

Menstrual Hygiene Management Practices and Associated Factors among Primary Second Cycle Female Students in Boset District of East Shoa Zone, Oromia, Ethiopia

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To cite this article:

Wandimagegn Gabre, Digafe Tsegaye, Endashaw Mandefro. Menstrual Hygiene Management Practices and Associated Factors among Primary Second Cycle Female Students in Boset District of East Shoa Zone, Oromia, Ethiopia. *Science Journal of Public Health*. Vol. 11, No. 3, 2023, pp. 64-75. doi: 10.11648/j.sjph.20231103.13

Received: March 5, 2023; Accepted: May 22, 2023; Published: May 31, 2023

Abstract: *Background:* In adolescents who experienced menstruation for the first time, menstrual hygiene management is constrained by practical, social, economic, and cultural factors such as the expense of commercial sanitary pads, lack of water and latrine facilities, lack of private rooms for changing sanitary pads, and limited education about the facts of menstrual hygiene. Therefore the Objective of this study is to menstrual hygiene management practices and associated factors among primary second-cycle female students in Boset district of east Shoa zone, Oromia regional state, central Ethiopia from March 28, 2022, to April 28, 2022. *Methods:* School-based cross-sectional study was conducted by multistage random sampling technique among 629 female students from the Primary second cycle. Data were collected using Self-administered pre-tested and semi-structured questionnaires. The data were coded, checked for completeness, entered into Epi-Info-7, and then exported to SPSS Version 22 for analysis. Bivariate and multivariate logistic regression with Crude and adjusted odds ratios with 95% CI was calculated, and p-values <0.05 was considered to indicate statistical significance. *Results:* The overall proportion of good menstrual hygiene management practices account for 51.2% (95% CI: 47.4–55.3). This study found that: being urban residence [AOR]: 1.84, 95% CI: (1.20, 2.80)], secondary and above the educational status of mothers [AOR]: 3.399, 95% CI: (2.07,5.57)], receiving pocket money for modes [AOR]: 2.19, 95% CI: (1.45,3.313)], freely discussing menstruation with parents [AOR]: 3.65, 95% CI: (2.327,5.727)], learning in school about menstrual hygiene [AOR]: 3.12, 95% CI: (2.096,4.628)], presence of water supply in school compound [AOR]: 1.71, 95% CI: (1.15,2.53)] and presence of functional toilets and hand washing facilities [AOR]: 1.789, 95% CI: (1.17,2.73)] were significant predictors of Menstrual Hygiene Management Practices. *Conclusion:* In this study, the practice of good menstrual hygiene management among primary second-cycle school girls was low. Factors independently influencing menstrual hygiene management practices were girls' place of residence, mothers' educational status, pocket money, discussions with parents, water supplies, functional toilets, and hand washing facilities. Hence students' parents should give pocket money and freely discuss with their female students and also government and other stakeholders should take action to improve and sustain water supply, functional toilets, and hand washing facilities for schools.

Keywords: Schoolgirls, Menstrual Hygiene, Menarche, Sanitary Pads, Bosat, East Shoa, 2022

1. Introduction

Menstruation is part of the female reproductive cycle that starts at puberty and menstrual hygiene is fundamental to the dignity and well-being of women and girls and an important

part of the basic hygiene, sanitation, and reproductive health services which every woman and girl has a right [1]. Menstruation is normal for every woman and a normal part of biological maturity. Early adolescent girls have been recognized as a special period in their life cycle that requires

due attention. This period is marked by the onset of menarche [2].

Globally, approximately 52% of the female population, or 26% of the total population is of reproductive age. Most of these women and girls menstruate each month for between two and seven days. Girls typically start to menstruate ('the time of menarche') during puberty or adolescence, typically between the ages of 10 and 19. It continues until they reach menopause, when menstruation ends, usually between their late forties and mid-fifties. The menstrual cycle is usually around 28 days but can vary from 21 to 35 days. The bleeding generally lasts between two and seven days, with some lighter flow and some heavier flow days [3].

A school-based cross-sectional study in Iran showed that more than half of adolescents have moderate practice and 95.6% of the participants were using disposable pads during menstruation [4].

Another cross-sectional study among rural adolescent girls in India showed that 89.2 % of girls use sanitary pads as a menstrual absorbent and the remaining 7.2% and 3% use fresh cloth and reusable cloth respectively [5]. An interventional study conducted in Bangladesh found that only 24% of girls use menstrual pads even after the health intervention with a 16% baseline. The remainder used poor-quality clothes dyed with toxic pigments, which might make them susceptible to uterine pain [6].

In developing countries, nevertheless, many girls cannot access or afford appropriate sanitary materials and often use inferior products such as new or old cloth, cotton wool, toilet paper, underwear alone, sponge, or nothing [7]. A Survey performed in five sub-Saharan African countries including Ethiopia also showed that the majority of adolescent girls reported a lack of safe, private, and clean toilets with washing facilities at schools which is important for MHM practices [8]. Girls in rural Ethiopia also expressed a hesitancy to buy sanitary pads in public shops due to the cultural or social implications of becoming a woman [9]. So that in Ethiopia, 11% of girls change their menstrual clothes once a day [10].

Menstrual hygiene management (MHM) is constrained by practical, social, economic, and cultural factors such as the expense of commercial sanitary pads, lack of water and latrine facilities, lack of private rooms for changing sanitary pads, and limited education about the facts of menstrual hygiene. During menstruation, adolescent girls are faced with challenges related to the management of menstrual hygiene in schools [11].

Globally girls miss up to 20% of school due to their monthly period, and one in ten will drop out altogether. 80% of girls in Afghanistan and 39% of girls in India use water but no soap for washing their menstrual protection. Menstruation affects girls' participation and performance at school. In various studies from Africa, the Middle East, and Asia, up to 95% of girls reported missing school because of their periods [12].

