


Knowledge on Menstruation and Practice of Menstrual Hygiene Management Among School Adolescent Girls in Central Ethiopia: A Cross-Sectional Study

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Background: Menstruation is a natural event that is a physiological and psychological milestone in women's reproductive life. But Menstrual Hygiene Management (MHM) continues to be a monthly challenge for adolescent girls in low-income countries, including Ethiopia harming their school attendance, health, and daily life. Therefore, this study aimed to determine the practice of MHM and associated factors in central Ethiopia.

Methods: School-based cross-sectional study was employed among preparatory and high schools in Holeta Town from May 01 to 20, 2019. A systematic random sampling method was used to select study subjects. Data were collected through a self-administered questionnaire and analyzed using SPSS version 23. Both bivariate and multivariable logistic regression were carried out to identify associated factors.

Results: From a total of 403 respondents, 72.5% of school adolescents had good overall knowledge about menstruation and only 34.7% had adequate MHM practice. The study identified adolescents from urban residence (AOR=2.62, 95% CI: 1.53–4.48), got information about menstruation from mothers (AOR=2.17, 95% CI: 1.18–3.96) and teachers (AOR=5.09, 95% CI: 2.67–9.67), school toilets with inside lock (AOR=2.82, 95% CI: 1.67–4.76), not missing school during menstruation (AOR=4.2, 95% CI: 1.55–11.41), experienced menstrual-related problems (AOR=2.63, 95% CI: 1.49–4.64), experienced any whitish or gray discharge per-vagina (AOR=2.84, 95% CI: 1.66–4.85) and having good overall knowledge about menstruation (AOR=1.94, 95% CI: 1.07–3.52) were significantly associated with adequate MHM practice.

Conclusion: The study revealed three-fourth of adolescents had good overall knowledge and two-third of them had inadequate MHM practice. Rural residence, source of information on menstruation, school toilets with inside lock, experiencing menstrual-related problems, and overall knowledge were associated with adequate MHM practice. Therefore, working on enhancing the awareness of adolescent girls on menstruation and MHM practice and making school environments conducive to safe MHM practice were recommended.

Keywords: adolescent girls, knowledge, menstrual hygiene management, Ethiopia

Background

Adolescence is a transition period from childhood to adulthood life during which pubertal development and sexual maturation take place. Rapid transformations due to the hormonal changes that accelerate the physical, cognitive, and psychosocial growth usually occurs during adolescence.^{1–4} From the many changes during

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adolescence occurrence of menstruation or menarche is the natural event which is a physiological and psychological milestone in women's reproductive life.⁵ Even though the occurrence of menstruation is a sign of normal female reproductive functions, it is bounded by several misbeliefs or misconceptions and girls do not feel free to discuss menstruation with other individuals in the public, classroom and even it can be a great taboo to discuss in the family.⁶⁻⁹

Studies from many low-income countries exhibited that many girls are not properly prepared and a very high number of girls start menstruating without having any idea of what is happening to them or why.^{7,10-12} For this reason, girls in low-income countries report facing stress, confusion, shame, and fear due to a lack of knowledge and poor menstrual hygiene practices.^{7,13} Additionally, there is a report of teasing and harassment from boys and classmates, not standing in class to answer questions, concerns about odour, and an embarrassing menstrual leak in the classroom among adolescent girls.^{6,14-17} Taboos surrounding menstruation often exclude girls from many aspects of social and cultural life including religious rituals during menstruation.^{18,19} Those factors increase the vulnerability of female adolescents to unhygienic practices during menstruation that leads to multiple infections including reproductive and urinary tract.^{20,21} Those are also highlighted as the main factors which have the most pronounced effect on the adolescent girl's school attendance, quality, and enjoyment of education.^{6-8,14}

Moreover, adolescent girls reported menstrual pain and lack of effective materials for safe MHM practices as a reason for school absenteeism.^{14,16,17} As a result, adolescent girls reported as they are frequently using folded, bunched up, or sewed cloth, tissues, or toilet paper, scraps of old cloth, or strips of an old blanket, which often leak and cause chafing, which made school attendance difficult.^{13,16,22} Water, Hygiene, and Sanitation (WASH) are the leading health-related risks for adolescents aged 10 to 14 years.^{2,23} In which more than half the schools in low-income countries lack sufficient latrines for girls.¹⁶ Improving the school environment and safe access to and use of toilets, sanitary materials and facilities were central interventions for safe MHM practices.^{21,23,24}

