Menstrual hygiene practices and school absenteeism among adolescent girls in Bangladesh: A cross-sectional study

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INTRODUCTION
Menstrual hygiene practices refer to maintaining specific hygiene during menstrual periods. Excused or unexcused school absenteeism can be attributed to adopted menstrual hygiene practices. This study aimed to assess the prevalence of school absenteeism during menstrual cycle and to explore the association of menstrual hygiene practices with school absenteeism among school-going adolescent girls in Bangladesh.

METHODS
A cross-sectional study was conducted from April to November 2019 based on a sample of 442 school-going adolescent girls (aged 10–19 years) from randomly selected nine Girls’ Schools in the Dhaka division, Bangladesh. Data were collected by an interviewer-administered questionnaire and a multiple regression model was applied to assess factors associated with school absenteeism.

RESULTS
The prevalence of school absenteeism was (35.1%) among school-going adolescent girls in Bangladesh. Factors associated with school absenteeism included older adolescent girls (AOR=2.97; 95% CI: 1.66–5.24, p<0.05), with an illiterate mother (AOR=5.36; 95% CI: 1.91–12.44, p<0.05) and illiterate father (AOR=4.66; 95% CI: 1.79–11.24, p<0.001), from single families (AOR=2.54; 95% CI: 1.45–4.47, p<0.001), who did not know about the menstruation cycle before menarche (AOR=2.14; 95% CI: 1.32–3.48, p<0.001) and who practised poor hygiene management (AOR=5.66; 95% CI: 2.73–15.32, p<0.001). Poor hygiene management including the lack of sanitary pads, the washing of a reusable cloth without soap/antiseptics, and lack of bathing and cleaning external genitalia, were factors associated with school absenteeism.

CONCLUSIONS
The study findings may help governmental and non-governmental organizations design interventions to improve knowledge on the menstrual cycle and so reduce school absenteeism during menstrual periods.
and bad response/attitude by male teachers and students, etc.\textsuperscript{5,6} Menstrual fatigue and pain are also responsible for school absenteeism. As a result, reduced school performance, drop-out from school, and lower educational attainment appear to have long-term effects on gender equality, education, sexual and reproductive health, and economic outcomes\textsuperscript{5,7}.

In Bangladesh, adolescent girls have negative attitudes towards menstrual hygiene practices. Many adolescent girls lack scientific knowledge about the menstrual cycle. They feel hesitant to discuss menstruation with their parents, relatives, friends and others\textsuperscript{8}. The majority of adolescent girls in Bangladesh do not know about menarche or maintain menstrual hygiene. The Bangladesh Demographic Health Survey\textsuperscript{2014} reported that only 33.7\% of adolescent girls (aged 15–19 years) had heard about menstruation before menarche\textsuperscript{8}. A study conducted among adolescent girls in a rural area in Bangladesh reported that about 69% used an unhygienic cloth or even no protection during menstruation. Only about 24\% of school settings fulfill basic wash facility criteria, which is a challenge to improve these facilities in Bangladesh\textsuperscript{10}. According to the National Baseline Survey\textsuperscript{2014} in Bangladesh, there is on average 1 toilet per 187 students with insufficient water and soap facilities in nearly two-thirds of the bathrooms. In addition, there is a lack of light and ventilation facilities\textsuperscript{11}.

Knowledge, attitudes, and practices on menstrual hygiene management and its impact among Bangladeshi adolescent girls are not well known, with little evidence-based intervention programs to reduce school absenteeism among adolescent girls during menstrual periods. To address this information gap, a cross-sectional study was conducted among Bangladeshi adolescent girls aimed to assess the prevalence of school absenteeism during menstrual periods and to explore the association of menstrual hygiene practices with school absenteeism, which can help governmental and non-governmental organizations to design programs to reduce school absenteeism and so improve the educational status of women.