A study done in Kenya showed that the girls had faced difficulty managing their menstrual periods at school due to a lack of adequate privacy and sanitary facilities.

Several studies documented that menstruation-related problems had affected more than a third of students' class concentration, participation, socializing with friends, test-taking skills, homework task performance, and Dysmenorrhea which is significantly associated with school absenteeism, decreased academic performance, sports participation, and socialization with peers [13, 14].

The urban-rural disparity in access to sanitary napkins indicated that 37.1% of urban girls used sanitary napkins while only 1.6% of rural girls used this product. Sanitary napkins use was limited due to access and financial constraints [15].

As far as my knowledge is concerned there is no previous study that assesses menstrual hygiene management practice among primary second-cycle female students in Boset woreda so far. Therefore, based on the above facts this study is aimed to assess the menstrual hygiene management practices and associated factors among primary second-cycle girls in the area and is also important to generate information for developing interventions that were carried out on problems associated with menstrual hygiene practice and school health performance which is one of Woreda's transformation agenda and SDG in the area as well as national level.

Conceptual Framework

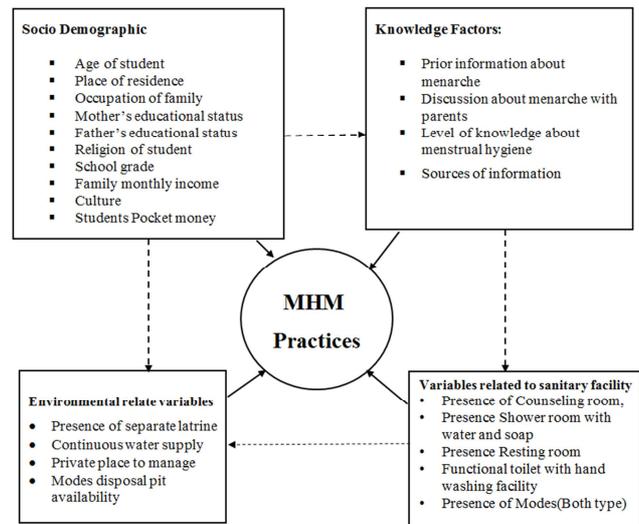


Figure 1. Conceptual Framework developed from Literature review (1, 5, 12, 13, 20, 23, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36).

2. Method and Materials

2.1. Study Area

The study took place in Boset district; one of the districts found in the eastern Shoa zone of the Oromia regional state. It is situated in the eastern parts of Ethiopia 25 km and 125km far from Adama and Addis Ababa respectively within the East Africa Great Rift Valley. The total population of this woreda is 220,362 (Male: 107,977 and Female: 112,385) but According to the CSA 2010, the total population of this woreda is estimated at around 142112 (Male: Female ratio;

52:48) of which 52% are males [16].

There is one primary Hospital, seven health centers (HC), and 33 health posts (HP) that provide health care services for residents of this woreda. There are 38 primary first cycle schools (grades 1 to 6) which educate 29,411 (Males: 15,276 and Females: 14,135), 30 primary second cycle schools (4 Private schools and 26 Governmental schools) which educate

3,939 (Males 2,290 and Females 1,649), and 6 secondary schools (grade 9 to 12) found in Boset district. The total of students from grades 1 to 12 for this year is 38,540 (19,898 Males and 18,642 Females). Among these, enrolled participants for this study were 1,649 Female students from 30 primary second-cycle schools (grades 7 to 8) for the 2022 academic year in this district.

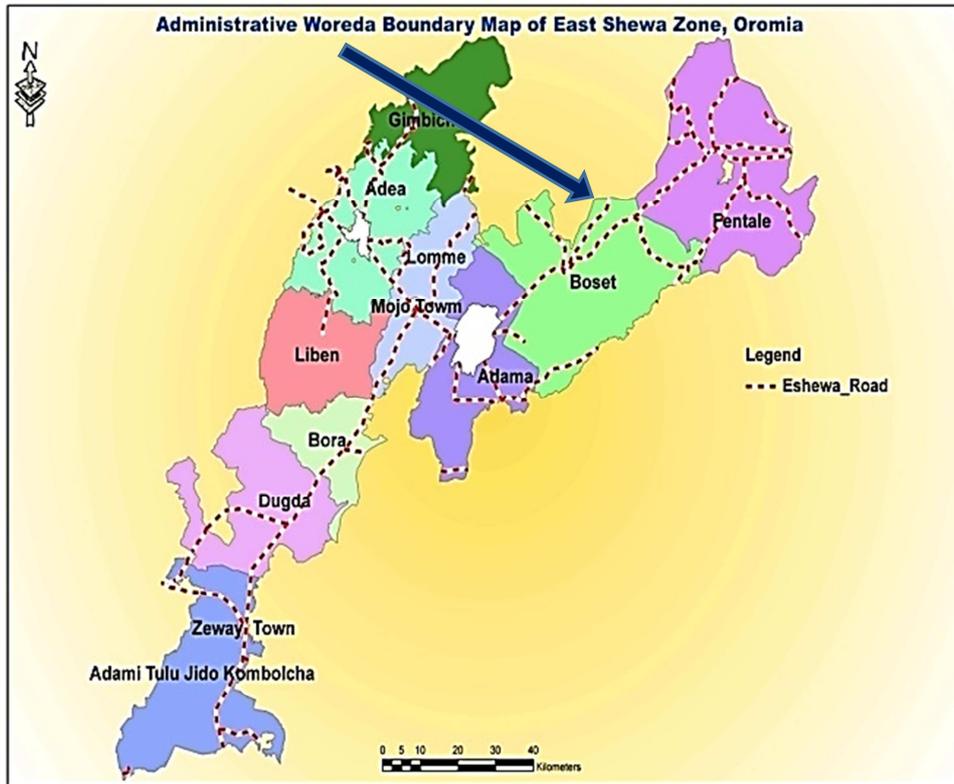


Figure 2. Boset Map.

