Comparison of awareness and perception of menstrual hygiene between pre and postmenarchal adolescents of North India: A cross-sectional study

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ABSTRACT

Context: Menstruation is a normal physiologic phenomenon. Due to lack of awareness regarding menstrual hygiene among adolescent girls in India, majority have unhygienic practices which make them vulnerable to various adverse health and social outcomes.

Aims and Objective: The aim of this study was to compare the awareness and perception of pre- and postmenarchal adolescent girls regarding menstrual hygiene.

Settings and Design: A hospital-based cross-sectional study was conducted by the Department of Obstetrics and Gynaecology and Paediatrics of a Government tertiary care center, Lucknow, Uttar Pradesh for 6 months from 1 July 2019 to 31 December 2019.

Material and Methods: The study was undertaken among 120 adolescent girls between 09 and 19 years of age. Premenarchal age group was from 9 to 12 years and postmenarchal was 13–19 years. All the adolescent girls who fulfilled the inclusion criteria were subjected to a pretested prevalidated semi-structured questionnaire assessing their awareness and perceptions regarding menstrual hygiene.

Result: Of 120 respondents, 43 girls were aware of menstruation prior to attainment of menarche. Mother was the first informant regarding menstruation in the case of 49 (49.65%) girls. A total of 57 girls believed it as a physiological process. 32 (53.3%) girls knew the use of sanitary pads during menstruation. Regarding restrictions practiced, 136 (85%) girls practiced different restrictions during menstruation.

Conclusion: Adolescent girls, being vulnerable, need to have adequate and correct awareness regarding menstrual hygiene. This will protect them from risk of developing reproductive or sexually transmitted infections (RTI/STI) which is a burden on our society and render many females infertile and cause other adverse health outcomes.

Keywords: Adolescents, attitudes, knowledge, menstrual hygiene, perception

Introduction

Menstruation is a physiological process that stipulates the onset of reproductive life. However, in Indian society, it is often regarded as an impure occurrence due to cultural taboos, insufficient information, and incorrect knowledge among the adolescent girls which causes unessential limitations in their day-to-day activities.²

Girls’ education has a long-term positive impact on personal welfare as well as economic and social development, especially in low-income communities.² Educated girls not only participate in the formal labour market and earn higher incomes but have healthy practices like they get married at a later age, have fewer children, potentially ensuring better health status and education for their children that can reduce poverty and contribute to a country’s development. However, a number of small-scale, mostly qualitative studies have

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observed that many school-age girls hesitate in attending school during menstruation due to shame, fear of developing visible stains on their clothes, absence of a private and secured area to handle menstruation in school and dysmenorrhoea.[6,7]

As adolescent girls are one of the most vulnerable group of the society and are the future mothers, they need to have adequate and correct awareness regarding menstrual hygiene because this will further protect them from risk of developing reproductive or sexually transmitted infections (RTI/STI) which are indeed a burden on our society and render many females infertile and cause other adverse health outcomes. So, if proper awareness is generated at primary level, then, a healthy girl will be a healthy mother in future and will contribute to reducing maternal as well as infant mortality which will result in overall women health empowerment.

Aims and Objectives
The aim of this study was to compare awareness and perception of Pre and Postmenarchal adolescent girls regarding menstrual hygiene and assess the related practices among the postmenarchal females.

Material and Methods

Study design
This was a hospital-based cross-sectional study.

Study Setting
The study was carried out in the Department of Obstetrics and Gynaecology and Paediatrics of a Government tertiary care centre of Lucknow, Uttar Pradesh.

Study Participants
The study was undertaken among the adolescent girls between 9 to 12 years and postmenarchal was 13-19 years.

Study Period
This study was carried out for 6 months from 1st July 2019 to 30 December 2019.

Inclusion criteria
All adolescent girls of age 9–19 years who consented to participate in the study were enrolled after informed verbal and written consent.

Exclusion criteria
All girls less than 9 years and above 19 years and those who were not cooperative were excluded.