**METHODS**

**Study settings**

The study was conducted from April to November 2019 among school-going adolescent girls in three rural areas of Bangladesh (Dhaka, Manikgonj and Gazipur). These three districts were randomly selected from the Dhaka Division in Bangladesh. We collected data from three different Girls’ Schools from each district.

**Study design**

This cross-sectional study was conducted among school-going adolescent girls present in the school during the data collection process. We invited all students to participate in the study and informed them about the purpose of the study, and ensured that the study had no personal implications. We only considered grades 7 to 10 because most of the girls in this class represent adolescent girls (aged 10–19 years) who reached menarche.

**Sample size estimation and procedure**

The minimum required sample size was calculated by using a single population proportion formula \((n = Z^2 p q / d^2)\), 5\% margin of error, 95\% confidence intervals, and an estimated prevalence of school absenteeism of 40\%, based on school-going adolescent girls during the menstrual cycle in India (developing country like Bangladesh)\textsuperscript{12}. This yielded a sample size of 442 with 20\% non-response rate. A simple random sampling process was used for this study. At first, we randomly selected girls’ schools from the list of the district education office for each district and then randomly selected participants from the attendance list of the respective classes. If the chosen girl was not interested in the study, she was excluded.

**Study variables**

Outcome variables were school absenteeism during menstruation and poor menstrual hygiene practices. School absenteeism was defined as having missed school during the menstrual cycle. According to a study measure developed by WaterAid and DFID\textsuperscript{13}, menstrual hygiene practices are considered as poor when girls report any one of the following behaviors: changing MHM (menstruation hygiene management) material less frequently than every 8 hours; not cleaning hands before and after changing MHM materials; not washing external genitalia at least once per day; and using reusable sanitary pads/cloths without washing them with soap/antiseptic.

Independent variables included sociodemographic (age, parents’ education and occupation, type of family, religion, family income, etc.) and menstrual hygiene practices information.

**Data collection**

A female research assistant was recruited and trained for fieldwork, which included sample selection and collection of data by reviewing the questionnaire through teamwork with the researcher. Structured questionnaires were used to collect data. A random sampling approach was adopted to collect information like menstrual hygiene practices, the menstrual cycle pattern, and factors associated with school absenteeism through face-to-face interviews. The protocol of this study was approved by the Research Ethical Committee (REC) of the Department of Environmental Sanitation, Patuakhali Science and Technology University, Bangladesh (approval no. ENS: 26/02/2019:04). The purpose of the study was explained in detail to the participants, and written informed consent was obtained from the subjects before participation in the study. Moreover, permission was obtained from the principals of the schools.
Statistical analysis
The quantitative data were analyzed using SPSS for Windows Version 23.0. Descriptive statistics, such as frequency, percentages, mean and standard deviation, were used to analyze the demographic details of the respondents. Multiple logistic regression analyses were performed to utilize factors associated with poor menstrual hygiene practices and school absenteeism during the menstruation cycle. Hosmer and Lemeshow test was used to express the goodness-of-fit of the multiple regression model. The adjusted odds ratio (AOR) was used to evaluate the strength of associated factors with poor menstrual hygiene practices and school absenteeism during the menstruation cycle at 95% CI, and p<0.05 was considered statistically significant.

RESULTS
Sociodemographic characteristics of school-going adolescent girls in Bangladesh are shown in Table 1. Of 442 participants, about one-third (35.1%) of adolescent girls were absent from school, and more than half (62.3%) of the adolescent girls were aged ≥15 years, with a mean (±SD) age of 16.8 (±5.3) years. Most of the respondents (94.3%) were Muslims. About half of the respondents’ mothers (54.1%) had secondary or above education level, and for the majority of (74.8%) respondents, their mother was a housewife. Moreover, about half of the respondents’ fathers were employed (53.4%) and had secondary or above education level (52.3%). About 43.2% of respondents did not know about the menstruation cycle before menarche; more than half (54.9%) of the respondents knew from their mother and 12.4% from a school-based program. The majority (67.2%) of the respondents did not know the reason for menstruation, only 30.3% of respondents knew that it is a physiological process, and 2.9% believed that it is a curse of God.

