Risk Factors behind Menstrual Disturbance of School Girls (Age 10 To 12 Years) in Rajshahi District, Bangladesh

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ABSTRACT Menstrual pain and irregular menstrual cycle are common problems among adolescents, however this disturbance generally affect the daily activities of school girls. The aim of this study was to determine the prevalence of menstrual disturbances and its associated factors among school girls (age, 10-12 years). A total number of 628 school girls were collected from Rajshahi district, Bangladesh using multi-stage random sampling. Descriptive statistics, chi-square tests and logistic regression model were used in this study. The prevalence of menstrual pain, irregular menstrual cycles and coexisting of pain and irregular cycle was 77.5 percent, 23.2 percent and 17.5 percent respectively among school girls. Five modifiable risk factors were found as predictors of menstrual disturbance of adolescent girls in Rajshahi district. However, two risk factors; age at menarche and menstrual bleeding were common for three types of disturbance. These findings can be considered for reducing the menstrual disturbance of adolescent girls.

INTRODUCTION

Menarche is one of the most important events in women's life. It occurs between ages 10 to 16 years; however, it shows a remarkable range of variation of women's life (Diaz et al. 2006). After menarche, pain, irregular and longer cycles are common for the first few years, and generally these problems are considered as menstrual disturbances (Hillard 2002). About 75 percent of girls experience some menstrual disturbances including delayed, irregular, painful, and heavy menstrual bleeding, which are the leading reasons for the physician office visits by adolescents (Lee et al. 2006). Menstrual disturbances are a major health problem among adolescent girls because they influence not only future fertility, but also mental health and quality of life (Sultan et al. 2012). Approximately 25 percent girls in Australia had significant menstrual disturbances affecting their daily life activity (Parker et al. 2010). Menstrual pain is pain in the legs and back, headaches, nausea and diarrhea. As a result, menstrual pain affects class absenteeism, and places limitations on social, academic and sporting activities (Femi-Agboola et al. 2017). Irregular menstrual cycle is another serious menstrual problem that causes pain, unusual bleeding, delayed menarche or missed periods and increased risk of hip fracture (Nicodemus et al. 2001).

It is essential to do research with menstrual disturbance among adolescent girls in order to determine the risk factors for controlling the disturbance. Many research works are available on adolescent girls' menarcheal age and menstrual disturbances around the world (Loto et al. 2008; Agarwal et al. 2009; Chang et al. 2009; De Sanctis et al. 2014; De Sanctis et al. 2015; Sharma et al. 2016; Esen et al. 2016; Liu et al. 2017; Omidvar et al. 2018; Singh et al. 2019; Al-Matouq et al. 2019; Acheampong et al. 2019). Some studies are available on menarcheal age among adults and adolescent in Bangladesh (Chowdhury et al. 2000; Chowdhuri 2007; Hossain et al. 2010). The aim of the present study was to investigate menstrual disturbances and its associated factors among adolescent school girls aged 10-12 years in Rajshahi district, Bangladesh.

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METHODOLOGY

Study Area and Population

The population of this study was school girls aged 10 to 12 years in Rajshahi district, Bang-

ladesh. The subjects were all of Bangladeshi birth. The present study was a cross sectional study and the data was extracted from the field survey conducted during the period March to July 2017.

Sample Size Determination

The required sample size for this study was determined by using the formula:

$$n = \frac{z^2 p\ (1-p)}{d^2}$$

where n = the number of samples, z = 1.96 for 95% confidence interval, p = 0.856, and 5 percent margin of error (d = 0.05) were considered. The prevalence of dysmenorrhea (menstrual pain) (85.6%) was taken from a previous study (Al-Matouq et al. 2019). According to the formula, 190 was the required sample size for the present study, however the researchers collected data from 628 school girls.

Questionnaire

A self-developed questionnaire was used to collect information. First the researchers drafted a questionnaire, and sent it to some experts for getting their opinion and suggestions. The researchers' questionnaire was revised according to experts' suggestions. The original questionnaire was in English, the revised one was translated into Bangla (Bangladeshi mother tongue) for easy understanding of school girls, and the translated questionnaire was checked by the researchers. A pilot study was done for checking the consistency, and the researchers' did not find any problem. Face to face interview was done by one of the researchers . Written consent of each selected girl and school authorities' permission had been taken.

