



## Menstrual problems among adolescent schoolgirls in East Delhi, India

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### ABSTRACT

#### Background

Many girls experience physical and emotional symptoms during and immediately before their menstrual period. This study surveyed adolescent schoolgirls in East Delhi, India to determine where they receive education regarding menstruation and the menstrual cycle. We recorded who they are most likely to turn to for advice on menstrual issues; documented the most common menstrual problems they face; and what formal education they receive, with the aim of identifying the most common menstrual problems and their associated factors.

#### Results

Most (62%) of the 337 students included in our study did not receive formal education sessions on menstruation at school. Those who did were most likely (22.3%, n=75) to learn about the topic as part of science education. The majority of the students (82%) do approach others for help with menstrual health problems – most commonly their mother (68.0%, n=229) – but only 4% (14) consulted a doctor. 87% of the study participants experience menstruation of normal frequency, defined as one cycle every 21-35 days, and 94% experience normal duration of 2-7 days. However, 91% experience painful menstruation, 96% experience premenstrual syndrome and 63% report blood clots. Blood clots are significantly associated ( $p < 0.05$ ) with younger age.

#### Discussion

Most of the adolescent schoolgirls in our study experience some health issues linked to menstruation, but the topic is still considered taboo in many parts of India. 60% of respondents consider menstruation to be a personal matter. Few girls (9%) reported sharing their menstrual concerns with male members of their family and even fewer (4%) consult a doctor. Girls' mothers are their primary source of information, though schoolteachers are also important, particularly after menarche (the onset of menstruation). This suggests that the role of school-based education on menstruation experiences and hygiene could be strengthened.

#### Conclusion

School-based health camps for reproductive health issues could encourage early health-seeking behaviour amongst adolescent girls if included as part of the school health programme. Schools should have a trained healthcare provider for counselling and managing menstrual problems experienced by adolescent schoolgirls. School toilets and sanitary facilities should be monitored and maintained appropriately by school authorities.

**Keywords:** Menstrual problems, Adolescent girls, Premenstrual syndrome

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## INTRODUCTION

Adolescence is defined as the period spanning 10-19 years of age, according to the World Health Organization (WHO). It comes from the Latin word *adolescere*, meaning "to grow in maturity". Adolescents comprise 21.4% of India's total population.<sup>1</sup> During adolescence, girls undergo physical, mental, endocrinal and emotional development as they transition from dependence on their family to relative independence, and from childhood to adulthood.<sup>2</sup>

One of the most important changes girls undergo during adolescence is the onset the menstrual cycle. The complex action and interaction of hormones released from the hypothalamus, pituitary gland and ovaries, and the effect of these hormones on the endometrium, signals the onset of possible fertility.<sup>3</sup> The average menstrual cycle of a healthy female should be regular and occur uniformly, in orderly intervals, throughout life: one cycle every 21-35 days. The average duration of menstrual blood flow is 4 days +/- 2 days, with an average blood loss per cycle of 40ml +/- 20ml (4-12 teaspoons).<sup>4</sup> Menstruation that has disorderly intervals from one cycle to another is considered irregular.<sup>5</sup>

The onset of menstruation is known as menarche. It is unique to females and is considered the central event of puberty. The global median age of menarche is 12.9 years<sup>6</sup> though the mean age differs from one population to the next depending on characteristics such as diet and environmental conditions. Studies suggest that menarche appears earlier with better nutritional, economic and hygienic conditions.<sup>7-8</sup>

During the menstrual cycle, adolescent girls frequently report issues including dysmenorrhea (cramping lower abdominal pain which may radiate to the back and lower legs during or before the onset of menstruation); premenstrual syndrome (a recurrent, variable cluster of physical and emotional symptoms that develop 7-14 days before the onset of menstruation and subside when menstruation begins);<sup>9</sup> and excessive menstrual bleeding. Physical health problems related to menstruation are a common cause of school absenteeism and lost work<sup>10</sup>

Knowledge of the length and variation of the menstrual cycle is necessary for patient education and for identifying deviations from a normal cycle that will guide clinical evaluation.<sup>11</sup> Menstrual issues are a major gynecological problem, especially among adolescent females<sup>12</sup> but few adolescents approach healthcare providers when menstrual disorders occur<sup>13</sup> even though they are often a source of anxiety for girls and their families<sup>14</sup>. Literature suggests that dysmenorrhea and premenstrual syndrome commonly impact on women's daily activities, disturbing their attendance at school, and their productivity at home and work. Our present study was conducted with the aim of identifying the common menstrual problems and their associated factors among adolescent schoolgirls in East Delhi.<sup>14,15</sup>