Table 2 shows the bivariate regression analysis used to identify sociodemographic factors associated with school absenteeism among school-going adolescent girls. The Hosmer and Lemeshow test (χ²=8, df=6, p=0.76) was used to express the goodness-of-fit. The adjusted regression model showed that the following sociodemographic factors were statistically significant with school absenteeism among adolescent girls: older age (AOR=2.97; 95% CI: 1.66–5.24, p<0.05); illiterate mother (AOR=5.36; 95% CI: 1.91–12.44, p<0.05) and illiterate father (AOR=4.66; 95% CI: 1.79–11.24, p<0.001); from single families (AOR=2.54; 95% CI: 1.45–4.47, p<0.001); did not know about the menstruation cycle before menarche (AOR=2.14; 95% CI: 1.32–3.48, p<0.001); and poor hygiene management (AOR=5.66; 95% CI: 2.73–15.32, p<0.001). Moreover, school absenteeism was less frequent among adolescent girls who received information about the menstrual cycle from school-based programs (AOR=0.17;
Table 1. Continued

| Characteristics | Total | Absenteeism |     |     |
|-----------------|-------|-------------|-----|-----|
|                 | n (%) | Yes n (%) | No n (%) | p   |
| Father’s occupation |       |           |    |     |
| Farmer          | 189 (42.8) | 47 (24.9) | 142 (75.1) | 0.046a |
| Employed or other | 253 (57.2) | 108 (42.7) | 189 (57.3) |     |
| Type of family  |       |           |    |     |
| Extended        | 275 (62.2) | 66 (24.0) | 209 (76.0) | 0.008a |
| Single/nuclear  | 167 (37.8) | 89 (53.3) | 78 (46.7) |     |
| Knew about menstruation cycle before menarche |       |           |    |     |
| Yes             | 251 (56.8) | 53 (21.1) | 198 (78.9) | 0.002b |
| No              | 191 (43.2) | 102 (53.4) | 89 (46.6) |     |
| Source of information before menarche |       |           |    |     |
| Mother          | 243 (55.0) | 80 (32.9) | 163 (67.1) |     |
| Relatives/friends | 78 (17.6) | 37 (47.4) | 41 (52.6) | 0.035a |
| TV/movies       | 66 (14.9) | 25 (37.9) | 41 (62.1) |     |
| School program  | 55 (12.5) | 13 (23.6) | 42 (76.4) |     |
| Thoughts about menstruation |       |           |    |     |
| Don’t know      | 297 (67.2) | 86 (29.0) | 211 (71.0) |     |
| Physiological process | 134 (30.3) | 62 (46.3) | 72 (53.7) | 0.751a |
| Curse of God    | 11 (2.5) | 7 (63.6) | 4 (36.4) |     |

a Chi-squared test. b Fisher’s exact test. Bold values are statistically significant.

Table 2. Factors associated with school absenteeism among school-going adolescent girls in Bangladesh

| Characteristics | OR (95% CI) | AOR (95% CI) | p   |
|-----------------|-------------|--------------|-----|
| Age (years)     |             |              |     |
| <15             | 1.0 | 1.0 |       |
| ≥15             | 3.53 (1.98–5.25)*** | 2.97 (1.66–5.24) | 0.026 |
| Religion        |             |              |     |
| Muslim          | 1.0 | 1.0 |       |
| Non-Muslim      | 1.47 (1.01–2.88)* | 0.81 (0.37–1.48) | 0.526 |
| Mother’s education level |       |              |     |
| Illiterate      | 8.27 (3.53–17.74)*** | 5.36 (1.91–12.44) | 0.016 |
| Primary         | 4.31 (2.12–9.02)*** | 3.11 (1.37–7.04) | 0.025 |
| Secondary or above | 1.0 | 1.0 |       |
| Mother’s occupation |     |              |     |
| House wife      | 1.0 | 1.0 |       |
| Employed        | 2.87 (1.83–4.51)*** | 2.42 (1.39–4.23) | 0.002 |
| Father’s education level |       |              |     |
| Illiterate      | 7.91 (2.53–15.84)*** | 4.66 (1.79–11.24) | 0.004 |
| Primary         | 4.37 (2.17–8.27)*** | 2.05 (1.17–6.04) | 0.037 |
| Secondary or above | 1.0 | 1.0 |       |