Sampling Procedure

Multistage random sampling was utilized for selecting 628 girls for this study. In the first stage, three upazilas (the third largest administrative division in Bangladesh) were selected randomly out of nine upazilas in Rajshahi district, Bangladesh. In the next stage, we selected three schools randomly from each selected upazilas. In third stage, 386 girls were selected randomly with proportion allocation technique from each selected schools.

Inclusion Criteria

Healthy school girls living in Rajshahi district, Bangladesh aged 10-12 having no mental problem were considered as sample in the present study.

Data Collection Procedure

All information of selected girls was gathered from respective school authorities. Some confidential questionnaires were asked to know the age of onset in years and months, menstrual pain and menstrual cycle. Girls' date of birth was calculated by the difference between survey and birth date (considering nearest integer age category) and classified into one of the age categories. Age at menarche was calculated from date of menarche (considering nearest integer age category) and date of birth. Digital scales and a portable stadiometer were used to measure their weight and height respectively. Height and weight were measured to the nearest 1 cm and 0.1 kg, respectively, and body mass index was calculated using the formula, BMI = weight (kg)/height (m)^2. For measuring menstrual bleeding, researchers asked a question to every girl "how much blood does come out during your menstruation? According to their reports, it was classified into three classes; (i) low, (ii) medium, and (iii) heavy. To know the duration of menstrual flow (in day), we asked a question to girl, "how long your menstrual flow usually?" The sample was classified into three classes according the day of menstrual flow; (i) <4, (ii) 4-7 and (iii) >7.

Outcome Variable

The outcome variable of this study was menstrual disturbance of school girls aged 10-12 years. The menstrual disturbance was defined by (i) menstrual pain, (ii) irregular menstrual cycle, and (iii) coexisting of pain and irregular cycle. We asked a question to girls "do you have painful periods or menstrual cramps for your last menstruation?" with a response option of "yes (code, 1)," or "no (code, 0)". For irregular menstrual cycle, researchers asked every girl a question "how many days do typically pass between your two menstrual periods?" The average menstrual cycle is about 28 days, 28 days pass between the

first day of period and the first day of next period. The range for menstrual cycles in adolescents is defined as being between 21 and 34 days (Fraser et al. 2007). Sooner than 21 days and longer than 34 days was considered as irregular menstrual cycle (yes, code 1), otherwise considered regular (no, code 0) in the present study. Coexisting of pain and irregular cycle was calculated from above two disturbance; if having both pain and irregular cycle (yes coexisting, code 1), if any at least one having no (no coexisting, code 0).

Independent Variables

Parents' socio-economic and demographic factors and girls' anthropometric factors were considered as independent variables in this study. Most of the variables were selected based on the previous study (Malitha et al. 2020). Selected independent variables and their codes are given below: Independent Variables: Residence (Rural 1; Urban 2), Type of family (Nuclear family 1; Joint family 2), Number of siblings (1-2 1; 3 and above 2), Mothers' occupation (House wife 1; Others 2), Fathers' occupation (Service 1; Business 2; Others 3), Mother's education level (Uneducated 1; Primary 2; Secondary 3; Higher (higher secondary to post-graduate) 4), Father's education level (Uneducated 1; Primary 2; Secondary 3; Higher (higher secondary to post-graduate) 4), Family income (BDT) ($\leq$10000 BDT 1; 10001-20000 BDT 2; $\geq$20001 3), Body mass index (Underweight 1; Normal weight 2; Overweight 3; Obese 4), Mode of delivery (Vaginal 1; Caesarian 2), Age at menarche (year) (Age > 11year 1; Age $\leq$ 11year 2), Duration of menstrual flow (day) ($\leq$4 days 1; 4-7 days 2; >7 days 3) and Menstrual bleeding (Low 1; Medium 3; Heavy 3).

Statistical Analysis

Frequency distribution of the dependent variables was used to find the prevalence of menstrual disturbances of school girls. Chi-square test was used to find the association between menstrual disturbance of school girls and independent variables. Multivariable binary logistic regression model was used to find the effect of socio-economic, demographic, anthropometric and menstrual factors on menstrual disturbance. The multicollinearity problems among independent variables was checked by standard error (SE), if the magnitude of the SE lies between 0.001 and 0.5, it is judged that there is no evidence of multicollinearity (Chan 2004). SPSS (IBM version 21) was used to analyze the data. All statistical significance was accepted at p<0.05.

