Original Article

Dysmenorrhoea and Its Association with Menstrual Pattern and Body Mass Index (BMI) of Adolescent Girls in Rural Bangladesh

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ABSTRACT

A cross-sectional, descriptive study was conducted in the selected rural areas of Nawabganj upazila under Dhaka district, Bangladesh, between January and December of 2017, to see the association of dysmenorrhoea with menstrual pattern and body mass index (BMI) of adolescent girls. Adolescents who were unmarried, attained menarche at least 2 years before study period and willing to participate were included in the study. However, adolescents who were suffering from diseases like ovarian cyst, endometriosis, pelvic inflammatory disease, and/or taking hormonal pills were excluded from the study. Based on inclusion and exclusion criteria, a total of 312 girls (between 13 and 19 years) were finally selected for the study. Data collection was done using a semi-structured questionnaire, which included participants age, height, weight, menstrual history, clinical features of dysmenorrhoea and medication history. Data was collected through face-to-face interview. Dysmenorrhoea was assessed using the 'verbal multidimensional scoring system'. Body Mass Index (BMI) was determined as weight divided by height squared (kg/m^2). The mean age of the participants was 15.7±1.23 years. 70.5% of the total participants reported some forms of dysmenorrhoea: 25.3% experienced mild dysmenorrhoea, while 23.1% had moderate and 22.1% had severe dysmenorrhoea. Regarding menstrual patterns, no association was observed with dysmenorrhoea (p>0.05); however, the relationship of positive family history and prevalence of dysmenorrhoea was statistically significant (p<0.05). No association was observed between body mass index (BMI) and dysmenorrhoea among female adolescents (p>0.05).

Keywords: Dysmenorrhoea, menstrual pattern, body mass index, adolescent girls, Bangladesh

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INTRODUCTION

Adolescent has been defined by the World Health Organization (WHO) as the period between 10 and 19 years of age, i.e., population in their second decade of life.[1] The world's adolescent population in about 1200 millions, which is about 19% of the total global population.[1] Particularly for female adolescents, it is a critical time of identity formation and a period of transition from childhood to womanhood and of great challenge to them as well as their parents.[1,2] The physical, psychological, mental and social changes of adolescent girls are critical to their wellbeing and need to be addressed in the perspective of a life course by all stakeholders in the health system.[3]

Dysmenorrhoea (painful menstruation) is one of the most common complaints among female adolescents that adversely affects their daily activities and quality of life.[4,5] Dysmenorrhoea occurs in two forms: primary and secondary. Primary dysmenorrhoea is cramping pain in the lower abdomen occurring at the onset of menstruation in the absence of any identifiable pelvic diseases, while secondary dysmenorrhoea refers to painful menstruation resulting from an identifiable pelvic pathology like fibroid, adenomyosis, pelvic inflammatory disease (PID), etc.[4,6,7]

Adolescents especially who live in rural areas are particularly susceptible to delays in accessing medical care due to no or limited access, lack of awareness and cultural differences in attitudes towards menstruation.[8] Moreover, a considerably high prevalence of dysmenorrhoea across the globe signifies that this condition is a public health concern that requires more attention.[5,8]

Several studies in different regions of the world examined relationship of demographic factors (e.g., age, weight, height etc.) and menstrual patterns of adolescents with dysmenorrhoea. However, there is a scarcity of literature regarding comparison of demography and menstrual pattern with prevalence of dysmenorrhoea among Bangladeshi adolescent girls. Hence, we proposed this study to compare the menstrual patterns and body mass index among rural adolescent girls with and without dysmenorrhoea in Bangladesh.

METHODS

This cross-sectional, descriptive study was conducted in the selected rural areas of Nawabganj upazila under Dhaka district, Bangladesh, between January and December of 2017. This study was approved by the Institutional Review Board (IRB) of National Institute of Preventive and Social Medicine (NIPSOM), Dhaka, Bangladesh. Written informed consent was obtained from the adolescents who are ≥18 years. However, for the participants who are minors (i.e., <18 years), we sought assent from the them and written informed consent from their parent(s) or legal guardian. Adolescents who were unmarried, attained menarche at least 2 years before study period and who were willing to participate were included in this study. However, Adolescents who were suffering from any diseases such as, ovarian cysts, endometriosis, pelvic inflammatory diseases,

and of those who were taking oral contraceptive pill for any hormonal problem were excluded from the study. Finally, a total of 312 adolescent girls were included in the study. Data collection was done using a semi-structured questionnaire, which included participants age, height, weight, menstrual history, clinical features and patterns of dysmenorrhoea and medication history. Data was collected through face-to-face interview.