2.2. Study Design and Period

The school-based cross-sectional study was conducted in the Boset district, East Shewa Zone of the Oromia region from December 28, 2022, to June 30, 2022.

2.3. Population

2.3.1. Source Population

All-female students were enrolled in primary second-cycle schools (grades 7 to 8) in the Boset district in the 2022 academic year.

2.3.2. Study Population

The study population was randomly sampled female adolescents from 11 primary second-cycle schools (grades 7 to 8) among the randomly selected schools during the 2022 academic year.

2.3.3. Eligibility Criteria

(i). Inclusion Criteria

All-female students enrolled from 11 primary second cycle schools (grades 7 to 8) for the regular program in the Boset

district in 2022 and volunteered to participate in the study.

(ii). Exclusion Criteria

All-female students who were not starting to menstruate or are in menarche due to abnormality or health problems.

Female students who are seriously ill during data collection time and visually impaired students were excluded.

2.4. Sample Size and Sampling Procedures

2.4.1. Sample Size Determination

The sample size was determined based on the assumption of the simple random sampling (SRS) method using the formula for single population proportion based on the findings of the previous similar study conducted in Southern Ethiopia, Chenchu woreda which found that 45.3% of the prevalence of menstrual hygiene practice among grade 7 and 8 adolescent school girls [17].

$$n = \frac{(Z_{\alpha/2})^2 P(1-P)}{d^2} = \frac{(1.96)^2 0.453(1-0.453)}{0.05^2} = 381$$

Where
n is the required sample size.

d is the margin of error (precision) =5%

Z a/2 is the Z- score corresponding to the 95% confidence level which is 1.96.

P which is 0.453 is taken from a previous study (Esayas Dilese et al., 2017)

10% of non-response

1.5 design effect applied because of multistage random sampling

So that, $nf = 381 * 1.5 = 572 + 10\% (572) = 572 + 57 = 629$

Assuming a 95% confidence level and an acceptable

difference of 5%, the sample size becomes 629. The sample size for the second objective was calculated by using EPI Info version 7, by considering the following assumptions confidence level of 95%, power of 80% by using factors associated with menstrual hygiene management. Many types of research show that menstrual hygiene management is associated with sanitary material-related factors, knowledge, environmental-related factors, and cultural factors.

Sample size estimation for a second specific objective

Table 1. The sample size for the second objective of the study was conducted in the Boset district, East Shoa zone, Oromia regional state, Ethiopia in 2022.

Factors	Proportion	AOR	CI	Power	Sample size	Reference
Affordability of pad	75.8%	2.10 (1.30,3.39)	95%	80	398	Zinie Abita, et al., 2019
Menstruation considered as secrete	81.2%	4.02 (1.2,13.1)	95%	80	335	Muluken Azage, et al., 2018
Frequency of discussing menses	34.6%	0.30 (0.13, 0.71)	95%	80	485	Seifadin Ahmed, et al., 2018
Poor knowledge about Menstruation	41.3%	11.3628 (5.6, 23.077)	95%	80	516	Teklemariam Ketema, et al., 2014

Therefore sample size for the second objective is less than for the first objective, so my final sample size is 629.

2.4.2. Sampling Procedure

A multistage sampling technique was used to select the study participants. There are 30 primary second-cycle schools or grades 7 and 8 found in this district (26 governmental and 4 private primary second-cycle schools). Initially, from the total of 30 primary second cycle schools, 11 (37%) schools were selected by a simple random sampling technique (9 from governmental and 2 from private) after being stratified into governmental and private schools. Then, the selection of each school was stratified into grade 7 and grade 8 and then further stratified into sections. Finally, a proportional allocation of female students was selected (see

Figure 3 below) by a simple random sampling technique from each section. Accordingly, to the data obtained from the Boset District Education office, there are about 1,649 Female students (860 grade 7 and 789 grade 8) attending their education in those selected schools. So that by dividing the total target population of 1,649 by our sample size of 629 (38%) we obtained a sampling interval K=3. From 1-3, picking the random number of female students was selected systematically by adding 3 intervals. The list (frame) of girl students enrolled in each class was obtained from the school's roster.

Schematic presentation

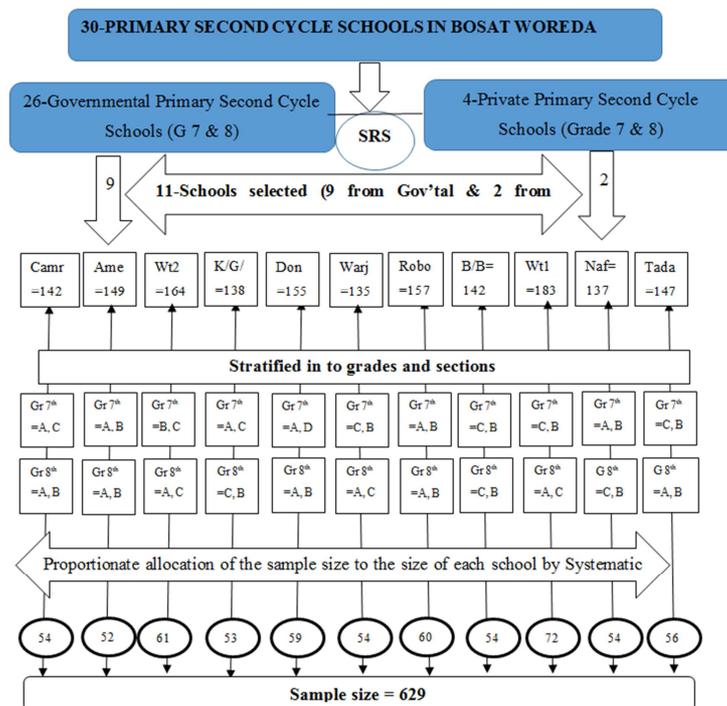


Figure 3. Schematic presentation of sampling procedure among all Female students enrolled in grades 7 to 8 in Boset District, East Shoa Zone, Ethiopia, 2022.

