Factors Associated with Knowledge and Practices of Menstrual Hygiene among Adolescent School-Going Girls of Birendranagar Municipality, Surkhet

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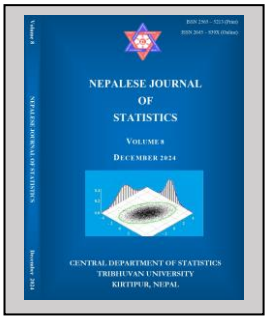

ABSTRACT

Background: Menstruation refers to a susceptible period in the life of adolescent girls. Various factors are associated with knowledge and practices of menstrual hygiene among adolescent girls.
Objective: To identify the factors associated with knowledge and practices of menstrual hygiene among adolescent school-going girls of Birendranagar Municipality, Surkhet.
Materials and Methods: A self-administered questionnaire collected the primary data of 372 adolescent school-going girls using a stratified random sampling technique. The study used both descriptive and inferential statistical analysis. Multiple logistic regression model was used followed by bivariate analysis. The goodness of fit of the model was examined by using the Hosmer-Lemeshow test and the accuracy of fitted model by using Receiver Operating Characteristic (ROC) Curve.
Results: The average age (mean ± SE) and the average age (mean ± SE) at menarche of the respondents were 14.62 ± 0.059 years and 12.47 ± 0.049 years respectively. The variables where respondents do not attain program/sessions at school about menstruation before menarche [OR:4.81, 95% CI: (1.36, 16.97), p = 0.015], who believed no effect of menstruation on academic performance [OR:0.21, 95% CI: (0.05, 0.84), p = 0.028], the heavy amount of bleeding [OR: 5.73, 95% CI: (1.63, 20.20), p = 0.007] and having restriction i.e. not allowed to sleep in their own room [OR: 6.02, 95% CI: (1.71, 21.24), p = 0.005] were significantly associated with poor knowledge of menstrual hygiene at α = 0.05. The fit of the model is good [H-L (χ^2) = 5.803, p = 0.446] and the AUC is 85.9%. Likewise, it is found that the poor practices of menstrual hygiene are significant with the reaction of respondents to their first menstruation i.e. emotional disturbance [OR: 13.34, 95% CI = (1.55, 114.99)] and having restriction i.e. not allowed to enter the kitchen during menstruation [OR: 3.86, 95% CI = (1.71, 8.65)] at α = 0.05. The fit of the model is good [H-L (χ^2) = 3.238, p = 0.778] and the AUC is 72.2%.
Conclusion: Students not attending sessions about menstruation and traditional barriers such as not allowed to sleep in their own room and not believing the effect of this on academic

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performance are highly responsible to the poor knowledge of menstrual hygiene. Emotional disturbances and restricting girls from kitchen during menstruation also contribute to poor hygiene practices. Addressing these issues within families can improve menstrual hygiene knowledge and practices.

Keywords: Knowledge and practice of menstrual hygiene, menstruation, multiple binary logistic regression.

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INTRODUCTION

Every month, 1.8 billion people across the globe menstruate. The menstrual cycle is difficult for millions of these girls, women, transgender men, and non-binary people to handle respectably and healthily. On the other hand, many adolescent females experience stigma, bullying, and social exclusion while having their periods. Menstrual health and hygiene requirements can be neglected due to gender inequality, discriminatory societal norms, cultural taboos, poverty, and a lack of essential services like toilets and sanitary products. For adolescent girls to successfully manage their menstrual cycle, UNICEF has named four pillars that are essential: social support, information and skills, facilities and services, and materials (UNICEF, 2019). According to WHO, Menstrual health should be identified, defined, and treated as a health and human rights issue rather than a hygiene issue. (WHO, 2019). Generally, menstruation is viewed as dirty (religiously and psychologically). Adolescence in girls is significantly different from boys. Numerous studies have found limitations in daily tasks. There are different taboos during the first period and menstruation. There is a sizable knowledge gap regarding menstruation among adolescent girls (Zegeye et al., 2009). Particularly in rural and tribal groups, social taboos and parents' unwillingness to discuss relevant topics in public have made it difficult for adolescent females to get the correct knowledge which may lead to poor hygiene (Adhikari et al., 2007).

