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The practice of menstrual hygiene management and associated factors among secondary school girls in eastern Ethiopia: The need for water, sanitation, and hygiene support

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Abstract

Background: During menstruation, school girls face obstacles connected to menstrual hygiene management in schools. Due to their monthly period, up to 20% of girls miss school globally, and one in ten will drop out entirely. Three hundred thirty-five million girls attended school without access to running water or soap. In Ethiopia, 67% of girls have no access to education on puberty and menstrual health; menstrual hygiene management continues to be one of the major problems among school girls. Thus, context-specific assessment of the practice may be useful in developing customized intervention approaches. Thus, the objective of the study was to assess practices of menstrual hygiene management and associated determinants among secondary school girls in East Hararghe, Ethiopia from 1 to 30 December 2020.

Methods: A school-based cross-sectional survey was undertaken with 486 randomly selected female students. Data were collected by pretested self-administered questionnaire. Descriptive statistical tests and multivariate logistic regression were used to describe the study variables and to examine the association. Statistical package for social science version 23 was used for data analysis, and a *p*-value of 0.05 was considered as a cut-off point for statistical significance.

Results: Of the total, 328 (68%) of the study participants practiced appropriate menstrual hygiene. Besides, 350 (72.6%) had a good level of understanding about menstrual hygiene. A higher level of knowledge (adjusted odds ratio = 2.12, 95% confidence interval = 1.28, 3.53), a greater wealth indexed family (adjusted odds ratio = 7.14, 95% confidence interval = 3.98, 12.88), earning permanent pocket money (adjusted odds ratio = 0.495, 95% confidence interval = 0.299, 0.821), and being in grade level (11–12) (adjusted odds ratio = 3.45, 95% confidence interval = 1.75, 4.501) were significant predictors of the good menstrual hygiene practice.

Conclusion: One-third of the school girls had poor menstrual hygiene practices which may affect their school performance and the reproductive health. Hence, tailored menstrual hygiene information should be given to school girls and parents. Besides, efforts ought to be made for the provision of affordable sanitary materials in schools.

Keywords

adolescent girl, menstrual knowledge, menstrual management, menstruation, practices of menstrual hygiene, sanitary, school

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Plain language summary: the practice of menstrual hygiene management among school girls

The health and education of school girls is a cornerstone of progress and a bridge to women's full involvement in the political, economic, and cultural realms of life. However, due to their monthly period, up to 20% of girls miss school internationally, and one in ten will drop out entirely. Worldwide, 335 million females attended schools where there was no access to water or soap. Moreover, it is projected that one out of every ten African school-aged females misses 4 days every 4 weeks due to menstruation accounting for school absenteeism. This is due to a serious challenge to a good menstrual hygiene management system. In Ethiopia, 67% of girls reported, they do not have access to knowledge about puberty and menstrual health. Hence, a school-based cross-sectional study was conducted from 1 to 30 December in eastern Ethiopia to analyze the practice of menstrual hygiene management and associated factors among teenage school girls to give evidence-based information. A total of 482 secondary school girls have participated. The mean age was 16.78 years with a standard deviation (SD) of +1.48 years. The age of 13 years was the first menarche experience in 108 (22.2%). Mothers in 172 (35.7%) of the respondents' cannot read and write as well as a housewife in the majority 267 (55.4%). Besides, 223 (46.3%) of their fathers were farmers and 313 (65.1%) of the respondents did not attain permanent pocket money. Among the study participants, 366 (75.9%) used menstruation absorbent during menstrual hygiene management (MHM). Of whom, 267 (73%) used commercially made sanitary pads and the rest 81 (22.1%) custom a homemade sanitary pad and 18 (4.9%) other methods such as underwear and sponge. Considering a habit of washing genital organs during menstruation, 87 (18%) did not wash at all in a day. The overall practice dictated, 154 (32%) exercised poor menstrual hygiene. The practice of good menstrual hygiene was more among school girls who were in the grade level of (11–12), had a high level of knowledge about menstrual hygiene, with families of higher wealth index category, having permanent pocket money and whose mother's with higher educational status. Hence, menstrual hygiene information should be maximized through school mass media, special education programs in the high school curriculum, and the public at large. Besides, schools should try for access and affordable sanitary materials with a conducive environment. This study addressed the issue of sensitive, personal, and cultural barriers to open communication. Although maximum effort has been made to minimize biases, there may be unavoidable socially desirable biases that may overestimate the practice.