Despite increasing local and global attention to MHM practice and its impact on adolescent girls, substantial knowledge gaps persevered.¹⁶ Menstruation and MHM practice continue to be a monthly challenge for women and girls across Ethiopia. This is mainly due to young girls

often has limited knowledge of menstruation because of the taboo for discussing the issues, lack of access to appropriate sanitary protection products or facilities, and lack of WASH facilities in schools.²⁵⁻²⁷

Access to a safe, clean, and private space to manage monthly menses with dignity is a human right and public health issue for every menstruating girls and women.^{16,28} However, in Ethiopia, most school adolescents were practising unsafe menstrual hygiene during menstruation. Studies from Ethiopia revealed that the proportion of adolescent girls practising safe menstrual hygiene management were 21% in Sebeta town,²⁵ (39.9%) in Nekemte Town,²⁹ (29.8%) in Wegera district,²⁷ and (39.7%) in Gedeo zone,¹⁰ (24.5%) in Bahir Dar Ethiopia³⁰ and (46.4%) in Ambo Town.²⁶

Although few studies highlighted the level of knowledge on menstruation and MHM practices among school adolescent girls in Ethiopia. Those studies mainly determined the level of safe or adequate MHM practice among school adolescents using the mean values from questions assessing adolescent girl's menstrual hygiene practice and/or the type of absorbents used during menses, which is not consistent with a unified definition by the World Health Organization (WHO) and United Nations (UNICEF). The Joint Monitoring Program of the WHO and UNICEF in 2012 defined MHM practice as:

Adolescent girls using a clean menstrual management material to absorb or collect blood that can be changed in privacy as often as necessary for the duration of the menstruation period, using soap and water for washing the body as required and having access to facilities to dispose of used menstrual management materials.^{15,31}

Based on this definition and criteria only a study conducted by Shallo et, al. had assessed MHM practice accordingly.²⁶ Considering the diversities concerning socio-demographic (social, economic, and cultural) factors and access to schools WASH facilities for MHM in different parts of Ethiopia it is important to conduct a study on knowledge and practices of MHM in central Ethiopia. Therefore, this study was designed primarily to assess adolescent girls' knowledge of menstruation and MHM practices and associated factors among secondary and preparatory school girls in Holeta Town, central Ethiopia. The result would be useful in helping stakeholders through determining MHM practice that is consistent with its definition and identifying factors that could affect their practice.

Methods

Study Design, Area, and Period

A school-based descriptive cross-sectional study was employed among adolescent school girls in Holeta town, Oromia special zone surrounding Finfinnee, Oromia region, central Ethiopia from May 01 to 20, 2019. The town is located 38 kilometers to the west of Addis Ababa and has an altitude of 2391 meters above sea level. There are three schools namely Burqa Harbu, Holeta high school, and Holeta preparatory in the town. The total number of school girl students in the town is 1832. There are two public health centers in the town. All regular menstruating adolescent girls attending school at Holeta preparatory and high schools during the data collection period and who were randomly selected were our study population.

Sample Size Determination and Sampling Procedure

The sample size was calculated using single population proportion formula with the assumption of a 95% confidence interval, the margin of error of 5%, 10% non-response, and 57% proportion of good menstrual hygiene practice from a previous study in Adama town.³² By adding a 10% non-response rate the final sample size was 415. The study units were allocated to all three schools proportional to their population size (number of adolescent girls). A systematic random sampling technique was employed to select 415 adolescent girls, by using the list of students from the class roster. Study subjects were selected every 4th individual by dividing the total number of adolescent girls (1832) to sample size.

Measurements

MHM, the practice was measured based on a definition developed by

UNICEF and WHO defining MHM practice as Adolescent girls using a clean menstrual management material to absorb or collect blood that can be changed in privacy as often as necessary for the duration of the menstruation period, using soap and water for washing the body as required and having access to facilities to dispose of used menstrual management materials.^{15,31}

Accordingly, the practice of menstrual hygiene management was measured based on the use of a clean menstrual management material to absorb or collect blood during menstruation that can be changed in privacy (assign 1

point for: use of a disposable sanitary pad or new menstrual cloth or re-usable type of pad), adequate frequency of change (1 point for three or more over 24 hours), washing their genitalia (1 for washing twice or more per 24 hours with soap and water or with plain water), and adequate disposal of used material (1 for burying in toilet or burning). The value of those four criteria was added together and those adolescent girls who scored 1 for all four criteria were considered as having adequate or safe MHM practice and otherwise classified as inadequate or unsafe.^{15,26,33}