Sample Size
For the purpose of sample size estimation, finite population correction has been applied to the sample size formula, that is, \( n = \frac{NX}{X + N - 1} \) where, \( X = \frac{Z_{\alpha/2}^2 p (1-p)}{d^2} \)

\( Z_{\alpha/2} \) – critical value of the normal distribution at \( \alpha/2 \), that is, 1.96, \( P \) - Estimated sample proportion, that is, Proportion of adolescent girls with inadequate knowledge about menstrual hygiene (Value is 71%).\(^8\) \( d \)-margin of error for appropriate level of precision (value is 0.08), \( N \)–Estimated population size, that is, approximate frequency of adolescent girls attending the hospital during the study period (value is 500). At 95% confidence interval, power of 80%, and 20% as dropouts/nonresponders, the minimum sample size is 120 adolescent girls. Therefore, the study was carried out among 120 adolescent girls. Out of which 60 were in the premenarchal group and the other 60 were in the postmenarchal group.

Ethical Consideration
The ethical permission was taken from Institutional Review Board, IEC of the tertiary care centre (IEC 81/18).

Data Collection
Systematic random sampling was used to enrol the adolescent girls in the study. With sampling interval of two, every second adolescent girl who fulfilled the inclusion criteria was enrolled in either of the groups. Informed verbal as well as written consent was taken from all the adolescent girls. A pretested pre-validated semi-structured questionnaire was prepared to capture all the relevant information regarding their sociodemographic characteristics and knowledge, perceptions and practices regarding menstruation and hygiene.

Variables
The dependent variables in the study were knowledge, perceptions and practices regarding menstrual hygiene. The independent variables include sociodemographic variables like age, religion, type of family and educational status followed by menstrual pattern among postmenarchal females like age at onset of menarche, regularity of menses, amount of flow and duration of flow.

Data Analysis
Data were analysed using SPSS software program, version 24.0. Descriptive summary using frequencies, percentages and cross tabs was used to present the study results. Probability (p) was calculated to test statistical significance at the 5% level of significance. Association between independent and dependent variables was determined using Chi-square test.

Results
Socio-demographic characteristics of the study participants in the two groups
Maximum students in the premenstrual group were early adolescents 10–11 years of age, whereas postmenstrual group had more of late adolescents, that is, between 13 and 19 years. Maximum respondents in both the group were Hindu by religion and lived in joint families. In the premenstrual group maximum participants had received primary education, whereas
in the postmenstrual group maximum participants had received secondary education [Table 1].

**Menstrual pattern of the study participants in the postmenarchal group**

Maximum subjects (33.3%) had attained menarche at around 13 years of age. Most of the subjects (80.0%) had regular menses with moderate flow (66.67%) lasting for 4-6 days (41.67%) in the postmenstrual group [Table 2].

**Comparison of awareness regarding menstrual hygiene between the two groups**

21 people in the premenstrual group and 22 in the postmenstrual group had knowledge of menses prior to the onset of menses. The respondents were aware of the organ from where the bleeding occurred. 9 people in the premenstrual group and 31 in the postmenstrual group thought it was the uterus, 20 people in the premenstrual group and 14 in the postmenstrual group thought it was the stomach, the rest don’t know. 24 people in the premenstrual group and 33 in the postmenstrual group thought menses to be a physiological process, 18 people in the premenstrual group and 17 in the postmenstrual group thought it was God-given, the rest did not know. The first source of knowledge in both the groups were the mothers followed by siblings followed by their peers. Time of first knowledge was same days of menses or the next day. Menstrual hygiene sessions were held in schools of 10 respondents in the premenstrual group and 25 in the postmenstrual group [Table 3].

**Comparison of perception regarding menstrual hygiene between the two groups**

23 people in the premenstrual group and 34 in the postmenstrual group knew that menstruation was a physiological process, whereas the rest still considered it as a disease or curse from god. Approximately 21 people in the premenstrual group and 33 in the postmenstrual group thought menstruation to be a natural process, whereas 28 and 12 people in the respective groups took it to be a burden, the rest thought it to be a necessary change, which was statistically significant.

