

Determinants of menstrual hygiene among adolescent school girls in a rural area of Patna, Bihar, India: A cross-sectional study

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ABSTRACT

Background: Adolescence is a transitional phase marked by the onset of menarche. Most adolescent girls have incomplete or inaccurate information about menstrual physiology and hygiene. There are several misconceptions and taboos linked with it, resulting in adverse health outcomes. However, numerous factors associated with menstrual hygiene are modifiable. If these are adequately identified and addressed, it can empower young girls to lead healthy life in a positive environment. **Aims and Objectives:** (1) To assess the knowledge and practices regarding menstrual hygiene among adolescent school girls. (2) To determine the association of menstrual hygiene practices with sociodemographic and related factors. **Materials and Methods:** A descriptive cross-sectional study was conducted in rural Patna, Bihar, in which 300 eligible adolescent school-going menstruating girls (13-17 years) were recruited from four schools. They were interviewed using a predesigned questionnaire, and relevant information on sociodemographic profiles and menorrhoeal characteristics was obtained. Median scores were calculated for the knowledge and practices domain. Multiple logistic regression was used to determine the associated factors of menstrual hygiene practice. **Results:** The mean age of girls was 14 ± 1.07 years, while the mean age of menarche was 12.37 ± 0.92 years. More than half (59.3%) were found to possess good knowledge (scores 7 and above) regarding menstruation and its physiology. Half (50.3%) of the girls had good menstrual hygiene practices (scores 9 and above). Multiple logistic regression model revealed that adolescent girls studying in government schools (AOR = 0.05, CI = 0.02-0.12) and those living in nuclear families (AOR = 0.05, CI = 0.02-0.12) were likely to be significantly associated with poor menstrual hygiene practices. **Conclusion:** Menstrual hygiene is still far from satisfactory; hence, it should be a vital aspect of the school health educational curriculum. There is an imperative need to design acceptable awareness/advocacy programs for adolescent girls in the future.

Keywords: Adolescent girl, knowledge, menstrual hygiene, practices, school

Introduction

Adolescence is a period of transition from childhood to adulthood which ranges from 10 to 19 years of age.^[1] It is characterized by rapid physical, psychological, and reproductive development

marked by the onset of menarche.^[2] Although menstruation is a normal process, there are several misconceptions and practices linked with it, resulting in adverse health outcomes.^[3] Poor water, sanitation, and hygiene (WASH) facilities in schools, inadequate puberty education, and lack of hygienic menstrual hygiene items (absorbents) cause girls to experience menstruation as shameful and uncomfortable.^[4]

Various studies have revealed that most adolescent girls have incomplete and inaccurate information about menstrual physiology and hygiene.^[5,6] In a systematic review of

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138 studies in India from 2000 to 2015, involving 193 subpopulations and 97,070 girls, Ejik *et al.* (2016) reported that half of Indian adolescent girls were unaware of the cause of menstruation while only a quarter had an understanding of the source of bleeding.^[4] According to NFHS-5 (2019-2020) data, only 58.8% of women aged 15-24 years in Bihar used hygienic methods of protection during their menstrual period.^[7] Another correlative study from Darbhanga, Bihar, depicted that although 81% of school girls in rural areas were aware of using sanitary pads, only 52.5% of them took bath regularly and less than one-fifth (18.75%) cleaned their genital area during menses.^[8]

Additionally, many restrictions and myths regarding menstrual hygiene prevail in our society which augments to the lack of proper knowledge, attitude, and practice about menstruation.^[9] Poor menstrual hygiene can lead to increased susceptibility to reproductive tract infections, urinary tract infections, pelvic inflammatory disease, and other complications later in life.^[10] Therefore, learning about menstrual hygiene and its determinants becomes crucial as patterns that are developed in adolescence are likely to persist into adult life. Many of these determinants are modifiable, and if these are adequately identified and addressed, they can empower young girls to lead a healthy life in a positive environment.

Numerous studies have been conducted in India and in abroad focusing on the knowledge and practices regarding menstrual hygiene. However, there is a paucity of data, especially in this part of India; hence, this study was conducted with the aim and objectives of assessing the knowledge and practices regarding menstrual hygiene among adolescent school girls in the rural area of Patna, Bihar, and to determine the association of menstrual hygiene practices with various sociodemographic and other related factors.