## METHODS AND MATERIALS

A school-based descriptive, cross-sectional study was conducted over a period of six months in senior secondary schools in two districts of East Delhi (Eastern and North-Eastern district), India. At the time of the study, the total number of schools in these districts, including private and government schools, was 595. Girls in classes 9 through 12 (age 14-18) who had attained menarche at least a year prior to the date of survey were included. Girls with a history of serious illness requiring hospitalization during the three months preceding the study, and with other self-reported endocrine abnormalities, were excluded. The study was approved by the Institutional Ethics Committee of University College of Medical Sciences, New Delhi. Written informed consent was obtained from all the subjects prior to participation in the study.

The sample size was calculated based on the prevalence of dysmenorrhea among adolescent girls in New Delhi of 67.02/100, confidence level  $(1-\alpha) = 95\%$ , recorded in 2017.<sup>16</sup> Taking 5% absolute precision, the minimum sample size is calculated at 333 using Epi Info 2000. For the purpose of the, study a minimum sample of 336 was decided – a number divisible by four as the sample was to be taken from four schools. Two government and two private schools were selected in each district of East Delhi at random. The directorate of health education was approached for the selected districts and permission

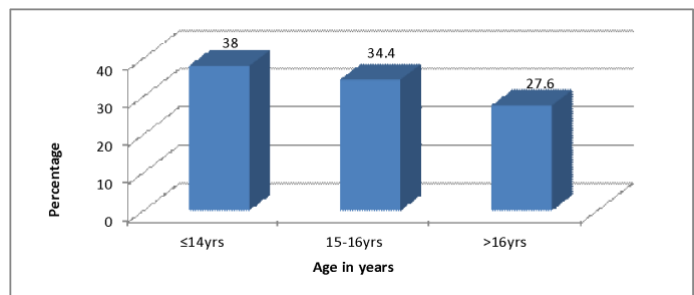
was obtained to undertake the survey in government schools; for private schools, written permission was obtained from the school principal. Information collected from the schools recorded a minimum of three sections (classes) in each year group with a minimum of 40 students in each section (120 students per year group). In government schools, each section had a minimum of 50 girls and in private schools, each section had 30 girls. In the selected schools, class teachers were approached and given consent forms. These were distributed to all the girls in the class along with a parent information sheet. The purpose of the study was explained to the class teacher and the students. The following day, seven girls from each section were selected through systematic random sampling from those who returned completed consent forms. This gave 21 students from each class and 84 students from each school (168 students from government schools and 168 students from private schools). Participants were interviewed in person with a self-administered, pre-tested, semi-structured questionnaire. Questionnaires were available in Hindi or English, according to each girl's preference.

The questionnaire gathered information including the type of school (government or private), number of class standards (9-12) and sections, and socio-demographic details of the girls (age, religion, type of family, number of siblings, level of parents' education, parents' occupation, and monthly family income). Further questions were asked relating to menstrual knowledge and awareness including whether they had obtained information before their own menarche; the source of that information; whether they considered menstruation to be a personal matter and whether they were happy to discuss it with members of their family; their experiences of menarche; class sessions relating to menstruation; and their experience of the normal menstrual cycle, including length of interval and duration of each period of menstruation. Additional questions were asked relating to menstrual problems they had experienced in the past 3 months, including whether they had experienced: pain during menstruation, and if so its intensity and onset; presence of clots in menstrual blood; intermenstrual bleeding; missed cycles; premenstrual syndrome; menstrual irregularity; and who, if anyone, they had approached to discuss menstrual health problems.

## RESULTS

### Demographics

A total of 337 adolescent schoolgirls participated in the study of whom 38% (n=128) were classified as being in early adolescence (14 years or under), 34.4% (n=116) in middle adolescence (15-16 years) and 27.6% (n=93) in late adolescence (above 16 years) (Fig 1).



**Fig 1: Age Composition of adolescent schoolgirls**

Most of the study respondents (81%, n=275) belonged to a nuclear family and the rest to an extended family. This is higher than the Indian national average recorded for nuclear families (60.5%), probably due to urban families being more likely to be nuclear; the study was conducted in an urban context<sup>17</sup>. Most were Hindus (82%, n=279), 15% were Muslims, with a small number of Christians, Sikhs and Jains; this is consistent with national census data on religion (the Census of India 2011 recorded 80.5% of the population were Hindus, followed by 13.4% Muslims, 2.3% Christians, 1.9% Sikhs, 0.8% Buddhists, 0.4% Jains and 0.6% other religions).

