

Menstrual hygiene practices among adolescent schoolgirls in the rural area of Bangladesh

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Article Info

Article history:

Received Apr 2, 2022

Revised Aug 17, 2022

Accepted Sep 7, 2022

Keywords:

Adolescent
Menstrual hygiene
Rural Bangladesh
Schoolgirls

ABSTRACT

Adolescence is a time of tremendous opportunity. However, inadequate menstrual hygiene habits are related to lower academic achievement and enrollment at school, with possible effects on longer-term socio-economic status and impaired overall quality of life. Therefore, this cross-sectional study was conducted among 422 adolescent schoolgirls in Bangladesh between July 2019 and February 2020 with the aim of examining menstrual hygiene practices. Data indicated that the mean age of menarche in 422 adolescents was 12.71 ± 0.97 . According to the data, 47% had well and 53% had poor hygiene practices. In multivariable logistic regression analysis, the educational status of respondents' mothers at the secondary level [AOR=2.023, 95% CI: 1.159-3.532], fathers at the graduate and above level [AOR=3.150, 95% CI: 0.883-11.238], high level of household income [AOR=2.580, 95% CI: 1.480-4.495], and knowledge about the complication of poor hygiene practice among girls [AOR=2.286, 95% CI: 1.160-4.504] were significantly associated with the level of hygiene practices. Poor menstrual hygiene practice was found among more than half of girls. Attitude toward safe menstrual materials should initiate to improve good hygiene practices. Awareness campaigns for parents and teachers to assist their children would be a vital strategy to ensure good hygiene practices.

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1. INTRODUCTION

Adolescence is known to be between the ages of 10 and 19, and about 1.2 billion teenagers exist around the globe, which is equivalent to 16% of the world's population [1]. Bangladesh is one of the recently listed developing nations with a population of over 164.7 million [2]. Among them, more than 34 million youngsters make up one-fifth of the country's total population [2]. Menstruation is a natural and physiological phenomenon undergone by both teenage girls and women [3]. It is important that women and girls should be able to hygienically handle menstrual bleeding in order to live healthy, prosperous, and dignified lives. However, in developing countries, menstrual hygiene treatment is inadequately understood and has not gained sufficient attention in the reproductive health field [4]. In Bangladesh, a significant portion of adolescent girls uses rags during menstruation to absorb the flow of menstrual blood. Even their disposal and recycling methods of menstrual materials are also poor and unhygienic [5].

Although menstruation is a common occurrence with a matter of privilege for women, people in underdeveloped and developing countries such as Bangladesh, and India, carry misunderstandings regarding it. Most of them even make fun of it or misinterpret it due to an inadequate sense of humor and knowledge. This misinterpretation is found on a large scale in rural areas and people, mostly uneducated, take this as a sign of stigmatization, which directly lowers the confidence of those girls who are already having a biological change and do not even know whom to discuss with and how to handle it that multiplies the problem to a great extent [6], [7]. In some remote places, it is believed that during menstruation a girl is not allowed to sit or eat together. Even they are treated like someone who is not holy enough to be in the house [8]. Many young girls look to their mothers or other close ones to learn about menstruation; when it comes down to sexuality, fertility, and menstruation, these female close ones guide them with misleading information and put them in a more unsecured phase [9]-[11]. Research in Kenya has found that menstruation is the leading cause of teenage morbidity [12]. The detrimental impact on women's health and their re-productivity may be the result of not following proper grooming habits during menstruation. Even in some cases, it may be life-threatening [13]. It has become a hidden disease that devastates women's lives and is closely connected to inadequate menstrual hygiene [14].

In addition, inadequate menstrual hygiene habits are related to lower academic achievement and enrollment at school, with possible effects on long-term socio-economic status and hamper the overall quality of life [15], [16]. According to the literature, about 19.7% of school-age girls in Uganda do not attend school during menstruation [17]. A similar study also reported, that due to the shortage of safe and private sanitation facilities, stomach, or back pain, feeling unwell, and fear of leaking blood are the significant reasons for school absenteeism [18]. Moreover, some girls are forced to use unhygienic materials due to a shortage of appropriate sanitary hygiene products [18].

