INTRODUCTION

Adolescence is a phase of transition from girlhood to womanhood and marks the onset of female puberty. This period of attaining reproductive maturity between the ages of 10-19 years is marked by a number of physiological, behavioral and psychological changes, the most notable being the onset of menstruation. Menstruation is a part of normal reproductive cycle in female and girls menstrual hygienic practices in the adolescent period can have effect on health and wellbeing.1

Studies have shown that most of the adolescent girls had inadequate information about the menstrual physiology and hygiene.2-4 It is crucial for adolescent girls to learn about their menstruation and menstrual hygiene practice to safeguard themselves against reproductive tract infections and maintain their health. Family and cultural practices also play significant role on adolescent girls overall health and well being. Literature showed that mothers, television, friends, teachers and relatives were the main sources of information on menstruation in the adolescent girls.5,6 Various factors such as adolescent age, duration of menstrual flow, knowledge towards menstruation, and mothers education are associated with the menstruation hygiene practice.4,7

Menstruation is still considered a socio-cultural stigma in many rural as well as urban areas of Nepal and women are restricted from enjoying a normal life during their cycle.2,8 Limited studies were conducted in Nepal and showed varied findings.

Hence, this study aimed to assess the knowledge on menstruation and menstrual hygiene practices among adolescent girls studying in schools of Chitwan district.

METHODS

A descriptive cross-sectional study was conducted in the three schools of Chitwan district namely Iris English Academy, Pre-rana Secondary English Boarding School, and Himalayan Secondary English Boarding School. Population of the study were adolescent girls who were of the age 10 to 18 years and studying in grade 8, 9 and 10 of the selected schools. Those girls who had menstrual flow experience and having at least three consecutive menstrual cycles within the last 3 months were included in the study to minimize recall bias. Consecutive sampling technique was used and all the girls who met the inclu-

ABSTRACT

Background: Menstrual hygiene is very important aspect for adolescent girls and proper menstrual hygiene has not been sufficiently addressed in developing countries including Nepal. This study aimed to assess the knowledge on menstruation and menstrual hygiene practices among adolescent girls.

Methods: Descriptive cross-sectional study was conducted among adolescent girls studying in selected schools of Chitwan district. A total 193 girls who had menstrual flow experience for at least three consecutive menstrual cycles were selected as sample using the consecutive sampling technique. Data were analyzed in Statistical Package for Social Sciences (SPSS) version 16.0 using descriptive and inferential statistics.

Results: Most of the girls knew about menstruation as physiological process, normal age of menstruation, and causes of menstruation as hormonal change. Overall, 66.8% of girls had adequate level of knowledge on menstruation. Regarding practice, 94.8% cleaned their genitalia properly, 93.8% used the sanitary pads, and 97.4% wrapped and disposed the pads in dustbin after use. Overall, 72.5% of girls had good level of menstrual hygiene practices. Adolescent girls age and grade, and occupation status of their father were significantly associated (p<0.05) with menstrual hygiene practice. Further, significant positive relationship found between knowledge on menstruation and menstrual hygiene practice.

Conclusions: One third of adolescent girls have inadequate knowledge on menstruation and one fourth have poor menstrual hygiene practice. Therefore, an awareness and advocacy programs on menstruation and menstrual hygiene practices are needed for the adolescent girls to safeguard themselves against reproductive tract infections.
sion criteria and were available during data collection period in the selected schools were taken as study sample. A total of 193 girls were selected from different schools viz. from Iris English Academy-90, Prerana Secondary English Boarding School-68, and Himalayan Secondary English Boarding School-35.

Data was collected within a month from 23rd June 2019 AD to 22nd July 2019 AD using the structured self-administered questionnaire. The questionnaire had four sections consisting of socio-demographic and menstrual related characteristics, knowledge regarding menstruation, practice on menstrual hygiene and cultural restrictions practices during menstruation. Response of each item of knowledge on menstruation and menstrual hygienic practices was scored as “1” for correct answers and “0” for incorrect answers. Afterwards, total knowledge and practice scores were calculated. Knowledge score was further classified into adequate level (≥median value) and inadequate level (<median value) of knowledge based on median value 5.0. Likewise, score on menstrual hygiene practice was classified into good (≥median value) and poor (<median value) categories according to median value 6.0. Data was collected in schools during school hours after getting data collection permission from the respective school principals. Eligible participants were explained about the purpose of the study, and took verbal informed consent from them. Prior to data collection, ethical approval was obtained from Chitwan Medical College Institutional Review Committee (CMC-IRC) and written informed consent was obtained from respondents' guardians/parents.