2.5. Study Variable

2.5.1. Dependent Variables

Menstrual hygiene Management practice

2.5.2. Independent Variables

Socio-Demographic

- 1) Age
- 2) Place of residence
- 3) Occupation of parents
- 4) Parents education level
- 5) Family monthly income
- 6) Students Pocket money

Cultural & Socio Economic Factors:

- 1) Family/Girls' income
- 2) Social norms
- 3) Male involvement

Variables related to sanitary facility

- 1) Presence of Solid & liquid waste disposal system
- 2) Presence of a Counseling room,
- 3) Presence of a Shower room with water
- 4) Presence of a Resting room
- 5) Presence of Functional Girls Club
- 6) Presence of Modes (any type)

Knowledge Factors:

- 1) Awareness
- 2) Sources of information
- 3) Family influence
- 4) Discussion about menarche with parents

2.6. Operational Definition

Knowledge of menstrual hygiene management: The scales to measure the knowledge according to Nursalam [7] where the level of knowledge is considered as good when the total score is 76–100%, moderate when the score is 56–75%, and poor when it is <56% [18].

Menstrual Hygiene practice: - MHM practices score was calculated out of 10 practice-specific questions. Each correct answer was given one mark, and any incorrect or do not know the answer was given zero marks. The total score of practice ranges from 0 to 10. The mean score of MHM practices was used to decide the cutoff point. Accordingly, respondents who scored mean and above the mean were categorized as having good MHM practices, while those who scored less than the mean were categorized as having poor MHM practices [18].

2.7. Data Collection Procedure and Materials And Data Quality Assurance

Data were collected by using pre-tested, semi-structured, and self-administered questionnaires adapted from a review of related literature. It consists of three sections (socio-demographic information, menstrual hygiene practices, and associated factors questions). A self-administered questionnaire was distributed to the students by trained four health extension workers with experience in data collection, the data were collected in classrooms and female instructors

facilitated the orientation and dissemination of the questionnaire. An observation checklist also was conducted by observing the school's campus. Finally, the filled questionnaire was checked for completeness and consistency of the data by the supervisors (BSc Midwives).

First, the questionnaire was pre-tested with 5% of the sample size on menstrual hygiene practice among primary school girls of Fatale woreda before the data collection period, those who were not included in the actual study, and necessary modifications were made based on the nature of gaps identified in the questionnaire. The midwife nurses who collect the data are given a brief orientation on how to gather the appropriate information, procedures of data collection techniques, and the whole contents and subject matter of the questionnaire. The data was collected by trained midwives using a standard, semi-structured, and pre-tested questionnaire prepared in Afan Oromo and Amharic.

Day-to-day on-site supervision by the researcher was carried out during the whole period of data collection. At the end of each day, the questionnaire was reviewed and cross-checked for completeness, accuracy, and consistency by the investigator, and corrective discussion was undertaken with all the data collectors. The data was edited and cleaned to ensure accuracy and consistency completeness of data.

2.8. Data Process and Analysis

Data were entered into Epi Info version 7.2. Statistical software and then exported to SPSS version 22 for further analysis. Frequencies and cross-tabulations were employed to summarize descriptive statistics. Bivariable logistic regression was conducted to assess the association between each categorical variable with the outcome variable and to identify candidate variables (with p -value ≤ 0.25) to be included in the multivariable logistic regression model. Then multivariate logistic regression model was fitted using the default variable selection method to identify variables independently associated with the outcome variable of interest at a 5% significance level. The AOR and the corresponding 95% CI for the variables in the final model were reported. The level of significance was declared at a p -value ≤ 0.05 .

2.9. Ethical Consideration

Ethical approval was obtained from Rift Valley University College of ethical clearance board and a letter of collaboration was sought from the Boset District Education office. Data collectors and supervisors were taken orientation and training on Ethical issues like confidentiality and the Right of students and how to encourage girls to talk about their and their friends' experiences before and after menarche, as well as, how to take information in a research ethics manner.

Data collectors were expected to provide adequate information about the purpose, benefits, and risks of the study and their right to discontinue or refuse to participate in the study. Permission to conduct the study is obtained from the Boset District Education office and then school directors

were briefed on the objectives of the study as well as written informed consent was presented to the participants. For those students who were under the age of consent, informed verbal assent was obtained from their parents. Confidentiality of information was maintained by omitting any personal identifier from the questionnaires. The recorded data were stored in a safe place where no one except the principal investigators has access to them.

2.10. Dissemination of Results

After completion of the research, the results of the study were presented during thesis defense, and the final result was submitted to Rift Valley University, School of Public Health. In addition, the result of the study will be disseminated to responsible bodies to be used as baseline information for further study, and also attempt will be made for Publication in a Research Journal.

3. Results

3.1. Socio-Demographic Characteristics of the Study Participants

A total of 629 primary second-cycle female students participated in this study, making a response rate of 100%. The mean standard deviation age of study participants was 15.48 ± 1.12 years. Whereas the mean with a standard deviation age at menarche was 12.78 ± 0.98 years. Most, 416 (66.1%) of the students were from rural residences. Regarding the educational status of their mother and father, about 406 (64.5%) of mothers and 338 (53.7%) of fathers had no formal education respectively. Concerning the Educational level of the respondent, more than half (52.1%) of them were grade 7 students. About 619 (98.4%) were single by marital status. The majority 468 (69.6%) female students permanently receive Pocket money from their parents for modes (Table 2).

Table 2. Socio-Demographic Characteristics of Primary Second Cycle Female Students in Boset District of East Shoa Zone, Oromia, Ethiopia, 2022 (n=629).