Adolescence is a time of tremendous opportunity. At the same time, it is also a time of getting on vulnerabilities. It is necessary to be aware that adolescent girls have adequate information and skills on crucial issues like menstrual hygiene and management. Significant urbanization is proceeding in developing countries such as Bangladesh, but many people live in rural settings. In this context, this study has attempted to identify factors affecting menstrual hygiene practices among adolescents during puberty in rural areas of Bangladesh.

2. RESEARCH METHOD

2.1. Study design and setting

A cross-sectional study was conducted among adolescent girls in secondary schools aged between 12 and 16 years who experienced a menstrual cycle. The sample was obtained from five different schools in the Kusiara and Bandar Ghat areas under the Narayanganj district of Bangladesh. The study was conducted between July 2019 and February 2020.

The study protocol was approved by the school of science research ethics committee of Primeasia University. A permission letter from the selected school head was then received. Each of the respondents was told about the study's intent, and written consent was taken from respondents' parents/teachers/guardians. The data collection team was aware of the respondents' privacy.

2.2. Sample size and technique

The sample size was determined using the appropriate equation ($n = Z^2 \alpha pq/d^2$). Therefore, the calculated sample was 384. An additional 10% had been added to the sample size to minimize the uncertainties caused by losses due to uncontrollable factors. The sample size was then turned into 422 [19]. Initially, five different schools were selected purposively from the targeted area. A simple random sampling technique was considered among the adolescents present in the classroom by following the register. The adolescent girls who experienced a menstrual period and agreed to the interview were selected as respondents. A well-designed structured questionnaire was used to obtain data from participants. Trained female university students performed all the face-to-face interviews.

2.3. Operational definition

Based on the income per month, the families were categorized into three income groups, lower group income were Bangladeshi taka (BDT) 10,000 or less, middle (BDT 10,000-29,000), and higher-income group ($\geq 30,000$ BDT). Family size was determined based on total family members. Consisting of a maximum of three members was considered a small family whereas it was 4-7 members for a medium-sized one. More than that came under a large one. To measure the menstrual hygiene practice and knowledge, there were eight questions with proper answers that carried 1 point, and 0 for negative or do not know. The competitors with 5-9 points were judged to have a good practice, and 0-4 points to have a poor practice as defined in similar previous studies [20].

2.4. Data management and analysis plan

The data for this study were analyzed by using Statistical Package Social Science (IBM SPSS) software, version 23. Descriptive analyses were executed for each variable to measure frequency, percentage, and mean value. Bivariate analysis was performed to see the crude association of the predictor variables with the outcome variable. Finally, variables that showed significant association with the dependent variable on the bivariate analysis were entered into a multivariate logistic regression model in order to identify their independent effects on the menstrual hygiene practices of adolescent schoolgirls. The strength of the association was also measured by the odds ratio with a corresponding 95% confidence interval. A p-value less than 0.05 was considered a significant association.

3. RESULTS AND DISCUSSION

A total of 422 adolescent girls aged between 12 to 16 years experiencing menstruation were interviewed in this study. Table 1 displays that approximately 98.6% of the girls were Muslim in religion. There were 36.7% of respondents were in class nine, which marks the highest class among study participants. The majority of the respondents (79.6%) came from a nuclear family, and 83.4% were from medium-sized families. Parents' education showed that most fathers and mothers (36.5% vs. 27.7%) did not have formal education. Nevertheless, higher education was found in greater numbers among fathers' relatives to teenage mothers. In terms of occupation, 36% of fathers were engaged in business, and the remaining were occupied in various occupations. The current study also found that 83.5% of mothers were housewives. 33.9% were found to have a family income below 10,000 BDT per month. On the other hand, the income of about 19.9% was found at more than 29,000 BDT per month, and 61.4% of the households had a single earner.

Table 2 indicates approximately more than half (54.5%) of the participants did not have sufficient menstrual information. Approximately 32.2% of adolescents were aware that menstruation is a physiological process. However, according to a study conducted in Ethiopia, more than two-thirds of adolescents are aware that menstruation is a physiological process [21]. Nearly 81.7% of respondents received information regarding menstruation and its management from their mothers', while the remaining respondents received information from other sources. The study participants reported that they had experienced menstruation by the age of 10 (2.6%). Although, 38.9% experienced their first menstrual cycle at 13 years. The menarche age of adolescents is found shorter in this study than the outcomes of other research performed in another country [17]. More than half (57.8%) of the respondents' menstrual duration was between 3-5 days in this study, which is somewhat similar to an Indian survey [13], [22]. About 77.5% of the respondents had a menstrual cycle interval between 24-35 days. However, the previous research shows a shorter interval of menstrual cycle than current study [22]. During menstruation, 77.7% thought their blood flow was normal, and 72.7% of participants reported painful menstruation that is very distinct from previous similar study [23]. There were 79.9% of participants were not used to taking any drug during menstruation. Absenteeism of school due to menstruation was found among 23.7% of girls. Although, more prevalent absenteeism of school during menstrual period (Approximately one in ten) found in former research [23]. Others research reported school absenteeism is 40% due to menstruation [24], [25].