Materials and Methods

Study design

Descriptive cross-sectional study.

Study setting

A list of all schools/high schools in the Bihta Block of Patna was prepared, and two government and two private co-education schools were selected by simple random sampling.

Study population and sample size

The study participants included eligible adolescent school-going girls from all four selected schools. Convenient sampling was used to take a total sample size of 300.

Inclusion criteria

School-going menstruating girls between 13 and 17 years of age who were willing to participate were included in the study.

Exclusion criteria

1. Girls who had not attained menarche.
2. Those girls who were not willing to participate in the study due to any reason or whose parents did not give consent for their children to participate.
3. Those who were found absent on study days.

Study duration

One month (January 2023).

Data collection

Data was collected using a predesigned and pretested structured questionnaire to study their level of awareness regarding menstruation. The questionnaire was initially prepared in English; translated into the vernacular (Hindi) language then back-translated into English to check consistency. Face validity of the questionnaire was carried out. The data collection tool contained four domains: sociodemographic profile consisted of personal and menarche-related characteristics, the knowledge domain included questions on the physiology of menstruation like origination of blood, frequency, and duration of the menstrual period, the flow of the cycle, awareness of menopause and knowledge on irregular cycles, etc. Practices aspect included questions like the type of absorbent; wash and dry used clothes; frequency of changing pads in schools and in their homes, cleaning of external genitalia, and various restrictions during menstruation.

Data analysis

Quantitative data were entered into Microsoft Excel, checked for completeness and analyzed using SPSS trial version 26 software. Mean and standard deviation were used to represent quantitative data and proportions of qualitative data.

Scoring was performed to assess the adolescent school girls' knowledge and practices regarding menstruation and related hygiene. The knowledge domain was elicited using 11 knowledge-oriented questions while practice was evaluated using 10 practice-specific questions. Each correct response scored one point, whereas a wrong or do not know the answer did not get any points, and accordingly total score was calculated for each domain. The median scores were calculated for each domain. The participants with a total score less than median score were considered as having poor knowledge/practice, while those who attained more or equal to the median scores were considered as having good knowledge/practices, respectively.

Further, a univariate regression was performed to ascertain the relationship between the dependent variables with other independent variables. Only those found to be significant were entered into the multiple logistic regression model to identify the associated factors of the practice of menstrual hygiene. The *P* value less than 0.05 was taken as statistically significant.

Results

Sociodemographic profile

Majority, 215 (71.7%), of girls were in the age group of 12-14 years. The mean age was found to be 14 ± 1.01 years. 159 (53%) of girls were studying in 6th to 8th standard. Maximum of 281 (93.7%) of girls were Hindus. Most 189 (63%) of students lived in a nuclear family, and family size was 5 or above in 246 (82%) of them. Nearly one-fourth (22%) of girls' mothers, while 13% of their fathers were found to be illiterate. 35% of fathers were skilled workers, while 32% were self-employed. 33.6% of girls belonged to V (lower) socioeconomic class according to the Modified BG Prasad Socioeconomic Status Scale (2022).^[11] Sanitary toilet at home was absent in around 15% of adolescent girls [Table 1].

Menorrhoeal characteristics

Table 2 showed that a maximum of 239 (79.7%) of adolescent girls attained menarche at 12-13 years of age. Mean age of menarche was 12.37 ± 0.92 years. Most 82.3% had a regular menstrual cycle with normal blood flow. Duration of flow ranged from 4 to 6 days in majority, 234 (78%), of girls. Dysmenorrhea was present in most, that is, 74.7%, while less than a quarter (18.7%) suffered from other related problems like vomiting, headache, mood swings, giddiness, and weakness. Half of the girls, that is, 171 (57%) of girls were aware of menarche prior to the onset of menstruation; out of these, the primary source of information regarding menstruation and hygienic practices were mothers in 123 (72%), followed by teachers in 14 (8.2%) and friends in 12 (7%) of adolescent cases.