People in both groups follow restrictions like not visiting temples or other religious restrictions, food restrictions, sitting separately, restrictions in doing household work, in walking around or playing. Only 4 people in the premenstrual group and 5 people in the postmenstrual group out of 60 followed no restrictions. 42 out of 60 people in the premenstrual group and 37 people in the postmenstrual group had normal reactions towards the bodily changes that occurred post menarche, whereas the rest were a little depressed.

17 out of 60 in the premenstrual group and 19 out of 60 in the postmenstrual group had to miss school because

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**Table 1: Socio-Demographic Characteristics of the Study Participants in both the groups**

| Variable          | Pre-menarchal (n=60) | Postmenarchal (n=60) | Chi square | P     |
|-------------------|----------------------|----------------------|------------|-------|
| Age               |                      |                      |            |       |
| Early Adolescence (9-12 years) | 50 (83.3) | 07 (11.7) | 61.78 | 0.001* |
| Late adolescence (13-19 years) | 10 (16.7) | 53 (88.3) |             |       |
| Religion          |                      |                      |            |       |
| Hindu             | 54 (90)              | 50 (83.3)            | 1.487      | 0.581† |
| Muslim            | 4 (6.7)              | 08 (13.3)            |            |       |
| Others            | 2 (3.3)              | 02 (3.4)             |            |       |
| Type of Family    |                      |                      |            |       |
| Nuclear           | 41 (68.3)            | 50 (83.3)            | 3.68       | 0.05  |
| Joint             | 19 (31.7)            | 10 (16.7)            |            |       |
| Educational Status|                      |                      |            |       |
| Illiterate        | 02 (3.2)             | 05 (8.3)             | 68.76      | 0.001* |
| Primary           | 46 (76.7)            | 02 (3.3)             |            |       |
| Secondary         | 10 (16.7)            | 34 (56.7)            |            |       |
| Intermediate      | 01 (1.7)             | 15 (25)              |            |       |
| Graduation        | 01 (1.7)             | 04 (6.7)             |            |       |

Number (%), †Yates’ corrected P, *P<0.05 is significant

**Table 2: Menstrual Pattern Among the Postmenarchal Females (n=60)**

| Variable                  | Frequency (n) | Percentage |
|---------------------------|---------------|------------|
| Age at Menarche (Year)    |               |            |
| 09                        | 01            | 1.67       |
| 10                        | 05            | 8.33       |
| 11                        | 11            | 18.33      |
| 12                        | 06            | 10.0       |
| 13                        | 20            | 33.33      |
| 14                        | 11            | 18.33      |
| 15                        | 06            | 10.0       |
| Regularity of Menses      |               |            |
| Regular                   | 48            | 80.0       |
| Irregular                 | 12            | 20.0       |
| Amount of Flow            |               |            |
| Scanty                    | 03            | 5.0        |
| Moderate                  | 40            | 66.67      |
| Heavy                     | 17            | 28.33      |
| Duration of Flow          |               |            |
| 1-3 days                  | 17            | 28.33      |
| 4-6 days                  | 25            | 41.67      |
| 6-8 days                  | 13            | 21.67      |
| More than 8 days          | 05            | 3.33       |
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### Table 3: Comparison of Awareness regarding Menstruation and Hygiene between the Two Groups