RESULTS

Prevalence of Menstrual Disturbance

Out of 628 girls, 77.5 percent girls were suffering from menstrual pain and 23.2 percent had experienced irregular menstrual cycle while 17.5 percent had both pain and irregular cycle (Table 1).

Association Between Mestrual Distubance and Different Factors

Table 1 shows the frequency distribution of each group for every selected variables, and association between menstrual disturbances and these variables. More than 52 percent school girls aged 10-12 years reached menarche at $\leq$11 years, among them 81.2 percent, 26.4 percent and 21.3 percent girls had menstrual pain, irregular menstrual cycle and coexisting of pain and irregular cycle. The χ^2-test demonstrated that the association between age at menarche and menstrual pain (p<0.05), menstrual cycle (p<0.05) and coexisting of both disturbance (p<0.01) was statistically significant. About 18 percent of girls had experienced menstrual flow for duration of 7 or more days. Of them, 76.1 percent, 31 percent and 24.8 percent had pain, irregular cycle, and both pain and irregular cycle respectively. The association between duration of menstrual flow and pain (p<0.01), irregular cycle (p<0.05) and coexisting of both disturbances (p<0.05) was significant. Only 7.96 percent reported that they had heavy menstrual bleeding, among them 90 percent girls were suffering from menstrual pain, while 48 percent and 40 percent had experienced irregular cycle and both disturbances respectively. Menstrual bleeding was significantly associated with these three types of disturbances (p<0.01). More than 32 percent girls were born by caesarian delivery. Of these girls, 82.9 percent, 24.4 percent and 19.5 percent had experienced menstrual pain, irregular cycle and coexisting of both respectively. Only the association between mode of delivery and menstrual

Table 1: Association between menstrual disturbances and socio-economic, demographic, anthropometric and menstrual characteristics

Variables	Group,	N (%) Menstrual pain Pain (77.7%), N (%)	χ^2-value (p-value)	Menstrual disturbances Menstrual cycle Irregular, (23.2%) N (%)	χ^2-value (p-value)	Coexisting of pain and irregular cycle Yes (17.5%), N (%)	χ^2-value (p-value)
Age at Menarche	Age>11 year, 299(47.61)	220 (73.6)	5.16 (0.015)	59 (19.7)	3.95 (0.047)	40 (13.4)	6.76 (0.009)
	Age ≤ 11 year, 329(52.39)	267 (81.2)		87 (26.4)		70 (21.3)	
Duration of Menstrual Flow (Day)	< 4 day, 183(29.14)	122 (66.7)	20.67 (0.001)	48 (26.2)	8.08 (0.018)	31 (16.9)	5.23 (0.073)
	(4-7) day, 332(52.87)	279 (84.0)		63 (19.0)		51 (15.4)	
	≥7 day, 113(17.99)	86 (76.1)		35 (31.0)		28 (24.8)	
Menstrual Bleeding	Low, 169(26.91)	90 (53.3)	78.77 (0.001)	44 (26.0)	21.90 (0.001)	21 (12.4)	20.64 (0.001)
	Medium, 409(65.13)	352 (86.1)		78 (19.1)		69 (16.9)	
	Heavy, 50(7.96)	45 (90.0)		24 (48.0)		20 (40)	
Mode of Delivery	Normal, 423(67.36)	317 (74.9)	5.05 (0.015)	96 (22.7)	0.22 (0.630)	70 (16.5)	0.84 (0.360)
	Caesarian, 205(32.64)	170 (82.9)		50 (24.4)		40 (19.5)	
Father's Education Level	Uneducated, 37(5.89)	22 (59.5)	16.32 (0.001)	16 (43.2)	11.79 (0.015)	10 (27)	7.35 (0.062)
	Primary, 110(17.52)	76 (69.1)		20 (18.2)		11 (10)	
	Secondary, 76(12.10)	57 (75.0)		20 (26.3)		16 (21.1)	
	Higher studies, 405(64.49)	332 (82.0)		90 (22.22)		73 (18)	
Father's Occupation	Service, 327(52.07)	210 (82.6)	10.59 (0.005)	72 (22.0)	2.91 (0.234)	57 (17.4)	0.11 (0.948)
	Business, 165(26.27)	122 (73.9)		35 (21.2)		28 (17)	
	Others, 136(21.66)	95 (69.9)		39 (28.7)		25 (18.4)	

Table 1: Contd...