Socioeconomic status was classified according to the Modified Kuppuswamy Scale 2012:<sup>18</sup> 35% (n=118) girls belonged to the upper middle class, 35% (n=117) to the lower middle class, and 23% (n=78) to the upper class 7% (n=24), with none from the lowest class. The educational backgrounds of the study participants' mothers were recorded as follows: 22% (n=74) of the mothers were illiterate, 15% (n=52) had completed primary school only; 17% (n=57) had completed middle school; 21% (n=70) had completed high school education; 13% (n=42) had a post-high school diploma and 12% (n=42) had undertaken graduate or postgraduate education. More fathers (93%) than mothers were classed as literate (78%).

**Table 1 Average menstrual cycle interval and duration**

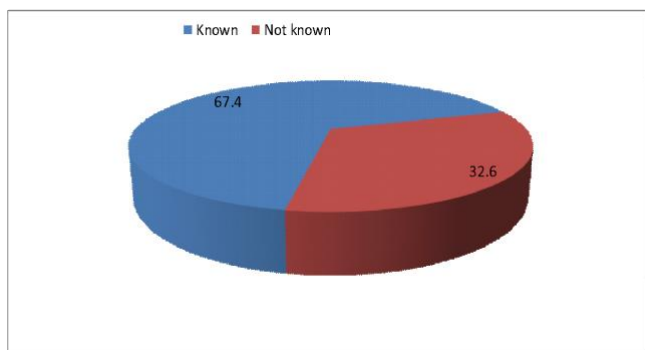
Average menstrual cycle interval in days	Number	Percentage
15-20	18	5
21-35	292	87
36-45	13	4
>45	14	4
Average menstrual cycle duration in days		
2-7	317	94
>8	20	6

**Characteristics of menstrual cycle**

Most girls (87%, n=292) reported a normal menstrual cycle interval of 21–35 days, with 5% (n=18) experiencing polymenorrhea (short cycle <21 days) and 8% (n=26) reporting oligomenorrhea (>35 days, or fewer than 6-8 cycles per year). The majority (94%, n=316) of girls had a normal duration of menstrual bleeding, defined as 2-7 days, with only 6% (n=20) reporting bleeding for longer than this. None reported a shorter period (Table 1, above).

**Knowledge and awareness about menstruation**

Most of the schoolgirls (68%, n=227) reported that they had been aware of menstruation before the onset of their own menarche. They had received information through their mothers (36%), relatives (14%), friends (10%), books/TV/radio/newspapers (6%) and teachers (2%). The primary source of information regarding menstruation after menarche was also their mother (41%, n=138). This was followed by teachers (19%, n=65), doctors (15%, n=49), friends (13%, n=44), sisters (8%, n=27), and the internet and books (4%, n=13).



**Fig 2 Knowledge of menstruation before menarche**

More than half of the girls (61%, n=205) had known about sanitary pads and cloths before menarche. Most of the girls (71%, n=240) used only sanitary pads, and 29% (n=97) used both pads and cloths. Information on choosing the sanitary material was most likely to come from the mother (51%, n=172), followed by schoolteachers (29%, n=97), siblings (9%, n=32) and friends (8%, n=27). More than half of the schoolgirls (56%) procured sanitary pads from commercial sources. Most of the girls 74% (n=250) changed 1-3 times a day at home, and 26% (n=87) more than 3 times. 61% (n=205) changed at schools, however only 1.5% (n=5) of the girls reported that changed more than 3 times at school and 37.5% (n=127) do not change their pads at school at all. A reasonably high percentage (38%) of the girls using pads reported allergy-related symptoms. The most common method of disposal was to place them in a standard dustbin (99%); 17% burnt some of their used pads.

**Information, education and communication (IEC)**

Table 2 on the following page shows the level of IEC (information, education and communication) on menstruation provided by schools. Most (63%, n=210) of the students had not received any class sessions on menstruation. Of the minority 37% (n=126) who had received class sessions, 22% (n=75) had been taught during science classes; 9% (n=30) had been educated by private sanitary pad companies; 4% (n=13) had been educated by Shiksha, an NGO focusing on education for underprivileged children, and 2% (n=8) had general knowledge from an unspecified source. More than half (57%, n=201) of the girls considered menstruation to be a matter of personal concern and 10% (n=36) said they felt shy discussing it with anyone. A third (33%, n=99) failed to give an answer.