Introduction

Globally, the female population approximately accounts for 52% with half of them of reproductive age.[1] In Ethiopia, 51% of the population is female and 23% of women are of reproductive age.[2–4] Menstruation is associated with a time of physiological change and a natural part of the reproductive cycle which starts at puberty for girls (normally between the ages of 9 and 14). However, it remains taboo and is rarely talked about in most cultures around the world. Young girls in both rural and urban areas often grow up with limited knowledge of menstruation due to a lack of open communication with mothers and adult women.[5,6] In general, knowledge about the physiological process associated with sexual maturity and biological facts as well as practices of managing menstruation is extremely limited in girls when they experience their period for the first time.[7,8]

Good menstrual hygiene management practices, such as the use of sanitary napkins and adequate washing of the genital areas with water and soaps, are required during the monthly flower period to boost confidence in day-to-day activities. Poor menstrual hygiene practices, however, create major challenges to managing with privacy and dignity due to a lack of or insufficient water supply and sanitation facilities in schools, health institutions, workplaces, prisons, public places, and in emergencies which may also increase susceptibility to reproductive health-related problems.[1,9] As a result, millions of women and girls' rights to services, as well as their right to dignity and gender equity, remain unfulfilled.[10] Accordingly, World Health Organization (WHO) has focused on menstrual hygiene management (MHM), believing that it can make a significant contribution to the achievement of several sustainable development goals (SDGs).[7,9]

Poor menstrual hygiene management in schools has been found to create anxiety and humiliation in adolescent girls, contributing to monthly absence and poor academic performance.[11,12] The health and education of school girls is a cornerstone of progress and a bridge to women's full involvement in the political, economic, and cultural realms of life. However, due to their monthly period, up to 20% of girls miss school internationally, and one in ten will drop out entirely. Worldwide, 335 million females attended schools where there was no access to water or soap. Furthermore, it is projected that one out of every ten African school-aged females misses 4 days every 4 weeks due to manustration related school absenteeism.[13] Similar interference on school attendance was reported from various studies in Africa, the Middle East, and Asia.[8,14,15]

Serious challenges to good MHM still exist in Ethiopia.[16,17] Girls do not always have access to knowledge about puberty and menstrual health,[18] with 67% of Ethiopian girls reporting that they do not receive any menstrual health instruction in school.[19] In rural areas,

almost 80% of women and girls use homemade alternatives, and only about a quarter of the population has access to improved sanitation in both rural and urban locations.[20,21] In addition, more than half of Ethiopian school girls[22] have the same difficulty. In light of this, menstruation is a topic that is often shrouded by numerous myths and misconceptions in Ethiopia.[23] According to several studies, school girls' primary source of information regarding menstruation is their mother,[24] who has insufficient and incorrect knowledge.[25–27] This might contribute to the poor practice of MHM[28] and disposal of used pads.[11,29–32]

International organizations and programs have been attempting to improve infrastructure as well as access to better sanitation and hygiene services to prevent these poor hygiene practices.[33,34] Focusing on schools was one of its dimensions, but it remained a barrier[17] in addressing gender equality and inclusive accessibility.[23,35] As a result, water, sanitation, and hygiene (WASH) in schools refer to a mix of technical and human development elements that are required to create a healthy school environment and establish proper health and hygiene behaviors.[36] Safe water supply, sanitation facilities, excellent hygiene practice, menstrual hygiene management, and solid and liquid waste management are among the minimal standards for school WASH programs.[37]

Nonetheless, because of financial position, personal preferences, local traditions and beliefs, geographic variation, natural resource diversity, and the presence or absence of interventional measures, the extent of menstrual hygiene management problems vary from place to place.[26,38–44] Consequently, area- or context-specific evaluations of MHM practice in Ethiopia, particularly among adolescent school girls, may be useful in developing customized approaches. As a result, in eastern Ethiopia, a school-based cross-sectional study was conducted to analyze the practice of menstrual hygiene management and associated factors among teenage school girls to provide evidence-based information.