Knowledge domain

It was revealed that the majority of the students knew that menstruation is a natural phenomenon (84.3%). However, most, that is, 264 (88%) of girls wrongly felt that menstrual blood is impure. Around half of them correctly knew that the origin of menstrual blood is from uterus (54%) and the reason for menstruation is either age-related or due to hormonal effects (56.3%). The majority of girls had a correct knowledge that menstruation occurs monthly (89.7%) and the normal duration of menses is up to 7 days (91.7%). Moreover, 250 (83.3%) of adolescent girls believed that there is influence of hot and cold foods on menses. Only 137 (45.7%) correctly knew that excessive bleeding can lead to anemia. However, 36% of respondents had wrong knowledge that menses continue to occur in pregnancy too. More than three-fourths (81%) correctly knew that menstruation is an indication of fertility, and 217 (72.3%) were aware of menopause [Table 3].

It was observed that the majority of the girls, 216 (72.0%), were using sanitary pads as the absorbent during menses, while the remaining 84 girls were either using only cloth (6%) or both pads and cloth (22%). The main reasons cited for not using pads were difficulty or embarrassment in procuring pads (41.7%), followed by expensive pads in 28.5%, and feeling of discomfort in 22.6% of adolescent girls. Most 197 (65.7%) of the girls changed

their sanitary pad/cloth two to three times a day. More than three-fourths of girls (80.7%) disposed used pads in dustbins, and 92.7% of girls preferred to wrap the absorbent before disposing it off. Almost all (99.7%) of the girls washed their hands with soap after changing sanitary napkins/cloth, while 93% sundried their undergarments. The majority, 90.3%, of girls washed their genital area while changing pads/cloth. The frequency of cleaning the genitals during menstruation was less than two times in a maximum of 185 (65.7%) of girls, and the agent most commonly used for cleansing was plain water (79.0%). 89% of the school girls took daily bath during menstruation [Table 4].

The total knowledge score of adolescent girls ranged from 0 to 11 with a median score of 7; therefore, participants with a total score of less than 7 (0–6) were considered as having poor knowledge, while those who scored 7 or above points were considered as having good knowledge. As evident from

Table 1: Sociodemographic profile of study participants (n=300)

Characteristics	n (%)
Age (in completed years)	
12-14	215 (71.7)
15-17	85 (28.3)
Mean age \pm SD	14 \pm 1.07
Class	
6-8	159 (53.0)
9 and above	141 (47.0)
Religion	
Hindu	281 (93.7)
Non-Hindu (Muslims and Christians)	19 (6.3)
Type of family	
Nuclear	189 (63.0)
Joint	111 (37.0)
Family size	
1 to 4	54 (18.0)
5 and above	246 (82.0)
Education of father	
Illiterate	39 (13.0)
<Secondary	119 (39.7)
>Secondary	142 (47.3)
Education of mother	
Illiterate	66 (22.0)
<Secondary	134 (44.7)
>Secondary	100 (33.3)
Occupation of father	
Unskilled Worker	29 (9.67)
Skilled Worker	105 (35.0)
Self-Employed	96 (32.0)
Service	70 (23.33)
Socioeconomic Status*	
I	68 (22.7)
II	42 (14.0)
III	38 (12.7)
IV	51 (17.0)
V	101 (33.6)
Sanitary toilet at home	
Present	257 (85.7)
Absent	43 (14.3)

*Modified BG Prasad Socioeconomic Status Scale

Table 2: Pattern of Menstruation among study population (n=300)

Characteristics	n (%)
Age at menarche (years)	
10-11	37 (12.3)
12-13	239 (79.7)
14 and above	24 (8.0)
Mean age±SD	12.37±0.92
Regularity of menses	
Regular	247 (82.3)
Irregular	53 (17.7)
Amount of flow	
Normal	247 (82.3)
Scanty	14 (4.7)
Excess	39 (13.0)
Duration of flow	
1-3 days	26 (8.7)
4-6 days	234 (78.0)
7 days or beyond	40 (13.3)
Dysmenorrhea	
Present	224 (74.7)
Absent	76 (25.3)
Any other menstrual problem/s	
None	244 (81.3)
Yes	56 (18.7)
Awareness regarding Menarche prior to Menstruation	
Yes	171 (57.0)
No	129 (43.0)