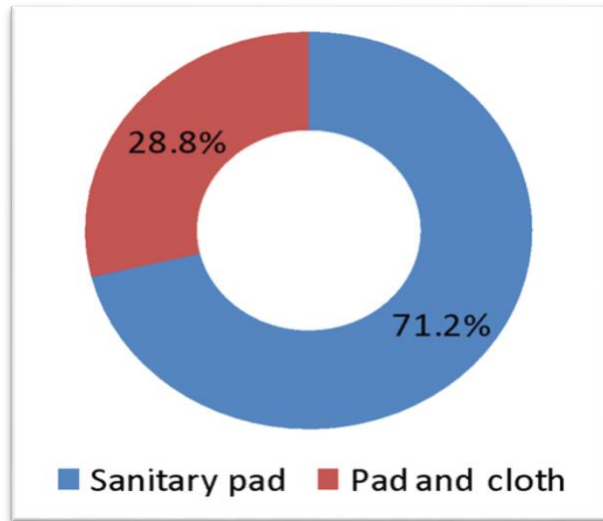


Fig 3 Knowledge of sanitary pads and cloth

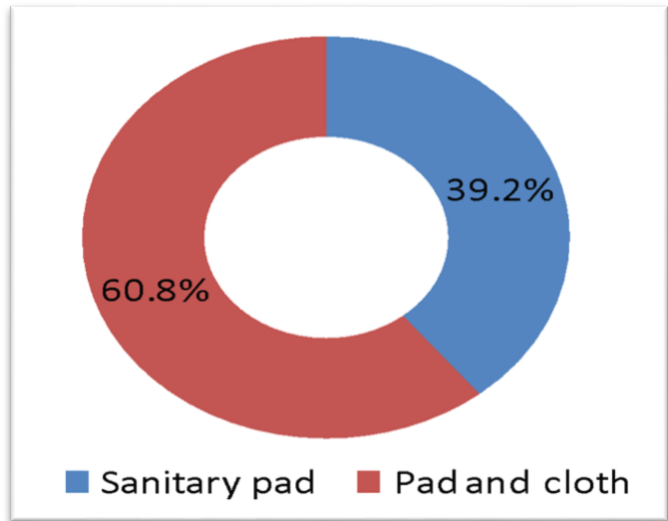


Fig 4 Use of sanitary pads and cloths

### **Attitudes to discussing menstruation**

Nearly all of the adolescent girls interviewed for this study (92%, n=308) preferred not to discuss menstrual issues with male family members. The main reasons they gave were feeling shy (46%, n=160) and feeling awkward/embarrassed (24%, n=81). The majority of the students (82%) did usually approach someone for advice regarding any menstrual health problems they encountered and reported that their mother was the most common person there are likely to approach (by 68%, n=229) followed by a sister (10%, n=33). Only 4% (n=14) sought advice from a doctor.

### **Health issues during menstruation**

Table 3 on the following page shows common issues experienced during menstruation. Most of the schoolgirls (91%, n=306) described experiencing dysmenorrhea (painful menstruation) at some point in their cycle. Pain was most commonly experienced in the first two days of menstruation (by 55%, n=186), for two days before onset (by 65%, n=195) and throughout the cycle by 16% (n=55). The intensity of

pain was described as very severe by 19% of the students (n=63), severe for 25% (n=83), moderate for 34% (n=116) and mild for 13% (n=44). Premenstrual syndrome was reported by 96% (n=323) of study participants, blood clots by 63% (n=212), backache by 38% (n=125), missed cycles by 34% (n=115), and intermenstrual bleeding by 20% (n=70). Reported symptoms of the most common condition, premenstrual syndrome, were abdominal pain (experienced by 26%, n=89 of the study participants), irritability (by 13%, n=43) and fatigue (by 9%, n=30).

A further 11% of the adolescent girls reported suffering symptoms including headache, increased weight, abdominal bloating, breast heaviness and joint pain during their menstrual period. The age of schoolgirls and passing of clots during menstruation was found to be statistically significant ( $p < 0.001$ ), with younger girls more likely to experience clots. No statistical significance was found for other parameters of menstrual health problems.