Methods and materials

Study design, area, and period

A school-based cross-sectional study was conducted in a selected secondary school of Chelenko town, eastern Ethiopia from 1 to 30 December 2020. Chelenko town is located 305 km away from Addis Ababa. In the town, there was one secondary school and one district hospital. According to the 2007 Ethiopian census report, the woreda had a total population of 252,185 of which 124,874 were reproductive age women.[45] The woreda had a total population of 15,187 and 7099 of them were females. In the 2019/2020 academic year, the school had a total of 3011 students ranging from grade 9 to 12. Among those students, female students accounted for 1713.[46]

The study population was 9th- to 12th-grade school girls who were attending their education and had started menstruation at the time of data collection. Those students who were sick and absent from the school on the date of data collection were excluded from the study.

Sample size and sampling technique

The sample size was calculated using the single-population proportion formula, $n = z^2 pq / d^2$, with the following assumptions: a 95% confidence interval (CI), the margin of error (5%), design effect (2), and (10%) nonresponse rate after reviewing different literature for the objectives.[22,29,47,48]

A total of 486 school girls were included in the study. The school list of the students was used as a sampling frame to select the study participants using a simple random sampling method. The study participants were selected in proportion to the size of the students in each grade.

Data collection tools and data collection

Data were collected using a pretested structured questionnaire. The questionnaire is composed of three parts. These are queries related to the socio-demographic characteristics of participants and their parents, knowledge regarding menstruation, and menstrual hygiene management practices, and related factors questions. It was developed after a detailed review of related literature. The questionnaire was initially prepared in English and translated into the local language, Afaan Oromo.

Data collection was facilitated by trained two diploma female nurses and two biology teachers; two BSc midwives were involved in the supervision of the data collection. Before the beginning of the actual data collection, the questionnaire was pretested on 5% of the sample size in a nearby secondary school, where the actual data collection was never been conducted, and a slight modification was made accordingly.

The data collector explained the aims of the study and what sort of information was needed from the study participants. Self-administered data collection was used in the classrooms under the facilitation of the data collectors. The data collector ensures the completeness and consistency of the questionnaires filled by the respondents. Anonymous of the participant was kept by informing them not to write their name.

Data quality control

The data collection tool was translated from the English version to the Afaan Oromo version. Pre-testing of the questionnaire was undertaken before the actual data collection was taken place and corrections on the instruments

were made accordingly. Furthermore, the completeness and consistency of data were assured through direct and daily supervision of the supervisors by principal investigator. In addition, double data entry was done by two data clerks to minimize errors.

Data processing and analysis

The collected data were entered into EpiData 3.1 and exported to SPSS 23 for data processing and analysis. Descriptive statistical tests and univariate and multivariate logistic regression analyses were used. Those independent variables at binary logistic regression with a *p*-value of < 0.25 were considered as a candidate for the final model, the multivariate logistic regression model. When a pair of co-linear variables were identified, one of the two was dropped from the model. Thus, the associations between the explanatory variables and MHM practice were determined by a multivariate logistic regression model; results were reported using adjusted odds ratios (AORs) and its 95% CIs. The Hosmer–Lemeshow test ($p < 0.05$) was used to check the goodness-of-fit of a logistic regression model.

The study variables

The practice of menstrual hygiene management is the dependent variable; socio-demographic variables (age, religion, grade level, ethnic group, residence), family related factors (educational status of the father and the mother, parent's monthly income, knowledge of menstruation), and school factors such as availability of continuous water supply, sex separated latrine, pads for menstrual hygiene management, presence of a private place to manage period in the school, availability, and affordability sanitary material are considered as the independent variables.