Variables	Group, N (%)	Menstrual disturbances					
		Menstrual pain Pain (77.7%), N (%)	χ^2-value (p-value)	Menstrual cycle Irregular, (23.2%) N (%)	χ^2-value (p-value)	Coexisting of pain and irregular cycle Yes (17.5%), N (%)	χ^2-value (p-value)
Mother's Education Level	Uneducated, 25(3.89)	20 (80.0)	6.54 (0.088)	8 (32.0)	8.63 (0.035)	5 (20)	11.30 (0.010)
	Primary, 107 (17.03)	74 (69.2)		22 (20.6)		12 (11.2)	
	Secondary, 136 (21.66)	103 (75.7)		43 (31.6)		36 (26.5)	
	Higher studies, 360 (57.32)	290 (80.6)		73 (20.3)		57 (15.8)	
Family Income (BDT)	≤10000, 197(31.37)	137 (69.5)	10.77 (0.005)	57 (28.9)	6.53 (0.039)	37 (18.8)	0.77 (0.681)
	(10001-20000), 108(17.20)	86 (79.6)		18 (16.7)		16 (14.8)	
	>200001, 233(37.10)	264 (80.85)		70 (19.5)		57 (17.6)	
Number of Siblings	1-2, 416(66.24)	335 (80.5)	6.29 (0.009)	98 (23.6)	0.06 (0.797)	77 (18.5)	0.84 (0.359)
	3 and more, 212(33.76)	152 (71.7)		48 (22.6)		33 (15.6)	
BMI Category	Under weight, 56(8.92)	39 (69.6)	8.07 (0.018)	13 (23.2)	0.17 (0.918)	8 (14.3)	1.65 (0.437)
	Normal weight, 396(63.06)	299 (75.5)		94 (23.7)		66 (16.7)	
	Overweight, 118(18.79)	149 (83.7)		39 (21.35)		36 (20.5)	
Type of Residence	Rural, 217 (34.55)	149 (68.7)	15.03 (0.0001)	56 (25.8)	1.216 (0.270)	36 (16.6)	0.197 (0.657)
	Urban, 411(65.45)	338 (82.2)		90 (21.9)		74 (18.0)	
Mothers' Occupation	Housewife, 520(82.80)	120 (23.1)	0.325 (0.569)	401 (77.1)	0.05 (0.823)	91 (17.5)	0.001 (0.982)
	Others, 108(17.20)	26 (24.1)		86 (79.6)		19 (17.6)	
Type of Family	Nuclear, 527(83.92)	406 (77.0)	0.486 (0.486)	126 (23.9)	0.801 (0.371)	93 (17.6)	0.039 (0.843)
	Joint, 101(16.08)	81 (80.2)		20 (19.8)		17 (16.8)	

pain was significant (p<0.05). More than 64 percent girls' fathers were highly educated; out of their girls, 82 percent, 22.22 percent and 18 percent had menstrual pain, irregular cycle and coexisting of both pain and irregular cycle respectively, the association between fathers' education and their girls' menstrual pain (p<0.01), irregular cycle (p<0.05) and coexisting of both (p<0.05) was significant. Father's occupation (p<0.05), family monthly income (BDT) (p<0.05), BMI category (p<0.05) of girls were significantly associated with girls' menstrual pain. 65.45 percent girls participated from urban environment, and urban girls were suffering more (82.2%) from menstrual pain than rural girls. The association between type of residence and their menstrual pain was significant (p<0.01) (Table 1). Only these significantly associated factors were considered as independent variables in multivariable binary logistic model.

Factors Influencing Menstrual Disturbance

The results of multivariable logistic model were interpreted using adjusted odds ratio (AOR), and its 95% confidence level (CI) with p-value. It was found that the standard error (SE) lies between 0 and 0.5, and there was no evidence of multicollinearity problems among independent variables.

Menstrual Pain

The model demonstrated that menstrual pain was reduced by 35.3 percent among girls who reached menarche at age>11 years [AOR=0.647; 95% CI: 0.443-0.943; p<0.05] compared to girls who got menarche early in their life (age ≤ 11 years). Menstrual pain was decreased by 86.5 percent for girls who reported low menstrual bleeding during their menstruation period (AOR=0.135, 95% CI: 0.049-0.371; p<0.01) compared to girls who had experienced heavy bleeding. It was found that urban school girls had a 2.113-fold higher chance to get menstrual pain (AOR=2.113; 95% CI: 1.442-3.097; p<0.01) compared to rural school girls.