In Nepalese society, there are various restrictions during menstruation like not touching other people, being restricted to enter the kitchen, worshiping god, etc. but another most serious restriction was *Chhaupadi* (Girls were banished from their residence during menstruation) which was mostly practiced in the mid and far-western regions of Nepal. Prolonged isolation has increased the mortality rates due to snake bites, animal attacks, and rapes during menstruation and also during post-partum childbirth. To be more precise, the Nepalese Supreme Court ordered the government to create legislation that would have *Chhaupadi* exterminated in May 2005. As a result, *Chhaupadi* raises a number of law and moral issues. These moral issues will now be addressed in relation to

liberalism and communism (Kadariya & Aro, 2015). In order for women and girls to be empowered and to be in good health, menstrual cleanliness is essential. At least 500 million women and girls around the world do not have adequate access to menstrual hygiene facilities, and more than one-third of institutions do not have single-sex restrooms which leads to the danger of urinary and reproductive tract infections rises in the absence of appropriate menstrual hygiene products (World Vision International, n.d.).

There are various factors, which influence the knowledge and practices of menstrual hygiene. The study reveals that knowledge and practices of menstrual hygiene among rural and urban school-going adolescent girls are poor (Thakre et al., 2011). The factors of family monthly income and prior knowledge of menstruation before menarche were significantly associated with knowledge of menstrual hygiene whereas the practice of menstrual hygiene was significant to family income only (Mutairi & Jahan, 2021). The education level and occupation of the mother were significantly associated with menstrual hygiene practice (Sarkar et al., 2017). The factors grade level, age, residence, known about sanitary pads, and learned about menstrual hygiene were found associated with knowledge whereas knowledge of menstrual hygiene, known about reproductive tract/sexually transmitted infections, private showers, and residence was found associated with practice of menstrual hygiene (Shumie & Mengie, 2022). Menstruation is rarely mentioned publicly in Nepal due to social and cultural taboos, which leads adolescent girls towards poor knowledge and practice of menstrual hygiene. Various studies were carried out on both national and international levels but the majority of the studies were descriptive but not reveals the factors associated with it. Since, the study related to this topic was not conducted in Birendranagar Municipality, Surkhet. So, this study has been conducted to assess the factors associated with knowledge and practices of menstrual hygiene among adolescent school-going girls of some selected schools of Birendranagar Municipality, Surkhet. In order to learn more about the factors affecting the menstrual hygiene of adolescent school-going girls, raise awareness on the subject, and assess them in good practice, the findings of this study may be beneficial.

MATERIALS AND METHODS

Study area

The study was conducted in schools (Public and Private) of Birendranagar Municipality, Surkhet, Karnali Province. The study population of this study consists of all adolescent school-going girls from (Grade 8 - Grade 10) of all (23 public and 44 private) schools of Birendranagar Municipality, Surkhet. And, the study was carried out on 9 schools, out of which 3 were public schools and 6 were private schools, excluding the schools where the samples associated with the population were absent. Data was collected among 372 adolescent school-going girls using stratified random sampling technique which begun on January, 2023 and concluded on April, 2023.

Data

Data was collected through the self-administered questionnaires method among respondents. To determine the knowledge of menstrual hygiene, there were 12 knowledge-specific

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questions (Tegegne et al., 2014). Each "correct response" earned one point, whereas any "incorrect" or "don't know response" got zero. The sum score of knowledge was calculated out of 12 points (Poor knowledge: (0-6) points; Good knowledge: (7-12) points). To determine the practice of menstrual hygiene, there were 10 practice-related questions (Belayneh et al., 2019). Each "correct response" earned one point, whereas any "incorrect" or "don't know response" got zero. The sum score of practice was calculated out of 10 points (Poor practice: (0-5) points; Good practice: (6-10) points). The standard questions were carried out fully from the previous study conducted in Ethiopia and other questions were prepared according to the preference of Nepalese students.