| Variable                                      | Pre-menstrual (n=60) | Post-menstrual (n=60) | Chi square | P       |
|-----------------------------------------------|----------------------|-----------------------|------------|---------|
| Knowledge of menses prior to menses           |                      |                       |            |         |
| Yes                                           | 21 (35)              | 22 (36.7)             | 0.928      | 0.335   |
| No                                            | 39 (65)              | 28 (63.3)             |            |         |
| Knowledge of organ from where bleeding occurs |                      |                       |            |         |
| Uterus                                        | 09 (15)              | 31 (51.7)             | 18.72      | 0.00008*|
| Stomach                                       | 20 (33.3)            | 14 (23.3)             |            |         |
| Don’t know                                    | 31 (51.7)            | 15 (25)               |            |         |
| Knowledge about cause of bleeding             |                      |                       |            |         |
| Physiological                                 | 24 (40)              | 33 (55)               | 3.735      | 0.154   |
| God given                                     | 18 (30)              | 17 (28.3)             |            |         |
| Don’t know                                    | 18 (30)              | 10 (16.7)             |            |         |
| Source of first knowledge                     |                      |                       |            |         |
| Peer                                          | 03 (5)               | 10 (16.7)             | 8.53       | 0.07    |
| Mother                                        | 36 (60)              | 24 (40)               |            |         |
| Sibling                                       | 09 (15)              | 11 (18.3)             |            |         |
| Internet                                      | 03 (5)               | 08 (13.3)             |            |         |
| Teacher                                       | 09 (15)              | 07 (11.7)             |            |         |
| Time of first knowledge                       |                      |                       |            |         |
| Prior to menarche                             | 09 (15)              | 07 (11.7)             | 4.956      | 0.175   |
| Same day                                      | 24 (40)              | 22 (36.7)             |            |         |
| Next day                                      | 17 (28.3)            | 11 (18.3)             |            |         |
| Later                                         | 10 (16.7)            | 20 (33.3)             |            |         |
| Menstrual hygiene education session had ever been provided at school | | | | |
| Yes                                           | 10 (16.7)            | 25 (41.7)             | 9.076      | 0.005*  |
| No                                            | 50 (83.3)            | 35 (58.3)             |            |         |

Number (%), *P<0.05 is significant

of menses and 47 and 27 people in the respective groups avoided standing in class to answer during menses due to risk of staining, which was statistically significant. 28 out of 60 people in the premenstrual group and 47 out of 60 in the postmenstrual group found it difficult to concentrate during menses. 43 people in the premenstrual group and 21 in the postmenstrual group were embarrassed during menses. 17 out of 60 people in the premenstrual group and 5 people in the postmenstrual group perceived those facilities available at school were inappropriate for managing menstrual hygiene [Table 4].

### Discussion

The onset of menstruation is the most important phenomena that occurs among girls at adolescence. It is not uncommon that girls have various questions and doubts about menstruation. Imparting correct knowledge about menstruation at the right time, will prevent them from developing inappropriate myths and will avert various adverse genital and urinary infections which poses a huge toll on our primary care physicians. So, menstrual hygiene plays a pivotal role in determining the health status of a woman.

Maximum girls in the premenstrual group were early adolescents, whereas postmenstrual group had more of late adolescents which was in accordance with the study by Alam et al., Gupta et al., Dasgupta et al. and Kamath et al.[6-9] Maximum respondents in both the groups were Hindu and lived in joint families, which was similar to the study by Chaudhary N and Gupta MK.[10]

Majority of the subjects (33.3%) had attained menarche at around 13 years of age, which is in accordance with the study done by Chaudhry N and Gupta MK.[10] Majority of the subjects had received primary education, this was similar to studies done by Chaudhry N and Gupta and Paria et al.[10,11] Most of the subjects (80.0%) had regular menses with moderate flow (66.67%) lasting for 4-6 days (41.67%) in the postmenstrual group, which was in consistent with the results obtained by Deshpande et al.[12]

Adolescent girls in different age groups had different idea about menstruation. 23 girls in the premenstrual and 34 in the

### Practices of menstrual hygiene in the post menarchal group

Hygienic practices were followed by 66.67% of participants in the postmenstrual group. 60% of respondents took bath daily during menses. 53.3% respondents used sanitary pads during menses, 20% use cloth and rest 26.7% used both cloth and sanitary pads during menses. 45% of the respondents changed pad thrice a day for hygiene purposes. The pads were not re-used by the majority of respondents; instead, they were disposed-off in dustbins, flushed in toilets, buried in pits or burnt.