Adolescent students who scored above the mean value was used to determine the cut-off point for good knowledge. Accordingly, all respondents who correctly responded to 9 and above questions out of 12 knowledge assessing questions were considered as having good overall knowledge on menstruation and menstrual management. Whereas, those who correctly responded to only 8 or less were considered as having poor overall knowledge of menstruation and menstrual management.^{17,29}

Data Collection Tool, Procedures, and Quality Control

Data were collected through a self-administered questionnaire by using the Afan Oromo version questionnaire. The questionnaires for this study were adapted and modified accordingly from the united nations children's fund and other related literature.^{10,15,29,34} Five trained female Midwife professionals (BSc) had collected the data and one supervisor with Masters level supervised the data collection process. One day of training was given for data collectors and supervisors, one week before the day of data collection. A pre-test was done on five percent of the sample at Ejere town preparatory and high schools and accordingly necessary modifications were made. Daily supervision was undertaken throughout the data collection period.

Data Processing and Analysis

The collected data were checked for completeness and entered into Epi info version 7.2.4 and exported to SPSS version 23 statistical software for analysis. Data cleaning was done before conducting the analysis. Bivariate analysis was done to identify those independent variables which have an association with the outcome variable at a p-value of less than 0.25. Hosmer and Lemeshow model test was done to check the model before fitting into the final

regression model and it was found to be 0.932. Those variables which have association were fitted into the multiple logistic regression model and associated factors for MHM practice were identified based on the odds ratio with its 95% confidence interval and a P-value of less than or equal to 0.05.

Results

Socio-Demographic Characteristics of Respondents

A total of 403 female adolescents have fully responded, making the response rate of 97.1%. The majority of the respondents, 351 (87.1%) were from grade 9th to 10th, 360 (89.3%) belong to the Oromo ethnic group and 244 (60.5%) were orthodox religious followers. More than half 232 (57.6%) of adolescents were from urban residences and in 239 (59.3%) of them, their parents provide them pocket money regularly. In about 187 (46.4%) and 217 (53.8%) of respondents, their father and mother have no formal education respectively (Table 1).

Source of Information and Knowledge on Menstruation

Almost all, 379 (94.0%) of school adolescent girls had heard about menstruation before their menarche. Their main source of information were mothers for 174 (43.2%) adolescent girls. More than half 226 (56.1%) of adolescents freely discuss menstrual issues with their parents. The main reasons reported for not discussing the menstrual issues with parents were because of shamefulness 50 (12.4%), not habitual 65 (16.1%), and due to privacy/secretcy of issue 62 (15.4%). Only 186 (46.2%) of adolescents knew the causes of menstruation as a physiologic process and 301 (74.7%) knew as menstrual blood is from the uterus. Nearly three fourth 292 (72.5%) of school adolescents have a good overall knowledge about menstruation (95% CI: 68.0–77.2%) (Table 2).

Menstrual Hygiene Management Practices Among School Adolescents

The mean age at menarche among the school adolescent girls was 13.62 with a standard deviation of 1.47 years (ranging from 9 to 17 years). The majority of respondents 267 (66.3%) use disposable sanitary pads during menstruation and 45 (11.2%) use reusable sanitary pads. More than half 229 (56.8%) use soap and water for genital cleaning during menstruation. The majority of respondents 253

(62.8%) change their sanitary material during menstruation in school. Only about 185 (45.9%) of school adolescents were able to change their sanitary material three times or more per day during their menses. The current study found that only 140 (34.7%) (95% CI: 30.1–38.9%) had adequate menstrual hygiene management practices (Table 3).

School and Environmental-Related Factors

About 235 (58.3%) reported as there was a separate female toilet having an inside lock. More than three-fourth 271 (67.2%) of respondents had ever experienced menstrual-related health problems during menstruation. More than half, 220 (54.6%) of respondents reported as they had experienced difficulty in pursuing class sessions during menstruation. Almost one-third 126 (31.3%) of the students reported as they missed school because of their menses.

Factors Associated with Menstrual Hygiene Management Practice

On bivariate analysis; mothers educational status, fathers educational status, fathers occupation, place of residence, respondents age at interview, source of information on menstruation before menses (mothers and teachers at school), number of days missed school because of menstruation, having female toilets kept locked inside, overall knowledge on menstruation, ever experienced health problems during menstruation and ever experienced any whitish or gray discharge through the vagina were found to be significantly associated with adequate or safe menstrual hygiene management practice among school adolescents at a p-value of less than 0.2.