Irregular Menstrual Cycle

The risk of irregular cycle was reduced by 38.8 percent among girls who reached menarche at age>11 years (AOR=0.612; 95% CI: 0.401-0.934; p<0.05) compared to girls who got menarche in early age (age ≤ 11 years). The risk of irregular cycle was decreased by 62.5 percent (AOR=0.375; 95% CI: 0.184-0.762; p<0.05) and 72.7 percent (AOR=0.273; 95% CI: 0.144-0.519; p<0.05) among girls who reported low and medium bleeding during their menstruation period compared to girls who had heavy bleeding respectively. Primary educated fathers' girls had lower risk (60.6%) in get irregular cycle than higher educated fathers' girls (AOR=0.394; 95% CI: 0.159-0.976; p<0.05). It was found that girls who were living in lower income families (≤10000 BDT) had a 2.028-fold higher chance to get irregular cycle (AOR=2.028; 95% CI: 1.026-4.007; p<0.05) than girls living in higher income families (> 200001 BDT).

Coexisting of Pain and Irregular Cycle

Girls who got menarche at age>11 years had lower risk for coexistence of pain and irregular cycle (AOR= 0.522; 95 percent CI: 0.329-0.829; p<0.01) than girls who reached menarche in early age (age ≤11). The risk for coexistence of pain and irregular cycle was reduced by 79.3 percent and 70.3 percent among girls who had experienced with low (AOR= 0.207; 95% CI: 0.098-0.438; p<0.01) and medium bleeding (AOR= 0.297; 95% CI:0.157-0.564; p<0.01) during their menstruation compared to girls who had heavy bleeding respectively (Table 2).

DISCUSSION

In this study, the researchers tried to determine the prevalence and risk factors of menstrual disturbance among adolescent school girls. Menstrual disturbance was defined by two type of menstrual problems and their coexistence such as (i) pain, (ii) irregular cycle and (iii) coexisting of pain and irregular cycle.

Prevalence of Menstrual Disturbances

This study revealed that more than three-quarters adolescent girls were suffering from menstrual pain, while near to one fourth girls had experienced irregular menstrual cycles. Similar findings were found in Rajshahi University female students where the prevalence of menstrual pain was 72.3

Table 2: Effects of socio-demographic factors on menstrual disturbances of adolescent girls

