 2017 Population Projection of Ethiopia, Bahir Dar had an estimated population of 227,165, of whom 113,694 were female and 113,471 were male (16). At the time of the study, the town had 11 secondary schools (7 public and 4 private) serving approximately 17, 651 secondary school students. The target population comprised all female students enrolled in these secondary schools. All female secondary school students who had attained menarche during the study

period were enrolled, while students who were absent from school or whose menarche had not yet occurred were excluded.

The sample size for the first objective was determined using the single population proportion formula, assuming a prevalence of 55.8% based on a previous study conducted in Ethiopia (17). A 95% confidence level, 5% margin of error, 10% non-response rate, and a design effect of 2 were considered, resulting in a sample size of 834 participants. The sample size for the second objective was calculated using Epi Info version 7 software based on factors associated with menstrual hygiene management practice identified in the same study (17). The calculation assumed a 95% confidence level, 80% power, and a 1:1 ratio of exposed to unexposed participants. The calculated sample sizes for the associated factors were 407, 572, and 737. Since the sample size calculated for the first objective (834) was larger than those calculated for the second objective, the final sample size for the study was set at 834 participants.

A multistage random sampling method was used. Schools, grades (9–12), and sections were selected by simple random sampling, with proportional allocation based on student enrollment. Eligible students were then systematically selected from class registers at intervals of 10 (K = 8022/834 ≈ 10), starting with a randomly chosen first participant, until the target sample of 834 was reached.

Data were collected using a standardized structured questionnaire, which was adapted from previous similar studies (10,12–14,17-18). The questionnaire consisted of socio-demographic characteristics, including age, ethnicity, religion, mother and father's educational status, mother and father's occupation, availability of pocket money, grade level, school type, and cohabitants. Students' knowledge of menstruation and menstrual hygiene was assessed using seven questions. Each correct response was assigned a score of 1, while an incorrect response was assigned a score of 0. Scores≥5 points were classified as having good knowledge, while those scoring <5 points were classified as having poor knowledge (13-14,19).

Safe menstrual hygiene management practices were assessed using 11 practice-related questions. Each correct practice response was scored as 1, and an incorrect response was scored as 0. Those students who scored < 6 were considered to have poor menstrual hygiene practice, while those students who scored ≥ 6 were considered to have good menstrual hygiene practice, as similarly described in the previous study (17–20).

The content validity of the questionnaire was assessed using the Content Validity Index (CVI) and Content Validity Ratio (CVR) by a panel of experts. The internal consistency of the knowledge and practice assessment items was evaluated using Cronbach's alpha. The reliability test showed Cronbach's alpha values of 0.874 for the knowledge questions and 0.889 for the menstrual hygiene management practice questions, indicating good internal consistency.

Before data collection, data collectors and supervisors received two days of training on the study objectives, data collection procedures, and ethical considerations. Data collectors were five trained midwives who collected the data under the supervision of three bachelor's-level midwives. The questionnaire was self-administered by the students, with close supervision by data collectors to ensure proper completion and to address any questions or uncertainties during the data collection process. Data collection was conducted during class-free periods within school hours. The questionnaire was initially prepared in English, translated into Amharic, and back-translated into English to ensure consistency.

Data were entered into EpiData version 3.1, then exported into SPSS version 26 for further analysis. Bivariate and multivariable logistic regression were employed to identify the association between outcome and predictor variables. The Explanatory variables with a P-value <0.2 in the bivariate analysis were candidates for the multivariable logistic regression model. Odds ratios (ORs), 95% confidence intervals (CIs), and P-values were computed. A variable with a P-value < 0.05 in the multivariable logistic regression analysis was considered a determinant factor for good menstrual hygiene management practice. The

final model goodness of fit was checked by the Hosmer-Lemeshow test with a p-value of 0.63. Multicollinearity was checked for interactions between explanatory variables through the variance inflation factor (VIF), which showed no collinearity. Finally, tables, graphs, and narration were used to present the data.

Results

All 834 participants were interviewed, yielding a 100% response rate. Regarding the socio-demographic characteristics of the respondents, more than half of the study participants, 434 (52.1%), were in the 17–19 year age group. Regarding their religion, nearly three out of four students, 614 (73.6%), were Orthodox (Table 1).