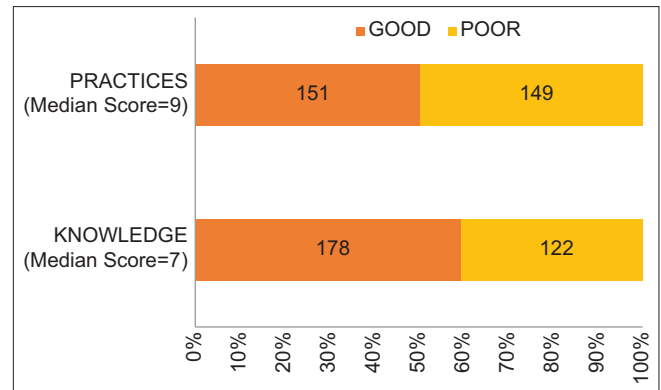
Table 3: Knowledge of adolescent girls on Menstruation (n=300)

Variables (Response)	No. (%)
Menstruation is a natural phenomenon (Yes)	253 (84.3)
Origin of menstrual blood (Uterus)	162 (54.0)
Reason for menstruation (Hormones/Age)	169 (56.3)
Menstrual blood is impure (Yes)	264 (88.0)
Frequency of menstrual cycle (Monthly)	269 (89.7)
Normal duration of menses (upto 7 days)	275 (91.7)
Influence of hot and cold food on menses (Yes)	250 (83.3)
Excessive bleeding leads to Anemia (Yes)	137 (45.7)
Menses during pregnancy (Yes)	108 (36.0)
Menstruation is an indication of fertility (Yes)	243 (81.0)
Awareness regarding menopause (Yes)	217 (72.3)

Figure 1, more than half of girls, that is, 178 (59.3%), obtained good knowledge scores, whereas the remaining 122 (40.7%) had poor knowledge scores.

Similarly, the total practice score of adolescent girls ranged from 3 to 11, with a median score of 9. The participants with a total score of less than 9 (0–9) were considered to have poor practice while those who scored 9 or above points were considered to have good menstrual practice. It was observed that half of the girls, 151 (50.33%), practiced good menstrual hygiene, whereas the rest 149 (49.67%), practiced poor menstrual hygiene [Figure 1].

Table 5 depicts the various sociodemographic and socioeconomic factors associated with the practice of menstrual hygiene.

**Figure 1: Distribution of adolescent school girls' Knowledge and practices scores**

The variables which were found statistically significant with *P* value less than 0.05 in the univariate analysis included type of school, fathers' educational status, mothers' educational status, socioeconomic status, type of family, presence of sanitary toilet at home, and prior awareness regarding menstruation. These were entered into the multivariate regression analysis model, which identified type of school and type of family as determinants of menstrual hygiene practice. Adolescent girls who were studying in government schools were 0.05 times less likely (AOR = 0.05, CI = 0.02-0.12) to have good practices regarding menstrual hygiene. The odds of having poorer menstrual hygiene practices were higher among girls who lived in nuclear families (AOR = 0.48, CI = 0.25-0.93) as compared to those living in joint families.

Regarding different types of restrictions practiced during menstruation, a maximum of 276 (92%) of girls do not visit holy places or attend any religious functions during their menses. Majority, 185 (61.7%), of girls had to follow diet restrictions during menses like avoidance of certain foods, particularly pickles, sour, hot foods, etc., 133 (44.3%) of girls discontinued physical activities or playing outdoors, 53 (17.7%) restricted doing kitchen or other household work and 22 (7.3%) slept separately during menses. Around one-fourth of the girls (26.7%) missed their schools during menstruation; the most common reason perceived was pain during menses in 70%, fear of leakage or staining of clothes in 12.5%, followed by 'feel uncomfortable' in 11.2% of girls [Table 6].

Discussion

Adolescence constitutes a vulnerable group, and the key priority is to provide them with the necessary knowledge, facilities, and cultural environment to manage menstruation hygienically and with dignity. The mean age of menarche in our study was 12.37 ± 0.92 years which is comparatively lesser than a previous study^[12] that had reported the average age of menarche as 13.16 ± 1.9 years, while a more recent study (2020) in Haryana reported it to be 12.8 ± 1.73 years.^[13] This shows a declining trend in the average age of menarche influenced perhaps by

factors such as geographical location, education, wealth status, caste, religious affiliations, etc.