Variables	SE	p-value	AOR	95% CI for AOR	
				Lower	Upper
Dependent Variable: Menstrual Pain					
Age at Menarche					
Age > 11 year vs Age ≤ 11 year	0.193	0.024	0.647	0.443	0.943
Menstrual Bleeding					
Low Vs Heavy	0.515	0.001	0.135	0.049	0.371
Medium Vs Heavy	0.502	0.364	0.634	0.237	1.697
Number of Sibling					
1-2 vs 3 and above	0.224	0.290	1.267	0.817	1.966
Duration of Menstrual Flow (Days)					
< 4 day vs > 7 day	0.310	0.925	0.971	0.529	1.783
(4 -7) day vs > 7 day	0.292	0.074	1.685	0.951	2.986
Father's Education Level					
Uneducated vs Higher	0.535	0.124	0.439	0.154	1.252
Primary vs Higher	0.432	0.810	0.902	0.387	2.101
Secondary vs Higher	0.393	0.618	0.822	0.380	1.776
Fathers' Occupation					
Service vs Others	0.320	0.786	0.917	0.490	1.716
Business vs Others	0.224	0.290	1.267	0.817	1.966
Body Mass Index					
Underweight vs Overweight	0.423	0.305	0.648	0.283	1.485
Normal weight vs Overweight	0.269	0.215	0.716	0.423	1.213
Family Income (BDT)					
<10000 vs > 20001	0.358	0.880	1.056	0.524	2.128
(10001-20000) vs > 20001	0.330	0.224	1.493	0.782	2.851
Mode of Delivery					
Vaginal vs Caesarian	0.260	0.705	0.906	0.544	1.509
Type of Residence					
Urban vs Rural	0.195	0.001	2.113	1.442	3.097
Dependent Variable: Irregular Menstrual Cycle					
Age at Menarche (Year)					
Age >11 vs Age ≤ 11	0.210	0.023	0.612	0.401	0.934
Duration of Menstrual Flow (Day)					
< 4 vs > 7	0.289	0.784	0.924	0.524	1.629
4 -7 vs > 7	0.265	0.048	0.593	0.353	0.996
Menstrual Bleeding					
Low vs Heavy	0.363	0.007	0.375	0.184	0.762
Medium vs Heavy	0.327	0.001	0.273	0.144	0.519
Father's Education Level					
Uneducated vs Higher	0.564	0.544	1.408	0.466	4.258
Primary vs Higher	0.463	0.044	0.394	0.159	0.976
Secondary vs Higher	0.405	0.172	0.575	0.260	1.727
Mother's Education Level					
Uneducated vs Higher	0.591	0.843	1.124	0.353	3.580
Primary vs Higher	0.609	0.270	1.956	0.593	6.448
Secondary vs Higher	0.669	0.817	0.856	0.231	3.175
Family Monthly Income (BDT)					
<10000 vs > 20001	0.347	0.042	2.028	1.026	4.007
(10001-20000) vs > 20001	0.312	0.276	0.712	0.386	1.312
Dependent Variable: Coexisting of Menstrual Pain and Irregular Menstrual Cycle					
Age at Menarche (Year)					
Age>11 vs Age ≤ 11	0.236	0.006	0.522	0.329	0.829
Menstrual Bleeding					
Low vs Heavy	0.382	0.001	0.207	0.098	0.438
Medium vs Heavy	0.327	0.001	0.297	0.157	0.564
Mothers' Education Level					
Uneducated vs Higher	0.601	0.451	0.636	0.196	2.065
Primary vs Higher	0.551	0.389	1.608	0.546	4.736
Secondary vs Higher	0.538	0.490	0.690	0.240	1.981

percent and the experience of irregular menstrual cycle was 12.9 percent (Hossain et al. 2010). Again, same reports were also found in Indian medical college students (Singh et al. 2008), Chinese (Liu et al. 2017), South Indian (Omidvar et al. 2018) and Ghana's (Acheampong et al. 2019) adolescents girls. They found that the prevalence of menstrual pain among Indian medical college students, South Indian Ghana's and Chinese adolescent girls were 73.8 percent, 66.8 percent, 68.1 percent and 73.5 percent and irregular menstrual cycles were only 7.47 percent, 22.1 percent, 19.8 percent and 10 percent respectively. According to a recent literature review, the prevalence of menstrual pain in adolescent girls is between 16 percent and 93 percent (De Sanctis et al. 2015) and 34 percent of the sample defined their menstrual cycle as irregular (Esen et al. 2015). Therefore, menstrual pain was very usual because it is the most common gynecologic complaint among adolescent and adult females (Polat et al. 2009). In this study, researchers determined the coexisting of menstrual pain and irregular menstrual cycle, and it was found that more than 17 percent school girls had been suffering from both menstrual problems.

Effect of Risk Factors on Menstrual Disturbances

Menstruation though a normal physiological process but in many times it is associated with different socioeconomic, demographic, anthropometric and menstrual factors. This study also aimed to examine the effect of some selected factors on menstrual disturbance of adolescent girls.

Menstrual Pain

In this study, it was observed school girls who reached menarche at an early age (age ≤ 11 years), were more likely to have menstrual pain. Our results coincided with the studies in Bangladeshi University female students (Hossain et al. 2010), Japanese college female students (Yamamoto et al. 2019), Nigerian university students (Loto et al. 2008) and high-school students in Kuwait (Al-Matouq et al. 2019). According to French (2005), early onset of menarche was an important factor for menstrual pain because early menarche reflects longer exposure to uterine prostaglandins

that plays a major role in dysmenorrhea through increasing uterine contractility resulting in pain. This study also found that girls having heavy menstrual bleeding were more likely to get painful menstruation than their counterparts. A cross-sectional study on 2,640 Chinese female students also found that menstrual pain was associated with greater amount of menstrual bleeding (Zhou et al. 2010). However, they also found that girls having heavy menstrual bleeding were more likely to get painful menstruation. There are several risk factors for painful menstruation such as high menstrual bleeding, reaching puberty before age 11 years and so on (Omidvar et al. 2018). This study also reported that urban girls had more chance for menstrual pain than rural girls. Similar reports were also observed in India (Avasarala et al. 2008).