Table 3 indicates that only 33.1 % of 422 respondents used commercially manufactured sanitary pads as a menstrual absorbent, though Indian surveys showed the attitude toward using sanitary pads is higher among Indian adolescents [26]-[28]. There were 76.3% of girls changed menstrual absorbent more than two times a day, which is much higher than the Nigerian study [29]. The current study also found that 88.6% of participants cleaned their genitalia twice or more per day. The percentage is higher than the previous study conducted in India by Rana (40%) [13]. Another survey identified around half of the participants only cleaned external genitalia separately while taking a bath during menstruation [30]. Nearly 64.2% of respondents used the school toilet during menstruation, and 89.6 % of girls had reproductive tract disease. Among teenagers, 32.7% retained the correct form of disposal, 7.3% tossed into the open field, and 60.0% reused cloth. 94.1% of cloth re-users cleaned clothes with soap and water, and 5.9% of the respondent's washed cloths with only water. In addition, due to lack of privacy, 66.8% of the girls did not dry rags under the sunlight. Whereas, a Nepalese study found that nearly half of the adolescent girls do not dry reusable clothes under the direct sunlight [31].

Table 1. Socio-demographic characteristics of respondents (n=422)

Variables	Categories	Frequency	Percentage
Age	12	14	3.3%
	13	53	12.6%
	14	127	30.1%
	15	151	35.8%
	16	77	18.2%
Religion	Muslim	416	98.6%
	Hindu	6	1.4%
Level of education	Seven	59	14%
	Eight	138	32.7%
	Nine	155	36.7%
	Ten	70	16.6%
Family size	Small	27	6.4%
	Medium	352	83.4%
	Large	43	10.2%
Family type	Nuclear	336	79.6%
	Joint	86	20.4%
Fathers' education	No formal education	154	36.5%
	Primary level	93	22%
	Junior school level	72	17.1%
	Secondary level	68	16.1%
	Higher secondary level	24	5.7%
	Graduate and above	11	2.6%
Mothers' education	No formal education	117	27.7%
	Primary level	116	27.5%
	Junior school level	81	19.2%
	Secondary level	91	21.6%
	Higher secondary level	12	2.8%
	Graduate and above	5	1.2%
Fathers' occupation	Jobless	13	3.1%
	Farmer	11	2.6%
	Daily labor	89	21.1%
	Business	152	36.0%
	Service holder	112	26.5%
	Others	45	10.7%
Mothers' occupation	Housewife	352	83.5%
	Service holder	39	9.2%
	Business	14	3.3%
	Others	17	4.0%
Monthly income	Low income	143	33.9%
	Middle income	195	46.2%
	High income	84	19.9%
Earning members	One person	259	61.4%
	Two persons	124	29.4%
	More than two	39	9.2%

Dietary habit (iron and vitamin-containing food) is essential during menstruation when unnecessary blood losses are already happening. This study found that 64.5% of the girls did not consume iron and vitamin-rich food during menstruation as shown in Table 4. However, the percentages are lower than in the Indian study [32]. About two-thirds of adolescents were not permitted to go to certain places, and more than half were restricted to religious activities. Moreover, 61.8% could not participate in outdoor games. Furthermore, 35.5% of the girls used separate utensils during menstruation in this study. The possible reasons for these findings would be social stigma and taboos related to menstruation [33], [34].

