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Perception and Practice about Menstrual Health/Hygiene Among Adolescent Girls in Barisal District

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ABSTRACT

Background & Objective: Although menstruation is a natural physiological process and usually goes away without any complex problems provided proper care is taken during the period. However, menstruation is linked with religious and cultural meanings that can affect the perceptions of young girls and the ways in which the adult communities around them respond to their felt-needs. So, menstruation-associated complaints are not uncommon. The present study was, therefore, intended to determine the perception and practice of adolescent girls about menstruation in Barisal District.

Methods: This cross-sectional descriptive study was conducted as part of Field-site Survey of the Department of Social Science & Public Health (SSPH). Having obtained consent from the parents/guardians, a total of 205 adolescent girls from the Barisal district (both from Barisal Metropolitan City and rural area of the District) who had experienced menarche at least 6 months prior to the day of interview were included in the study. Data were collected over a period of three months from July 2020 to September 2020. Before interview, the issue of menstruation was discussed with the respondents. The interview was done by the female Health Assistants (field staff of Upalzila Health Complex in the Government setting) so that the interviewees answer freely to such private matters as menstruation thereby reducing the chance of bias during interview.

Result: Nearly 70% of the respondents were 14-16 years old with mean age of the girls being 15.2 ± 1.6 years. Majority of the respondents was unmarried (95.1%), urban resident (86.8%) and students of Public-School (66.8%). In terms of socioeconomic status, almost half (49.3%) was middle class, 29.8% lower middle class and 10.7% upper middle class. Most (87.8%) of the respondents had their menarche at 11-14 years with mean age at menarche being 12.9 ± 1.3 years. Over two-thirds (68.8%) of the respondents reported their length of menstrual cycle to vary from 26 – 30 days and period to vary from 3-5 days. A substantial proportion (83.4%) of respondents had regular menstruation. The predominant complaint during menstruation was fatigue or tiredness (73.2%) followed by pelvic pain (62%), malaise (60%) and low back pain (38.5%). Over half (50.4%) consulted with physicians, 11.8% with drug-sellers, 3.9% with herbal healer and 1.6% with homeopath for pain relief. Approximately 57% took analgesics to get relief from the pain. Other symptoms or complaints relating to menstruation were altered appetite (55.6%), abdominal bloating (39%), heavy bleeding (45.4%) and frequency of micturition (31.7%). About 46% of the respondents' routine activities were adversely affected, social relationships disrupted (32.7%), family relationship hampered (25.4%), sports/exercise activities stopped or reduced (58%). Nearly half (47.8%) of them had to absent from the school during the period with average school absenteeism of 3-4 days each month being reported by more than half of the cases. Majority (94.6%) of the respondents perceived that 'period of adolescent girls' should occur every month and that their period should not make them anxious (81.5%). About 83% told that a period of 3-5 days duration be considered normal. Almost 94% took some sanitary measures while they were on period. Majority (87.3%) talked the issue to a family member and about 64% to friends. Over one-third (37.6%) sought suggestion about menstrual affairs from their mothers, 27.8% from their sisters, 26.8% from friends and relations and only 7.8% from doctors.

Conclusion: Majority of the adolescent girls start menstruation at 11-14 years with mean age at menarche being 13 years. Adolescent girls usually adopt hygienic measures during the period by using sanitary napkin or clean home-made pad. The predominant symptoms experienced during the period are pelvic pain, malaise and low back pain. Other symptoms are loss of appetite, flatulence, heavy bleeding and frequency of micturition with personal, familial and social life being adversely affected and they remain absent from the school during the period in each cycle. Half of the girls consult with physicians for pain relief and take analgesics.

Key words: Perception, Practice, Menstrual Health/Hygiene Adolescent Girls, Barisal District etc.