Irregular Menstrual Cycle

Irregular menstrual cycles were another serious kind of menstrual disturbances for adolescent girls. In this study, girl's menarcheal age ≤ 11 years were more risky for irregular menstruation than girl's aged > 11 years. In 2013, Wronka et al. (2013) agreed with the present result. They found significant differences in the pattern of menstrual cycles with relation to age at menarche. They also found early maturing girls irregular cycles were more frequent than among those who reached puberty at late. Menstruate girls with heavy high bleeding had higher risk of irregular menstruation than low and medium bleeding menstruate girls was also found in this study. This result was supported by the statement of Santos-Longhurst (2020). He stated that irregular menstrual cycle happened due to more or less bleeding during menstrual period. In this study, it was also found that menstrual cycle significantly differed due to father's education level and highly educated (higher secondary to post-graduate) father's daughters' had high risk for irregular menstruation than their counterparts. Recently, a study from Central Poland also found that menstrual cycle was significantly associated with father's education level (Nieczuja-Dwojack et al. 2019). It was observed that girls who were living in lower income families (≤ 10000 BDT) had higher chance to get irregular cycle than girls living in higher income families (> 200001 BDT). This result was also in line with

another study which was based on adult Korean women (Kwak et al. 2019).

Coexisting of Menstrual Pain and Irregular Menstrual Cycle

A large number of school girls (17.5%) in Rajshahi district were suffering from both menstrual problems were found in this study. It was already found that age at menarche and menstrual bleeding were the common risk factors of menstrual pain and irregular menstrual cycle. Definitely these two factors were the influential factors for getting both menstrual problems. There was no scope to compare these results with other studies due to there being no other such type of study.

There is discrimination between urban and rural adolescent girls daily food intake. Urban adolescent girls usually consumed high fat and rich food but fruit and vegetable intake was quite inadequate in their daily meal. While protein intake was inadequate and fat intake is low in rural girls due to lack of proper knowledge and poverty (low income family). Usually, higher income and highly educated (higher secondary to post-graduate) family live in urban area and their adolescent's daughter were more aware about menstrual disturbance than rural adolescent girl. Therefore, these factors significantly influence the menstrual disturbance among adolescent girls in Rajshahi district, Bangladesh.

Strength and Limitations of the Study

Perhaps this was the first time we attempted to study the menstrual disturbance among adolescent school girls in Rajshahi district, Bangladesh. Also, the first time we determined the prevalence and associated factors of coexisting of menstrual pain and irregular menstrual cycle. However, there were several limitations of this study. The study was conducted in the selected region; therefore, generalizing must be done with care. The findings may not be representative of the menstrual characteristics in whole Bangladesh. Other important factors that may be directly related to menstrual problems (menstrual pain and irregular menstrual cycles) such as family history of menstrual pain, lifestyles, history of smoking, dietary habits, psychosocial stress and dieting were not considered.

CONCLUSION

A total of 628 girls were selected using multistage random sampling with a proportional allocation technique during the period March to July 2017 from school going girls in Rajshahi district, Bangladesh. Logistic regression was used to detect the effect of socio-demographic of anthropometric and menstrual characteristics on menstrual disturbances (menstrual pain and menstrual cycles). These statistical tools demonstrated that both menarcheal age and very high menstrual bleeding were more important factors for menstrual disturbances (menstrual pain and menstrual cycle) among adolescent girls. Appropriate health education is needed for adolescent girls during primary and secondary school level to prevent unnecessary suffering and interruption of daily activities and other problems in later life.

RECOMMENDATIONS

Throughout this study, some recommendations can be made for preventing adolescent menstrual problems. It is essential for health professionals to have an understanding of the menstrual disturbances of adolescent girls, the ability to differentiate between normal and abnormal menstruation, and the skill to know how to evaluate the adolescent girl patient. This study identified some factors which was responsible for adolescent girls' menstrual problems. Therefore, health authorities should consider these factors to reduce adolescent girls' menstrual disturbances. Moreover, health professionals and teachers should arrange some awareness program through school health programs and to implement the awareness programs for adolescents, health teachers should be trained.

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