Menstrual hygiene practices among adolescent girls were classified as good and poor practices as presented in Table 5. According to the overall respondents' data, 47% had well, and 53% had poor hygiene practices. Adolescent girls whose maternal education status was secondary level were 2.023 times more likely to have healthy menstrual hygiene than mothers who did not attend formal education [AOR=2.023, 95% CI: 1.159-3.532]. Likewise, girls whose father's educational achievement graduated or above were 3.150 times more likely to have good menstrual hygiene practices than their counterparts [AOR=3.150, 95% CI: 0.883-11.238]. The potential cause may be the awareness of the educated parents' menstrual hygiene

habits. Previous research also revealed similar findings [35]-[37]. Girls whose households were at a high-income level are 2,580 times more likely to have healthy hygiene behaviors than their peers [AOR=2.580, 95% CI: 1.480-4.495]. The likelihood of having well menstrual hygiene practice among respondents who had an idea or knowledge about infection compared to those who did not know about infection [AOR=2.286, 95% CI: 1.160 -4.504].

Table 2. Experiences of menstruation among study participants (n=422)

Variables	Categories	Frequency	Percentage
Knowledge about the reason for menstruation	Physiological process	136	32.2%
	Hormonal change	56	13.3%
	Not known	230	54.5%
Information sources	Mother	345	81.7%
	Sister	38	9.0%
	Friend	14	3.3%
	Teacher	18	4.3%
	Mass media	7	1.70%
Onset of menarche	10 years	11	2.6%
	11 years	31	7.3%
	12 years	122	28.9%
	13 years	164	38.9%
	14 years	94	22.3%
Average duration of menstruation	3-5 days	244	57.8%
	More than five days	178	42.2%
Flow of bleeding	More	76	18.0%
	Usual	328	77.7%
	Less	18	4.3%
Interval between menstrual cycle	<24 days	56	13.3%
	24-35 days	327	77.5%
	>35 days	39	9.2%
Sufferings of abdominal pain	Yes	307	72.7%
	No	115	27.3%
Taking medications	Yes	85	20.1%
	No	337	79.9%
Attend school during menstruation	Yes	322	76.3%
	No	100	23.7%

Table 3. Menstrual hygiene practice among the study subjects (n=422)

Variables	Categories	Frequency	Percentage
Protection materials	Sanitary pad	140	33.1%
	Cloth	156	37.0%
Frequency of changing pad	Sanitary pad or cloth	126	29.9%
	Single time/day	100	23.7%
	≥ 2 time/day	322	76.3%
Cleaning of genitalia	Single time/day	48	11.4%
	≥ 2 time/day	374	88.6%
Use school toilet during menstruation	Yes	271	64.2%
	No	151	35.8%
Knowledge about infectious disease	Yes	378	89.6%
	No	44	10.4%
Method of disposal	Open field	31	7.3%
	Others proper disposal	138	32.7%
	Cloth reused	253	60.0%
Cloth cleaning materials (n=253)	Only water	15	5.9%
	Soap with water	238	94.1%
Drying method (n=253)	Not drying sunlight	169	66.8%
	Drying sunlight	84	33.2%

Table 4. Several common restrictions related to menstruation (n=422)

Taboos	Categories	Frequency	Percentage
Keeps separately from other family members	Yes	90	21.3%
	No	322	78.7%
Touches of religious book	Yes	16	3.8%
	No	406	96.2%
Uses of separate utensils	Yes	150	35.5%
	No	272	64.5%
Plays outdoor games	Yes	161	38.2%
	No	261	61.8%
Food restriction	Yes	272	64.5%
	No	150	35.5%

Table 5. Factors associated with good menstrual hygiene practices among adolescent girls (n=422)

Factors	Categories	Menstrual hygiene		AOR 95% CI	p-value
		Good (47%)	Poor (53%)		
Educational status of mother's	Illiterate	44	73	1	
	Primary level	53	63	1.396 [0.827-2.354]	0.211
	Junior school level	40	41	1.619 [0.912-2.874]	0.100
	Secondary level	51	40	2.023 [1.159-3.532]	0.013
	Higher secondary level	8	4	3.318 [0.944-11.665]	0.061
	Graduate & above	4	1	2.489 [0.4-15.481]	0.328
Educational status of Father's	Illiterate	55	99	1	
	Primary level	54	39	2.385 [1.409-4.038]	0.001
	Junior school level	38	34	1.611 [0.913-2.842]	0.100
	Secondary level	37	31	2.148 [1.203-3.837]	0.010
	Higher secondary level	12	12	1.800 [0.758-4.277]	0.183
	Graduate & above	6	5	3.150 [0.883-11.238]	0.077
Monthly Income	Low income	57	86	1	
	Middle income	88	107	1.241 [0.801-1.922]	0.334
	Higher income	53	31	2.580 [1.480-4.495]	0.001
Idea about reproductive tract infection	Yes	185	193	2.286 [1.160-4.504]	0.017
	No	13	31	1	
Use of school toilet	Yes	134	137	1.330 [0.890-1.986]	0.164
	No	64	87	1	

