

Effect of Dietary Patterns on Dysmenorrhoea among Rural Adolescents in Bangladesh

*Urmy NJ¹, Rahman MA², Alamgir SN³, Ruma KS⁴, Tarannum F⁵, Sultana N⁶

Abstract

A cross-sectional, descriptive study was conducted among 312 adolescents girls (between 13 and 19 years) in the selected rural areas of Nawabganj upazila under Dhaka district, Bangladesh, between January and December of 2017, to determine the effect of dietary patterns on dysmenorrhoea among rural adolescent girls in Bangladesh. Adolescents who were unmarried, having history of menarche at least 2 years back and willing to participate in the study were included. However, adolescents having diseases like ovarian cyst, endometriosis, pelvic inflammatory disease and/or taking oral contraceptive pills for any hormonal issues, were excluded. Data collection was done by using a semi-structured questionnaire, which included participants age, height, weight, menstrual history, clinical features and patterns of dysmenorrhoea and dietary patterns which included dietary habits and frequency of meals. Data was collected through face-to-face interview. Dysmenorrhoea was assessed using the Verbal Multidimensional Scoring System (VMSS). The mean age of the participants was 15.7±1.23 years. Among 312 adolescent girls, 220(70.5%) reported some forms of dysmenorrhoea (menstrual pain), while 92(29.5%) never experienced menstrual pain. Regarding clinical category, 25.3% experienced mild dysmenorrhoea, while 23.1% had moderate and 22.1% had severe dysmenorrhoea. Prevalence of dysmenorrhoea was observed more among those who took breakfast and tiffin (snacks) ≥4 times/week. However, those differences were not statistically significant ($p>0.05$). Moreover, no association was observed between types of food intake (carbohydrate, protein, fruits, leafy vegetables, fast food and soft drink) and prevalence of dysmenorrhoea ($p>0.05$).

CBMJ 2026 July: Vol. 15 No. 02 P:35-43

Keywords: Adolescent girls, Bangladesh, dietary pattern, dysmenorrhoea, rural area

Introduction

Menstrual disorders are very common globally, reflecting an under-recognized public health problem. Dysmenorrhoea (painful menstruation) affects 16-93% of adolescent girls across the globe.¹ Evidence

showed that it often leads to decreased quality of life, absenteeism (habitual or intentional pattern of absence from school or work), and increased risk of anxiety and depression among adolescent girls.¹⁻⁵

1. *Dr. Nushrat Jahan Urmy, Research Associate, BRAC James P Grant School of Public Health, Dhaka-1212.
2. Prof. Md. Anisur Rahman, Ex-Professor and Head, Department of Epidemiology, National Institute of Preventive and Social Medicine (NIPSOM), Dhaka-1212.
3. Dr. Sadia Nusrat Alamgir, Assistant Professor, Department of Gynaecological Oncology, National Institute of Cancer Research and Hospital (NICRH), Dhaka-1212.
4. Dr. Kazi Sadeka Ruma, Assistant Professor, Department of Obstetrics & Gynaecology, Shaheed Suhrawardy Medical College & Hospital, Dhaka-1207.

5. Dr. Farhana Tarannum, Assistant Professor, Department of Obstetrics & Gynaecology, 250 Bedded General Hospital, Chattogram-4000.
6. Dr. Naznin Sultana, Registrar, Department of Obstetrics & Gynaecology, Institute of Child and Mother Health (ICMH), Matuail, Dhaka-1362.

Address of Correspondence:

Email: jahanislam2021@gmail.com

Concerning dietary factors, several previous studies analyzed the possible influence of dietary patterns, e.g., consumption of certain foods, frequency of meals, eating healthy and balanced diet with prevalence of dysmenorrhoea,⁶⁻¹⁰ however, the evidence on this subject remains very limited in our country to date and further research is warranted especially focusing on adolescents. Another important factor is that in low- and middle-income countries (LMICs) like Bangladesh, lack of resources affects adolescent girls' health badly, especially rural adolescent girls face more challenges because of lack of knowledge, less awareness of eating healthy and balanced diet, poor economics and lack of institutional support.¹¹ Hence, in rural adolescents, dysmenorrhoea is often underreported and undertreated despite its high prevalence; it significantly impacts adolescents' quality of life.^{11,12}

Improving lifestyle and nutrition through modification of dietary habits and meal patterns can help rural adolescent girls to improve general health as well as their menstrual health. Thus, adolescents may avail an opportunity to accept healthy lifestyle trends, which help them reduce their sufferings of dysmenorrhoea. This also may replace medicinal methods that poses various side effects and bring them into more appreciated lifestyle. Under the circumstances, we conducted this study to assess the relationship between dietary patterns and dysmenorrhoea in order to facilitate improving lifestyle for management of dysmenorrhoea among adolescent girls living in the rural areas of Bangladesh.