Table 2 IEC on menstruation

Menstruation IEC	Number	Percentage
Yes	126	37.4
No	211	62.6

**Table 3 Menstrual problems among adolescent schoolgirls**

Menstrual Problems	Number	Percentage (%)
<b>Dysmenorrhea</b>		
Yes	306	91
No	30	9
<b>Clots</b>		
Yes	212	63
No	106	32
Don't know	18	5
<b>Intermenstrual bleeding</b>		
Yes	70	20
No	262	78
Don't know	4	12
<b>Missed cycle</b>		
Yes	115	34
No	208	62
Don't know	13	4
<b>Premenstrual syndrome</b>		
Yes	323	96
No	13	4

**Menstrual issues: associations**

Our study also looked for associations between the menstrual problems of adolescent schoolgirls, such as dysmenorrhea, premenstrual syndrome, passing bloodclots, intermenstrual bleeding and missed cycle, and various independent factors such as girls' age; whether or not information, education, communication (IEC) sessions on menstruation and associated issues were offered by the girls' schools and in what format; girls' awareness of menstruation before menarche; their family religion; their parents' level of education; and the family's socioeconomic status and level of income.

A statistically significant ( $p < 0.05$ ) association was found between a missed cycle and IEC sessions on menstruation conducted in schools. A statistically significant association was also found between intermenstrual bleeding and attendance at IEC sessions on menstruation offered by schools. The passing of blood clots was analyzed using multivariate regression. Schoolgirls aged less than 16 years were 3.38 times (95% CI = 2.10 - 5.44,  $P < 0.001$ ) more likely to pass blood clots compared with girls aged 16 years and above. No other associations were found to be statistically significant.

**DISCUSSION**

This study gives information about menstrual knowledge, sanitary pad and cloth use, attitudes to discussing menstrual issues and common menstrual problems experienced by adolescent schoolgirls in the age group 13-19 years from classes 9-12 in East Delhi, India. The schoolgirls were more likely than average to belong to a nuclear family (83% in the study, compared with the national average for India of 60.5%). More fathers and mothers were literate than the national average (93% of fathers compared with a national average of 75% and 78% of mothers compared with a national average of 54% in the 2011 National Census).

As the study was conducted in Delhi, an urban/metropolitan city where nuclear families are a growing trend, this may explain the higher-than-expected number of nuclear families in the study.<sup>18</sup> The socioeconomic status of the girls was also higher than was found in a similar study carried out in Trivandrum<sup>19</sup>. The reason could be again due to educational level and income scales being higher among the residents in the capital city. Representation by religious group was comparable with the national average.



### **Information about menstruation**

More than two-thirds of the adolescent schoolgirls (68%) in our study were aware of menstruation before their own menarche, with their mothers (36%) being the most commonly cited source of information, followed by other relatives (14%). After commencing menstruation, the majority of the girls continued to acquire information from their mothers (41%) but their schoolteachers became an increasingly important source (19%) of knowledge. This suggests that schoolteachers play an increasingly important role in providing menstrual information to girls as they move through adolescence.

Despite improvements in the availability and accessibility of computers, television and newspapers in recent years, in our study these were found to be the least used source of information among the schoolgirls before and after menarche.

In India, people are strongly bound to cultural and religious practices regardless of their educational and socioeconomic status. Menstruation is considered a taboo subject in many parts of India and is often not spoken about.<sup>20</sup> Menstruation was considered a personal matter by 60% of the adolescent schoolgirls in our study, though amongst these the majority (90%) did not specify a reason why. Very few schoolgirls (9%) felt comfortable sharing their menstrual concerns with male members of their family. The Indian sociocultural context might be a reason for the findings in our study. A similar study undertaken in Nigeria among schoolgirls found that mothers were the most common source of information for most of adolescent schoolgirls (81%), followed by teachers (7.4%) and friends (6.1%). These figures are similar to those recorded in our study.<sup>21</sup>

### **Menstruation parameters of adolescent schoolgirls**

The average menstrual cycle interval of most (87%) of the adolescent schoolgirls was within a normal range, defined as between 21 and 35 days. Similarly, the menstrual cycle duration was also in the normal range (2-7 days) for most of the adolescent schoolgirls (94%). Studies conducted in Italy and Nigeria depict similar patterns of menstrual cycle intervals and duration among adolescent girls.<sup>22</sup>