Measurement of variables

Knowledge of menstrual hygiene: to measure the respondent's knowledge of menstrual hygiene, there were nine questions with each correct answer attaining 1 point and 0 for incorrect or do not know. Respondents who scored 50% and above were considered as having a high-level knowledge while a score of less than 50% as a low level of knowledge.[26]

Menstrual hygiene practice scoring

- The practice of menstrual hygiene measurement focuses on the use of material during menstruation (assign 1 point for use of the sanitary pad, 0 other sanitary materials).
- Methods of disposal of materials (0 for open field, 1 for proper disposal).
- Cleaning of external genitalia (1 for cleaning two or more times/day, 0 for <2 times/day).
- Frequency of sanitary pad change (1 for changing pad two or more times/day, 0 for <2 times/day).
- Materials used for cleaning purposes (1 for washing with soap and water or with plain water, and 0 for not washing).

Generally, 1 is given for the correct answer and 0 for the incorrect. Accordingly, respondents who scored 5–9 points were adjudged as having a good practice, and respondents who scored 0–4 points were adjudged as having poor practices.[26]

Household Wealth Index

An indicator used to measure the level of family wealth status that is consistent with the expenditure and income measures. In this study, households were categorized into three groups (lower <-0.17, middle -0.16 to 0.16, higher >0.17 index value) using household factor score obtained from the principal component analysis.

Results

Socio-demographic characteristics of the study participants

A total of 482 secondary school girls were participated in the study making a response rate of 99%. The mean age of participants was 16.78 years with a standard deviation (SD) of ± 1.48 years. One hundred fifty-three (31.7%) of the respondents' mothers can read and write. More than half (55.4%) of their mothers were housewives and 223 (46.3%) of their fathers were farmers. Besides, 313 (65.1%) of the respondents did not get permanent pocket money. One hundred eight (22.2%) were experienced menarche at the age of 13 years (Table 1).

The practice of menstrual hygiene management

Among the study participants, 366 (75.9%) used menstruation absorbent during MHM. Of whom only 267 (73%) used commercially made sanitary pads, and the rest (22.1%) custom a homemade sanitary pad and 18 (4.9%) other methods such as underwear and sponge. Two hundred ninety-two (80%) throw used menstrual soaking materials in the pit latrine and 35 (9.5%) throw used pads in the open field. One hundred twenty-three (48.3%) participants washed their genitalia three times and above per day. The majority of them (68.7%) used soap and water to keep hygiene. But, 22.2% did not have a habit of taking bath/shower during menstruation. Seventy-seven (31.3%) of the school girls dry their reusable sanitary material

Table 1. Socio-demographic characteristics of secondary school girls in eastern Ethiopia, 2021.

Variable		Frequency	Percentage
Age	13–15	97	20.1
	16–18	321	66.6
	19–21	64	13.2
Ethnicity	Oromo	361	74.9
	Amara	108	22.4
	Gurage	13	2.7
Religion	Muslim	388	80.5
	Orthodox	77	16
	Protestant	16	3.3
	Others	1	0.2
Place of residence	Urban	253	52.5
	Rural	229	47.5
Grade level	9–10	341	72.2
	11–12	141	29.3
Father's education	Cannot read and write	160	33.2
	Primary	143	29.7
	Secondary	112	23.2
	Higher	67	13.9
Mother's education	Cannot read and write	172	35.7
	Primary	153	31.7
	Secondary	82	17
	Higher	75	15.6
Father's occupation	Government employee	141	29.3
	Farmer	223	46.3
	Private employee	109	22.6
	Others	9	1.9
Mother's occupation	Government employee	83	17.2
	Housewife	267	55.4
	Private employee	124	25.7
	Others	8	1.7
Household Wealth Index	Lower	163	33.8
	Medium	191	39.6
	Higher	128	26.6
Earn permanent pocket money	Yes	168	34.9
	No	314	65.1
Age at menarche	9–12	173	35.9
	13–16	288	59.8
	>17	21	4.4

after washing in the sunlight outside. One hundred fifty-four (32%) of the participants practiced poor menstrual hygiene while 328 (68%) practiced good menstrual hygiene (Table 2).