Key = statistically significant value is p-value <0.05; 1= reference category

4. CONCLUSION

Menstrual hygiene practices were associated with parents' education, income, and knowledge of study participants. The current research suggests that safe menstrual material should be available, accessible and ensure utilization for the girls, especially in rural settings, to improve good hygiene practices. The results recommend that the required awareness campaign for parents and teachers to assist their children should be coordinated by government and non-government organizations. Furthermore, we propose further research on obstacles to healthy menstrual habits, like menstrual taboos based on geographical area.

Like every research, our research has some limitations. This cross-sectional study is limited by the fact that it provides only a snapshot in time and does not provide information on cause-and-effect correlations between study variables. Furthermore, because the sample was collected from a specific location in Bangladesh, it is not appropriate to extrapolate the results to the entire population.

REFERENCES





- [1] UNICEF, "Adolescent demographics," *Unicef*. p. 1, 2019, [Online]. Available: <https://data.unicef.org/topic/adolescents/demographics/>.
- [2] Ministry of Health and Family Welfare (MOHFW), "National-Strategy-for-Adolescent-Health-2017-2030" Ministry of Health and Family Welfare (MOHFW), 2016.
- [3] P. Senapathi and H. Kumar, "A comparative study of menstrual hygiene management among rural and urban adolescent girls in Mangaluru, Karnataka," *International Journal of Community Medicine And Public Health*, vol. 5, no. 6, p. 2548, 2018, doi: 10.18203/2394-6040.ijcmph20182193.
- [4] "Wateraid menstrual-hygiene-school-adolescencegirls-Nepal_2009." [Online]. Available: https://menstrualhygieneday.org/wp-content/uploads/2016/12/Wateraid_menstrual-hygiene-school-adolescencegirls-Nepal_2009.
- [5] R. Ahmed and K. Yesmin, "21 Menstrual hygiene: Breaking the silence," [online]. Available:

- <https://fr.ircwash.org/sites/default/files/Ahmed-2008-Menstrual.pdf2008>.
- [6] A. Malhotra, S. Coli, S. Coates, and M. Mosquera-Vasquez, "Factors associated with knowledge, attitudes, and hygiene practices during menstruation among adolescent girls in Uttar Pradesh," *Waterlines*, vol. 35, no. 3, pp. 277–305, 2016, doi: 10.3362/1756-3488.2016.021.
 - [7] R. Dhingra, A. Kumar, and M. Kour, "Knowledge and practices related to menstruation among tribal (Gujjar) adolescent girls," *Studies on Ethno-Medicine*, vol. 3, no. 1, pp. 43–48, Jan. 2009, doi: 10.1080/09735070.2009.11886336.
 - [8] N. Joshy, K. Prakash, and K. Ramdey, "Social taboos and menstrual practices in the pindar valley," *Indian Journal of Gender Studies*, vol. 26, no. 1–2, pp. 79–95, 2019, doi: 10.1177/0971521518811171.
 - [9] P. A. Phillips-Howard, B. Caruso, B. Torondel, G. Zulaika, M. Sahin, and M. Sommer, "Menstrual hygiene management among adolescent schoolgirls in low- and middle-income countries: Research priorities," *Global Health Action*, vol. 9, no. 1, p. 33032, 2016, doi: 10.3402/GHA.V9.33032.
 - [10] E. Wilson, J. Haver, B. Torondel, J. Rubli, and B. A. Caruso, "Dismantling menstrual taboos to overcome gender inequality," *The Lancet Child and Adolescent Health*, vol. 2, no. 8, p. e17, 2018, doi: 10.1016/S2352-4642(18)30209-8.
 - [11] A. H. El-Gilany, K. Badawi, and S. El-Fedawy, "Menstrual hygiene among adolescent schoolgirls in Mansoura, Egypt," *Reproductive Health Matters*, vol. 13, no. 26, pp. 147–152, 2005, doi: 10.1016/S0968-8080(05)26191-8.
 - [12] M. Secor-Turner, K. Schmitz, and K. Benson, "Adolescent experience of menstruation in Rural Kenya," *Nursing Research*, vol. 65, no. 4, pp. 301–305, 2016, doi: 10.1097/NNR.0000000000000161.
 - [13] K. N. . V. S. M. P. A. S. Bhavik Rana; Arpit Prajapati; Sonaliya, "An assessment of menstrual hygiene practices amongst adolescent females at Kheda district of Gujarat state, India," *Healthline Journal*, vol. 6, no. 1, pp. 23–9, 2010, [Online]. Available: <http://web.a.ebscohost.com.libproxy.lib.unc.edu/ehost/detail/detail?vid=16&sid=aaca6d74-7e8f-452e-8974-ff8f4baf4059%40sdc-v-sessmgr05&bdata=JnNpdGU9ZWWhvc3QtbGl2ZQ%3D%3D#AN=20153276802&db=llh>.
 - [14] A. Dasgupta and M. Sarkar, "Menstrual hygiene: How hygienic is the adolescent girl?," *Indian Journal of Community Medicine*, vol. 33, no. 2, p. 77, 2008, doi: 10.4103/0970-0218.40872.
 - [15] H. J, S. AK, R. J, S. KJ, and M.-T. GJ, "Women's and girls' experiences of menstruation in low- and middle-income countries: A systematic review and qualitative metasynthesis," *PLoS medicine*, vol. 16, no. 5, p. e1002803, 2019, [Online]. Available: <https://pubmed.ncbi.nlm.nih.gov/31095568/>.
 - [16] M. Sivakami *et al.*, "Effect of menstruation on girls and their schooling, and facilitators of menstrual hygiene management in schools: Surveys in government schools in three states in India, 2015," *Journal of Global Health*, vol. 9, no. 1, 2019, doi: 10.7189/jogh.09.010408.
 - [17] G. Miirto *et al.*, "Menstrual health and school absenteeism among adolescent girls in Uganda (MENISCUS): a feasibility study," *BMC Women's Health*, vol. 18, no. 1, p. 4, Dec. 2018, doi: 10.1186/s12905-017-0502-z.
 - [18] J. R., K. S.D., and S. J., "Menstrual hygiene and reproductive morbidity in adolescent girls in Dehradun, India," *Bangladesh Journal of Medical Science*, vol. 13, no. 2, pp. 170–174, 2014, [Online]. Available: <http://www.banglajol.info/index.php/BJMS/article/view/14257/12852%5Cnhttp://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed12&NEWS=N&AN=2014202191>.
 - [19] G. K. Ghosh, N. Islam, K. N. Juthi, A. Yesmin, T. Rahman, and R. Rabeya, "Nutritional status, dietary diversity, and food security of adolescent girls in rural Bangladesh," *Ethiopian Journal of Health Development Adolescent's*, vol. 35, no. 3, pp. 1–6, 2020.
 - [20] T. Ketema Gultie, "Practice of menstrual hygiene and associated factors among female mehalmeda high school students in Amhara Regional State, Ethiopia," *Science Journal of Public Health*, vol. 2, no. 3, p. 189, 2014, doi: 10.11648/j.sjph.20140203.18.
 - [21] Mulugeta A *et al.*, "Child malnutrition in Tigray, Northern Ethiopia," *East African Medical Journal*, vol. 87, no. 6, pp. 248–254, 2011.
 - [22] H. M. Gena, "Menstrual hygiene management practices and associated factors among secondary school girls in East Hararghe Zone, Eastern Ethiopia," *Advances in Public Health*, vol. 2020, pp. 1–7, 2020.
 - [23] S. Omidvar, F. Amiri, A. Bakhtiari, and K. Begum, "A study on menstruation of Indian adolescent girls in an urban area of South India," *Journal of Family Medicine and Primary Care*, vol. 7, no. 4, p. 698, 2018, doi: 10.4103/jfmpc.jfmpc_258_17.
 - [24] J. Davis *et al.*, "Menstrual hygiene management and school absenteeism among adolescent students in Indonesia: evidence from a cross-sectional school-based survey," *Tropical Medicine and International Health*, vol. 23, no. 12, pp. 1350–1363, 2018, doi: 10.1111/tmi.13159.
 - [25] A. Vashisht, R. Pathak, R. Agarwalla, B. N. Patavegar, and M. Panda, "School absenteeism during menstruation amongst adolescent girls in Delhi, India," *Journal of Family and Community Medicine*, vol. 25, no. 3, pp. 163–168, 2018, doi: 10.4103/jfcm.JFCM_161_17.
 - [26] S. Mohammed, R. E. Larsen-Reindorf, and I. Awal, "Menstrual hygiene management and school absenteeism among adolescents in ghana: results from a school-based cross-sectional study in a rural community," *International Journal of Reproductive Medicine*, vol. 2020, pp. 1–9, 2020, doi: 10.1155/2020/6872491.
 - [27] K. Jyoti, M. Lal, S. Mahajan, and T. Singh, "Assessing the impact of information, education and communication activities regarding menstrual hygiene practices among adolescent girls 13-17 years in the rural area of Amritsar," *International Journal Of Community Medicine And Public Health*, vol. 7, no. 4, p. 1470, 2020, doi: 10.18203/2394-6040.ijcmph20201458.
 - [28] S. Hossain, P. Sharma, and V. Sen, "A study of the knowledge and practice regarding menstrual hygiene in rural adolescent school going girls in an Indian Cosmopolitan City," *Journal of Pharmacy Practice and Community Medicine*, vol. 3, no. 3, pp. 185–187, Jun. 2017, doi: 10.5530/jppcm.2016.3.37.
 - [29] D. V. K. Bhagavan, D. A. GP, and D. S. Shetty, "To study the effect of health education on knowledge of pubertal changes and menstrual hygiene," *International Journal of Clinical Obstetrics and Gynaecology*, vol. 3, no. 2, pp. 79–82, 2019, doi: 10.33545/gynae.2019.v3.i2b.15.
 - [30] F. O. Fehintola, A. O. Fehintola, A. O. Aremu, A. Idowu, O. A. Ogunlaja, and I. P. Ogunlaja, "Assessment of knowledge, attitude and practice about menstruation and menstrual hygiene among secondary high school girls in Ogbomoso, Oyo state, Nigeria," *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, vol. 6, no. 5, p. 1726, 2017, doi: 10.18203/2320-1770.ijrcog20171932.
 - [31] K. Suhasini and M. Chandra, "Factors influencing menstrual hygiene practice among late adolescent girls in an urban Area of Belgaum," *Annals of Community Health*, vol. 4, no. 4, pp. 20–24, 2018.
 - [32] C. K. Bhusal, "Practice of menstrual hygiene and associated factors among adolescent school girls in Dang District, Nepal," *Advances in Preventive Medicine*, vol. 2020, pp. 1–7, 2020, doi: 10.1155/2020/1292070.
 - [33] M. K. Goel, "Psycho-Social Behaviour of Urban Indian Adolescent Girls during menstruation," *Australasian Medical Journal*, vol. 4, no. 1, pp. 49–52, Jan. 2011, doi: 10.4066/AMJ.2011.534.