Statistical model

The study involved two dependent variables i.e. Knowledge of Menstrual Hygiene (KOMH) [poor coded as '1' and good coded as '0'] and Practices of menstrual Hygiene (POMH) [poor coded as '1' and good coded as '0'] and 51 independent variables. The study was conducted to obtain both descriptive as well as inferential statistical analysis. The results were calculated through univariate, bivariate, and multivariate analysis. In Univariate analysis, data have been analyzed and expressed in the form of frequency and percentage. For a continuous variable, mean ± S.E, median, maximum, and minimum values have been calculated. In bivariate analysis, the association between dependent and independent variables was tested using independent t-test (determines whether there is statistically significant difference between the means of two unrelated groups) and Chi-square test (determines whether there is a significant association between categorical variables). The variables, which seem significant at a 10% level of significance were included in the model in order to capture the major significant variables. In multivariate analysis, a binary logistic regression model is used. For the binary logistic regression model, only the variables, which seem significant from the bivariate analysis are taken. The model for multiple binary logistic regression model for 'k' number of independent variables is given by:

$$\pi(x) = \frac{e^{\beta_0+\beta_1 x_1+\beta_2 x_2+\beta_3 x_3+\beta_4 x_4+\cdots+\beta_k x_k}}{1+e^{\beta_0+\beta_1 x_1+\beta_2 x_2+\beta_3 x_3+\beta_4 x_4+\cdots+\beta_k x_k}}$$

In this study, the categorization of dependent variables, Y_i= 1 for poor knowledge/practice and Y_i= 0 for good knowledge/practice.

Model's performance checking

After fitting the model, the accuracy of fitted model was determined using Nagelkerke R square and Hosmer and Lemeshow's χ^2 test. The accuracy of fitted model was evaluated using Receiver Operating Characteristic (ROC) curve.

RESULTS AND DISCUSSION

Table 1 includes the prevalence of dependent variables i.e. (knowledge of menstrual hygiene and practice of menstrual hygiene). Most students have 359 (95.5%) good knowledge and 325 (87.4%) practice of menstrual hygiene. Table 2 gives descriptive information on the independent

variable i.e. age at menarche which shows that the average age at menarche of 372 respondents was 12.47 years with the range of 10 to 15 years.

Table 1. Prevalence of knowledge of menstrual hygiene and practices of menstrual hygiene.

Variables	Categories	Frequency	Percent
Knowledge of menstrual hygiene	Poor	13	3.5
	Good	359	96.5
Practices of menstrual hygiene	Poor	47	12.6
	Good	325	87.4

Table 2. Descriptive information on age at menarche of respondents.

	n	Mean ± S.E	Median	Minimum	Maximum
Age at menarche (in years)	372	12.47 ± 0.049	13	10	15

Table 3 provides descriptive information for the knowledge-related variables of menstrual hygiene. It shows that the majority of respondents i.e. 332 (89.2%) knew that menstruation is a physiological process, 281(75.5%) respondents knew that menstruation occurs due to hormones, 164 (44.1%) of girls responded that menstrual blood comes from the vagina, 329 (88.4%) respondents answered girls have their first period at the age between 10 to 13 years, 352 (94.6%) respondents answered that the duration of menstruation in a normal person is 3 to 7 days, 301(80.9%) respondents knew that the duration of menstruation in a normal person is 3 to 7 days, 301(80.9%) knew that the duration of menstrual cycle in a normal person is between 25 to 30 days, 351(94.4%) of respondents knew about menstruation before menarche. Majority of respondents were informed by their mothers followed by teachers, friends, books, and mass media. 297 (79.8%) respondents answered that they feel comfortable talking about menstruation, 253 (68.0%) responded that one cannot get pregnant during menstruation, 302 (81.2%) respondents learned about menstruation and its hygienic management and 361(97.0%) respondents attended school during menstruation and 11 (3.0%) didn't attend school during menstruation.

Table 4 revealed that all the respondents use absorbents during menstruation. Among 372 respondents, 348 (93.5%) use commercially made sanitary pads and the remaining 24 (6.5%) don't use commercially made sanitary pads. Similarly, 328 (88.2%) respondents use cotton clothes and the remaining 44 (11.8%) didn't use cotton clothes. Only two respondents use menstrual cups during menstruation. Most of the respondents i.e. 228 (61.3%) change their pads three or more times a day, 130 (34.9%) respondents change their pads twice a day and only 14 (3.8%) respondents change their pads once a day. It was observed that the majority of respondents i.e. 301(80.9%) cleaned clothes with soap and water, 27 (7.3%) respondents clean clothes with only water whereas 44 (11.8%) participants didn't need cleaning because they didn't use cotton clothes as absorbent during menstruation. The majority of respondents i.e. 291 (78.2%) dry clothes in sunlight, 37 (9.9%) respondents dry clothes inside the house whereas 44 (11.8%) participants didn't need drying

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because they didn't use cotton clothes as absorbent during menstruation. Regarding disposal of pads, 261 (70.2%) girls disposed their pads in a dustbin, 77 (20.7%) girls burnt it, 16 (4.3%) girls disposed their pads in toilets, 15 (4.0%) in the drain and 3 (0.8%) girls disposed their pads in an open field. 274 (73.7%) girls wrapped their pads with plastic bags, 73 (19.6%) girls wrapped their pads with papers, and 25 (6.7%) girls didn't wrap their pads during disposal.