Obtained data was entered into SPSS version 16.0 for window. Descriptive statistics (such as frequency, percentage, mean and standard deviation, median and interquartile range) was used to describe the socio-demographic, menstruation related characteristics, and knowledge and practice related variable. Inferential statistics test ($\chi^2$) was used to measure the association between the level of menstruation hygiene practice and selected variables.

**RESULTS**

More than half of the respondents were 15 years and above age. The median (±IQR) age of respondents was 15.0 (14.0-15.0) years with minimum and maximum age ranges from 10 years and 16 years. Almost all (94.8%) respondents followed Hindu religions. Majority (79.8%) of the respondents belonged to Brahmin/Chhetri ethnicity (79.8%), and nuclear family (68.9%). Regarding parents education, most of the respondents mothers and fathers had completed secondary or above level of education. Likewise, majorities of respondents’ mothers were engaged in household work (76.7%) whereas highest percentages of respondents’ fathers were in service (47.7%) and business (39.4%) (Table 1).

Mean age of menarche of the respondents was 12.45 years. Mothers were the major source of information (81.9%) regarding menstruation and menstrual hygiene (Table 2).

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**Table 1: Socio-demographic Characteristics of Respondents**

| Socio-demographic Characteristics | Number (%) |
|----------------------------------|------------|
| Completed age in years           |            |
| <15                              | 90 (46.6)  |
| ≥15                              | 103 (53.3) |
| Median (IQR) = 15.0(14-15) years |            |
| Min age:10 year                  |            |
| Max age: 16 years                |            |
| Religion                         |            |
| Hindu                            | 183 (94.8) |
| Non-Hindu                        | 10 (5.1)   |
| Caste                            |            |
| Brahmin/Chhetri                  | 154 (79.8) |
| Janajati                         | 39 (20.2)  |
| Grade                            |            |
| 8 class                          | 42 (21.8)  |
| 9 class                          | 53 (27.5)  |
| 10 class                         | 98 (50.8)  |
| Family type                      |            |
| Nuclear                          | 133 (68.9) |
| Joint                            | 60 (31.1)  |
| Mothers education                |            |
| Illiterate                       | 4 (2.1)    |
| Basic                            | 5 (2.6)    |
| Secondary                        | 155 (80.3) |
| Bachelor and above               | 29 (15.0)  |
| Father education                 |            |
| Basic                            | 6 (3.1)    |
| Secondary                        | 108 (56.0) |
| Bachelor and above               | 79 (40.9)  |
| Mothers’ occupation              |            |
| Household work                   | 148 (76.7) |
| Business                         | 19 (9.8)   |
| Service                          | 21 (10.9)  |
| Foreign employee                 | 5 (2.6)    |
| Fathers’ occupation              |            |
| Agriculture                      | 7 (3.6)    |
| Business                         | 76 (39.4)  |
| Service                          | 92 (47.7)  |
| Foreign employee                 | 18 (9.3)   |

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**Table 2: Menstruation Related Information among Respondents**

| Variables                                              | Number (%) |
|--------------------------------------------------------|------------|
| Mean age (SD) of menarche : 12.45 (±1.05), min:10 years max:15 year |            |
| Sharing of menarche information with                   |            |
| Mothers                                               | 174 (90.2) |
| Sisters                                                | 14 (7.3)   |
| Friends                                                | 5 (2.6)    |
| Sources of information regarding menstruation and hygiene |            |
| Self                                                   | 7 (2.7)    |
| Mothers                                               | 158 (81.9) |
| Relatives/friends                                     | 12 (6.2)   |
| Course book                                            | 16 (8.3)   |
Table 3: Knowledge on Menstruation among Respondents

| Knowledge Items                                                      | Correct Response Number (%) |
|---------------------------------------------------------------------|-----------------------------|
| Menstruation is a physiological process                             | 183 (94.8)                  |
| Normal age for the menstruation is 10-14 years                      | 183 (94.8)                  |
| Hormones are the causes of menstruation                            | 176 (91.2)                  |
| The interval between 2 normal menstrual cycle is 28 days            | 152 (78.8)                  |
| The normal flow of blood is usually 5 to 7 days                     | 9 (4.7)                     |
| Bleeding occurs from uterus during menstruation                     | 34 (17.6)                   |
| Menstruation is usually ceased at the age of 45-55 years            | 162 (83.9)                  |

Most of the respondents knew about menstruation as physiological process (94.8%), normal age of menstruation (94.8), and causes of menstruation as hormonal change (91.2%). However, very few respondents had knowledge about normal blood flow as 5-7 days (4.7%), and organ from which bleeding occur in menstruation (17.8%) (Table 3).