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INTRODUCTION:

Puberty is the period of human development, when secondary sexual characteristics appear, sexual maturation occurs, and reproductive capacity is attained. Ovulation and menstruation begin in girls during this period.[1] Menstruation is a natural physiological process and usually passes without any significant problems provided appropriate care is taken (based on scientifically sound knowledge) during the period. However, menstruation is linked with religious and cultural beliefs, influenced by superstitions and dogmas, that can affect the perceptions of young girls as well as the ways in which the adults in the communities around them respond to their needs. That's why menstruation-associated complaints are frequently reported by the adolescents. Pain accompanying the menstrual period is the most frequently reported complaint.[2-8] Irregular menstrual cycles are also reported frequently during the first years after menarche, possibly due to immaturation of the hypothalamic-pituitary-gonadal axis in the young adolescent.[2,4] Physical, psychological, and emotional symptoms are also observed before and during menstruation in almost all adolescents.[4,9-11] Mainly pain and also other symptoms occurring during menstruation affect daily life activities, can decrease school performance, and also increase the rate of school absenteeism.[2-4,6-8,12] Girls in many developing countries enter puberty with knowledge gaps and misconceptions about menstruation, unprepared to cope with it and unsure of when and where to seek help. This is because the adults around them, particularly parents, peers and teachers, are themselves ill-informed and uncomfortable discussing sexuality, reproduction & menstruation (which frequently comes laden with dirty, polluting and shameful connotations).[13]

Therefore, the present survey aims to map the knowledge, attitudes, beliefs and practices surrounding menarche, menstrual hygiene, and menstrual health, pattern and disorders among adolescent girls in rural settings which might have future policy implications and programming. To do this, the proposed study intends to 1) determine the perception of rural adolescent girls of our country about menstruation, 2) investigate their sources of information regarding menstruation, 3) determine the pattern of menstrual cycle in terms of duration, length of period, amount of flow and common menstrual disorders faced by them, 4) explore how the adults around them respond to their information needs about menstruation, 5) assess the negative health and social effects that the rural adolescent girls in our country experience from menstrual affair and 6) assess how the adolescents respond when they experience these negative effects and practices adopted by them as a result.

METHODS:

This cross-sectional descriptive study was conducted as part of Field-site Survey of the Department of Social Science & Public Health (SSPH), Bangladesh Open University (BOU), Gajipur, Dhaka. Data for the study were collected from Barisal District (from both Barisal Metropolitan City and from rural area of the District) over a period of three months from July 2020 to September 2020. A total of 205 school-going adolescent girls who have had their first menstruation at least 6 months before the day of interview were included in the study as respondents. Before commencing data collection for the study, the issue of menstruation and its different aspects was discussed with the students and consent was taken from their parents or legal guardians. The interview was done by the female Health Assistants (field staff of Upalzila Health Complex in the Government setting) alone so that the interviewees (respondents) do not feel embarrassed and answer freely to such private matters as menstruation. Data were collected using a semi-structured questionnaire containing the variables of interest. Collected data were processed and analyzed using SPSS (Statistical Package for Social Sciences), version 25.0.

RESULT:

Over two-thirds (69.8%) of the respondents were 14 – 16 years old with mean age of the girls being 15.2 ± 1.6 years. Majority of the respondents was

unmarried (95.1%), urban resident (86.8%) and two-thirds (66.8%) were students of Public-School. In terms of socioeconomic status, almost half (49.3%) was middle class, 29.8% lower middle class, 10.7% upper middle class and 8.3% were poor. Very few (2%) belonged rich class (Table I). Table II depicts the pattern of menstruation experienced by the respondents. Most (87.8%) of the respondents started menstruating (menarche) at 11-14 years and about 10% at 15-17 years with mean age at menarche being 12.9 ± 1.3 years. Over two-thirds (68.8%) of the respondents reported their length of menstrual cycle to vary from 26-30 days with mean length of cycle being 29.6 ± 2.9 days. About 65% of the respondents' period varied from 3-5 days with mean duration of period being 4.7 ± 1.6 days. A substantial proportion (83.4%) of respondents had regular menstruation.

Table III illustrates the menstruation-related symptoms/complaints of the adolescent girls and measures taken thereby. The predominant complaint was fatigue or tiredness (73.2%) followed by pelvic pain (62%) (with 56.1% being mild in nature), malaise (60%) and low back pain (38.5%). Over half (50.4%) of the respondents who suffered from pelvic pain consulted with physicians for pain relief, 11.8% with drug-sellers, 3.9% with herbal healer & 1.6% with homeopath. Approximately 57% respondents suffering from pelvic pain took analgesics to get rid of the pain. Other symptoms or complaints relating to menstruation were altered appetite (55.6%), abdominal bloating (39%), heavy bleeding (45.4%) and urgency of urination (31.7%).