- [34] K. MacLean, C. Hearle, and K. N. Ruwanpura, "Stigma of staining? Negotiating menstrual taboos amongst young women in Kenya," *Women's Studies International Forum*, vol. 78, p. 102290, Jan. 2020, doi: 10.1016/j.wsif.2019.102290.
- [35] Z. Belayneh and B. Mekuriaw, "Knowledge and menstrual hygiene practice among adolescent school girls in southern Ethiopia: A cross-sectional study," *BMC Public Health*, vol. 19, no. 1, 2019, doi: 10.1186/s12889-019-7973-9.
- [36] C. K. Bhusal, S. Bhattarai, R. Kafle, R. Shrestha, P. Chhetri, and K. Adhikari, "Level and associated factors of knowledge regarding menstrual hygiene among school-going adolescent girls in Dang District, Nepal," *Advances in Preventive Medicine*, vol. 2020, pp. 1–9, 2020, doi: 10.1155/2020/8872119.
- [37] I. Sarkar, M. Dobe, A. Dasgupta, R. Basu, and B. Shahbabu, "Determinants of menstrual hygiene among school going adolescent girls in a rural area of West Bengal," *Journal of Family Medicine and Primary Care*, vol. 6, no. 3, p. 583, 2017, doi: 10.4103/2249-4863.222054.

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