Variables	Categories	Frequency (n)	Percent (%)
Age	≤15 years	350	55.6
	Above 16 years	279	44.4
Age at menarche	10-13	502	79.8
	>14years	127	20.2
Residence of students	Urban	213	33.9
	Rural	416	66.1
	2 ^{ndary} and above education	166	26.4
Mother educational status	Primary education	57	9.1
	No formal education	406	64.5
	2 ^{ndary} and above	228	36.2
Father educational status	Primary education	63	10.0
	No formal education	338	53.7
	1000-2000Birr	36	5.7
	2001-3000Birr	250	39.7
Average monthly income of parents (Ethio. birr)	3001-4000Birr	181	28.8
	above 4000 Birr	162	25.8
	Engage	7	1.1
Marital status	Married	3	.5
	Single	619	98.4
The educational level of the respondent	Grade 7	328	52.1
	Grade 8	301	47.9
Pocket money for modes	Yes	438	69.6
	No	191	30.4

3.2. Knowledge of Menstruation and Its Hygiene Management

In this study, 364 (57.9%) female students had good knowledge of Menstruation and Hygiene Management. The majority (496 (78.86%)) of them knew that menstruation was a physiological process. Regarding causation, 351 (55.8%) knew that the cause of menstruation was hormonal and 199 (31.6%) thought that it was caused by curses of GOD. Concerning the source of blood during menstruation nearly half (49.6%) responded uterus was a source of blood during menstruation while 222 (35.3%) thought that it was from the vagina. About 503 (80.0%) responded that Menstrual blood was unhygienic. The majority still 414 (65.8%) did not wash their external genitalia with soap and water. Regarding the ideal menstrual absorbent, 339 (53.9%) of them stated that a

sanitary pad was a good absorbent. Concerning the normal menstrual bleeding duration, about 536 (85.2%) of them reported it was within 2-8 Days. In addition, More than three-fourths (76.2%) of them reported as they went to school during menstruation (Table 3).

More than one-third (33.2%) of female students freely discuss menstruation with their parents/friends while the remaining 420 (66.8%) of them did not. Accordingly, the reasons for not discussing with parents were: shamefulness 312 (57.2%) the main reason followed by privacy or secrecy menstruation issue 100 (15.89%). In this study, the main source of information regarding menstruation and menstrual hygiene of the respondents was more than one source (teacher, sister, and mother) which accounts for 204 (32.4%), mothers 158 (25.1%), followed by teacher 115 (18.3%) and friends 84 (13.4%) respectively (Table 3).

Table 3. Knowledge of Menstruation and its Hygiene Management among Primary Second Cycle Female Students in Boset District of East Shoa Zone, Oromia, Ethiopia, 2022 (n=629).

Variables	Categories	Frequency (n)	Percent (%)
Heard about menstruation	Yes	472	75.0
	No	157	25.0
Menstruation	It is a physiological process	496	78.86
	due to a curse from God	94	14.9
	I don't know	39	6.2
Source of blood during menstruation	Uterus	312	49.6
	Vagina	222	35.3
	Urinary Bladder	63	10.0
	Abdomen	32	5.1
Causes of menstruation	Hormone Action	351	55.8
	Curse of God	199	31.6
	Disease	39	6.2
	Don't know	40	6.4
Source of information about menstruation	Mother	158	25.1
	Sister	68	10.8
	Teacher	115	18.3
	Friends	84	13.4
Menstrual blood is unhygienic	More than one (teacher, mother)	204	32.4
	Yes	503	80.0
	No	126	20.0
Freely discuss with parents	Yes	209	33.2
	No	420	66.8
washing external genitalia with soap and water	Yes	215	34.2
	No	414	65.8
girls go to school during menstruation	Yes	479	76.2
	No	150	23.8
Menstruation is a secret issue	Yes	246	39.1
	No	360	60.9
	Shamefulness	312	57.2
Reason for not discussion with parents (n=420)	privacy or secrecy	100	15.89
	not habitual	22	3.49
	Other reason	9	1.4
	Disposable sanitary pad	339	53.9
The absorbent is ideally used during menstruation	Pant liners or other	71	11.3
	Rags or any clothes	74	11.8
	Reusable and washable cloth pads	145	23.1
How Long is the normal menstrual bleeding duration	2-8 Days	536	85.2
	Less than 2 Days	50	7.9
	More than 8 Days	43	6.8
Overall knowledge status	Good	364	57.9
	Poor	265	42.1

3.3. Menstrual Hygiene Management Practices

The proportion of the good menstrual hygiene management practice among female students was found to be 322 (51.2%) (95% CI: 47.4%–55.3%). About two-thirds (60.1%) of them use reusable modes during menstruation. Among the total, 504 (80.1%) of them used commercial

disposable modes during menstruation. Around two-fifths, (39.9%) of girls were changing their modes more than three times a day during menstruation, and nearly one-fifth (19.9%) of them took a bath daily with soap during menstruation. All (100%) female students cleaned their external genitalia with water and soap during menstruation. Half (50.1%) of them were disposed of using sanitary pads in dustbins (Table 4).

Table 4. Menstrual Hygiene Management Practices among Primary Second Cycle Female Students in Boset District of East Shoa Zone, Oromia, Ethiopia, 2022 (n=629).