Table 4: Menstrual Hygiene Practices among Respondents

| Practice Items                                                      | Correct Response Number (%) |
|---------------------------------------------------------------------|-----------------------------|
| Genitalia is usually cleaned in every toilet visit                  | 146 (75.6)                  |
| Plain water is used to clean the genitalia                          | 174 (90.2)                  |
| Genitalia is cleaned properly                                       | 183 (94.8)                  |
| Sanitary pads is used during period                                 | 181 (93.8)                  |
| Pad is changed in every 4-6 hours in a day                          | 156 (80.8)                  |
| Soap and water is used to wash hand after pad change                | 185 (95.9)                  |
| Sanitary pads is wrapped and disposed in dustbin                    | 188 (97.4)                  |
| Daily bath is taken during period                                   | 124 (64.2)                  |

Regarding practices, most of the respondents disposed the pads in dustbin after wrapping (97.4), used soap and water to wash hand after pad change (95.9%), cleaned genitalia properly (94.8%), and used sanitary pads during periods (93.8%). However, just more than half (64.2%) respondents took bath daily during period (Table 4).

Most of the respondents (92.7%) did not participate in religious activities or visit temple and 74.6% respondents did not enter into the kitchen during menstruation whereas 16.1% respondents said that they avoided certain foods like dairy products, banana etc during menstruation (Table 5). Regarding impact of menstruation, 27.5% of respondents reported that they missed school due to period. Likewise, 50.8% and 58.5% of the respondents respectively reported that they become unable to continue daily activities and play sports due to pain during menstruation (Not shown in table).

Table 5: Cultural Restrictions Practiced during Menstruation among Respondents

| Restrictions                                                       | Number (%)  |
|--------------------------------------------------------------------|-------------|
| Not entering into the kitchen to cook food                         | 144 (74.6)  |
| Eat food outside the kitchen                                       | 124 (64.2)  |
| Not sleeping in usual bed during period                            | 39 (20.2)   |
| Not allowed to touch others during menstruation                    | 51 (26.4)   |
| Not participate in religious activities or visiting temple         | 179 (92.7)  |
| Avoided certain foods (i.e dairy products, banana ect) during menstruation | 31 (16.1)  |

Table 6: Level of Knowledge on Menstruation and Menstrual Hygiene Practices among Respondents

| Variable                                                          | Number (%) |
|-------------------------------------------------------------------|------------|
| **Level of knowledge regarding menstruation**                    |            |
| Adequate (median ≥5.0)                                            | 129 (66.8) |
| Inadequate (median<5.0)                                           | 64 (33.2)  |
| **Level of menstrual hygiene practice**                          |            |
| Good (median ≥6.0)                                                | 140 (72.5) |
| Poor (median<6.0)                                                 | 53 (27.5)  |

Two third (66.8%) of the respondents had adequate level of knowledge on menstruation and 72.5% of respondents had good level of menstrual hygiene practice (Table 6).
Table 7: Association between Level of Menstrual Hygiene Practice and Selected Variables of Respondents

| Variables                  | Level of Practice | \( \chi^2 \) | p-value |
|----------------------------|-------------------|-------------|---------|
|                            | Poor No.(%)       | Good No.(%) |         |
| Age group in years         |                   |             |         |
| <15                        | 33 (36.7)         | 57 (63.3)   | 7.174   | 0.007  |
| \( \geq 15 \)              | 20 (19.4)         | 83 (80.6)   |         |        |
| Caste                      |                   |             |         |
| Brahmin/Chhetri            | 42 (27.3)         | 112 (72.7)  | 0.014   | 0.907  |
| Janajati                   | 11 (28.2)         | 28 (71.8)   |         |        |
| Religion                   |                   |             |         |
| Hindu                      | 51 (27.9)         | 132 (72.1)  | 0.32    | 0.858  |
| Non Hindu                  | 2 (20.0)          | 8 (80.0)    |         |        |
| Grade                      |                   |             |         |
| Grade 8                    | 17 (40.5)         | 25 (59.5)   | 12.480  | 0.002  |
| Grade 9                    | 20 (37.7)         | 33 (62.3)   |         |        |
| Grade 10                   | 16 (16.3)         | 82 (83.7)   |         |        |
| Educational status of mother |                  |             |         |
| illiterate                 | 1 (25.0)          | 3 (75.0)    |         |        |
| Secondary                  | 44 (27.5)         | 116 (72.5)  | 0.13    | 0.994  |
| Bachelor and above         | 8 (27.6)          | 21 (72.4)   |         |        |
| Fathers’ occupation        |                   |             |         |
| Agriculture                | 3 (42.9)          | 4 (57.1)    | 8.373   | 0.016  |
| Service                    | 33 (35.9)         | 59 (64.1)   |         |        |
| Business and foreign employment | 17 (18.1) | 77 (81.9)  |         |        |
| Mothers’ occupation        |                   |             |         |
| Household work             | 40 (27.0)         | 108 (73.0)  | 0.062   | 0.969  |
| Service                    | 6 (28.6)          | 15 (71.4)   |         |        |
| Business and foreign employment | 7 (29.2) | 17 (70.8)  |         |        |

Table 7 shows the significant association between levels of menstrual hygiene practice with age, and grade of respondent, and occupation of their father.