Continued
95% CI: 0.04–0.69, p<0.001).

Table 3 depicts the findings of multiple logistic regression analysis used to identify the association of menstrual hygiene practices with school absenteeism among school-going adolescent girls. The adjusted regression analysis revealed that the following menstrual hygiene practices were significant with school absenteeism: use of a homemade cloth for sanitary protection (AOR=2.14; 95% CI: 1.23–5.79, p<0.01); underwear instead of a sanitary pad (AOR=2.54; 95% CI: 1.43–2.82, p<0.01); reuse of sanitary material (AOR=1.74; 95% CI: 1.21–2.31, p<0.005); washing reusable cloth with only water (AOR=3.78; 95% CI: 1.27–

Table 3. The association of menstrual hygiene practices with school absenteeism among school-going adolescent girls in Bangladesh (N=155)

| Characteristics                        | Absenteeism | AOR (95% CI) | p   |
|----------------------------------------|-------------|--------------|-----|
|                                        | Yes n (%)   |              |     |
| **Types of sanitary protection**       |             |              |     |
| Sanitary pad (Ref.)                    | 61 (39.3)   | -            |     |
| Homemade cloth                         | 68 (43.9)   | 2.14 (1.23–5.79) | 0.031 |
| Underwear                              | 26 (16.8)   | 2.54 (1.43–2.82) | 0.042 |
| **Dispose or reuse**                   |             |              |     |
| Dispose (Ref.)                         | 61 (39.4)   | -            |     |
| Reuse                                  | 94 (60.6)   | 1.74 (1.21–2.31) | 0.007 |
| **Washing of reusable cloth**          |             |              |     |
| Only water                             | 29 (18.7)   | 3.78 (1.27–11.14) | 0.004 |
| Water and soap                         | 86 (55.5)   | 1.54 (1.03–2.11) | 0.031 |
| Water with antiseptic (Ref.)           | 40 (25.8)   | -            |     |

OR: odds ratio. AOR: adjusted odds ratio. CI: confidence interval. *p<0.05, **p<0.01, ***p<0.001. Bold values indicate statistically significant. Multiple logistic model fit by Hosmer and Lemeshow test (χ²=8, df=6, p=0.76). a Less frequently than every 8 hours; not cleaning hands before and after changing materials; not washing external genitalia at least once per day; using reusable sanitary pad/cloth but not washing it with soap/antiseptic.
11.14, p<0.001); bathing using only water in this period (AOR=1.93; 95% CI: 1.09–3.69, p<0.001); unsatisfactory cleaning of external genitalia (AOR=4.37; 95% CI: 1.19–7.54, p<0.005); and sanitary pad/cloth changed once per day (AOR=3.14; 95% CI: 1.36–7.45, p<0.01).