Table 1. Socio-demographic characteristics of female secondary school students in Bahir Dar town, 2022 (N=834)

Variables	Frequency (%)
Age	
14-16 years	227 (27.2)
17-19 years	434 (52.1)
>19 years	173 (20.7)
Ethnicity	
Amhara	688 (82.5)
Oromo	78 (9.4)
Tigray	52 (6.2)
Others	16 (1.9)
Religion	
Orthodox	614 (73.6)
Islam	157 (18.8)
Protestant	46 (5.5)
Catholic	20 (2.1)
Mother's educational attainment	
Cannot read and write	156 (18.7)
Can read and write	161 (19.7)
Complete primary education	107 (12.8)
Complete secondary education	156 (18.7)
Complete college and university	254 (30.5)
Father's educational attainment	
Cannot read and write	87 (10.4)
Can read and write	167 (20.0)
Complete primary education	108 (12.9)
Complete secondary education	188 (22.5)
Complete college and University	284 (34.1)
Father's occupation	
Private employee	299 (35.9)
Government employee	256 (30.7)
Merchants	227 (27.2)
Others (driver, daily laborer, farmer)	52 (6.2)
Mother's occupation	
Private employee	189 (22.7)
Government employee	145 (17.4)
Merchants	30 (3.6)
Housewife	382 (45.8)
Other (daily laborer, farmer)	88 (10.6)
Pocket money	
Yes	272 (32.6)
No	562 (67.4)
Grade	
Grade 9	228 (27.3)
Grade 10	249 (29.9)
Grade 11	167 (20.0)
Grade 12	190 (22.8)
School type	
Private	280 (33.6)
Governmental	554 (66.4)
Cohabitants	
Family	659 (79.1)
Relative	138 (16.5)
Other (alone, as servant)	37 (4.4)

The students' perceptions of the school environment for menstrual hygiene management indicated that 504 (60.4%) reported that their school environment was not comfortable or uncomfortable for managing menstruation. The reported reasons included the absence of water in the latrines (17.1%), insufficient water supply in the school (15.0%), latrines without doors (14.6%), and an insufficient number of latrines (7.0%). Additionally, 11.9% of the respondents reported more than one reason.

Regarding menstrual characteristics, 168 (20.1%) respondents experienced menarche before the age of 12 years, 565 (67.7%) between 12 and 15 years, 93 (11.2%) after the age of 15 years, and 8 (0.96%) could not recall their age at menarche. Furthermore, 553 (66.3%) respondents reported a menstrual duration of 3–5 days per cycle.

With respect to menstrual knowledge and communication, 731 (87.6%) students demonstrated good knowledge of menstruation and menstrual hygiene, while 523 (62.7%) had received information about menstruation before menarche. Although 210 (25.2%) respondents reported discussing menstruation and menstrual hygiene with their friends, 104

(12.5%) stated that they never discussed these topics (Table 2).

Table 2. Knowledge of menstruation and menstrual hygiene among female secondary school students in Bahir Dar, 2022(N=834)

Variables	Frequency (%)
School environment comfortability	
Comfortable	330(39.6 %)
Not comfortable	504 (60.4 %)
Age of menarche	
< 12 years	168 (20.1%)
12-15 years	565 (67.7%)
> 15 years	93 (11.2%)
Those who did not remember	8 (1.0%)
Information before menarche	
Yes	523 (62.7)
No	311 (37.3)
Menstruation discussion partner	
Mother	158 (18.9)
Father	51 (6.1)
Teacher	69 (8.3)
Sister	103 (12.4)
Friends	210 (25.2)
Others	139 (16.7)
Not at all	104 (12.5)
Interval between the menstrual cycles	
< 20 days	19 (2.3)
20 - 35 days	806 (96.6)
> 35 days	9 (1.1)
Menstrual bleeding duration	
<3days	17 (2.0)
3 - 7 days	723 (86.7)
>7 days	37 (4.4)
Don't know	57 (6.8)
Cause of menses	
Hormonal	533 (63.9)
Curse of GOD	227 (32.6)
Others	29 (3.5)
Source of bleeding during menstruation	
Uterus	784 (89.7)
Abdomen	41 (4.9)
Urinary Bladder	26 (3.1)
Others	19 (2.3)
Doing exercise during menses	
Yes	476 (57.1)
No	358 (42.9)
History of infection due to poor menstrual hygiene	
Yes	740 (88.7)
No	94 (11.3)
Knowledge of menstrual hygiene	
Good	731 (87.6)
Poor	103 (12.4)

According to menstrual hygiene management practice, six hundred eighty-seven (82.4%) of respondents were using commercially made sanitary pads, and 79 (9.5%) were using new cloth. The majority of the study participants, 644 (77.2%), disposed of their used sanitary pads in the latrine pit (Table 3). The overall proportion of students who practiced safe menstrual hygiene management was 46.6% (95% CI: 43.2%–50.0%).