In multivariable logistic regression analysis respondents residence, source of information about menstruation (mother and teachers at schools), schools having inside lock female toilets, number of days missed school because of menstruation, experiencing health problems during menstruation, experiencing any whitish or gray discharge through the vagina and good overall knowledge about menstruation were factors identified to be associated with adequate or safe menstrual hygiene management practice among school adolescents.

The current study identified that students who were from the urban residence were 2.62 times more likely to have safe MHM practice than those from rural residences

Table 1 Socio-Demographic Characteristics of School Adolescent Girls Holeta Town, Central Ethiopia 2019

Variables	Categories	Number (N=403)	Percentage (%)
Respondents age in years	13–16	206	51.1
	17–19	197	48.9
Grade level	9th to 10th	351	87.1
	11th to 12th	52	12.9
Residence	Urban	232	57.6
	Rural	171	42.4
Ethnicity	Oromo	360	89.3
	Amhara	24	6.0
	Others*	19	4.7
Religion	Orthodox	244	60.5
	Protestant	143	35.5
	Other religion**	16	4.0
Fathers educational status	Has no formal Education	187	46.4
	Primary education	75	18.6
	Secondary education	64	15.9
	College diploma or above	77	19.1
Mothers educational status	Has no formal Education	217	53.8
	Primary	76	18.9
	Secondary	65	16.1
	College diploma or above	45	11.2
Fathers occupation status	Farmer	189	46.9
	Merchant	36	8.9
	Private employee	44	10.9
	Government employee	95	23.6
	Others occupations [†]	39	9.7
Mothers occupation status	Housewife	231	57.3
	Merchant	57	14.1
	Private employee	39	9.7
	Government employee	55	13.6
	Others occupations ^{**}	21	5.2
Do parents provide pocket money regularly	Yes	239	59.3
	No	164	40.7

Notes: Gurage & Tigre*, Muslim & Wakefeta**, Daily laborer, driver and student[†], Student, daily laborer^{**}.

Table 2 Source of Information and Knowledge on Menstruation Among School Adolescent Girls in Holeta Town, Central Ethiopia 2019

Variables	Categories	Number (N=403)	Percentage (%)
Heard about menstruation before menarche	Yes	379	94.0
	No	24	6.0
Source of information about menstruation before menarche	Mother	174	43.2
	Teachers at school	114	28.3
	Health personnel	14	3.5
	Friends	91	22.6
	Others (Media/internet)	10	2.4
Freely discuss menstruation issues with parents	Yes	226	56.1
	No	177	43.9
Reason for not discussing menstruation with parents	Because of shamefulness	50	12.4
	Not habitual	65	16.1
	Privacy or secrecy of issue	62	15.4
	Discussed with parents	226	56.1
Knows average age at which girls commence menses	Yes	394	97.8
	No	9	2.2
Causes of menstruation	Physiologic process	186	46.2
	Pathological process	16	4.0
	Is a curse of God	97	24.1
	I do not know	103	25.6
Source of menstrual blood	Uterus	301	74.7
	Vagina	35	8.7
	I do not know	45	11.2
	Bladder or abdomen	22	5.4
Absorbent that should be ideally used during menstruation	Disposable sanitary pad	386	95.8
	Reusable & washable cloth pads	10	2.5
	Rag or pieces of cloth	7	1.7
Knew the normal menstrual bleeding duration	Yes	359	89.1
	No	44	10.9
Knew the normal duration of the menstrual cycle	Yes	172	42.7
	No	231	57.3
Girl can go to school during menstruation	Yes	368	91.3
	No	35	8.7
Knew that menstrual blood is unhygienic	Yes	267	66.3
	No	136	33.7

(Continued)

Table 2 (Continued).

Variables	Categories	Number (N=403)	Percentage (%)
Knew that it is foul-smelling during menstruation	Yes	335	83.1
	No	68	16.9
Knew pain during menstruation is not to mean someone is sick	Yes	334	82.9
	No	69	17.1
Good overall knowledge about menstruation	No	111	27.5
	Yes	292	72.5

(AOR=2.62, 95% CI: 1.53–4.48). Those adolescents' girls who got information about menstruation before menarche from their mothers (AOR=2.17, 95% CI: 1.18–3.96) and at schools from teachers (AOR=5.09, 95% CI: 2.67–9.67) were twice and five more likely to practice adequate/safe MHM than those who did not.