Practice-related questions	Yes		No	
	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)
Uses reusable modes	378	60.1	251	39.9
Uses commercial disposable modes	504	80.1	125	19.9
Changes modes more than three times a day	251	39.9	378	60.1
Wash reusable modes with soap and water	378	60.1	251	39.9
Dry reusable modes in the sunlight	350	55.6	279	44.4
Disposes of pads by wrapping them in paper	251	39.9	378	60.1
Takes bath daily with soap during menstruation	125	19.9	504	80.1

Practice-related questions	Yes		No	
	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)
Cleans external genitalia during menstruation	243	38.6	386	61.4
Cleans external genitalia with water and soap	629	100.0	0	0
Disposes of used sanitary pads in dustbins	315	50.1	314	49.9
Overall menstrual hygiene practices	Good	322	51.2	
	Poor	307	48.8	

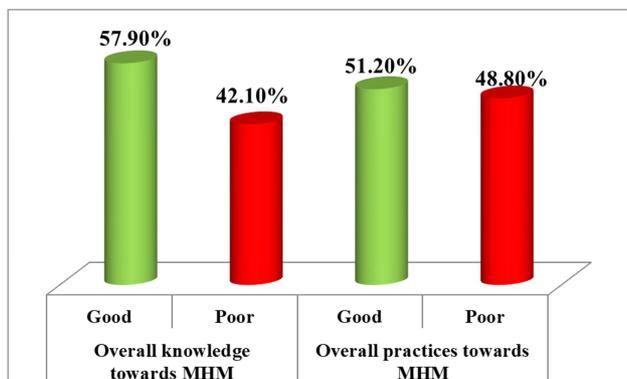


Figure 4. Overall summary of knowledge and practices towards menstrual hygiene management among Primary Second Cycle Female Students in Boset District of East Shoa Zone, Oromia, Ethiopia, 2022 (n=629).

3.4. Factors Associated with Menstrual Hygiene Management Practices

Binary and multiple logistic regression analyses were done to identify factors associated with Menstrual Hygiene Management Practices. In bi-variable logistic regression, among variables analyzed; Secondary and above the educational status of mothers, being urban residents, Receiving pocket money for modes, Freely discussing menstruation with parents, Presence of water supply in the school compound, Presence of functional Toilets and hand washing facilities, Presence of suitable counseling room during menstruation and having good knowledge about menstruation hygiene management showed a p-value < 0.25. However after fitting those variables into multiple logistic regressions model: being urban residence [AOR]: 1.84, 95% CI: (1.20, 2.80)], Secondary and above the educational status of mothers [AOR]: 3.399, 95% CI: (2.07,5.57)], Receiving pocket money for modes [AOR]: 2.19, 95% CI: (1.45,3.313)], Freely discussing menstruation with parents [AOR]: 3.65, 95% CI: (2.327,5.727)], Presence of water supply in school

compound [AOR]: 1.71, 95% CI: (1.15,2.53)], Presence of functional Toilets and hand washing facilities [AOR]: 1.789, 95% CI: ((1.17,2.728)] and learning in school about menstrual hygiene [AOR]: 3.12, 95% CI: ((2.096,4.628)] were found to be predictor variables for Menstrual Hygiene Management Practices (value<0.05).

Accordingly, the odds of having good Menstrual Hygiene Management Practices were 1.84 times higher among female students from urban residences as compared to that in rural residences [AOR]: 1.84, 95% CI: (1.20, 2.80)]. In addition, the odds of Good MHM practices were increased by 3 fold among female students whose mothers were secondary and above educational status as compared to those with no formal educational status [AOR]: 3.399, 95% CI: (2.07,5.57)]. Moreover, the finding of the present study indicated that the odds of Good MHM practices increased by about 2 folds among female students that Received permanent pocket money for modes from their family as compared to those that did not [AOR]: 2.19, 95% CI: (1.45,3.313)].

In this study the odds of having Good MHM practices were 3.65 times more likely higher among female students that freely discussed menstruation with their parents/friends as compared to counterparts [AOR]: 3.65, 95% CI: (2.327,5.727)]. Besides, the odds of Good MHM practices increased by 1.71-fold among female students reporting the presence of water supply in the school compound as compared to those that did not [AOR]: 1.71, 95% CI: (1.15,2.53)]. Furthermore, the odds of Good MHM practices increased by 2 folds among female students that reported the presence of functional Toilets and hand washing facilities as compared to those that did not [AOR]: 1.789, 95% CI: (1.17,2.728)]. Lastly, this study also indicated that female students that learn in school about menstrual hygiene 3 times higher odds of practicing Good MHM as compared to those who did not learn [AOR]: 3.12, 95% CI: (2.096, 4.628)] (Table 5).

Table 5. A logistic regression analysis of Menstrual Hygiene Management Practices among Primary Second Cycle Female Students in Boset District of East Shoa Zone, Oromia, Ethiopia, 2022 (n=629).

Variables	Category	MHM practice		COR (95% CI)	AOR (95% CI)	p. value
		Good	Poor			
Age category	Above 16 years	143	136	1.0 (0.73,1.38)	0.99 (0.727,1.366)	0.983
	≤15 years	179	171	1.00	1.00	
Residence	Urban	131	82	1.88 (1.34,2.64)*	1.84 (1.20,2.80)	0.005
	Rural	191	225	1.00	1.00	
Mother educational status	2 ^{ndary} and above education	126	40	4.33 (2.88,6.5)**	3.399 (2.07,5.57)	0.000
	Primary education	25	32	1.07 (0.6,1.88)	1.20 (0.62,2.301)	0.593
	No formal education	171	235	1.00	1.00	
Father educational status	2 ^{ndary} and above education	117	111	0.99 (0.71,1.39)	0.99 (0.71,1.396)	0.981
	Primary education	31	32	0.91 (0.53,1.56)	0.907 (0.52,1.57)	
	No formal education	174	164	1.00	1.00	