Table 3. Descriptive information on knowledge-related variables of menstrual hygiene.

Variables	Categories	Frequency	Percent
Menstruation	Physiological	332	89.2
	Pathological	1	0.3
	Curse	11	3.0
	Don't Know	28	7.5
Cause of menstruation	Hormones	281	75.5
	Curse of gods	6	1.6
	Disease	2	0.5
	Enzymes	3	0.8
	Don't Know	80	21.5
Organ of bleeding	Uterus	126	33.9
	Vagina	164	44.1
	Bladder	48	12.9
	Abdomen	1	0.3
	Don't Know	33	8.9
Known about menstruation before menarche	Yes	351	94.4
	No	21	5.6
Feel comfort to talk about menstruation	Yes	297	79.8
	No	75	20.2
Known about pads are used as soak-up	Yes	330	88.7
	No	42	11.3
Think girls cannot conceive during menstruation	Yes	253	68.0
	No	119	32.0
Learn about menstruation in school	Yes	302	81.2
	No	70	18.8
Attend school during menstruation	Yes	361	97.0
	No	11	3.0

Table 4. Descriptive information on the practice-related variables of menstrual hygiene.

Variables	Categories	Frequency	Percent
Use of absorbent	Yes	372	100.0
	No	0	0.0
Times of changing absorbent (per day)	Once	14	3.8
	Twice	130	34.9
	Three or more	228	61.3
Used material to clean cloth(if absorbent is cloth)	Soap and water	301	80.9
	Only water	27	7.3
	Not used any material	44	11.8
Cloth dry	Sunlight	291	78.2
	Inside the house	37	9.9
	Not used any cloth	44	11.8
Dispose pads	Dustbin	261	70.2
	Toilets	16	4.3
	Drain	15	4.0
	Open field	3	0.8
	Burnt	77	20.7
Wrap	Papers	73	19.6
	Plastic bag	274	73.7
	Not wrap	25	6.7
Genital clean	Yes	372	100.0
	No	0	0.0
Material cleaning	Soap and water	207	55.6
	Only water	159	42.7
	Tissue paper	5	1.3
	Towel	1	0.3
Bathing	Daily	268	72.0
	First day	33	8.9
	Second day	4	1.1
	Not take bath any time	2	0.5
	Others	65	17.5
Absorbent used			
Commercially made sanitary pads	Yes	348	93.5
	No	24	6.5
Cotton clothes	Yes	328	88.2
	No	44	11.8
Menstrual cup	Yes	2	0.5
	No	370	99.5

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All the respondents clean their external genitalia during menstruation. Out of 372 respondents, the majority of respondents i.e. 207 (55.6%) clean their genitalia with soap and water, 159 (42.7%) respondents clean their genitalia with only water, 5 (1.3%) respondents clean their genitalia with tissue paper and only one of the respondents clean genitalia with a towel. It was revealed that the majority of respondents i.e. 268 (72.0%) take bath daily during menstruation, 65 (17.5%) respondents take bath alternatively (first day, third day, fifth day, and seventh day), 33 (8.9%) respondents bath in the first day, and 4 (1.1%) respondents bath in the second day and remaining one never takes bath during menstruation (Table 4). Table 5 revealed that the age at menarche of respondents is similar among both categories (i.e. good and poor) knowledge of menstrual hygiene. The knowledge of respondents about menstrual hygiene is not significant to their age at menarche since the p-value is 0.148 (>0.05).

Table 5. Table for analysis of age at menarche and KOMH obtained from t-test.