Table 3. The Menstrual hygiene practice among female secondary school students in Bahir Dar Town, 2022 (n=834)

Variables	Frequency (%)
Types of materials used as menstrual absorbents	
Sanitary pads	687 (82.4)
New cloth	79 (9.5)
Old cloth	66 (7.9)
Others (soft paper)	2 (0.2)
Frequency of changing the pad per day	
Once	167 (20.0)
Two times	311 (37.3)
Three times	258 (30.9)
Four times	87 (10.4)
>four times	11 (1.3)
Change sanitary pads during the night (sleeping) time	
Yes	222 (26.6)
No	612 (73.4)
Reuse sanitary pad (N=147)	
Yes	100 (68.0)
No	47 (32.0)
Sanitary pad cleaning material (N=100)	
Water and soap	70 (70.0)
Only water	30 (30.0)
Method of drying reused pad (N=100)	
With direct sunlight	36 (36)
Without sunlight	64 (64.0)
Place of disposing of the used pad	
Latrine pit	644 (77.2)
Open space	190 (22.8)
Washing the external genitalia during menses	
Yes	733 (87.9)
No	101 (12.1)
Materials used for washing the genitalia (N=733)	
Water and soap	233 (31.8)
Only water	500 (68.2)
Bath during menstrual period	
Yes	518 (62.1)
No	316 (37.9)
Frequency of bathing per week	

Variables	Frequency (%)
Once	65 (12.5)
Two times	161 (31.1
Three times	147 (28.4)
Four times	85 (16.4)
>four times	60 (11.6)

The factors associated with menstrual hygiene management practice identified by multivariable logistic regression are presented in Table 4.

Bivariate analysis was done to assess the association between independent variables and menstrual hygiene management practice. Accordingly, variables with a p-value < 0.2 in bivariate analysis were the father's educational attainment, mother's educational attainment, father's occupation, mother's occupation, pocket money, grade of respondents, information about menses and its management before menarche, age at menarche, school environment comfort, and knowledge of respondents about menses and menstrual hygiene. Multiple logistic regression analysis showed that respondents who have pocket money were 2.6 times more likely to had good menstrual hygienic practice than those who did not have pocket money (AOR=2.6;95%CI:1.9,3.6), respondents who have information about menses and it's management before menarche were 3 times more likely to had good menstrual hygiene practice than those who did not have information about menses and it's management before menarche (AOR= 3.0; 95%CI: 2.2,4.2), respondents who felt comfortable school environment for menstrual hygiene were 2 times more likely to have good menstrual hygiene than respondents who felt uncomfortable school environment (AOR= 2.0; 95%CI:1.5, 2.8). The participants with good knowledge of menstruation were 1.9 times more likely to practice proper menstrual hygiene than those with poor knowledge (AOR= 1.9; 95%CI:1.1, 3.1). Those respondents who started menstruating after the age of 15 were 6.4 times more likely to practice good menstrual hygiene management compared to those who started menstruating before the age of 12 (AOR= 6.4;95%CI:3.0,13.6) (Table 4).

Table 4. Bivariate and multivariate logistic regression of factors associated with safe menstrual hygiene management practices among female secondary school students in Bahir Dar Town, 2022 (N=834)

Variable	Menstrual hygiene practice		COR 95% CI	P-Value	AOR 95% CI	P-Value
	Good	Poor				
Grade						
Nine	87	141	1		1	
Ten	121	128	1.5 (1.1, 2.2)		1.1 (0.7, 1.7)	
Eleven	85	82	1.7 (1.1, 2.5)	0.03	1.6 (1.0, 2.5)	0.061
Twelve	96	94	1.7 (1.1, 2.4)		1.2 (0.8, 1.9)	
Pocket money						
No	210	352	1		1	
Yes	179	93	3.2 (2.4, 4.4)	0.01	2.6 (1.9, 3.6)	0.001
Information before menarche						
No	192	331	1		1	
Yes	197	114	2.9 (2.2, 4.4)	0.001	3.0 (2.2, 4.2)	0.001
School environment						
Not comfortable	189	315	1		1	
Comfortable	200	130	2.6 (1.9, 3.4)	0.001	2 (1.5, 2.8)	< 0.001
Age at menarche						
<12	72	110	1			
12-15	246	319	1.2 (0.8, 1.7)		0.99 (0.7, 1.5)	
>15	68	11	9.4 (4.7, 19)	0.002	6.4 (3.0, 13.6)	0.001
Do not remember	3	5	0.9 (0.2, 3.9)		1.4 (0.3, 6.5)	
Knowledge of menstrual hygiene						
Poor	37	66	1		1	
Good	352	379	1.7 (1.1, 2.5)	0.021	1.9 (1.1, 3.1)	0.014