Table 8: Relationship between Respondents’ Knowledge on Menstruation and Menstrual Hygiene Practices

| Variable                           | \( r^* \) | p     |
|------------------------------------|-----------|-------|
| Knowledge score vs.practice score   | 186       | 0.010 |

*Pearson correlation

Table 8 reveals the significant positive relationship between respondents knowledge on menstruation and menstrual hygiene practice (p<0.05).

DISCUSSION

Our finding revealed that two third of the adolescent girls had adequate knowledge on menstruation and three fourth adolescent girls had good menstrual hygiene practices. Inaddition, multiple cultural restrictions were followed upon by most of the adolescent girls studying in schools and the commonest restrictions was related to visiting religious places, and entering kitchen for cooking and eating.

Regarding knowledge, we found that almost all (91% to 94%) of the adolescent girls had knowledge on different aspects of menstruation such as menstruation as a physiological process, normal age of menarche,and causes of menstruation. Similar findings were reported by other studies\(^2\)\(^3\)\(^4\)\(^5\) in which 83.3% and 83.0% of adolescent girls respectively reported menstruation is a physiological process. However, only 52.0% of the respondents knew that the cause for the menstruation is hormone.\(^2\)

Further, our study showed that 66.8% of adolescent girls had adequate knowledge on menstruation whereas 33.2% had inadequate level of knowledge. This is similar to the finding from Boakye-Yiadom and colleagues’ from Ghana but in contrast to the finding of study done by Belayneh and Mekuria\(^6\) where 68.3% of adolescent school girls had poor knowledge of menstruation. The possible explanation for this discrepancy might be study setting and instruments used in the studies.

Regarding practices, we found that majorities of the adolescent girls cleaned genitalia properly (94.8%), used plain water to clean genitalia (90.2%), used sanitary pads (93.4%), used soap
and water to wash hand after pad change (95.7%), disposed the used pads in dustbin after wrapping (97.4%), cleaned the external genitalia in every toilet visit (75.6%), changed their pads in every 4-6 hours (80.8%) and took bath daily (64.2%). This finding is almost similar to other studies where majorities of respondents properly managed used pads during menstruation, took bath daily, used soap and water to wash hands after pad change and cleaned the genitalia after every toilet visit during menstruation. In contrast, studies reported lower practices on sanitary pads use during menstruation, frequency of pads change and hand washing after pad change. This descripiancies might be due to different in geographical variations of the adolescent schools.

This study revealed that 72.5% of the adolescent girls had good practice on menstrual hygiene which is higher than the findings from the other studies. This might be due to the difference in the study area. Almost all adolescent girls of our study were from urban areas where health information and communication related menstrual hygiene are easily accessible.

Our study revealed mother as the main source of information regarding menstruation and menstrual hygiene (81.9%) for the adolescent girls. Similar findings were also reported by other studies in which mother was the main sources of information.

Socio-cultural restriction was prevalent in every adolescent girls. Restrictions was found in the area of entering in the kitchen, eating food in kitchen, participating in religious activities, sleeping in the usual own bed, taking all types of food, and touching anyone in family. This is inline with other similar studies.

We also found that the level of menstrual hygiene practice was significantly associated with adolescent girl’s age, and grade, and occupation of their fathers. Further, knowledge on menstruation and menstrual hygiene practices were positively correlated. This is supported by other studies in which age, and knowledge on menstruation were significantly associated with level of practice on menstrual hygiene. Taklemariam (2014) also revealed the significant association between knowledge on menstruation and menstrual hygiene practice.

**CONCLUSION**

Menstruation and menstrual hygiene are important for the adolescent girls to maintain healthy life. One third of adolescent girls have inadequate knowledge on menstruation and one in four girls have poor practice on menstrual hygiene. Cultural restriction is also prevalent among the girls such as not entering into kitchen and not participating in religious activities. Further, adolescent girl’s age, and grade, and occupation of their father are significantly associated with their menstrual hygiene practice. Knowledge on menstruation is positively correlated with the menstrual hygiene practice. Hence, there is need of awareness and advocacy programs for the adolescent girls to enhance their knowledge as well as for encouraging safe hygienic practices during menstruation. In our study, mothers are the main source of information regarding menstruation and menstrual hygiene, therefore proper education of mothers and adolescent girls is very important.

**CONFLICT OF INTEREST:** None

**FINANCIAL DISCLOSURE:** None

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