Knowledge	n	Mean ± S.E	t-value	df	p-value
Poor	13	12.85 ± 0.191	1.450	370	0.148
Good	359	12.46 ± 0.051			

The multiple binary logistic regression model has been fitted to examine the relationship between knowledge of menstrual hygiene and independent variables. The independent variables, which seem significant at a 10% level of significance from the bivariate analysis i.e. Program at school, amount of bleeding, the medication used, pocket money, academic performance, the effect of menstruation on academic performance, and allowed to sleep in their own room, think menstrual blood as unhygienic, allowed to eat with family, and allowed to touch well, public tap, or river were included in the model in order to capture the major significant variables. The covariates: medication used, pocket money, and effect of menstruation on academic performance, think menstrual blood as unhygienic, allowed to eat with family, and allowed to touch well, public tap, or river were found not significant at a 10% level of significance. While fitting the model, we took the variables which are significant at 10% level of significance. The multiple binary logistic regression model has been fitted taking the covariates: program/sessions attained at school about menstruation before menarche, the effect of menstruation on academic performance, amount of bleeding, and restriction i.e. allowed to sleep in their own room significant at 5% level of significance, which has been confirmed from Forward Likelihood ratio method run in SPSS version 26. The results of multiple binary logistic regression model for KOMH is presented in the Table 6.

The Fig. 1 revealed that the area under ROC curve (AUC) was found to be 85.9% CI (75.8% - 96.0%) which lies in the range of excellent (0.8 – 0.9) (Dardis, 2021). Thus, the fitted model is excellent. Table 7 reveals that the age at menarche of respondents is similar among both categories (i.e. good and poor) knowledge of menstrual hygiene. The practice of respondents about menstrual hygiene is not significant to their age at menarche since the p-value is 0.730 (>0.05).

Table 6. Results of multiple binary logistic regression for knowledge of menstrual hygiene (KOMH).

Variables	Categories	S. E	p-value	Odds ratio Exp (β)	95% C. I. for Odds ratio	
					Lower	Upper
Programs/sessions at school about menstruation before menarche	Yes (®)	-	-	-	-	-
	No	0.64	0.015	4.81	1.36	16.97
Effect of menstruation on academic performance	Yes (®)	-	-	-	-	-
	No	0.70	0.028	0.21	0.05	0.84
Amount of bleeding	Scanty/Moderate (®)	-	-	-	-	-
	Heavy	0.64	0.007	5.73	1.63	20.20
Allowed to sleep in their own room	Yes (®)	-	-	-	-	-
	No	0.64	0.005	6.02	1.71	21.24
Constant		0.69	<0.001	0.007		

(®) Reference category

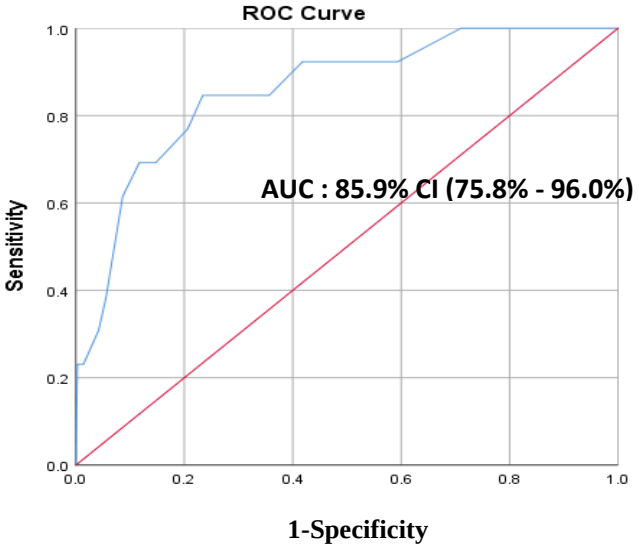

Fig. 1. Receiver operating characteristic (ROC) curve for model of KOMH.

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Table 7. Table for analysis of age at menarche and POMH obtained from t-test.

Practice	n	Mean ± S.E	t-value	df	p-value
Poor	47	12.43 ± 0.151	0.345	370	0.730
Good	325	12.48 ± 0.052			

Table 8 shows that the multiple binary logistic regression model has been fitted to examine the relationship between practices of menstrual hygiene and independent variables. The independent variables, which seem significant at a 10% level of significance from the bivariate analysis i.e. reaction to their first menstruation, effect of menstruation on academic performance, restrictions i.e. allowed to enter the kitchen, allowed to touch male members of a family or a pregnant woman or children below five years and allowed to eat with family are used in the model, and menstrual flow was used in the model in order to capture the major significant variables. While fitting the model, we took the variables which are significant at 10% level of significance. The covariates: effect of menstruation on academic performance, restrictions i.e. allowed to touch male members of a family or a pregnant woman or children below five years, allowed to eat with family and menstrual flow were found not significant at 10% level of significance. The multiple binary logistic regression model has been fitted taking the covariates: reaction of girls to their first menstruation and restriction i.e. allowed to enter the kitchen, significant at 5% level of significance which has been shortlisted from Forward Likelihood ratio method run in SPSS version 26.