The impact of menstruation on life-style of the respondents was highlighted in table IV. About 46% of them informed that their daily activities including house-hold chores were adversely affected, social relationships disrupted (32.7%), family relationship hampered (25.4%), sports/ exercise activities stopped or reduced (58%). Nearly half (47.8%) of them had to remain absent from school with average school absenteeism of 3-4 days each month was reported by 53.1% of the respondents, 1-2 days by 43.9% and 5-7 days by 3.1% respondents. Majority (94.6%) of the respondents perceived that 'period of adolescent girls' should occur every month and that their period should not make them anxious (81.5%). About 83% of the respondents opined that a period of 3-5 days duration be considered normal and 38.5% told that they should disappear from all sorts of social activities during their period. Almost 98% expressed the view that hygienic measures should be adopted during the period and 93.7% took some sanitary measures while they were on period. Of the measures taken, sanitary napkin was mainly used (55.7%) followed by home-made pad (29.2%) and rags (15.1%). Majority (87.3%) talked about their periods to a family member and about 64% to friends. Over one-third (37.6%) sought suggestion regarding menstrual affairs from their mothers, 27.8% from their sisters, 26.8% from friends and relations only 7.8% from doctors (Table V).

Table I. Distribution of demographic characteristics of adolescent girls (n=205)

Demographic characteristics	Frequency	Percentage
Age* (years)		
11-13	30	14.6
14-16	143	69.8
17-19	32	15.6
Marital Status		
Married	10	4.9
Unmarried	195	95.1
School		
Private	68	33.2
Public	137	66.8
Residence		
Urban	178	86.8
Rural	27	13.2
Socioeconomic status		
Poor	17	8.3
Lower middle class	61	29.8
Middle class	101	49.3
Upper middle class	22	10.7
Rich	4	2.0

*__Mean age__ = (15.2 ± 1.6); __range__ : 11-19 years.

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Table II. Distribution of menstruation pattern of adolescent girls (n=205)

Menstrual profile	Frequency	Percentage
Age at menarche (years)		
9-10	5	2.4
11-14	180	87.8
15-17	20	9.8
Average length of cycle (days)		
21-25	23	11.2
26-30	141	68.8
31-35	33	16.1
36-40	8	3.9
Menstrual flow		
Scanty	26	12.7
Average	158	77.1
Profuse	21	10.2
Duration of the period (days)		
1 – 2	19	9.3
3 – 5	133	64.9
6 – 8	53	25.9
Menstrual regularity		
Irregular	34	16.6
Regular	171	83.4

*Mean age at menarche = 12.9 ± 1.3 years; mean length of cycle = 29.6 ± 2.9 days; mean duration of period = 4.7 ± 1.6 days.

Table III. Menstruation-related symptoms/complaints on life activities of adolescent girls

Menstruation-related symptoms	Frequency	Percentage
Low back pain (n = 205)	79	38.5
Fatigue or tiredness (n = 205)	150	73.2
Malaise (n = 205)	123	60.0
Pelvic Pain (n=205)	127	62.0
Mild	115	56.1
Moderate	8	3.9
Stabbing	4	2.0
Consulted for pain relief (n=127)		
No	41	32.3
Physician	64	50.4
Drug seller	15	11.8
Herbal healer	5	3.9
Homeopath	2	1.6
Take analgesics (n = 127)	72	56.7
Altered appetite (n = 205)	114	55.6
Abdominal bloating (n = 205)	80	39.0
Frequent urge to urinate (n = 205)	65	31.7
Heavy bleeding (n = 205)	93	45.4

Table IV. Influence of menstrual on life-style of adolescent girls

Menstruation influence on life activities	Frequency	Percentage
Daily activities adversely affected	94	45.9
Social/friendship activities disrupted/reduced	67	32.7
Family relationship hampered	52	25.4
Sports & exercise activities stopped/reduced	119	58.0
Absent from the school	98	47.8
Average duration of absence (n = 98)		
1-2 days	43	43.9
3-4 days	52	53.1
5-7 days	3	3.1

Table V. Assessment of perceptions of the girls about different aspects of menstruation

Perception about different aspects of menstruation	Frequency	Percentage
Should your period occur every month	194	94.6
Should your period make you anxious		
Yes	38	18.5
No	167	81.5
Should a period of 3-5 days be considered normal (Yes)	170	82.9
Talk to a family member about your periods	179	87.3
Should you disappear from all usual social activities during the period (Yes)	79	38.5
Should you take hygienic measures during the period (Yes)	200	97.6
Took sanitary measures	192	93.7
What measures taken (n = 192)		
Rags	29	15.1
Home-made pad	56	29.2
Sanitary napkin	107	55.7
Talked to friends about period	131	63.9
From whom took suggestion regarding menstruation		
Mother	77	37.6
Sister	57	27.8
Friends and relations	55	26.8
Doctors	16	7.8