**DISCUSSION**

We found that about one-third (35.1%) of school-going adolescent girls were absent from school during menstrual periods, which is in accordance with a study conducted among adolescent girls in India (40%)12. Another study conducted in Nepal reported that girls were more likely to be absent from school during menstruation than on other days14. This study identified that the older adolescent girls, whose mother was illiterate, and came from a nuclear family were significantly associated with higher school absenteeism during menstrual periods. Older adolescent girls were more absent from school compared with younger girls, and this was consistent with previous studies4,15. Overall, school absenteeism was higher among the older age group, indicating that age may be a significant factor associated with school absenteeism. School absenteeism was higher among the adolescent girls whose parents were illiterate, a result also found in a study conducted among Nigerian school-going girls16. Literate mothers play an important role in motivating their daughters regarding hygiene practices and a healthy attitude toward menstruation17. Thus, school absenteeism was high among adolescent girls with illiterate mothers. Adolescent girls who come from a nuclear family and had no knowledge about menstrual hygiene management before menarche were more absent from school. A study conducted in Dibrugarh town1 reported that adolescent girls from single/nuclear families were more absent from school during menstruation. It also found that girls from an extended family had good knowledge of menstrual hygiene management, as found in previous studies18,19. School absenteeism among the adolescent girls was lower for those who received information about menstrual hygiene management from school-based programs, as found in a previous study20. Hence, this study suggests that school-based menstrual hygiene practice intervention programs should be increased to reduce school absenteeism among school-going adolescent girls.

The present study revealed that poor menstrual hygiene practices were significantly associated with absenteeism among school-going adolescent girls during menstrual
periods, in line with previous studies\textsuperscript{4,21}. A study conducted in India reported that poor hygiene management was associated with reproductive tract infections\textsuperscript{21}. In our study poor hygiene management was considered if the frequency of change of sanitary pad/cloth was greater than eight hours; not cleaning hands before and after changing MHM materials; not washing external genitalia at least once per day; and using reusable sanitary pads/cloths without washing them with soap/antiseptic. This type of poor hygiene is intricately linked with risks of infection, such as urogenital infections, yeast infection, fungal infection, and urinary tract infection\textsuperscript{21-23}, leading to increased school absenteeism during menstrual periods.

This study found that school absenteeism was higher among adolescent girls who used homemade cloths or underwear, reused sanitary materials, washed reusable cloths with only water and dried these inside the house or outside without sunlight. School absenteeism was less among the girls who use sanitary pads during this period. School absenteeism was significantly associated with the reuse of sanitary materials, consistent with results found with a study conducted in Northeast Ethiopia\textsuperscript{3}. The adolescent girls who used sanitary pads were more concern about menstruation and hygiene practices\textsuperscript{22}. Due to proper hygiene maintenance and concern about menstruation, they had less reproductive tract infections and less school absenteeism. Reusable sanitary cloth washing with soap or antiseptic results in properly disinfected or less contaminated cloths that inhibit several genital problems and less infection\textsuperscript{24}. Improper drying of reusable cloths may be associated with contamination and responsible for reproductive tract infections found in a previous study\textsuperscript{25}. Unsatisfactory cleaning or cleaning without soap/antiseptics also leads to less school participation by adolescent girls during menstrual periods. This issue is responsible for reproductive infections\textsuperscript{26,27} and pain during menstruation\textsuperscript{28}.

**Strengths and limitations**

This study has some strengths. It is one of the first studies to explore school absenteeism among school-going adolescent girls in Bangladesh and assesses some of the factors associated with school absenteeism. However, this study has limitations. School absenteeism was considered a full-day absence from school, but evidence suggests that girls often miss only part of the school day. School wash facilities of the study participants were not visited, and household wash facility data were not collected. This study suggests further longitudinal research to interpret the association between school wash facilties, poor menstrual hygiene management, and poor wash facilities at home with school absenteeism.

**CONCLUSIONS**

The major finding of this study was that the lack of knowledge and the lack of wash facilities and soap/antiseptic equipment for washing sanitary pads, for bathing and cleaning external genitalia were responsible for school absenteeism among school-going adolescent girls. Menstrual hygiene management knowledge and adequate mother’s education level prevent school absenteeism. This study’s findings may help governmental and non-governmental organizations to design programs to reduce school absenteeism during menstrual periods by improving education on health hygiene practices during the menstrual cycle.

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CONFLICTS OF INTEREST
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