Methods

This cross-sectional, descriptive study was conducted among 312 female adolescents aged between 13 and

19 years in the selected rural areas of Nawabganj upazila under Dhaka district, Bangladesh, between January and December of 2017. 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.

Data collection was done by using a semi-structured questionnaire, which included participants age, height, weight, menstrual history, clinical features and patterns of dysmenorrhoea, medication history, and dietary patterns including dietary habits and frequency of meals. 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 (Grade 0: No 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).¹²

Statistical analysis was performed by using Statistical Package for the Social Sciences (SPSS) version 16.0 for windows. Descriptive analysis (as frequency and

percentage) were computed and presented in tables. Chi-square test was carried out to examine the factors influencing the level of dysmenorrhoea. Statistical significance was defined as $p < 0.05$.

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 those who are minors (< 18 years), we sought assent from them as well as written informed consent from their parent(s) or legal guardian.

Results

Among 312 study participants, 29.5% reported that they never experienced menstrual pain, while 70.5% reported some forms of dysmenorrhoea (menstrual pain) based on the Verbal Multidimensional Scoring System (VMSS); 25.3% experienced mild dysmenorrhoea, while 23.1% had moderate and 22.1% had severe dysmenorrhoea (Table-I). Prevalence of dysmenorrhoea was observed more among those who took breakfast and tiffin (snacks) ≥ 4 times/week. However, those differences were not statistically significant ($p > 0.05$) (Table-II).

Table-I: Prevalence of dysmenorrhoea among study participants (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

Dysmenorrhoea was found higher among those who ate rice > 6 times/week, bread and flattened or

puffed rice < 1 time/week, cake/biscuit or ice-cream/chocolate ≤ 3 times/week. However, those differences were not statistically significant ($p > 0.05$) (Table-III). Dysmenorrhoea was found higher among those who took lentils, meat (beef/mutton) and poultry products (meat/egg) ≤ 3 times/week, fish > 1 time/week, and milk and milk products < 1 time/week. However, those differences were not statistically significant ($p > 0.05$) (Table-IV). Dysmenorrhoea was found higher among those who took fruits, fast food and soft drink ≤ 3 times/week and leafy vegetables > 1 time/week and > 6 times/week. However, those differences were not statistically significant ($p > 0.05$) (Table-V).

Table-II: Habit of taking breakfast and tiffin (snacks) and dysmenorrhoea (n=312)

Variables	Dysmenorrhoea		No dysmenorrhoea		Test statistics
	Frequency	Percentage	Frequency	Percentage	
Having breakfast					
0-3 times/ week	31	79.5	8	20.5	$\chi^2=1.726$ p=0.189
4-7 times/ week	189	69.2	84	30.8	
Having tiffin (snacks)					
0-3 times/ week	42	62.7	25	37.3	$\chi^2=2.513$ p=0.113
4-6 times/week	178	72.7	67	27.3	

Chi-square test was applied to reach p-value; NS=not significant.

Table-III: Carbohydrate intake and dysmenorrhoea (n=312)

Variables	Dysmenorrhoea		No dysmenorrhoea		Test
	Frequency	Percentage	Frequency	Percentage	statistics
Rice					
4-6 times/week	-	-	1	100.0	$\chi^2=0.203$ p=0.652
>6 times/week	220	70.7	91	29.3	
Bread					
<1 time/week	41	73.2	15	26.8	$\chi^2=0.267$ p=0.966
1-3 times/week	60	70.6	25	29.4	
4-6 times/week	16	69.6	7	30.4	
>6 times/week	103	69.6	45	30.4	
Flattened or puffed rice					
<1 time/week	136	70.8	56	29.2	$\chi^2=0.128$ p=0.988
1-3 times/week	58	70.7	24	29.3	
4-6 times/week	10	66.7	5	33.3	
>6 times/week	16	69.6	7	30.4	
Cake/biscuit					
<1 time/week	44	71.0	18	29.0	$\chi^2=3.663$ p=0.300
1-3 times/week	98	74.8	33	25.2	
4-6 times/week	34	70.8	14	29.2	
>6 times/week	44	62.0	27	38.0	
Ice-cream/chocolate					
<1 time/week	64	71.9	25	28.1	$\chi^2=5.029$ p=0.170
1-3 times/week	100	73.5	36	26.5	
4-6 times/week	30	57.7	22	42.3	
>6 times/week	26	74.3	9	25.7	

Chi-square test was applied to reach p-value; NS=not significant.