53.3% of respondents were comfortable in changing pads in school. 63.3% subjects washed their hands with soap and water after using the sanitary pads. 81.67% had toilet facility at home. People in different age groups had different idea about menstruation [Table 5].
postmenstrual group knew that menstruation was a physiological process, whereas the rest still considered it as a disease or curse from god, which was similar to the results obtained by Alam et al. and Deo et al.\[6,13\] 28 and 12 girls in the respective groups took it to be a burden, the rest thought it to be a necessary change, which was statistically significant, and in agreement with findings of Deo et al.\[13\] This clearly indicates that even with advent of free and compulsory education in India for 6-14 years age group, majority of the adolescent girls were deprived of correct knowledge regarding menstrual hygiene and the social stigma further subjects them to more adverse health outcomes.

Adolescent girls in both the groups followed restrictions while menstruating like not visiting temples or other religious places, food restrictions, sitting separately, restrictions in doing household work and in walking around or playing. Only 4 girls in the premenstrual group and 5 in the postmenstrual group, out of 60, followed no restrictions. However, variable results have been reported by other researchers.\[14‑16\] In a comparative study by Kumar A and Srivastava K conducted among the adolescent girls of urban slums and urban residential areas of Ranchi, it was observed that 96.07% of girls in urban residential areas reported that they do not face any kind of social restriction during menstruation from parents whereas 45.5% of the girls in the slum reported facing social restriction. Both Hindu and Muslim girls reported restricting themselves from religious practices or worshipping religious places during menstruation.\[17\] 42 out of 60 girls in the premenstrual group and 37 girls in the postmenstrual group had normal reaction towards the bodily changes that occurred post menarche, whereas the rest were a little depressed, which was similar to the results obtained by Chaudhry N and Gupta MK.\[10\] 17 and 19 girls, out of 60 in the premenstrual and postmenstrual group, respectively,

| Variable                                      | Pre-menstrual (n=60) | Post-menstrual (n=60) | Chi square | P     |
|-----------------------------------------------|----------------------|-----------------------|------------|-------|
| Cause of menses                               |                      |                       |            |       |
| Physiology                                    | 23 (38.3)            | 34 (56.7)             | 4.107      | 0.2501|
| Disease                                       | 14 (23.3)            | 10 (16.6)             |            |       |
| Curse from God                                | 12 (20)              | 09 (15)               |            |       |
| Sin                                           | 11 (18.4)            | 07 (11.7)             |            |       |
| Opinion on menses                             |                      |                       |            |       |
| Natural                                       | 21 (35)              | 33 (55)               | 9.682      | 0.008*|
| Burden                                        | 28 (46.7)            | 12 (20)               |            |       |
| Necessary change                              | 11 (28.3)            | 15 (25)               |            |       |
| Restrictions practised during menses†         |                      |                       |            |       |
| Not visiting temples/religious restriction     | 20 (33.3)            | 25 (41.7)             |            | -     |
| Food restrictions                             | 25 (41.7)            | 25 (41.7)             |            | -     |
| No touching                                   | 0 (0)                | 01 (1.7)              |            |       |
| Sit separately                                | 05 (8.3)             | 11 (18.3)             |            |       |
| Restrictions in household work                | 10 (16.7)            | 14 (23.3)             |            |       |
| Restriction in playing                        | 11 (18.3)            | 17 (28.3)             |            |       |
| Instructed not to walk fast/run               | 04 (6.7)             | 05 (8.3)              |            |       |
| No restrictions                               | 0 (0)                | 0 (0)                 |            |       |
| Reaction towards menses                       |                      |                       |            |       |
| Normal                                        | 48 (80)              | 39 (65)               | 3.386      | 0.0657|
| Depressed                                     | 12 (20)              | 21 (35)               |            |       |
| Reaction towards bodily changes               |                      |                       |            |       |
| Normal                                        | 42 (70)              | 37 (61.7)             | 0.926      | 0.3359|
| Depressed                                     | 18 (30)              | 23 (38.3)             |            |       |
| Does your menses cause you to miss school      |                      |                       |            |       |
| Yes                                           | 17 (28.3)            | 19 (31.7)             | 2.256      | 0.1331|
| No                                            | 43 (71.7)            | 41 (68.3)             |            |       |
| Do you avoid standing in class to answer questions during menses | 47 (78.3) | 27 (45) | 14.101 | 0.0002* |
| No                                            | 13 (21.7)            | 33 (55)               |            |       |
| Do you find it hard to concentrate during your menses | 28 (46.7) | 47 (78.3) | 12.836 | 0.0003* |
| No                                            | 32 (53.3)            | 13 (21.7)             |            |       |
| Did you experience embarrassment during your menses | 43 (71.7) | 21 (35) | 16.205 | 0.0005* |
| Yes                                           | 17 (28.3)            | 05 (8.3)              | 8.015      | 0.005* |
| No                                            | 43 (71.7)            | 55 (91.7)             |            |       |