Students whose school toilets had female toilets with inside lock were 2.82 times more likely to have safe or adequate MHM practices than those who did not have (AOR=2.82, 95% CI: 1.67–4.76). Adolescent girls who missed their school for one day (AOR=3.69, 95% CI: 1.55–8.77) and did not miss school (AOR=4.2, 95% CI: 1.55–11.41) during their menses were 3.69 and 4.2 times more likely to practice safe MHM than those who missed more than one day respectively.

Adolescent girls who experienced health problems during menstruation were 2.6 times more likely to practice adequate MHM than those who did not experience (AOR=2.63, 95% CI: 1.49–4.64). Those students who ever experienced any whitish or gray discharge through the vagina were 2.8 times more likely to have adequate MHM practices than those who did not experience it (AOR=2.84, 95% CI: 1.66–4.85). Those adolescent girls who had good overall knowledge about menstruation were almost twice more likely to practice adequate or safe MHM than those who had poor knowledge (AOR=1.94, 95% CI: 1.07–3.52) (Table 4).

Discussion

The current study found that only one-third of adolescent girls in the Preparatory and High Schools of Holeta Town had good or adequate menstrual hygiene management practices [34.7%, 95% CI: 30.1–38.9%]. This finding was nearly in line with studies done in Nekemte Town

(39.9%),²⁹ Wegera district (29.8%),²⁷ and Gedeo zone (39.7%)¹⁰ Ethiopia.

But the current finding is higher than studies conducted in Kamuli district, Uganda 9.5% had adequate MHM,¹⁵ Bahir Dar Ethiopia 24.5%,³⁰ and 21% in Sebeta town Ethiopia²⁵ had safe or good MHM practice. The possible reason for this is might be due to the difference in socioeconomic characteristics and study period compared with the Kamuli district. The difference in the study period and setting in which Bahir Dar study was conducted with community-based involving both students and other adolescents. This mainly due to education plays an important role in increasing the awareness of MHM among students than other adolescents in the community. Additionally, there is improved attention from different stakeholders on MHM including school-based educational interventions which might have brought some improvement in both countries which is also supported by a systematic review done on MHM.³⁵

The current finding was lower than studies conducted in Mehalmeda, Amhara region (90.9%),³⁶ Boset district East Shewa zone (70.2%)³⁷ had a good MHM practice. The study done in Ambo town which is 53.6% had unsafe MHM practice²⁶ and Adama town (57%).³² It is also lower than the study conducted in Ghana (50.8%) had good MHM.²² The variations were mainly due to the differences in the measurements of MHM practice among those studies in which they have used the mean values of their responses from practice assessing questions.

Nearly three fourth of adolescent girls in preparatory and high schools had good overall knowledge about menstruation [72.5%, 95CI: 68.0–77.2%]. This is in agreement with a study done in the Boset district of East Shewa zone (70.9%).³⁷ The current finding was higher than the study done in Nekemte Town Ethiopia 60.9% had good

Table 3 Menstrual Hygiene Management Practices During Menstruation Among School Adolescent Girls in Holeta Town, Central Ethiopia 2019

Variables	Categories	Number	Percentage (%)
Sanitary materials used during menstruation (N=403)	Disposable sanitary pads	267	66.3
	Disposable piece of rags	14	3.5
	Reusable sanitary pads	45	11.2
	Paper/toilet tissue	5	1.2
	Underwear	23	5.7
	Uses no sanitary materials	49	12.2
Genital cleaning material used during menstruation (N=403)	Only Water	159	39.5
	Soap and water	229	56.8
	Plain paper	10	2.5
	Not used any	5	1.2
Washing genitalia twice or more times per day during menses	No	87	21.6
	Yes	316	78.4
Taking ≥ 2 baths during menstruation per day	No	220	54.6
	Yes	183	45.4
Frequency of changing sanitary material during menses per day	Could not change it	150	37.2
	1 to 2 times	68	16.9
	Three times or more	185	45.9
Proper disposal of used menstrual hygiene materials	No	178	44.2
	Yes	225	55.8
Overall adequate MHM practiced	No	263	65.3
	Yes	140	34.7

knowledge,²⁹ Wegera district identified (34.3%)²⁷ and Gedeo zone (31.7%) had good knowledge of menstruation.¹⁰ The possible reason for this might be due to the difference in the study period and study population in which the current study was conducted in town unlike that of the Wegera district and Gedeo Zone.