Table-IV: Protein intake and dysmenorrhoea (n=312)

Variables	Dysmenorrhoea		No dysmenorrhoea		Test statistics
	Frequency	Percentage	Frequency	Percentage	
Lentils					
<1 time/week	24	75.0	8	25.0	$\chi^2=0.128$ p=0.224
1-3 times/week	161	72.5	61	27.5	
4-6 times/week	19	65.5	10	34.5	
>6 times/week	16	55.2	13	44.8	
Fish					
<1 time/week	18	75.0	6	25.0	$\chi^2=3.269$ p=0.352
1-3 times/week	66	72.5	25	27.5	
4-6 times/week	59	63.4	34	36.6	
>6 times/week	77	74.0	27	26.0	
Meat (beef/mutton)					
<1 time/week	23	65.7	12	34.3	$\chi^2=2.395$ p=0.495
1-3 times/week	164	71.9	64	28.1	
4-6 times/week	26	72.2	10	27.8	
>6 times/week	7	53.8	6	46.2	
Poultry products (meat/egg)					
<1 time/week	61	69.3	27	30.7	$\chi^2=0.296$ p=0.961
1-3 times/week	103	72.0	40	28.0	
4-6 times/week	22	68.8	10	31.2	
>6 times/week	34	69.4	15	30.6	
Milk					
<1 time/week	103	73.0	38	27.0	$\chi^2=1.570$ p=0.666
1-3 times/week	45	67.2	22	32.8	
4-6 times/week	11	61.1	7	38.9	
>6 times/week	61	70.9	25	29.1	
Milk products					
<1 time/week	185	69.0	83	31.0	$\chi^2=4.261$ p=0.212
1-3 times/week	25	78.1	7	21.9	
4-6 times/week	7	100.0	-	-	
>6 times/week	3	60.0	2	40.0	

Chi-square test was applied to reach p-value; NS=not significant.

Table-V: Fruits, vegetables, fast food and soft drink intake and dysmenorrhoea (n=312)

Variables	Dysmenorrhoea		No dysmenorrhoea		Test statistics
	Frequency	Percentage	Frequency	Percentage	
Fruits					
<1 time/week	71	77.2	21	22.8	$\chi^2=3.414$ p=0.332
1-3 times/week	82	65.6	43	34.4	
4-6 times/week	36	70.6	15	29.4	
>6 times/week	31	70.5	13	29.5	
Leafy vegetables					
<1 time/week	64	73.6	23	26.4	$\chi^2=0.989$ p=0.804
1-3 times/week	48	71.6	19	28.4	
4-6 times/week	25	71.4	10	28.6	
>6 times/week	83	67.5	40	32.5	
Fast food					
<1 time/week	99	73.3	36	26.7	$\chi^2=1.927$ p=0.588
1-3 times/week	80	70.8	33	29.7	
4-6 times/week	25	62.5	15	37.5	
>6 times/week	16	66.7	8	33.3	
Soft drink					
<1 time/week	100	68.0	47	32.0	$\chi^2=4.044$ p=0.257
1-3 times/week	94	74.6	32	25.4	
4-6 times/week	20	74.1	7	25.9	
>6 times/week	6	50.0	6	50.0	

Chi-square test was applied to reach p-value; NS=not significant.

Discussion

To our knowledge this is the first ever study done in our country that targeted rural adolescent girls to determine the prevalence of dysmenorrhoea and its relationship with their lifestyle factors such as dietary patterns.