Factors associated with practice of menstrual hygiene management

In the bivariate analysis, those independent variables with p-value < 0.25 have been transferred to multivariate analysis as shown in Table 3. In the multivariate model, it revealed that the practice of good menstrual hygiene was more among school girls who were in the grade level of (11–12) (adjusted odds ratio (AOR) = 2.95 (95% CI = 1.75, 4.50)) than those female students who were in grade level of (9–10), whose mother's with higher educational status were 64% less to practice poor menstrual hygiene than those female students whose mothers cannot read and write (AOR = 0.36 (95% CI = 0.15, 0.88)).

Among the study participants, school girls who have earned permanent pocket money from parents or relatives (AOR = 0.49 (95% CI = 0.29, 0.82)) were 50% less practiced poor menstrual hygiene than those who did not. Besides, those who had a high level of knowledge about menstrual hygiene (AOR = 2.12 (95% CI = 1.28, 3.53)) practiced two times better than those with a low-level knowledge and whose families in the higher wealth index category were (AOR = 7.14 (95% CI = 3.98, 12.80)) seven

Table 2. The practice of menstrual hygiene among secondary school girls in eastern Ethiopia, 2021.

Variable		Frequency	Percentage
Use of menstrual absorbent	Yes	366	75.9
	No	116	24.1
Materials used for menstrual absorbent	Homemade pad	81	22.1
	Commercially made	267	73
	Sponge	18	4.9
Place of pad store in between uses	In the bathroom	186	50.8
	With other cloth	16	4.4
	Separately	164	44.8
Place where to dispose used pad	In the toilet pan	39	10.5
	In the open field	35	9.5
	In the pit latrine	292	80
Frequency of washing genitalia/day	Once	103	28.1
	Two times	59	12.2
	Three and above times	123	48.3
	No washing at all	87	18
Materials used for washing genitalia	With soap and water	331	68.7
	With water only	151	31.3
Bath during your period	Yes	375	77.8
	No	107	22.2
Dry clothes in sunlight	Yes	77	21.1
	No	289	78.9
Change sanitary material at school during menses	Yes	17	4.6
	No	349	95.4
Clean external genitalia during menstruation	Yes	395	82
	No	87	18
Practice	Good practice	328	68
	Poor practice	154	32

times higher associated with the practice of good menstrual hygiene than their counterparts (Table 4).

Discussion

This study showed that around three-fourths of the girls had good knowledge; while good menstrual hygiene management was practiced in two-thirds of the participants. However, the practice was poor and associated with mothers without formal education and accurate knowledge, being from families of lower wealth index category, deprivation of permanent pocket money to buy absorbent, and lower graded level. Thus, a significant proportion of school girls are at risk of those public health problems related to unhygienic menstrual hygienic practices.

As knowledge could be a cornerstone for proper practices, around three-fourth (72.6%) of the participants had a good level of knowledge regarding menstruation and its management which was similar to a study conducted in Addis Ababa (70%)[49] and central Ethiopia (72.5%).[50] But, this finding was higher than the result of the studies done in Nepal (40.6%, 42.9%),[51,52] and Kenya (51.6%).[30] This difference might be due to a lack of parents' engagement in educating their daughters because of the taboo about menstrual hygiene. On the contrary, a higher (90.7%) knowledge level was obtained in a study done in the Amhara region of northern Ethiopia.[14] This difference might implicate the need for sufficient information delivery by families/friends and schools to increase understanding of MHM.