DISCUSSION:

Although girls attain puberty and enter into reproductive life through menstruation cycle, menstruation and menstrual practices still face many social, cultural, and religious restrictions which are a big barrier in the path of menstrual

hygiene management. In many parts of the country especially in rural areas girls are not prepared and aware about menstruation so they face many difficulties and challenges at home, schools, and work places. In the present study, majority of the respondents experienced menarche at 11-14 years with mean age at menarche being 13 years, which is consistent with the findings of several recent Indian studies.[14-20] Majority of the respondents was of the opinion that hygienic measures should be taken during the period and most of them practiced taking sanitary napkin or home-made pad. Choudhary and Gupta[14] in their study reported that over half of the girls from urban and nearly one-third from the rural area use sanitary napkins while they menstruate. Similar kind of observations have been made by many other studies.[15,16,21-23] Contrasting findings have also been reported by many studies.[17,19,24] The predominant symptoms experienced by the adolescent girls were fatigue or tiredness followed by pelvic pain, malaise and low back pain. Half of the respondents who suffered from pelvic pain consulted with physicians for pain relief and took analgesics and the rest received medications (usually an analgesic) from drug-sellers, herbal healers and homeopath. Other symptoms or complaints relating to menstruation were altered appetite, abdominal bloating, heavy bleeding and urgency of urination. Similar kind of observations have been made by other studies.[20,25] where most common health problem during menstruation was pain in abdomen followed by irritation, heavy bleeding, and backache.[17-20]

In the present study nearly two-thirds (64%) of the respondents discussed the issue with their friends. But most them took suggestions about menstrual affairs from their mothers and sisters followed by friends and relations. Very few discussed the issue with doctors. Several studies demonstrated that mmajority of the girls had ever faced any kind of health problem during menstruation, and most of them discussed the issue with their mother.[14,15,16,18, 21,24,26] As impact of menstruation on life-style of the respondents was investigated, nearly half of the respondents informed that their daily activities including house-hold chores were adversely altered, social relationships disrupted, family relationship hampered, sports/exercise activities stopped or reduced and nearly half of them had to remain absent from school with an average school absence of 3-4 days in each cycle was reported by more than half of the respondents. A number of small-scale, mostly qualitative studies have found that many school-aged a girls do not attend school during menstruation[27-30] due to shame, fear of having visible stains on their clothing, absence of a private place to manage menstruation in school[27,2-,31,32] or dysmenorrhoea[33,34] In an Ethiopian study, about 90% of girls stated that their academic performance or class rank declined after menarche.[29] However, little attempt has been made to quantify the complex ways by which menstruation affects girls at school.[35] The present study noted school absence reported by students which could have implication in menstrual health management (MHM).

A nationally representative, cross-sectional survey was conducted in Bangladeshi schools from March to June 2013 among 700 girls of 11 to 17 years old who reached menarche. Over 40% of them reported missing school with an average of 2.8 missed days per menstrual cycle. Students who felt uncomfortable at school during menstruation and who believed menstrual problems to interfere with school performance were more likely to miss school during menstruation than those who did not. School absence during menstruation was less common among girls attending schools with unlocked toilet for girls while school absence was more common among girls who were forbidden from any activities during menstruation.[36] However, not all studies have found a convincing relationship between menstruation and absenteeism. Oster and Thornton[37] collected daily data on school attendance and menstrual calendars, and found that menstruation had only limited impact on school attendance. Enabling girls to manage menstruation at school by providing knowledge and management methods prior to menarche, privacy and a positive social environment around menstrual issues may benefit

the students by reducing school absence. Summarizing the findings of the present study and studies compared and contrasted so far, the following conclusions can be made.

CONCLUSION:

Majority of the adolescent girls start menstruation at 11-14 years with mean age at menarche being 13 years. Adolescent girls usually adopt hygienic measures during the period by using sanitary napkin or clean home-made pad. The predominant symptoms experienced during the period are fatigue or tiredness followed by pelvic pain, malaise and low back pain. Half of the girls consult with physicians for pain relief and take analgesics and the rest consult with drug-sellers, herbal healers and homeopath. Other less common symptoms are altered appetite, abdominal bloating, heavy bleeding and frequency to micturate. About half of the girls' personal, familial and sociocultural life are adversely affected due to menstruation and they remain absent from the school during the period in each cycle.