Variable	Menstrual hygiene practice		COR 95% CI	P-Value	AOR 95% CI	P-Value
	Good	Poor				
Father's education						
Informal	30	57	1		1	
Formal	359	388	1.8 (1.1, 2.8)	0.17	0.9 (0.5, 1.7)	0.767
Mother's education						
Informal	55	101	1		1	
Formal	334	344	1.8 (1.2, 2.6)	0.02	1.4 (0.9, 2.3)	0.170
Father's occupation						
Private employee	160	139	1		1	
Government employee	127	129	0.9 (0.6, 1.2)		1.1 (0.8, 1.7)	
Merchant	83	144	0.5 (0.3, 0.9)		0.8 (0.4, 1.8)	
Others (driver, daily laborer, farmer)	19	33	0.5 (0.4, 0.7)	0.001	0.9 (0.6, 1.4)	0.08
Mother's occupation						
Private employee	107	82	1		1	
Government employee	68	77	0.7 (0.4, 1.1)	0.078	0.6 (0.4, 1.1)	0.112
Merchant	10	20	0.4 (0.2, 0.9)	0.021	0.7 (0.3, 1.99)	0.065
Housewife	172	210	0.6 (0.4, 0.9)		0.7 (0.5, 1.1)	
Other (daily laborer, farmer)	32	56	0.4 (0.3, 0.7)		0.6 (0.3, 1.1)	

Keynotes: COR: Crude Odds Ratio; AOR: Adjusted Odds Ratio; CI: Confidence Interval; 1= reference

Discussion

The present study assessed the menstrual hygiene management practice and associated factors among female secondary school students. Concerning safe menstrual hygiene management practices, nearly one in two participants demonstrated good menstrual hygiene management practices. The presence of an information gap before menarche and knowledge of menstruation might be a possible explanation for this. Therefore, developing effective awareness and advocacy initiatives for female students to enhance their knowledge and safe menstrual hygiene practices during menstruation is required.

The proportion of students with good menstrual hygiene management practices was comparable to that reported in a study conducted in Saoner, Nagpur District, where 45.74% of respondents demonstrated good menstrual hygiene practices (21). However, the present study is higher than the studies conducted in Nekemete (39.9%)(13), Uganda (9.5%) (22), and Lebanon (10.5%) (23). This difference might be due to variations in participants' knowledge, social taboos, and cultural beliefs surrounding menstruation, which may negatively influence menstrual hygiene management practices. Harmful menstrual beliefs and restrictive practices have been reported as important barriers to effective menstrual management among girls and women(24). In contrast, these findings are lower compared to studies conducted in Addis Ababa, 80.6%(15), and Nepal, 72.5% (4). This variation may be due to disparities in the socio-demographic characteristics of the study populations, as well as differences in prior knowledge about menstruation and menstrual hygiene before menarche in those studies compared to the present study.

In this study, pocket money was positively associated with safe menstrual hygiene management practices. This agrees with a study conducted in western Ethiopia (3). This may be explained by the fact that girls who did not receive financial support from their parents and could not afford commercially made sanitary pads. These findings revealed that respondents who felt comfortable in a school environment for menstrual hygiene were more likely to have good menstrual hygiene practices than respondents who felt uncomfortable in a school environment. This finding is consistent with the study conducted in Central Ethiopia(11). The possible explanation might be that an

uncomfortable school environment prevents girls from changing their sanitary materials as well as from washing their genitalia at school, which negatively affects the practice of good menstrual hygiene (10,22).

Participants who had good knowledge of menstrual hygiene were more likely to have good menstrual hygiene practices than respondents who had poor knowledge about menstruation and its management. This result is similar to studies conducted in Gedeo Zone (1), Wegera (25), and a study in Boset district (18). The possible explanation is that respondents with poor knowledge about menstruation may not know how to manage it, and therefore do not maintain proper hygiene during menstruation (26,27).