It was observed that 68% of the participants had good practice of menstrual hygiene. Consistent results were reported in the country, central (51.3%),[49] east Shewa (66.8%),[25] northwest (68%) Ethiopia,[53] and Kenya (28.8%).[30] In addition, a very low practice was reported from Uganda, which indicated that only 9.5% practice good menstrual hygiene.[54] The unhygienic practice of genital and menstrual hygiene management among women predisposes them to genital infections including cervical cancer.[55,56] Poor practices like using an uncleaned homemade sanitary pad, irregular bathing, and not washing genitalia at all during menstruation were among the factors that predispose women to develop reproductive organ infections.[57]

There was also a significant association between the level of knowledge and practice of menstrual hygiene. Those participants who had a high level of knowledge were practicing good menstrual hygiene than their counterparts. Consistent findings were reported in the country,[39,49,58,59] but different from the study done in India

Table 3. Bivariate analysis to identify factors associated with the practice of MHM among secondary school girls in eastern Ethiopia, 2021.

Variable		MHM practice		COR (95% CI)	*p*-value
		Proper (frequency)	Poor (frequency)		
Age	13–15	66	31	1.83 (0.951, 3.51)	0.07
	16–18	218	103	2.64 (1.27, 5.48)	0.009
	19–21	44	20	1.00	
Ethnicity	Oromo	245	116	1.00	0.132
	Amara	73	35	0.42 (0.14, 1.27)	0.122
	Gurage	9	4	0.315 (0.098, 1.014)	0.05
Place of residence	Urban	172	81	1.00	
	Rural	156	73	1.006 (0.686, 1.477)	0.974
Grade level	9–10	232	109	0.290 (0.192, 0.439)	0.000
	11–12	96	45	1.00	
Father's education	Cannot read and write	109	51	1.992 (1.164, 3.408)	0.012
	Primary	97	46	1.539 (0.788, 3.004)	0.206
	Secondary	46	21	1.354 (0.772, 2.373)	0.290
	Higher	31	36	1.00	
Mother's education	Cannot read and write	117	55	2.970 (1.516, 5.816)	0.002
	Primary	104	49	2.092 (0.978, 4.475)	0.057
	Secondary	56	26	2.315 (1.165, 3.601)	0.017
	Higher	51	24	1.00	
Father's occupation	Government employee	96	45	1.00	
	Farmer	152	71	1.245 (0.248, 6.265)	0.790
	Private employee	74	35	1.810 (0.367, 8.924)	0.466
	Others	6	3	1.95 (0.386, 9.849)	0.419
Mother's occupation	Government employee	56	27	1.00	
	Housewife	182	85	2.847 (0.332, 24.405)	0.340
	Private employee	84	40	3.559 (0.431, 28.376)	0.238
	Others	5	3	3.212 (0.382, 27.008)	0.283
Household Wealth Index	Lower	111	52	0.174 (0.105, 0.289)	0.00
	Medium	130	61	0.065 (0.036, 0.114)	0.000
	Higher	87	41	1.00	
Earn permanent pocket money to buy sanitary pad	Yes	114	54	1.00	
	No	214	100	1.956 (1.317, 2.905)	0.000
Knew that pads were available in market	Yes	297	140	1.00	
	No	31	14	0.752 (0.398, 1.420)	0.380
Water availability in school	Yes	305	143	1.00	
	No	23	11	1.348 (0.656, 2.769)	0.416
Toilet facility available	Yes	298	140	1.383 (0.730, 2.622)	0.320
	No	30	14	1.00	
Male and female toilet in the opposite direction	Yes	105	50	1.00	
	No	222	105	0.695 (0.464, 1.040)	0.077
Female toilet kept from inside	Yes	279	131	1.337 (0.794, 2.261)	0.275
	No	49	23	1.00	
Knowledge summary	Poor	90	42	1.00	
	Good	238	112	0.653 (0.439, 0.970)	0.035

MHM: menstrual hygiene management; COR: crude odds ratio; CI: confidence interval.

where no association was revealed between knowledge and practice.[5] This difference could be due to the cultural restriction of washing or bathing in the Rajasthan which affects their level practices regardless of their understanding. This may also imply, cultural influences[60] had strong consequences which possibly extend to decreased academic performance and promotion of school absenteeism.[61]

Table 4. Multiple logistic regression analysis for factors affecting the practice of MHM among secondary school girls in eastern Ethiopia, 2020.