In the present study, 57% of the adolescent girls had awareness about menstruation before menarche, which is similar to the study conducted in West Bengal, where 67.5%, and in Uttarakhand, where 62.5% of girls were aware of menstruation prior to attainment of menarche.^[3,14] However, it was observed to be low, around 24%, in the study conducted by Deshpande *et al.*^[2] and only 18.67% in the study by Zaidi *et al.*^[9] Sociodemographic variations between study populations may contribute to this difference. According to our study, the main informant regarding menstruation and its hygiene was mother (72%). Similar findings were observed in studies by Patel *et al.*^[15] and Ramachandra *et al.*^[16] where the mother was the primary source of this information in 64.5% and 85% of girls, respectively. So, a mother plays a significant role in imparting knowledge and preparing a girl for menstruation, and this should be openly discussed before they reach menarche to prevent related morbidities in the future.

Regarding the knowledge of adolescent girls, the majority, 84.3%, correctly knew that menstruation is a normal physiological phenomenon. The results of the present study were congruent to other studies conducted by Patel *et al.* in Gujarat (80.42%)^[15] and Sarkar *et al.* in West Bengal (97%).^[17] However, it was unfortunate to observe that most of the girls in the present study did

not know about the source of menstrual bleeding; only 54% correctly knew that the source of blood was the uterus, which is consistent with the finding of Surana *et al.*^[13] which elicited that 59.9% of girls had this knowledge, whereas studies by Deshpande *et al.* and Sarkar *et al.* showed that only 16% and 28.3% of the study respondents had a correct knowledge that the source of menstrual blood is from the uterus.^[2,17] The above observation might be due to the poor literacy level of mothers or the absence of health education programs in schools focusing on menstrual hygiene.

According to the present study, sanitary pad was the most frequently used (72%) absorbent during menses, followed by both pads and cloth in 22%, which is comparable to other studies across different parts of India like the study by Sajjan *et al.* in Karnataka which demonstrated that 78% of girls used only sanitary pads^[18] and another similar study from Gujarat^[15] showed that majority 55% of girls used commercial pads. However, few studies also revealed a relatively lower usage of sanitary pads.^[13,17,19] This might be due to the advancement in time and different study settings. The reasons cited behind the less or nonusage of pads in our study included difficulty or embarrassment faced by adolescents to procure or buy sanitary pads (42%), followed by the high cost of commercial pads in 29% of cases which is similar to the study from South India where 68% of girls found the pads to be expensive.^[18] The cost factor thus acts as an impediment, and girls have to resort to usage and reuse of cloth during menstruation, particularly in rural settings leading to an increased risk of reproductive tract infections. Although the Department of Health has initiated social marketing to make sanitary napkins available at affordable prices, but it still needs proper advocacy and thorough marketing.

The present study observed that about 66% of girls changed the absorbents two to three times a day which is in concordance with several studies.^[9,12,18,20] Method of disposal of sanitary pads was satisfactory (throwing in dustbins after wrapping it) among 80% of the girls. Similar findings were obtained in other studies as well.^[3,15,20] Less than 40% of girls in the present study washed their genitals frequently, less than two times/day, which is the same (35%) as a study by Parikh *et al.*^[20] Only one-fifth (21%) of girls used soap and water for cleansing their genital area as against 97.5% in the study by Dasgupta *et al.*^[3] and 77.5% in another study conducted in Bihar.^[8] These differences in practices could be attributed to the fact that some of the school students are being taught the basics of menstrual hygienic practices as a part of their curriculum.

Based upon the scoring criteria, about 40% of adolescent girls in our study have poor knowledge regarding menstruation which is better than a similar study conducted in Ethiopia, where 68.3% had poor knowledge and perception of menstrual hygiene.^[21] The possible explanation for this could be the varied measurement techniques used to assess the level of knowledge as well as the sociocultural differences of study participants. Coming to the menstrual hygiene practices, almost half (49.67%) of girls practiced

Table 4: Menstrual hygiene practices among study population (n=300)