REFERENCE:

1. Rosenfield RL, Cooke DW, Radovick S. Puberty and its disorders in the female. In: Sperling MA, editor. Pediatric Endocrinology. Philadelphia: Elsevier Saunders; 2014:569–663.
2. Vicdan K, Kukner S, Dabakoglu T, Ergin T, Keles G, Gokmen O. Demographic and epidemiologic features of female adolescents in Turkey. *J Adolesc Health* 1996;18:54–58.
3. Eryilmaz G, Ozdemir F, Pasinlioglu T. Dysmenorrhea prevalence among adolescents in eastern Turkey: its effects on school performance and relationships with family and friends. *J Pediatr Adolesc Gynecol* 2010;23:267–272.
4. Parker MA, Sneddon AE, Arbon P. The menstrual disorder of teenagers (MDOT) study: determining typical menstrual patterns and menstrual disturbance in a large population-based study of Australian teenagers. *BJOG* 2010;117:185–192.
5. Demir SC, Kadayyfcy TO, Vardar MA, Atay Y. Dysfunctional uterine bleeding and other menstrual problems of secondary school students in Adana, Turkey. *J Pediatr Adolesc Gynecol* 2000;13:171–175.
6. Suvitie PA, Hallamaa MK, Matomaki JM, Makinen JI, Perheentupa AH. Prevalence of pain symptoms suggestive of endometriosis among finnish adolescent girls (TEENMAPS study) *J Pediatr Adolesc Gynecol* 2016;29:97–103.
7. Pitangui AC, Gomes MR, Lima AS, Schwingel PA, Albuquerque AP, Araujo RC., de Menstruation disturbances: prevalence, characteristics, and effects on the activities of daily living among adolescent girls from Brazil. *J Pediatr Adolesc Gynecol* 2013;26: 148–152.
8. Zannoni L, Giorgi M, Spagnolo E, Montanari G, Villa G, Seracchioli R. Dysmenorrhea, absenteeism from school, and symptoms suspicious for endometriosis in adolescents. *J Pediatr Adolesc Gynecol* 2014;27: 258–265.
9. Wilson CA, Keye WR., Jr A survey of adolescent dysmenorrhea and premenstrual symptom frequency. A model program for prevention, detection, and treatment. *J Adolesc Health Care* 1989;10:317–322.
10. Vichnin M, Freeman EW, Lin H, Hillman J, Bui S. Premenstrual syndrome (PMS) in adolescents: severity and impairment. *J Pediatr Adolesc Gynecol* 2006;19: 397–402.
11. Allen LM, Lam AC. Premenstrual syndrome and dysmenorrhea in adolescents. *Adolesc Med State Art Rev* 2012;23:139–163.
12. Banikarim C, Chacko MR, Kelder SH. Prevalence and impact of dysmenorrhea on Hispanic female adolescents. *Arch Pediatr Adolesc Med* 2000;154: 1226–1229.
13. Mouli VC and Patel SV. Mapping the knowledge and understanding of menarche, menstrual hygiene and menstrual health among adolescent girls in low- and middle-income countries Reprod Health 2017;14:30. doi: 10.1186/s12978-017-0293-6.
14. Neha Choudhary and Manoj K. Gupta. A comparative study of perception and practices regarding menstrual hygiene among adolescent girls in urban and rural areas of Jodhpur district, Rajasthan. *J Family Med Prim Care* 2019;8(3):875–880. doi:10.4103/jfmpc.jfmpc_ 69_19.
15. Paria B, Bhattacharyya A, Das S. A Comparative study on menstrual hygiene among urban and rural adolescent girls of West Bengal. *J Fam Med Prim Care* 2014;3:413–7.
16. Senapathi P, Kumar H. A comparative study of menstrual hygiene management among rural and urban adolescent girls in Mangaluru, Karnataka. *Int J Community Med Public Health* 2018;5:2548–56.

17. Gupta P, Gupta J, Singhal G, Meharda B. Knowledge and practices pertaining to menstruation among the school going adolescent girls of UHTC/RHTC area of Government Medical College, Kota, Rajasthan. *Int J Community Med Public Health* 2018;5:652–6.