This finding is lower than the study done in the Amhara region Ethiopia 90.7% had a high level of knowledge about menstrual hygiene management.³⁸ The possible reason for this is due to the difference in measurement of knowledge in which the current study used the mean value of responses, but the study in Mehalmeda used 50% as a cut of point to consider adolescents as having good knowledge.

The current study identified that students who were from the urban residence were likely to practice safe

MHM than those who were from rural. This is in line with studies done in Mehalmeda, Amhara region students³⁶ and Harbu districts, Ethiopia showed girls from urban areas were more likely to use a disposable sanitary napkin than their counterparts.¹⁷ This finding is also consistent with the result of the review of studies from resource-poor countries.³⁹ This was because adolescents from urban were more likely to have access to different sources of information on menstruation and menstrual management and adolescents from rural have less access to materials and facilities used for MHM practices which is also supported by the findings from Jodhpur district of Rajasthan state,⁴⁰ Zambia,⁴¹ and Ethiopia.^{17,30}

Those adolescents who got information about menstruation before menarche from their mothers were twice

Table 4 Factors Associated with Menstrual Hygiene Management Practice Among School Adolescent Girls in Holeta Town, Central Ethiopia, 2019

Variables	Menstrual Hygiene Management		COR (95% CI)	AOR (95% CI)	P-value
	Good	Poor			
Residence					
Urban	102 (44.0)	130 (56.0)	2.74 (1.76–4.28)	2.62 (1.53–4.48)	
Rural	38 (22.2)	133 (77.8)	1	1	0.0004
Got information about menstruation before menarche from mothers					
Yes	71 (40.1)	106 (59.9)	1.52 (1.009–2.303)	2.17 (1.18–3.96)	
No	69 (30.5)	157 (69.5)	1	1	0.012
Got information about menstruation before menarche at schools from teachers					
Yes	62 (54.4)	52 (45.6)	3.22 (2.05–5.06)	5.09 (2.67–9.67)	
No	78 (27.0)	211 (73.0)	1	1	0.0000
Female toilets kept locked inside					
Yes	107 (45.5)	128 (54.5)	3.42 (2.16–5.41)	2.82 (1.67–4.76)	
No	33 (19.6)	135 (80.4)	1	1	0.000
Number of days missed school because of menstruation					
Not missed	101 (36.5)	176 (63.5)	2.41 (1.15–5.01)	3.69 (1.55–8.77)	0.003
One day	29 (39.2)	45 (60.8)	2.70 (1.17–6.22)	4.2 (1.55–11.41)	0.005
≥ to 2 days	10 (19.2)	42 (80.8)	1	1	0.008
Experienced health problems during menstruation					
Yes	111 (41.0)	160 (59.0)	2.46 (1.52–3.97)	2.63 (1.49–4.64)	
No	29 (22.0)	103 (78.0)	1	1	0.001
Ever experienced any whitish or gray discharge per the vagina					
Yes	106 (45.1)	129 (54.9)	3.23 (2.05–5.10)	2.84 (1.66–4.85)	
No	34 (20.2)	134 (79.8)	1	1	0.0001
Good overall knowledge about menstruation					
Yes	112 (38.4)	180 (61.6)	1.84 (1.13–3.008)	1.94 (1.07–3.52)	
No	28 (25.2)	83 (74.8)	1	1	0.029

more likely to have adequate MHM practices than those who did not. In agreement with this study done in Ambo town identified females who frequently discussed menses with their mothers were 70% less likely to manage their MHM safely.²⁶ This finding is also supported by the review from low and middle-income countries.¹² This might be due to those mothers who openly discuss

menstruation with their daughters were likely to support them with the required materials.

Adolescents who got information about menstruation before menarche at schools from teachers were five times more likely to practice safe MHM than those who did not. In agreement with the study done in Mehalmeda, Amhara region.³⁶ This finding is also consistent with a study done

in Nigeria, which is an inappropriate experience of menarche and the use of unhygienic menstrual absorbents were common in girls who had no premenarcheal training than those who did.⁴² This is maybe since those adolescents who get relevant information at school from teachers either in class or through clubs were likely to be equipped with the necessary skills needed for safe MHM practices.