### **Menstrual problems among adolescent schoolgirls**

Premenstrual syndrome (96%) was the most frequently cited menstrual health problem among the schoolgirls, of which the most common symptoms reported were backache (37%), abdominal pain (26%) and irritability (13%). A few girls reported abdominal bloating (0.6%). The second most common problem was dysmenorrhea (90%), with moderate pain commonly felt during the first two days of menstruation; passing clots (63%); missed cycles (34%); intermenstrual bleeding (21%); oligomenorrhea (8%); and polymenorrhea (5%). Studies conducted in other countries have also reported that premenstrual syndrome is the most frequent menstrual health problem faced by adolescent girls, followed by dysmenorrhea and other problems.<sup>23</sup> Other Indian studies have identified dysmenorrhea as the most common symptom, followed by premenstrual syndrome and other problems.<sup>24</sup> The higher prevalence of premenstrual syndrome in our study might be due to variation in study setting and population in comparison with other Indian and international studies.

In our study, 82% of adolescent schoolgirls approached someone for their menstrual health problems; most (68%) approached mothers and only a few approached doctors (4%). This is consistent with findings from other countries, which also show that few girls consult healthcare providers when they experience menstrual health problems.<sup>23</sup> Previous studies from India have also suggested that the majority of girls approach their mother for help with their menstrual health problem(s), and that only very few opt for medical help.<sup>24</sup>

Studies from other countries have identified a number of associations that act as predictors of menstrual issues. In a study conducted in Japan among college students, stress, heavy menstrual flow and menstrual pain were found to be significant predictors of premenstrual syndrome.<sup>25</sup> Another study among Japanese women found an association between irregular cycles, the age of the subjects and smoking habits.<sup>26</sup> A study from China found an association between adolescent schoolgirls seeking medical help for menstrual problems and opinions held by a family

member.<sup>27</sup> These associations were not found in our study, most likely due to variability in study population (for example, smoking in our study setting is very rare), setting and questionnaires used.

Only a few variables were found to be statistically significant in univariate analysis. The association between missed cycle and IEC sessions on menstruation conducted in schools was found to be statistically significant ( $p < 0.05$ ). Though we have evidence of a statistical association, a clinically plausible explanation may not be possible. The reason for such an association could be explained by the girls who attended the IEC sessions having increased awareness for identifying a missed cycle, which might have led to bias in them being more likely to report such an event. Similarly, while an association was found to be significant between intermenstrual bleeding and IEC sessions on menstruation by schools, this also may be explained in the same way.<sup>28</sup> The odds of passing clots among schoolgirls aged less than 16 years was 3.38 times greater than for girls aged 16 years and above. Despite our best efforts, no literary evidence on an association between age and passing of blood clots could be found. One possible reason could be that girls younger than 16 years may have misinterpreted endometrial tissue as clots, due to lack of awareness and less experience than girls of age 16 years and above and misreported them.

## CONCLUSION

Our study offers significant findings. Firstly, not all girls have sufficient information about menstruation before their onset of their own menarche; 67% are informed but this still leaves a significant minority who need better education. Menstruation is considered a personal matter by 60% of the adolescent schoolgirls

in our study, with most of their information still coming from their mother. Only 4% approach doctors, but as the average cycle intervals and cycle duration are within normal range for most of the girls (87% and 94% respectively), there may be little need to do so regularly.

The most commonly reported menstrual problems were premenstrual syndrome (96%), with the most frequently reported symptom backache (38%); dysmenorrhea (90%, with moderate pain); passing blood clots (63%), missed cycle (34%), intermenstrual bleeding (21%), oligomenorrhea (8%) and polymenorrhagia (5%). Passing clots was strongly associated with age and a missed cycle. Intermenstrual bleeding was found to be associated with IEC sessions conducted by schools. Most (71%) of girls use sanitary pads only and (29%) use both cloths and pads. A significant percentage – 38% of the girls – reported not changing their pads while they were in school, suggesting that IEC sessions on menstruation and related hygiene practices should be conducted in schools on a regular schedule.

On the basis of our study findings, we recommend that school-based health camps for reproductive health issues should be conducted to encourage early health-seeking behaviour amongst adolescent girls, included as a part of the school health programme. Schools should have a trained healthcare provider for counselling and managing menstrual problems commonly experienced by adolescent schoolgirls. School toilets and sanitary facilities should be monitored regularly and maintained appropriately by the school authorities. A future consideration could look to position electrical sanitary incinerators in schools for safe disposal of sanitary materials.

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