Variables	Response	n (%)
Absorbents used during menses	Sanitary pad	216 (72.0%)
	Only Cloth	18 (6.0%)
	Both	66 (22.0%)
Reason for not using pads (n=84)	Difficult/embarrassing	35 (41.7%)
	Expensive	24 (28.5%)
	Feels uncomfortable	19 (22.6%)
(Among those using only cloth or both)	Any other	6 (7.1%)
Frequency of changing sanitary pad/cloth in a day	Once	82 (27.3%)
	2-3 times	197 (65.7%)
	>3 times	21 (7.0%)
Method of disposal of absorbent	Open dumping	56 (18.7%)
	Throwing in dustbin	242 (80.7%)
	Wash & Reuse	1 (0.3%)
	Flush out in the toilet	1 (0.3%)
Wrapping the pad while disposing	Yes	278 (92.7%)
	No	22 (7.3%)
Washing hands with soap after changing sanitary napkin/cloth	Yes	298 (99.7%)
	No	2 (0.3%)
Sundrying undergarments	Yes	279 (93.0%)
	No	21 (7.0%)
Washing genital area while changing pads/cloth	Yes	271 (90.3%)
	No	29 (9.7%)
Frequency of cleaning the genitals during menstruation	<2 times/day	185 (61.7%)
	>2 times/day	115 (38.3%)
Agents used for cleaning	Plain water	237 (79.0%)
	Soap and water	63 (21.0%)
Taking bath daily	Yes	267 (89.0%)
	No	33 (11.0%)

Table 5: Factors associated with level of menstrual hygiene practices using bivariate and multivariate analysis

Characteristics	Practice level (%)		*COR 95% CI	^b AOR 95% CI
	Good (Median score >9)	Poor (Median score <9)		
Age of girl				
12-14 years	106 (49.3)	109 (50.7)	0.86 (0.52-1.43)	-
15-17 years	45 (52.9)	40 (47.1)	1	
Type of school				
Govt.	26 (17.3)	124 (82.7)	0.04 (0.02-0.08)*	0.05 (0.02-0.12)*
Private	125 (83.3)	25 (16.7)	1	1
Father's education				
<Secondary	49 (31.0)	109 (69.0)	0.18 (0.11-0.29)*	0.67 (0.29-1.5)
>Secondary	102 (71.8)	40 (28.2)	1	1
Mother's education				
<Secondary	75 (37.5)	125 (62.5)	0.19 (0.11-0.33)*	0.57 (0.22-1.50)
>Secondary	76 (76.0)	24 (24.0)	1	1
Socioeconomic status				
₹ <5000 per capita/mth	77 (36.7)	133 (63.3)	0.13 (0.07-0.23)*	0.85 (0.33-2.21)
₹ >5000 per capita/mth	74 (82.2)	16 (17.8)	1	1
Religion				
Hindu	143 (50.9)	138 (49.1)	1.43 (0.56-3.65)	-
Non-Hindus	8 (42.1)	11 (57.9)	1	
Type of family				
Nuclear	78 (41.3)	111 (58.7)	0.37 (0.23-0.60)*	0.48 (0.25-0.93)*
Joint	73 (65.8)	38 (34.2)	1	1
Family size				
Upto 4 members	31 (57.4)	23 (42.6)	1.42 (0.78-2.57)	-
5 and above members	120 (48.8)	126 (51.2)	1	
Sanitary toilet at home				
Present	137 (53.3)	120 (46.7)	2.37 (1.19-4.68)*	1.25 (0.49-3.12)
Absent	14 (32.6)	29 (67.4)	1	1
Prior awareness regarding menstruation				
Yes	101 (59.1)	70 (40.9)	2.28 (1.43-3.64)*	1.24 (0.65-2.34)
No	50 (38.8)	79 (61.2)	1	1

CI=Confidence interval. *Significant at $P<0.05$, 1=Reference category, ^acrude odds ratio, and ^badjusted odds ratio. For the multivariate model, the Hosmer-Lemeshow test gave $P=0.152$ indicating good model fit. Nagelkerke $R^2=0.526$ revealed that the model explained 52.5% of change in the dependent variable and 83% of values were correctly classified

Table 6: Restrictions practiced during menstruation among the study population (n=300)

Restrictions	n (%)
Not visiting holy places or attending religious functions	276 (92.0)
Diet restrictions	185 (61.7)
Discontinuing physical activities/games/playing outdoors	133 (44.3)
Restricting kitchen work	53 (17.7)
Isolation or sleeping separately	22 (7.3)
Missing school	80 (26.7)
Reasons for missing school (n=80)	
Pain	56 (70)
Fear of leakage/staining of clothes	10 (12.5)
Feel uncomfortable	9 (11.2)
No place to change or dispose of pads	5 (6.3)

poor menstrual hygiene, which is in line with the studies conducted by Surana *et al.* in rural Haryana and Sarkar *et al.* in rural areas of West Bengal, where 43.6% (283 out of 649) and 52.4% (161 out of 307) adolescent girls were reported to have poor menstrual hygiene respectively.^[13,17] However, slightly better results were obtained in the neighboring country, Nepal, where only one-third (33%) of girls had poor menstrual hygiene practices.^[22] This disparity might be again due to different study settings and divergent scoring systems for measuring the practice levels of menstrual hygiene.