18. Bachloo T, Kumar R, Goyal A, Singh P, Yadav S, Bhardwaj A, et al. A study on perception and practice of menstruation among school going adolescent girls in district Ambala Haryana, India. *Int J Community Med Public Health* 2016;3:931–7.

19. Omidvar S, Amiri FN, Bakhtiari A, Begum K. A study on menstruation of Indian adolescent girls in an urban area of South India. *J Fam Med Prim Care* 2018;7: 698–702.

20. Mathiyalagen P, Peramasamy B, Vasudevan K, Basu M, Cherian J, Sundar B. A descriptive cross-sectional study on menstrual hygiene and perceived reproductive morbidity among adolescent girls in a union territory, India. *J Fam Med Prim Care* 2017;6:360–5.

21. Sudeshna R, Aparajita D. Determinants of menstrual hygiene among adolescent girls: A multivariate analysis. *Natl J Community Med* 2012;3:294-301.

22. Deshpande TN, Patil SS, Gharai SB, Patil SR, Durgawale PM. Menstrual hygiene among adolescent girls - A study from urban slum area. *J Fam Med Prim Care* 2018;7:1439–45.

23. Tundia MN, Thakrar DV. A study on menstrual hygiene practices and problems amongst adolescent girls in Udaipur, Rajasthan, 2018 *Int J Community Med Public Health* 2018;5:3486–91.

24. Kamath R, Ghosh D, Lena A, Chandrasekaran V. A study on knowledge and practices regarding menstrual hygiene among rural and urban adolescent girls in Udupi Taluk, Manipal, India. *Glob J Med Public Health* 2013;2:1–9.

25. Shoor P. A study of knowledge, attitude, and practices of menstrual health among adolescent school girls in urban field practice area of medical college, Tumkur. *Indian J Health Sci Biomed Res KLEU* 2017;10:249-55.

26. Patle R, Kubde S. Comparative study on menstrual hygiene in rural and urban adolescent girls. *Int J Med Sci Public Health* 2014;3:129–32.

27. McMahon SA, Winch PJ, Caruso BA, et al. . 'The girl with her period is the one to hang her head' Reflections on menstrual management among schoolgirls in rural Kenya. BMC Int Health Hum Rights 2011;11:7.10. 1186/1472-698X-11-7

28. Mason L, Nyothach E, Alexander K, et al. . 'We keep it secret so no one should know'—a qualitative study to explore young schoolgirls attitudes and experiences with menstruation in rural western Kenya. *PLoS One* 2013;8:e7913210.1371/journal.pone.0079132

29. Tegegne TK, Sisay MM. Menstrual hygiene management and school absenteeism among female adolescent students in Northeast Ethiopia. *BMC Public Health* 2014;14:1118.10.1186/1471-2458-14-1118

30. World Health Organization. Progress on sanitation and drinking-water—2013 update, 2013.

31. Alexander K, Oduor C, Nyothach E, et al. . Water, sanitation and hygiene conditions in Kenyan rural schools: are schools meeting the needs of menstruating girls? *Water* 2014;6:1453–66.10.3390/ w6051453

32. Long J, Caruso BA, Lopez D, et al. . WASH in schools empowers girls' education in rural Cochabamba, Bolivia: an assessment of menstrual hygiene management in schools. New York: United Nations Children's Fund, 2013.

33. Dambhare DG, Wagh SV, Dudhe JY. Age at menarche and menstrual cycle pattern among school adolescent girls in Central India. *Glob J Health Sci* 2012;4: 105–11.10.5539/gjhs.v4n1p105

34. Zegeye DT, Megabiaw B, Mulu A. Age at menarche and the menstrual pattern of secondary school adolescents in northwest Ethiopia. *BMC Womens Health* 2009; 9:29.10.1186/1472-6874-9-29

35. Sumpter C, Torondel B. A systematic review of the health and social effects of menstrual hygiene management. *PLoS One* 2013;8:e6200410.1371/ journal.pone.0062004

36. Alam M, Luby SP, Halder AK, Islam K, Opel A, Shoab AK et al. Menstrual hygiene management among Bangladeshi adolescent schoolgirls and risk factors affecting school absence: results from a cross-sectional survey. *BMJ Open* 2017;7(7): e015508. doi: 10.1136/ bmjopen-2016-015508 Research

37. Oster E, Thornton R. Menstruation, sanitary products, and school attendance: evidence from a randomized evaluation. *Am Econ J Appl Econ* 2011;3:91–100.10. 1257/app.3.1.91