Table 8. Results of multiple binary logistic regression for practices of menstrual hygiene (POMH).

Variables	Categories	S. E	p-value	Odds ratio Exp (β)	95% C. I. for Odds ratio	
					Lower	Upper
Reaction to their first menstruation	Happy (®)	-	-	-	-	-
	Scared	1.08	0.520	2.01	0.24	16.72
	Discomfort	1.05	0.160	4.34	0.56	33.65
	Emotional disturbance	1.10	0.018	13.34	1.55	114.99
Allowed to enter the kitchen	Yes (®)	-	-	-	-	-
	No	0.41	0.001	3.86	1.72	8.65
Constant		1.07	<0.001	0.015		

(®) Reference Category

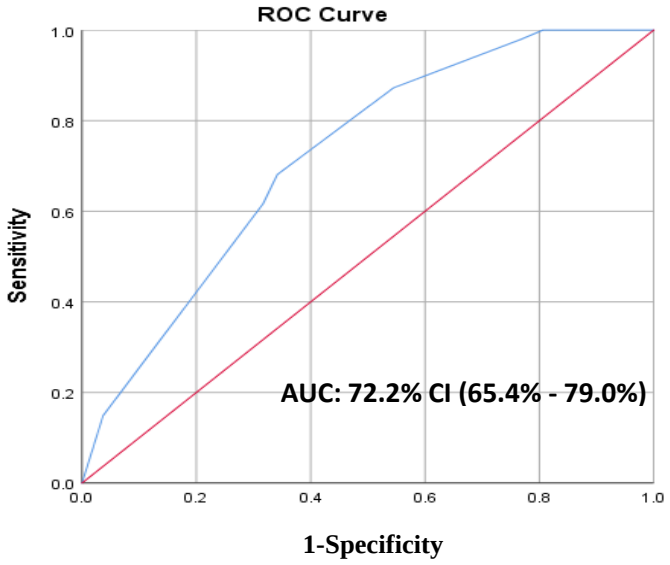

Fig. 2. ROC curve for model of POMH.

Fig. 2 revealed that the area under ROC curve (AUC) was found to be 72.2% CI (65.4% - 79.0%) which lies in the range of acceptance (0.7 – 0.8) (Dardis, 2021). Thus, the fitted model is acceptable. As mentioned in the objective of the study, the comparison of results of bivariate analysis of knowledge and practice of menstrual hygiene are presented in the Table 9. The table demonstrates that there is no significant difference between knowledge and practice of menstrual hygiene based on the type of schools i.e. public and private since the p-value is 0.778 (>0.05) and 0.298 (>0.05) respectively. It represents that type of school does not influence the knowledge and practice of menstrual hygiene.

Table 9. Comparison of results of knowledge of menstrual hygiene and practices obtained from the public and private schools.

Variable	Categories	Poor ['Count (%)]	Good [Count (%)]	p-value
Knowledge of menstrual hygiene				
School type	Public	9 (3.8)	230 (96.2)	0.778*
	Private	4 (3.0)	129 (97)	
Practices of menstrual hygiene				
School type	Public	27 (11.3)	212 (88.7)	0.298**
	Private	20 (15.0)	113 (85.0)	