Variables	Category	MHM practice		COR (95% CI)	AOR (95% CI)	p. value
		Good	Poor			
School grade	Grade 8	154	147	0.99 (0.73,1.36)	0.97 (0.68,1.37)	0.845
	Grade 7	168	160	1.00	1.00	
Pocket money for modes	Yes	247	191	2.0 (1.42,2.83)**	2.19 (1.45,3.313)	0.000
	No	75	116	1.00	1.00	
Awareness before menarche	Yes	241	231	0.98 (0.68,1.405)	1.045 (0.70,1.55)	0.828
	No	81	76	1.00	1.00	
Discuss menstruation with parents	Yes	159	50	5.01 (3.45,7.28)**	3.65 (2.327,5.727)	0.000
	No	163	257	1.00	1.00	
Presence of water supply in the school compound	Yes	201	119	2.62 (1.90,3.62)*	1.71 (1.15,2.53)	.008
	No	121	188	1.00	1.00	
Separate toilet for girls	Yes	281	270	0.94 (0.58,1.51)	0.93 (0.55,1.553)	0.773
	No	41	37	1.00	1.00	
Presence of hand washing facilities in the school compound	Yes	112	98	1.14 (0.82,1.58)	1.157 (0.80,1.667)	0.432
	No	210	209	1.00	1.00	
Toilets and hand washing facilities functional	Yes	210	98	3.99 (2.87,5.57)**	1.789 (1.17,2.728)	0.007
	No	112	209	1.00	1.00	
learn in school about menstrual hygiene	Yes	193	86	3.84 (2.75,5.37)**	3.12 (2.096,4.628)	0.000
	No	129	221	1.00	1.00	
Knowledge status	Good	203	161	1.55 (1.125,2.12)*	1.156 (0.68,1.95)	0.588
	Poor	119	146	1.00	1.00	

1: reference category, MHM: Menstrual hygiene management, COR: Crude Odd Ratio, AOR: Adjusted Odd Ratio, * refers significance at binary analysis (p-value<0.25) ** refers to the strong association with P.value <0.0001

4. Discussions

The present study demonstrated that 51.2% of female students had a good level of menstrual hygiene management practice (95% CI: 47.4%–55.3%). The finding present is lower as compared to previous studies from Egypt 90% [19], Mehalmeda high school students in Amhara regional state 90.9% [20], Debre Tabor Town 73.2% [21], Finot Selam town in northwest Ethiopia 68% [22], Harari Region 55.8% [23], East Hararge Zone Eastern Ethiopia 58.3% [18], Chelenko town in Eastern Ethiopia 68% (46) and Adama Town 57% [24]. The possible justification for the lower level of good menstrual hygiene management practice in our case might be variation in the study population: In this study, only grade 7 and grade 8 students were included while the majority of the above mention studies include high school and secondary level students that might have a better understanding on menstrual hygiene practice as compared to those with lower grade students which in turn raises their prevalence. This difference might be also due to the reason that 64.5% of mothers in this study area were illiterate and not interested to express their views and educating their daughters about menstrual hygiene because of the taboo of discussing menstruation. Moreover, this discrepancy could be a result due to low socioeconomic status to buy sanitary pads and soap, shortage of water, and poor knowledge of menstrual hygiene.

This study, however, was higher as compared to studies from Bangladesh 29.7% [25], Indonesia 35.9% [26], Nigeria 13.2% [27], Wegera District in Northwest Ethiopia 29.8% [25], Ambo City 46.4% [28], adolescent schoolgirls in sebeta town 21% [29]. This higher level of good menstrual hygiene management practice might be due to the difference in the study area in which MHM is still donors' supported activities

in Boset woreda by international NGOs like UNICEF (urban WASH and Regular WASH program) and local NGOs like CCFO and ODA. These NGOs are supporting both software parts (awareness creation for targeted students) and hardware parts like reusable and commercial modes and constructing WASH facilities for selected schools. The difference in the study period and study population could also be another possible explanation. The present study is in line with studies in Ambo town in Western Ethiopia 53.6% [30] and School Adolescent Girls in Addis Ababa 51.3% [31]. The existence of such similarity might be due to multiple primary schools being included in this study which makes it similar to the study From Addis Ababa. Likewise, comparable sample sizes were included in both studies.

In the current study, residence was a significant predictor of good menstrual hygiene management practice. Accordingly, the odds of having good Menstrual Hygiene Management Practices were 1.84 times higher among female students from urban residences as compared to those in rural residences [AOR]: 1.84, 95% CI: (1.20, 2.80)]. This finding is consistent with the study done in Indonesia, East hararge zone, Mehalmeda High School Students in Amhara Regional State, Bangladesh, and Debre Tabor Town all studies indicated Adolescent girls who live in urban areas are more likely to practice good menstrual hygiene than those who live in rural area [18, 20, 21, 25, 26]. The plausible justification for this association might be adolescent girls who live in urban areas can expose to a different source of information and the educational level of parents and freedom of discussion with parents might be good in urban than in rural. In addition access to appropriate and affordable sanitary products and access to sanitary facilities at the household and school, levels might be better in the urban areas as compared to the rural area.

The present study indicated that higher maternal education

was positively associated with girls' good MHM practices. The odds of Good MHM practices were increased by 3 fold among female students whose mothers were secondary and above educational status as compared to those with no formal educational status [AOR]: 3.399, 95% CI: (2.07, 5.57)]. This finding is in line with several other studies from East hararge zone, Chelenko, Debre Tabor, and Addis Ababa that reported Adolescent girl's mother who attends secondary school and above are more likely to practice good menstrual hygiene than those who did not have formal education [18, 21, 31, 32]. This can be explained by the fact that educated mothers might have a better awareness of menstrual hygiene practices, and thus, they could have an open discussion with their daughters about menstruation and/or more likely provide appropriate sanitary materials for them to keep their menstrual hygiene during menstruation.

These studies also revealed that receiving pocket money from a parent was a strong determinant of good menstrual hygiene management practice. Hence the odds of Good MHM practices increased by about 2 folds among female students that received permanent pocket money for modes from their families as compared to those that did not [AOR]: 2.19, 95% CI: (1.45, 3.313)]. The finding of the present study was supported by a study from Chelenko that showed there was a significant association observed between permanent pocket money and the practice of menstrual hygiene [32]. This might be explained by the fact that financial constraints may compel them to use old/homemade clothes that were not effectively cleaned or fully dried before use.