In our study, 70.5% of the adolescents reported dysmenorrhoea. Similar findings were reported from Turkey (68.1-72.2%)² and Saudi Arabia (74.4%).⁴ However, higher prevalence was reported from India (76.66%)⁶ and Australia (76%),³ while lower

prevalence was reported from India (64.53%)⁵ and Georgia (52.07%).¹³ We observed that prevalence of dysmenorrhoea was more among those adolescents who took breakfast and tiffin (snacks) ≥ 4 times/week. However, those differences were not statistically significant ($p>0.05$), which there was no association between skipping of breakfast and dysmenorrhoea. However, Shinde & Laddad⁶ (studied on Indian adolescents), Kazama, Maruyama & Nakamura⁷ (studied on Japanese adolescents), and Jeong *et al.*⁸ (studied on Korean adolescents) showed that eating habit is associated with prevalence of

dysmenorrhoea, particularly focusing on the effect of irregular eating habits, e.g., skipping breakfast. Though the mechanism of irregular eating/skipping breakfast on intensity of dysmenorrhoea was unclear, current trends to skip breakfast and thus, low intake of certain foods and nutrients may attribute decreased anti-inflammatory effects, and thereby enhance pain phenomena in young girls that ultimately precipitate dysmenorrhoea.^{7,9}

In the present study, no association was observed between types of food intake (carbohydrate, protein, fruits, leafy vegetables, fast food and soft drink) and prevalence of dysmenorrhoea ($p>0.05$). However, Balbi *et al.*¹⁰ reported that, for dietary habits, a higher consumption of fish, eggs and fruits is correlated with a lower frequency of dysmenorrhoea in adolescents. Similarly, Tavallae *et al.*¹⁴ found that women who had high fruit and vegetable intake experienced less pain during their menstruation, and Nagata *et al.*¹⁵ observed that Intake of dietary fibre was significantly inversely correlated with the menstrual pain in women.

In contrast to our findings, Abdul-Razzak *et al.*¹⁶ reported lower intensity of dysmenorrhoea among those who consumed three or four servings of dairy products per day as compared to those who consumed no dairy products. Moreover, several previous studies reported association between fast food/junk food consumption and higher incidence of dysmenorrhoea,^{17,18} which is not in congruence with our study findings. Similar to our report, Monday *et al.*¹⁹ found no association between dysmenorrhoea and soft/cafeinated beverages. However, Hailemeskel *et al.*²⁰ found a potential link between sugary carbonated beverages (soft drinks) and dysmenorrhoea. Dietary factors are important in dysmenorrhoea based on the evidence that foods that are low in fat or high in fiber reduce plasma

oestrogen levels and its activity. Reduced oestrogen levels presumably reduce endometrial thickening. In turn, reduced endometrial thickening may reduce the production of prostaglandins (e.g., PGE2) that cause the uterine muscle contraction and ischaemia. Diet can also play a role by helping to suppress the inflammation that contributes to pain perception in women having dysmenorrhoea.^{21,22}

Our study has several limitations. We used a cross-sectional design, which hardly determines causal relationship. Moreover, quantifying and assessment tool used may impose adolescents' self-reporting with recall bias, which could limit the authenticity of the findings of this study. A small sample from a specific region may not be able to present the true picture of the whole country. Therefore, further studies with larger samples selected from different regions of the country are warranted.

Conclusion

Our data suggests that a large number of participants in this study reported to have dysmenorrhoea. However, no association was observed between frequency of meal and dysmenorrhoea. Moreover, no association was observed between types of food intake (carbohydrate, protein, fruits, leafy vegetables, fast food and soft drink) and prevalence of dysmenorrhoea. To develop a clear understanding of dysmenorrhoea as a globally significant health issue which may manifest in diverse ways throughout the lives of adolescent girls remains relevant in practice and research on women's health. We also advocate that youth awareness campaigns on importance of balanced diet and physical activity should be strengthened as part of behavioural change communication (BCC) programmes in our country.