The Verbal Multidimensional Scoring System (VMSS) was used to assess the severity of dysmenorrhoea by evaluating multiple dimensions, including pain intensity, impact on daily activities, systemic symptoms, and analgesic requirements. We used a 0-3 scale to categorize the severity of dysmenorrhoea (i.e., **Grade 0: N**o pain or impact on daily activities. No analgesics needed; **Grade 1:** Mild pain that does not usually inhibit daily activities and only occasionally requires analgesics; **Grade 2:** Moderate pain that affects daily activities, and analgesics are required but provide sufficient relief; and **Grade 3:** Severe pain that significantly restricts daily activities, with limited relief from analgesics and the presence of systemic symptoms).[9] Body Mass Index (BMI) was calculated by dividing weight by height squared (kg/m^2) and categorized by the WHO criteria: underweight (<18), normal (18.5 to 24.9), overweight (25 to 29.9) and obese (≥30).[10]

Data analysis was performed by using Statistical Package for the Social Sciences (SPSS) version 16.0 for Windows. Data was presented as frequency and percentage as well as mean±SD, as applicable, in tabulated form. Chi-square test and Students t-test were applied to see the association between variables. To assess the strength of associations, Odds Ratio (OR) and their corresponding 95% confidence interval (CI) were calculated. A p-value <0.05 was considered as statistically significant.

RESULTS

The mean age of the participants was 15.7±1.23 years (ranged between 13 and 19 years). Among 312 adolescent girls, 220(70.5%) reported some forms of dysmenorrhoea (menstrual pain), while 92(29.5%) never experienced menstrual pain. 79(25.3%) experienced mild dysmenorrhoea, while 72(23.1%) had moderate and 69(22.1%) had severe dysmenorrhoea (Table-I). Dysmenorrhoea was found more common among adolescents having irregular

menstrual cycle (73.5%) than those with regular cycles (70.1%) (p>0.05). Age of menarche was found slightly higher among adolescents with dysmenorrhoea (12.77±1.07 vs. 12.64±.99 years; p>0.05). Prevalence of dysmenorrhoea was lower among teens who had menstrual cycle between 21 and 35 days (68.3%) than those who had cycles less than 21 days (76.7%) or more than 35 days (76.4%) (p>0.05). Dysmenorrhoea was lower among them whose length of menstrual phase was 1-2 days (66.7%) than those having 3-7 days (70.0%) and 8-12 days (88.9%) (p>0.05). Similarly, dysmenorrhoea was lower among them who had normal menstrual flow (66.2%), followed by heavy menstrual flow (82.1%) and scanty menstrual flow (86.4%) (p<0.05). In contrast, dysmenorrhoea was more common among adolescents having pre-menstrual syndrome (PMS) (76.3%) than those did not have PMS (69.7%) (p>0.05). Nonetheless, dysmenorrhoea was found significantly

higher among them who had family history of dysmenorrhoea (84.5%) than those who had no such family history (67.5%) (p<0.05) (Table-II). According to the body mass index (BMI), dysmenorrhoea was more frequent among those who had normal weight (72.3%), followed by underweight (69.2%), obese (66.7%) and overweight (64.0%). No association was observed between BMI and dysmenorrhoea among female adolescents (p>0.05) (Table-III).

Table-I: Prevalence of dysmenorrhoea (n=312)

Characteristics	Frequency	Percentage
No dysmenorrhoea	92	29.5
Mild dysmenorrhoea	79	25.3
Moderate dysmenorrhoea	72	23.1
Severe dysmenorrhoea	69	22.1

Table-II: Correlation of menstrual pattern and dysmenorrhoea among adolescents (n=312)

Characteristics	Dysmenorrhea		No dysmenorrhea		Test statistics
	Frequency	Percentage	Frequency	Percentage	
Pattern of menstrual cycle					
Regular	195	70.1	83	29.9	χ^2=0.167, p=0.683
Irregular	25	73.5	9	26.5	
Age at menarche					
Menarche age	12.77±1.07		12.64±.99		t= –0.975,* p=0.330
Menstrual cycle length					
<21 days	23	76.7	7	23.3	χ^2= 1.995, p=0.369
21-35 days	155	68.3	72	31.7	
>35 days	42	76.4	13	23.6	
Menstrual phase length					
1-2 days	2	66.7	1	33.3	χ^2=1.498, p=0.498
3-7 days	210	70.0	90	30.0	
8-12 days	8	88.9	1	11.1	
Menstrual flow					
Scanty	19	86.4	3	13.6	χ^2=8.357, p=0.015
Normal	155	66.2	79	33.8	
Heavy	46	82.1	10	17.9	
Pre-menstrual syndrome (PMS)					
Yes	29	76.3	9	23.7	χ^2=0.701, p=0.403
No	191	69.7	83	30.3	
Family history of dysmenorrhoea					
Yes	49	84.5	9	15.5	χ^2= 6.687, p=0.010
No	171	67.3	83	32.7	OR=2.643
					CI=1.239–5.637

Chi-square test was applied to reach p-value; *=Student's t-test was done to reach p-value

Table-III: Correlation of body mass index (BMI) and dysmenorrhoea among adolescents (n=312)

Characteristics	Dysmenorrhoea		No dysmenorrhoea		Test statistics
	Frequency	Percentage	Frequency	Percentage	
Underweight	63	69.2	28	30.8	
Normal	133	72.3	51	27.7	χ^2=0.94, p=0.815
Overweight	16	64.0	9	36.0	
Obese	8	66.7	4	33.3	

Chi-square test was applied to reach p-value.