Number (%), *P<0.05 is significant, †Multiple response

Table 4: Comparison of Perception about Menstruation and Hygiene between the Two Groups
Table 5: Practices Regarding Menstrual Hygiene in the Postmenarchal Group (n=60)

| Variable                                | Postmenstrual | Percentage |
|-----------------------------------------|---------------|------------|
| Hygienic practices during menses        |               |            |
| Yes                                     | 40            | 66.6%      |
| No                                      | 20            | 33.3%      |
| Material used during menses             |               |            |
| Sanitary pad                            | 32            | 53.3%      |
| Cloth                                  | 12            | 20.0%      |
| Both                                   | 16            | 26.7%      |
| Takes bath daily during menses          |               |            |
| Yes                                     | 36            | 60.0%      |
| No                                      | 24            | 40.0%      |
| Frequency of changing pad per day       |               |            |
| Once                                   | 10            | 16.7%      |
| Twice a day                             | 13            | 21.7%      |
| Thrice a day                            | 27            | 45.0%      |
| More than thrice                        | 10            | 16.7%      |
| Reuse pad                               |               |            |
| Yes                                     | 12            | 20.0%      |
| No                                      | 48            | 80.0%      |
| Disposal of pad                         |               |            |
| Throw in dustbin                        | 23            | 38.3%      |
| Bury in pit                             | 10            | 16.7%      |
| Burn                                    | 08            | 13.3%      |
| Flush in toilet                         | 11            | 18.3%      |
| Wash & reuse                            | 02            | 3.3%       |
| No response                             | 06            | 10.0%      |
| Satisfactory Cleaning of external genitalia |           |            |
| Yes                                     | 45            | 75.0%      |
| No                                      | 15            | 25.0%      |
| Changing pad in school                  |               |            |
| Yes                                     | 32            | 53.3%      |
| No                                      | 28            | 46.67%     |
| Hand washing with soap and water        |               |            |
| Yes                                     | 38            | 63.33%     |
| No                                      | 22            | 36.67%     |
| Toilet facility at home                 |               |            |
| Yes                                     | 49            | 81.67%     |
| No                                      | 11            | 18.33%     |

had to miss school because of menses and 47 and 27 girls in the respective groups avoided standing in class to answer during menses due to risk of staining, which was statistically significant, and was consistent with the findings of Chaudhry N and Gupta MK.[19] Other researchers have also reported that school absenteeism by adolescent girls is strongly related to menstruation. [6,18] However, conflicting evidence regarding the same also exists. Oster and Thornton collected daily data on school attendance and menstrual calendars and found that menstruation had only limited impact on school attendance. According to them at the beginning of menarche, girls tend to miss school because they are not able to cope well with menstruation.[19]

43 people in the premenstrual group and 21 in the postmenstrual group were embarrassed during menses, which was in concordance with study by Alam et al.[10] 17 out of 60 girls in the premenstrual group and 5 girls in the postmenstrual group perceived those facilities available at school were inappropriate for managing menstrual hygiene, which was again in agreement with study of other researchers.[6,10]