References

1. De Sanctis V, Soliman A, Bernasconi S, Bianchin L, Bona G, Bozzola M, et al. Primary dysmenorrhea in adolescents: prevalence, impact and recent knowledge. *Pediatr Endocrinol Rev.* 2015;13(2):512-20.
2. 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(5):267-72.
3. Wong LP. Attitudes towards dysmenorrhoea, impact and treatment seeking among adolescent girls: a rural school-based survey. *Aust J Rural Health.* 2011;19(4):218-23.
4. Abd El-Mawgod MM, Alshaibany AS, Al-Anazi AM. Epidemiology of dysmenorrhea among secondary-school students in northern Saudi Arabia. *J Egypt Public Health Assoc.* 2016;91(3):115-9.
5. Verma K, Baniya GC. Prevalence of depression, anxiety and quality of life in adolescent girls with dysmenorrhoea in a remote area of western Rajasthan. *J Obstet Gynaecol India.* 2022;72(Suppl 1):281-9.
6. Shinde GR, Laddad M. Overview of adolescent menstrual problems and its relation to BMI, eating habits and physical activity. *J Evol Med Dental Sci.* 2016;5(91):6757-61.
7. Kazama M, Maruyama K, Nakamura K. Prevalence of dysmenorrhea and its correlating lifestyle factors in Japanese female junior high school students. *Tohoku J Exp Med.* 2015;236(2):107-13.
8. Jeon GE, Cha NH, Sok SR. Factors influencing the dysmenorrhea among Korean adolescents in middle school. *J Phys Ther Sci.* 2014;26(9):1337-43.
9. Fujiwara T. Diet during adolescence is a trigger for subsequent development of dysmenorrhea in young women. *Int J Food Sci Nutr.* 2007;58(6):437-44.
10. Balbi C, Musone R, Menditto A, Di Prisco L, Cassese E, D'Ajello M, et al. Influence of menstrual factors and dietary habits on menstrual pain in adolescence age. *Eur J Obstet Gynecol Reprod Biol.* 2000;91(2):143-8.
11. Head A, Huggett C, Chea P, Yamakoshi B, Suttor H, Hennegan J. Systematic review of the effectiveness of menstrual health interventions in low- and middle-income countries in the East Asia and Pacific region. *Lancet Reg Health Southeast Asia.* 2023;20:100295.
12. Andersch B, Milsom I. An epidemiologic study of young women with dysmenorrhea. *Am J Obstet Gynecol.* 1982;144(6):655-60.
13. Gagua T, Tkeshelashvili B, Gagua D. Primary dysmenorrhea: prevalence in adolescent population of Tbilisi, Georgia and risk factors. *J Turk Ger Gynecol Assoc.* 2012;13(3):162-8.
14. Tavallae M, Joffres MR, Corber SJ, Bayanzadeh M, Rad MM. The prevalence of menstrual pain and associated risk factors among Iranian women. *J Obstet Gynaecol Res.* 2011;37(5):442-51.
15. Nagata C, Hirokawa K, Shimizu N, Shimizu H. Associations of menstrual pain with intakes of soy, fat and dietary fiber in Japanese women. *Eur J Clin Nutr.* 2005;59(1):88-92.
16. Abdul-Razzak KK, Ayoub NM, Abu-Taleb AA, Obeidat BA. Influence of dietary intake of dairy products on dysmenorrhea. *J Obstet Gynaecol Res.* 2010;36(2):377-83.
17. Latif S, Naz S, Ashraf S, Jafri SA. Junk food consumption in relation to menstrual abnormalities among adolescent girls: a comparative cross sectional study. *Pak J Med Sci.* 2022;38(8):2307-12.
18. Vani KR, Veena KS, Subitha L, Kumar VRH, Bupathy A. Menstrual abnormalities in school going girls – are they related to dietary and exercise pattern? *J Clin Diagn Res.* 2013;7(11):2537-40.

19. Monday I, Anthony P, Olunu E, Otohinoyi D, Abiodun S, Owolabi A, et al. *Prevalence and correlation between diet and dysmenorrhea among high School and college ctudents in Saint Vincent and Grenadines. Open Access Maced J Med Sci.* 2019;7(6):920-4.
20. Hailemeskel S, Demissie A, Assefa N. *Primary dysmenorrhea magnitude, associated risk factors, and its effect on academic performance: evidence from female university students in Ethiopia. Int J Womens Health.* 2016;8:489-96.
21. Rock CL, Flatt SW, Thomson CA, Stefanick ML, Newman VA, Jones LA, et al. *Effects of a high-fiber, low-fat diet intervention on serum concentrations of reproductive steroid hormones in women with a history of breast cancer. J Clin Oncol.* 2004;22(12):2379-87.
22. Barnard ND, Scialli AR, Hurlock D, Bertron P. *Diet and sex-hormone binding globulin, dysmenorrhea, and premenstrual symptoms. Obstet Gynecol.* 2000;95(2):245-50.