DISCUSSION

The mean age of the participants in the present study was 15.7±1.23 years, which is quite similar with the mean age of Chinese (15.67±1.54 years) and Iranian adolescents (15.94±1.17 years) as reported in two previous studies.[11,12] However, the reported mean age of Korean girls was 13.53±0.04 years, which was much lower than that of the present study.[13] In contrast, the reported mean age of Palestine refugee girls (16.8±1.1 years), Kuwaiti and Non-Kuwaiti school girls (17.4±0.7 years) and Omani school girls (17.50±0.98 years) were much higher than that of our findings.[14-16]

In the present study, 25.3% of the adolescents experienced mild dysmenorrhoea, while 23.1% had moderate and 22.1% had severe dysmenorrhoea. Wong studied on Chinese adolescents and 27.1% of them reported mild pain, while 60.8% had moderate and 12.1% had severe pain,[11] while Al-Kindi & Al-Bulushi studied on Omani school girls and 27%, 41% and 32% of them reported mild, moderate and severe dysmenorrhoea respectively.[15] However, Ghandour et al. found the prevalence of mild, moderate, and severe dysmenorrhoea were 17.2%, 37.9%, and 41.2%, respectively in Palestine refugee camps, which was diametrically opposite to our findings.[14]

Among menstrual patterns and characteristics, no association was observed with dysmenorrhoea in the present study except its prevalence was found significantly higher among them who had family history of dysmenorrhoea (p<0.05). Jeon et al. and Al-Kindi & Al-Bulushi reported similar findings aligning with ours; however, they found no association between family history and dysmenorrhoea (*p*>0.05).[13,16] Khodakarami et al. also reported the same except they found a statistically significant relationship between primary dysmenorrhoea and pre-menstrual syndrome (PMS) (p<0.001).[12] Al-Matouq et al. found

significant association of dysmenorrhoea with regularity of menstruation (*p<0.05*) and menstrual flow (*p<0.01*); however, they also observed no association between family history and dysmenorrhoea (*p*>0.05).[15] In another study done by Wong reported quite similar observations compared to ours; however, he did not include family history of dysmenorrhoea as variable.[11]

Regarding body mass index (BMI), dysmenorrhoea was more frequently observed among those who had normal weight (72.3%), followed by underweight (69.2%), obese (66.7%) and overweight (64.0%) in the present study (p>0.05). Similar results were reported by Wong, Khodakarami et al., Al-Matouq et al., and Al-Kindi & Al-Bulushi as their studies also found no association between BMI and dysmenorrhoea (p>0.05).[11,12,15,16] In contrast, Tangchai et al. found low BMI to be significantly associated with dysmenorrhoea (*p<0.05*).[17] Similarly, Chauhan et al. observed an increased prevalence of dysmenorrhoea in the lower BMI group (*p<0.01*).[18] Rafique & Al-Sheikh found higher prevalence of moderate and severe dysmenorrhoea in underweight group as compared to the obese subjects (*p<0.01* and *p<0.05* respectively).[19] In another study, Donayeva et al. found a strong correlation between dysmenorrhoea and BMI in both underweight and overweight adolescent groups (*p<0.000001*).[20]

About limitations of this study, it was conducted in the selected rural areas of Nawabganj upazila under Dhaka district with a small sample, which possibly limits the generalizability of the study findings in whole population. Moreover, we used a cross-sectional design, which hardly determines causal relationship. Last but not the least, during interview process, there was a possibility of recall bias while investigating on the menstrual patterns of the participants that may limit the accuracy of the findings of this study.

CONCLUSION

Our data suggests no association of menstrual patterns with dysmenorrhoea except for positive family history and prevalence of dysmenorrhoea. Similarly, no association was observed between body mass index and dysmenorrhoea among rural adolescent girls in Bangladesh. The findings of this study expand understanding of demographic and menstrual features of Bangladeshi adolescent girls with dysmenorrhoea. Healthcare professionals should come forward to utilize such knowledge pool to initiate screening in their practice for early identification of dysmenorrhoea among adolescents and timely intervention to reduce their sufferings and enhance quality of life.

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