Age at menarche was another factor associated with menstrual hygiene management practices. Respondents who started menses after the age of 15 years were more likely to have good menstrual hygiene practices than those who experienced their first menses before the age of 12 years. This is in line with the study conducted in Mekele (28). This might be explained as girls whose menarche occurs late can have better opportunities to share information, prepare for and adjust themselves for menstruation, and practice proper menstrual hygiene management than girls whose menarche occurs earlier (29).

In this study, participants who had information about menses and their management before menarche were more likely to have good menstrual hygiene practices than those who did not have such information about menses and their management before menarche. This result aligns with the study conducted in Ginbi Town (20). The possible explanation might be that a lack of prior information about menstruation may reduce girls' mental preparation to accept the change constructively; they may not know what to use and how to use sanitary materials and therefore may not properly manage their menses (27,30).

Based on the study findings, a substantial knowledge–practice gap was observed among high school female students. Although many students had adequate knowledge of menstrual hygiene management, this knowledge was not consistently translated into safe menstrual hygiene management practices. This finding is supported by a study conducted in Gedeo Zone (1), indicating that students are not managing their menstruation properly (31). In light of these results, all responsible bodies are encouraged to understand and take action on the determined factors to improve high school female students' knowledge of menstrual hygiene management (MHM). Enhanced knowledge of hygiene-related practices among girls and women is a crucial issue, as it significantly contributes to the achievement of several Sustainable Development Goals. Therefore, awareness creation and advocacy programs about menstrual hygiene for female students are required to improve their knowledge and promote safe menstrual hygiene practices during menstruation.

The strengths of this study include its multicenter design, relatively large sample size, random sampling, high response rate (100%), and the use of self-administered questionnaires, which helped to maintain the confidentiality and privacy of the respondents so that they could provide the required information comfortably, thereby minimizing social desirability bias. However, despite this minimization, social desirability bias might still exist due to the use of self-administered questionnaires, as respondents may prefer to report what is socially acceptable within the community rather than their actual experiences, since the issue is sensitive. There might also be recall bias since some questions required recalling, which could result in inaccurate information. This study did not include night-female students due to financial constraints that may affect the representativeness of the study. In addition, because of the cross-sectional design, causal relationships cannot be inferred.

Conclusion

These findings indicated that 53.4% of the study participants lacked safe menstrual hygiene management practices. Age at menarche, prior information before menarche, having pocket money, comfort with the school environment, and knowledge of menstrual management were found to be predictors of good menstrual hygiene practice.

The following recommendations are proposed for relevant stakeholders based on the

results. It is recommended that the regional government should emphasize the school environment to make it comfortable for female students by improving water accessibility, toilet accessibility, and privacy. Bahir Dar town school administrators should increase awareness by incorporating menstrual hygiene education in the school club program and designing health information and communication programs for awareness creation. The teachers should educate female students about menstruation in the early classes to improve their menstrual hygiene practice, create awareness about menses and their management, and better establish a support club for students who do not have pocket money. The mother/family must have the correct and appropriate information on menstrual hygiene to educate their daughters and provide economic support if needed.

Declerations

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Conflicts of interest

The authors declared no conflicts of interest.

Ethical considerations

The study was conducted following the ethical standards of the Declaration of Helsinki. An ethical letter was provided to the facility to obtain permission for data collection. The purpose of the study and participants' right to refuse were explained to the study participants, and informed written consent was obtained. Additionally, informed consent was gathered from parents or guardians of participants under 18 years old. Coding was implemented to remove respondents' names and other personal identifiers throughout the study to ensure participant confidentiality.

Code of Ethics

Ethical clearance was obtained from the Institutional Review Board (IRB) of Bahir Dar University, College of Medicine and Health Sciences (Ref. No: IRB/003/2022).

Use of Artificial Intelligence (AI)

We have not used any AI tools or technologies in the preparation of this manuscript.

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Authors' contribution

ABD, ZA, MA and SN contributed substantially to the conception and design of the study. ZA supervised and carried out the data collection process. ABD, MA and ZA analyzed and interpreted the data. MA and SN drafted the manuscript. TD, ZA, ABD and MA reviewed the manuscript critically for important intellectual content. All authors read and approved the final manuscript and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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