The important determinants of good menstrual hygiene practice among adolescent girls in the current study included higher literacy levels of their father as well as mother, those studying in private schools, having better socioeconomic status, girls living in joint families, presence of sanitary toilet at home and prior awareness regarding menstruation. Similarly, variables like educational status of the parents, prior knowledge regarding menstruation and presence of proper sanitary latrine at home were found to be significantly associated with menstrual hygiene practices in other studies.^[17,23] On multivariate analysis, the type of school and type of family were found to be major predictors of menstrual hygiene practices in our study. Girls studying in private schools had better hygienic practices than their counterparts which is consistent to studies by Asati *et al.* in Madhya Pradesh and Sharma *et al.* in Rajasthan.^[24,25] This significant difference may be due to the type of curriculum and the knowledge imparted by the teachers in their respective schools because knowledge given by teachers regarding menstrual hygiene ultimately affects the menstrual practices of pupils. Interestingly, adolescent girls residing in joint families were observed to have better menstrual hygiene practices probably because the girls can freely discuss about menstruation and related aspects owing to a greater number of females in joint families; thus, they might be better

informed or guided compared to those who lived in nuclear or smaller families. This is however, in contrast to other studies^[13,17] where joint families showed a higher association with the odds of practicing poor menstrual hygiene. This might arise due to socio-cultural differences between the study populations.

Numerous restrictions were imposed on the girls in the present study such as certain dietary restrictions (avoiding pickles, sour, hot foods, etc.), discontinuation of physical activities or outdoor games, restricting kitchen work/not cooking food, with not performing religious activities or visiting holy places being the commonest limitation. This is almost similar to other studies across India conducted by Deshpande *et al.*, Savarna *et al.*, Zaidi *et al.*, Surana A *et al.*, Sarkar I *et al.*, Sajjan SV *et al.*, Ray S *et al.*, where not performing religious rituals was found to be the most common restriction observed.^[2,8,9,13,17,18,23] This clearly indicates that menstruation is considered filthy or impure and large number of such traditional beliefs and taboos still prevail in our society. School absenteeism was also observed in a quarter of girls, and the most common reason cited was pain, followed by fear of leakage/staining of clothes. Absence from school was also reported by several other studies.^[4,8,9,18,20,24] This reiterates the need to impart health education to school girls regarding the management of menstruation-related issues like coping with painful periods and discomfort but also continuing regular activities like going to school, playing outdoors, etc.

Limitations of the study

Even today menstruation is considered a sensitive topic, so the results might have been affected by social desirability response bias owing to conscious falsification on the part of the students regarding sociodemographic profile or practices of menstrual hygiene. As this study included only 300 girls from 13 to 17 years of age, some younger girls may have been missed, who had already attained menarche. Therefore, this study lacks generalizability.

Conclusion

This study reveals that the knowledge and menstrual hygiene practices are still far from satisfactory among a large proportion of adolescent girls, especially those studying in government schools. Education of girls pertaining to the basic knowledge of menstruation and hygienic practices should be more emphasized in the school curriculum. It is imperative to bring them out of age-old traditional beliefs, taboos, misconceptions, and restrictions and equip them with lifelong skills regarding safe and hygienic practices. Teachers should be trained about menstrual health to empower them to transfer correct scientific information to girls through focused group discussions and other Information Education Communication (IEC) mediums in school, facilitate peer education and engage parents, especially mothers, during parent–teacher meetings to raise menstrual-related awareness. Further studies are recommended to explore the “effectiveness of health education intervention on menstrual hygiene practices” to design acceptable awareness/advocacy programs among young girls.

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Conflicts of interest

There are no conflicts of interest.

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