In this study discussion with parents about menstruation was the other predictor of menstrual hygiene management. The odds of having Good MHM practices were 4 times more likely higher among female students that freely discussed menstruation with their parents/friends as compared to counterparts [AOR]: 3.65, 95% CI: (2.327, 5.727)]. This finding is concordant with studies from Harari, Finote Selam, and Ambo City that showed those who have a discussion with their parents at home are more likely to have good practice than those who didn't discuss [22, 23, 28]. This might probably be related to getting the freedom to ask for sanitary materials from their parents and to consider it as a natural phenomenon to manage without frustration.

This study also revealed that the odds of Good MHM practices increased by 2-fold among female students reporting the presence of water supply in the school compound as compared to those that did not [AOR]: 1.71, 95% CI: (1.15, 2.53)]. This finding analogous to a study from Mehalmeda in Amhara regional state and India that indicated those participants who had access to water were practiced good menstrual hygiene [20, 33]. The plausible justification for this association might be water used for washing the genital areas and a lack of water supply and sanitation facilities in schools may also increase susceptibility to reproductive health-related problems.

This study also showed that the odds of Good MHM practices increased by 2 folds among female students that reported the presence of functional Toilets and hand washing

facilities as compared to those that did not [AOR]: 1.789, 95% CI: ((1.17,2.728)]. This finding is consistent with studies from Western Kenya and Gambia that showed Water, sanitation, and hygiene (WASH) conditions in schools, such as access to latrines, water, and soap, are essential for the comfort, equity, and dignity of menstruating girls [34, 35]. Inadequate WASH facilities in schools hindered them from meeting the thresholds of appropriate MHM to avert adverse health outcomes, particularly for girls with heavy menstrual bleeding [35].

This study also indicated that Learning in school about menstruation was significantly associated with menstrual hygiene management practice. Female students that learn menstrual hygiene in school have about 3 times higher odds of practicing Good MHM practices as compared to those who did not learn [AOR]: 3.12, 95% CI: (2.096, 4.628)]. This finding is parallel with studies from Debre Tabor town that revealed Adolescent girls who had learned in school were 3.14 times more likely to practice good menstrual hygiene than those who had not learned in school [21]. This could be related to the fact that Education briefly describes menstruation as a natural process, caused by hormones and it can be properly managed in addition, it reduces taboos and backward cultural beliefs that Girls menstruating couldn't walk on the road when there is a religious ceremony. It was not allowed for women to shake hands with spiritual fathers.

4.1. Strength of the Study

This study was done by challenging the security challenges. Also studying early adolescent school girls on MHM is the cornerstone to intervene and prevent MHM-related risks which is one of SDG. Self-administered questionnaires with a random selection of schools and girl students with a large sample size increased the accuracy of generalizing the targeted population.

4.2. Limitations of Study

Due to the cross-sectional nature of the study, it is difficult to establish a causal relationship between the dependent and predicting variables.

The study addressed the culturally sensitive issue of menstrual hygiene so; it is prone to a bias called social desirability bias. Hence we tried to minimize it by using experienced female data collectors and female teachers to facilitate the orientation and it was self-administered.

There may also be recall bias for the age of menarche.

5. Conclusions and Recommendations

5.1. Conclusion

In this study, more than half of primary second-cycle school girls had good MHM practices which were still low. Factors independently influencing menstrual hygiene management practices were: residence, educational status of mothers, receiving pocket money for modes, freely discussing menstruation with parents, presence of water supply in the school compound, presence of functional toilets,

and hand washing facilities, and learning in school about menstrual hygiene.

5.2. Recommendation

Policymakers and stakeholders should give special attention to making a friendly school environment or a comfortable place for girls to manage their menstrual hygiene. Boset Woreda's educational office should enrich adult education for all mothers in this woreda. Boset woreda health office in addition to awareness creation on MHM also should follow whether school WASH facilities function properly and facilitate the construction of MHM facilities (Shower room, Cauncling room, and resting room) by considering for differently abled (disabled) students.

All school directors, teachers, PTA, and school girls' clubs should participate in awareness creation and reusable modes of production for affordability, accessibility, and durability especially, for rural students. Mass media could be used to disseminate accurate information about menstrual hygiene management, particularly in rural settings. All students' parents are advised to give pocket money and freely discuss menstruation with their female students. We invite other researchers to undergo large-scale studies on menstrual hygiene by employing both qualitative and quantitative methods.

List of Acronyms

CCFO: Care for Child and Family Organization
 HC: Health center
 HP: Health post
 IRB: Institutional review board
 MHM: Menstrual hygiene management
 NGO: Non-Governmental Organization
 ODA: Oromia Development Association
 PTA: Parent Teacher Association
 SDG: Sustainable Development Goal
 SNV: Netherlands Development Organization
 UNICEF: United Nations Children's fund
 WASH: Water, sanitation, and hygiene

Compliance with Ethical Standards

Data Availability

The data used to support the finding of this study are available from the corresponding author upon request.

Conflict of Interest

The authors declare that they have no competing interests.

Funding Sources

All the expenses for this original study were covered by principal investigators.

Ethical Approval

Ethical approval was obtained from Rift Valley University,

Boset Districts Education Office, and Boset District Health Office.

Acknowledgements

First of all, I would like to express my gratitude and special thanks to Rift Valley University Faculty of Health Science Department of Public Health to design career development for Public Health at the Master's level. Next to my GOD almighty; who kept me safe, secure, healthy, and for all his kindness in my Study.

I would like to forward my deepest appreciation and thanks to all my Instructors/advisors for their unreserved and continuous guidance, constructive advice, valuable comments, and suggestion for the development of this work.

Also, more thanks go to the entire administration of the Boset District Education office for the provision of information and cooperation in the Background area. I would like to thank all students who participated in this study and wish long life with better education achievements.

Finally, my sincere acknowledgment goes to my family members and friends for the prayers, encouragement, financial support, love, and presence whenever I need them.

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