When practices regarding menstrual hygiene were observed among the post menstrual group, it was reported that 60% of the respondents took bath daily during menses, which was also observed by Chaudhary and Gupta and Jothy et al.[10,20] Overall Hygienic practices were followed by 66.67% of the study participants in the postmenstrual group But a mismatch was observed between the knowledge of the adolescent girls regarding menstrual hygiene in the post menarchal group and their practices. Although only approximately 37% of the girls in post menarchal group had knowledge about menses prior to onset, almost more than two-third (66.67%) practiced menstrual hygiene. Similarly, Singh et al.[21] also observed in his study on menstrual hygiene among rural adolescent girls that there was a difference in the knowledge and practice mean score of participants in the control group for pre and post-intervention group. This can be attributed to the fact that unprepared girls having early menarche showed more negative attitude and beliefs related to menstruation, although if they are aware before onset of menarche, they tend to have better practices.[22] The positive association between premenarchal preparedness with pleasantness (feeling of grown up and womanhood) and negative association between preparedness to negative attitudes like secrecy, annoyance and worrying thoughts are well supported by other published literature.[23,24]

53.3% of the respondents used sanitary pads during menses, 20% use cloth and rest 26.7% used both cloth and sanitary pads during menses, which was in accordance with the result obtained by Shah et al.[20] 45% of the respondents changed pad thrice a day for hygiene purposes. The pads were not re-used by the majority of respondents, instead they were disposed-off in dustbins, flushed in toilets, buried in pits or burnt, these results were similar to the results obtained by other researchers also.[11,12,14] 53.3% of the respondents were comfortable in changing pads in school. 63.3% subjects washed their hands with soap and water after using the sanitary pads, which was also reported by Deshpande et al.[23] 81.67% had toilet facility at home, which was similar to the results obtained by Chaudhry, Gupta and Paria et al.[10,11] In a study by Das et al.,[24] the lack of privacy, unsuitable sanitation facilities and use of cloth as preferred absorbent were key determinants of unhygienic menstrual practices in hostels or tenants place.

Approximately one-third of the adolescent girls in both the premenstrual and postmenstrual group had knowledge of menses prior to the onset of menses, which was consistent with the results obtained by Patle et al. and others also. [8,20,27] The respondents were aware of the organ from where the bleeding occurred. 9 girls in the premenstrual group and 31 in the postmenstrual group thought it was the uterus, 20 girls in the premenstrual group and 14 in the postmenstrual group thought it was the stomach, the rest did not know, and similar findings were reported by Prajapati J and Patel R.[28]
24 girls in the premenstrual group and 33 in the postmenstrual group thought menses to be a physiological process, 18 girls in the premenstrual group and 17 in the postmenstrual group thought it was god given, the rest did not know as also seen in study by Deo et al.[13] The first source of knowledge in both the groups were the mothers followed by siblings followed by their peers, these results are in accordance with the studies obtained by Chaudhary and Gupta, Patle et al.[10,27] Time of first knowledge was same days of menses or the next day, which was similar to the results obtained by Chaudhry N and Gupta MK.[14] Menstrual hygiene sessions were held in schools of 10 respondents in the premenstrual group and 25 in the postmenstrual group, which was similar to the results obtained by Alam et al. and Thakre et al.[6,20]

**Conclusion**

71.7 and 35% adolescent girls in the premenarchal and postmenarchal group, respectively, felt embarrassed during menses clearly indicating the social stigma and negative attitude regarding menstruation that exists more among the girls in the premenstrual group. A mismatch was observed between the knowledge of the adolescent girls regarding menstrual hygiene in the post menarchal group and their practices. Although only approximately 37% of the girls in post menarchal group had knowledge about menses prior to onset, almost two-third (66.67%) practiced menstrual hygiene. So, unprepared girls having early menarche showed more negative attitude and beliefs related to menstruation although if they are aware before onset of menarche, they tend to have better practices.

**Recommendations**

Early education and awareness about menstrual hygiene in pre-menarchal phase will be useful in the postmenarchal phase of life. Strategies to encourage positive social norms towards menstruation such as awareness sessions and counselling of both the adolescent girls and her mother, would help to promote better knowledge among them. Menstrual hygiene should be an integral component of school education system where the adolescent girls can be imparted with adequate and correct information regarding menstruation. Proper IEC material for generating awareness among adolescent girls regarding menstruation and hygienic practices should be displayed in the schools and pamphlets should also be distributed to them in early adolescent phase only.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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