Variables		Practiced		COR (95% CI)	AOR (95% CI)	*p*-value
		Properly	Poorly			
Grade level	9–10	232	109	1.00		
	11–12	96	45	3.45 (2.28, 5.21)[a]	2.95 (1.75, 4.501)[b]	0.025
Educational status of mother	Cannot read and write	117	55	2.79 (1.32, 2.91)[a]	0.36 (0.15, 0.88)[b]	0.001
	Primary	104	49	1.00		
	Secondary	56	26	1.00		
	Higher	51	24	1.00		
Knowledge level	Poor	90	42	1.00		
	Good	238	112	1.53 (1.03, 2.28)[a]	2.12 (1.28, 3.53)[b]	0.035
Family wealth index	Low	111	52	1.00		
	Medium	130	61	0.065 (0.036, 0.114)[a]	0.419 (0.230, 0.763)[b]	0.041
	High	87	41	5.74 (3.46, 9.53)[a]	7.14 (3.98, 12.8)[b]	0.013
Earned permanent pocket money	Yes	114	54	1.00		
	No	214	100	1.96 (1.52, 5.82)[a]	0.495 (0.299, 0.821)[b]	0.002

COR: crude odds ratio; CI: confidence interval; AOR: adjusted odds ratio.
[a]Associated in bivariate analysis.
[b]Associated in multivariate analysis.

This study also revealed menstrual hygiene practice was significantly associated with mothers' educational status. A similar association was reported in other studies.[26,49,59] This might explain in this study that mothers with good literacy status impact their daughters' practice through prior orientation and support in academic performance that further augmented by unaffected girls' school attendance during menstruation among these groups.[15] Yet, a similar study from Amhara regional state, Ethiopia reported, there was no significant relationship between maternal education and the practice of menstrual hygiene.[26]

The other finding was participants from a family with a higher-level wealth index category practiced good menstrual hygiene seven times better than their counterparts which showed similarity with another study.[49] Yet, results from the school-based cross-sectional studies conducted in Odisha, India,[13] and Adama, Ethiopia[27] reported no association between family wealth index and practice of menstrual hygiene. The difference observed may be due to other factors like the availability and accessibility of sanitary products and water supplies as well as socio-cultural attitudes.[30,62] Moreover, there was a significant association observed between permanent pocket money and practice of menstrual hygiene implying nearly 51% less likely to have poor practice. Financial constraints may compel them to use old/homemade clothes that were not effectively cleaned or fully dried before use. This could be a risk factor for increased bacterial growth as more than three-fourths of this study participants responded they did not use sunlight for drying. An analogous result was reported from Ethiopia[22,53] and South India[5] which might enable to access MHM material.[39,63]

Likewise, higher grade level students were practicing good menstrual hygiene management three times more among school girls, unlike a study done in the Amhara region, Ethiopia.[26] This observation might be the possible increment of exposure to information regarding menstruation and hygienic management in higher grades. Therefore, older students could help in peer teaching activities. Problems to access education on puberty and menstrual health[64,65] are among the challenges of addressing adolescents and youth health services which include stigma, service costs, provider bias, facility setup, client–provider interaction, waiting time of services, and service sensitivity to all young groups.[15,66–68]

The Ethiopian government prioritized adolescent and youth development through focused policies and strategies which enabled a favorable work climate for non-governmental organizations' support. However, it was agreed that the setting was relatively restricted in general, with regional variations and dynamic changes in the countries.[69] In order to implement the strategy, several problems must be overcome, including limitations in the scope of the plan, a lack of coordination among implementing partners, limited stakeholder and youth involvement, insufficient resources, and societal and cultural hurdles. Moreover, changes in the demographic, social, economic, and technical environments have influenced policy and program decisions on a local and global scale.[70,71]