* Fisher's exact test; ** Chi-square test

The findings of this study revealed that majority of adolescent girls (94.4%) have heard about menstruation before menarche and the main source of information were the respondent's mother which was similar to the study conducted in Nigeria (Fehintola et al., 2017) but contrary to the findings of the study conducted in Egypt (El-Gilany et al., 2005) which revealed that the main source of information was mass media. The reason for this might be due to the fact that most of the respondent's mother are literate in this study. The majority of girls (96.5%) had good knowledge and (87.4%) had good practice of menstrual hygiene in this study which was similar to the study conducted in Dang district, Nepal (Bhusal et al., 2020) and (Bhusal, 2020) but contrary to the study conducted in Nigeria (Fehintola et al., 2017). The study revealed that the average age at menarche of respondents was 12.47±0.049 years which was similar to the study conducted in Saoner, Nagpur district of India (Thakre et al., 2011), Kaski district of Nepal (Poudel & Gautam, 2020) and Egypt (El-Gilany et al., 2005). This implies that majority of girls respondents had their first menstruation in the age range of 12-14 years. The main reason of not using commercially made sanitary pads was lack of knowledge followed by high cost, which was similar to the previous study conducted in Ethiopia (Tegegne et al., 2014). This implies proper knowledge about using sanitary pads should be provided among adolescent girls. Girls are practicing various restrictions such as not being allowed to enter the kitchen, touching male members and religious books which was similar to the study conducted in Sunsari, Nepal (Sapkota et al., 2014) and Kaski district of Nepal (Poudel & Gautam, 2020). This may be because majority of respondents belongs to Hindu family where various social and cultural taboos are practiced during menstruation. The variables mother's and father's education level, mass media, age, type of schools, adolescents living in rural area, living only with mothers, family size etc. were significantly associated with knowledge and practice of menstrual hygiene, which were seen to be not significant in this study. This may be due to difference in the study variables involved. The variable prior knowledge on menstruation before menarche was found significant in the study conducted in Buraida city, Saudi Arabia (Mutairi & Jahan, 2021) which was a bit similar to the significant variable attained programs/sessions 75 at school about menstruation before menarche in this study. Though the variations in the values of odds ratio (OR) for the significant variables are similar to the study conducted in the Dang district (Bhusal et al., 2020) but variation in the 95% confidence interval of OR is large compared to the previous study. The variable taken a class about menstruation before menarche was found significant with practices of menstrual hygiene in the study conducted in the Chitwan district (Adhikari, 2018) but in this study programs/sessions attained at school about menstruation before menarche was found significant with knowledge of menstrual hygiene. The variable amount of bleeding which was found significant in this study is doubtful but heavy bleeding may make any girls nervous and conscious about menstruation, which may lead them to the knowledge of menstrual hygiene. In addition, the study relied on the respondent's information on menstrual hygiene, which is subject of bias. Nevertheless, our findings may have significant implications for adolescent's proper knowledge and practice of menstrual hygiene of Birendranagar Municipality, Surkhet, Nepal.

Limitations

Since the study was based on adolescent girls students in grades 8, 9 and 10 of public and private schools of Birendranagar Municipality, Surkhet, Nepal, the findings of this study may not be generalized other than the study area.

CONCLUSION

From the study, it can be concluded that (96.5%) of respondents had good knowledge of menstrual hygiene and (87.4%) of respondents had good practice of menstrual hygiene which is the high proportion. Majority of respondents have symptoms like abdominal and back pain followed by sleeplessness, and heavy bleeding during their first menstruation and suffered from abdominal and back pain during menstruation, which leads to absenteeism. Major cause of not using commercially made sanitary pads is lack of knowledge followed by high cost and shyness. Since the major source of information about menstruation before menarche are mothers, more the mothers are illiterate, more the girls have a poor practice of menstrual hygiene. The variables where respondents do not attained programs/sessions at school about menstruation before menarche, do not believe effect of menstruation on academic performance, heavy amount of bleeding, and having restriction i.e. not allowed to sleep in their own room have a significant impact on the respondent's poor knowledge of menstrual hygiene. Variables reaction of respondents to their first menstruation i.e. emotional disturbance and having restriction i.e. not allowed to enter the kitchen have a significant impact on the respondent's poor practice of menstrual hygiene. The ROC curve explained model by 85.9% and 72.2% area under curve (AUC) for KOMH and POMH respectively. The average age (mean ± S.E) at menarche of respondents was 12.47±0.049 years. There is no significant difference between knowledge of menstrual hygiene and practices of menstrual hygiene of respondents based on the type of schools.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

AUTHOR CONTRIBUTION

SKB designed the study, collected data, performed statistical analysis and prepared manuscript. SPK supervised the entire research work, reviewed and finalized the manuscript.

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DATA AVAILABILITY

Data can be made available upon request.

ETHICAL STATEMENT

The study was approved by the Department Research Committee of the Central Department of Statistics, TU and the final ethical approval (Regd. No. IRCIOST-23-0008) was granted by the Institutional Review Committee of Institute of Science and Technology (IoST), TU.

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