Adolescent girls whose school toilets had female toilets with inside lock almost three times more likely to practice adequate MHM than those who did not have. In agreement with this study done in the Boset district of the east Shewa zone found those who have access to WASH facilities were more likely to have good MHM practice.³⁷ This is because students with school toilets with no inside locks were forced to wear wet sanitary materials until they find the appropriate place to change or dispose of it and fail to clean their genitalia privately.

The odds of practising safe MHM were higher among those adolescent girls who did not miss their school compared with those who had missed school. This is in agreement with the finding in Indonesia girls with poor MHM missed one or more days of school.⁸ This finding is also supported by the study done in Harbu districts of northeast Ethiopia in which school absenteeism was higher among those who did not use the disposable sanitary napkins as menstrual absorbent than their counterparts.¹⁷ This might be due to the fact that those who did not practice safe MHM were likely to be afraid of being suddenly stained with menstrual blood, ashamed or feeling insecure at school, concerned about odour, fear of teasing from other students, and have higher menstrual-related health problems than those who practice safe MHM. This is also supported by the study done in Uganda, in which MHM was associated with school attendance, with those changing three times a day or more had a higher school attendance rate.¹⁵

The current study also revealed that adolescent girls who ever experienced health problems during menstruation and experienced any whitish or gray discharge through the vagina were more likely to practice safe MHM than those who did not. This might be due to those adolescent girls' who had experienced those problems were likely to have awareness on MHM and pay more attention to their vaginal discharge. Additionally, those school girls who had a history of whitish or gray vaginal discharge might have a fear that others could smell their menses from their previous experience so that they try to keep their menstrual hygiene. This is also supported

by the finding from a study done in rural Uganda in which less whitish or green vaginal discharge was reported among those students who have fears that others could smell their menses.¹⁵

Those adolescent students who had good overall knowledge about menstruation were almost twice more likely to practice good MHM than those who had poor knowledge. The current finding is consistent with a study done in Sebeta town,²⁵ Mehalmeda,³⁶ Wegera district,²⁷ and Gedeo zone¹⁰ Ethiopia. This is also supported by the finding from Bangladesh knowledge improved adolescents MHM practice.^{11,21} This finding is also supported by the review study from resource-poor countries.³⁹ This could be since those adolescents who have a good overall knowledge might have more self-esteem and adequate skills in MHM practice.

The implications of this study for managers at different levels in the health and education systems in Ethiopia were as follows. A significant number that is nearly four out of six adolescent girls in the study area were practising unsafe MHM. It has also highlighted as there were disparities on MHM practices with residence, availability of female with inside lock toilets in schools, a source of information and overall knowledge on menstruation. Moreover, unsafe MHM practice is affecting school attendance and indirectly affecting adolescent girls school performance in the study area. Therefore, the findings from this study implied for designing an appropriate intervention through working on enhancing the awareness of adolescent school girls on menstruation and MHM practice and making school environments conducive for the safe MHM practices through equipping schools with adequate WASH facilities.

Limitations of the Study

Due to the cross-sectional nature of the study, it is difficult to establish a cause-and-effect relationship and the cultural sensitivity of the issue is not free from social desirability bias.

Conclusions

The study indicated overall only one-third of school adolescent's girls in the study area practiced good menstrual hygiene management. Nearly one-third of school adolescent girls possessed good overall knowledge of menstruation. Respondents residence, source of information about menstruation (mother and teachers at schools), schools having female toilets with inside lock, number of days missed school because of menstruation, experienced health

problems during menstruation, ever experienced any whitish or gray discharge through the vagina and having good overall knowledge about menstruation were factors identified to be associated with good MHM practice among school adolescent girls.

Therefore, all stakeholders should emphatically work on enhancing the awareness of adolescent girls on menstruation and MHM practice through teachers at schools, encouraging parent-adolescent girls' discussion about menstruation, making school toilets conducive for female adolescents with an inside look; and providing support and guidance for those adolescents who miss school due to menstruation.

Abbreviations

MHM, menstrual hygiene management; WASH, water, sanitation and hygiene.

Data Sharing Statement

The datasets used in the current study can be accessed from the author upon reasonable request.

Ethical Approval

The study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from the Research review committee of the College of Medicine and Health Sciences, Ambo University. Then an official letter of support was written to the Holeta town Education bureau and school administrations. Written informed consent was obtained from each study subject and their parents for under 18 years after they read the information sheet and the assent form. Data was collected without having any identifiers and the collected data were kept in a locked file along with the investigator.

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