Young adolescents, particularly those living in rural areas, have limited access to timely information about puberty. Particularly, menstruation (often a taboo subject) and menstrual management are the major sources of concern for girls, owing to gendered social norms that confuse

menstruation with female sexuality, making it a highly stigmatized bodily function[6,72,73] further fueling gender discrimination.[74] Adolescents are not a homogeneous group; at different times of their lives, they require different items and are subjected to different restraints, all of which are influenced by a variety of circumstances at the home, community, and state levels. As a result, to sustain service provision, uptake, and outcomes, program designers and implementers must address the impact of underlying societal norms in a more strategic and context-specific manner.[54,75]

It was observed that schools were the main target area for addressing adolescent and youth health with the help of non-governmental organizations designing various programs such as WASH that integrate menstrual hygiene management as one parcel.[23] Nonetheless, inadequate funding and budgeting have been identified as a major impediment to integrating successful and sustainable WASH programs into school settings.[37] One of the most important ways to improve sustainability was to involve the community by making users more responsible for program operation and maintenance once donors or private financiers were no longer involved. By encouraging community involvement, it may be easier to take advantage of local resources, build local capacity for WASH, ensure user satisfaction, and involve under-represented groups such as women.[1,37,72]

In addition, strengthening collaborative approaches between stakeholders such as the ministry of education and health, increasing human power professionals with knowledge of adolescent and youth health, structuring and strengthening schools set up for guidance counseling activities, and mainstreaming in the curriculum based on level of education keeping hierarchy and coherency of ideas will play a large role in alleviating the problem at varies level. Similarly, reproductive health programs should aim to raise awareness among parents, teachers, and policymakers about the importance of integrating adolescent and youth health[57,36,76–84] through targeted training, experience sharing, comparative interventional research, and the generation of scientifically based evidence.

Strength and limitation

This study used a representative sample size and addressed the issue of sensitive, personal, and cultural barriers to open communication. Hence, the respondents (female students) were separated from male students in the classroom, and a self-administered questionnaire was used with selected female teachers or health professionals data collectors/supervisors. Although maximum effort has been made to minimize biases, there may be an unavoidable socially desirable prejudice by answering as to the required that may overestimate the practice.

Conclusion

One-third of the participants had poor menstrual hygiene practices which might risk reproductive organs' health. Being in higher grade level, from a family of lower wealth index, educational status of the mother, lack of permanent pocket money to buy sanitary material, and understanding hygienic management of menstruation was found to be an independent predictor of menstrual hygiene management practice in secondary school girls of eastern Ethiopia. Hence, menstrual hygiene information should be maximized through school mass media and special education programs in the curriculum. Older students might also be engaged in peer teaching activities. Besides, efforts should be made for access and affordable sanitary materials with a conducive environment and strengthen sector collaboration in schools. Moreover, health extension workers are advised to provide awareness about MHM to parents and the public at large. Further studies should be designed targeting school setup and teachers' perceptions in support of students while practicing menstrual hygiene.

Author contribution(s)

Jemal Hussein: Conceptualization; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Software; Supervision; Calidation; Visualization; Writing—original draft; Writing—review and editing.
Tesfaye Gobena: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Writing—review and editing.
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Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical consideration

The study was approved by the Haramaya University, College of Health and Medical Sciences Institutional Health Research Ethics Review Committee (IHRERC) with reference number IHRERC/100/2020. The permission and agreement consent was obtained from the woreda Educational office. An informed written and signed consent was obtained from all subjects for their participation after the purpose of the study was fully explained to them in their local languages. For those students who were under the age of consent, verbal assent was obtained from the parents of the study participants. A signature was used on the consent form. Those who were signed written consent only participated in the study and confidentiality of response was maintained throughout the research process by giving code for the participant. The entire study participants were informed that data were kept private and confidential and used only for research purposes. The participants

were also assured that they have the right to refuse or withdraw if they were not comfortable at any time. Personal privacy and cultural norms were respected. Health education on associated factors and menstrual hygiene practices were provided to all of the participants after the completion of data collection.

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Data availability statement

The data used to support the findings of this study are included in the article.

Supplemental material

Supplemental material for this article is available online.

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