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Dietary and Exercise Behaviour of Secondary School Girls in Rural and Urban Settings

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ABSTRACT

Background & objective: The increasing prevalence of unhealthy eating habits and sedentary lifestyles among adolescents, which often continues into adulthood, is a global public health problem. Many studies have so far addressed the nutritional status, dietary and exercise behaviour of the urban adolescents. But there are few studies which compared the nutritional status, dietary and exercise behaviour of the rural adolescent girls with those of urban adolescent girls. The present study was aimed to make a comparative evaluation of food and exercise behaviour of secondary school girls between rural and urban settings.

Methods: This cross-sectional analytical study was conducted in the Department of Community Medicine, Rajshahi Medical College, Rajshahi over a period of 12 months from January 2019 to December 2019. The data for the study were collected from 314 adolescent girls (from class 6 to class 10) from two secondary girls' school of Kushtia, namely Panti Girls High School, a rural school and Kushtia Govt. Girls High School an urban school. Of the 314 girls (respondents), 140 were rural and 174 were urban residents. Students 1) having known chronic diseases like valvular heart diseases or any other systemic diseases that may affect their nutritional status, 2) absent on the day of interview and 3) who refused to participate in the study were excluded. Data were collected from the respondents using a semi-structured questionnaire containing the variables of interest.

Result: The age of the respondents of secondary school girls ranged from 11 to 17 years with mean age being nearly 14 years in both rural and urban cohorts. Urban adolescent girls were heavier than their rural counterparts (22 and 20.9 kg/m^2 respectively). The predominant indoor and outdoor exercises adopted by rural and urban girls were jumping rope and walking respectively. While urban adolescent girls used to skip rope more commonly, rural girls prefer riding a bicycle and running as outdoor exercises more often than the urban girls. One-third (32.1%) of the rural girls and 17% of the urban girls met the WHO criteria of physical activity/exercise. Rural girls frequently watch TV, while urban girls prefer playing games or surfing social media on mobile or computer as a pastime. Besides, the urban girls were more often fond of listening music, reading a book and gardening compared to their rural counterparts with majority of the urban girls spent > 1 hour each day on mobile/TV/computer. About 90% of the urban girls used to having breakfast more or less regularly as compared to 77% of the rural girls. Practice of taking major meals > 2 times a day was significantly higher in the rural group than that in the urban group. However, taking light meals or snacks ≥ 2 times a day was much higher among urban respondents. Consuming milk, eggs and meat in most of the days in a week were frequently practised by the urban girls than that by the rural girls. Although intake of vegetables was almost identical between the groups, consumption of fruits was much higher in the urban girls than that in the rural girls. There was significant association between dietary habit and residence with more than 55% of the rural adolescent girls having unhealthy dietary behaviour as opposed to 41% of urban girls. The odds of having unhealthy dietary behaviour were nearly 2-fold (95% CI = 1.2-2.9) higher in rural girls than that in urban girls.

Conclusion: The study concluded that urban adolescent girls are usually heavier than the rural girls. About one in three rural girls and one in six urban girls meet the WHO criteria of physical activity/exercise suggesting that rural girls are more inclined to have good exercise behaviour than do their urban counterparts. A significant association between dietary habit and residence is observed with risk of having unhealthy dietary behaviour in rural girls is nearly double than that of urban girls.

Key words: Dietary behaviour, exercise behaviour, adolescent school girls, rural, urban etc.

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INTRODUCTION:

Adolescence represents one of the critical transitions in life-span and is characterized by rapid physical growth and changes in body composition and physiology with profound biological, emotional, social & cognitive changes.[1] Healthy food-behaviour and practice of physical activity/exercise during adolescence are crucial to a healthy productive and reproductive life and for the prevention of non-communicable chronic diseases in adult life.[2] The increasing prevalence of unhealthy food behaviours and sedentary lifestyles among adolescents, which often continues into adulthood, is a global public health problem.[3,4] Increased intake of foods rich in fat and sugar and maintaining a sedentary lifestyle (being physically inactive) are major contributors to obesity in adolescents.[5-7] A decline in dietary quality, particularly a decrease in fruits, vegetables and milk consumption, and an increase in sugar-sweetened beverage consumption are commonly observed during transition from childhood to adolescence.[8,9] It has been observed that dietary behaviour of children & adolescents are shaped by both social and physical environment.[10] Moreover, socioeconomic and sociocultural factors such as parents' educational level, ethnicity, time constraints to take care of their children, meal-time and the sources of foods (e.g., schools, restaurants) are all somehow related to the eating behaviour of children and adolescents.[10]

The World Health Organization recommends that children and adolescents should have at least 60 minutes of moderate to vigorous intensity physical activity (any bodily movements including working, playing, doing household chores, travelling and engaging in recreational pursuits produced by skeletal muscles that require energy expenditure) daily.[11] Regular participation in physical activities (PA) has been shown to produce significant health benefits for adolescents such as obesity prevention, improved psychological well-being & cardiovascular fitness and bone health.[12,13] Besides, habit of physical activities adopted during adolescence is likely to be maintained in adulthood.[14] Studies on exercise behaviour of active young people in several countries revealed that only 20% of adolescents practice physical activity/ exercise regularly.[15] Several systematic reviews have reported that adolescents spend most of their time in sedentary activities.[16,17]

Healthy dietary behaviour (having 3 meals a day, intake of plenty of fruits and vegetables for a snack or light-meal, eating more chicken and fish, habit of drinking milk regularly) is rarely observed among adolescents these days. Physical activity (PA), another component of healthy-life style, is also seldom practiced by the adolescents. Insufficient physical activity and unhealthy food behaviour are the leading risk factors for non-communicable diseases. The promotion of healthy life-style (PA and healthy food behaviour) in this cohort has thus become a priority to prevent disease and reduce the prevalence of obesity. Exploring the magnitude of prevalence of unhealthy life-style among adolescents in rural and urban settings is, therefore, of utmost need to plan intervention to promote healthy life-style among adolescents. The purpose of this study was to evaluate food and exercise behaviour among secondary school girls in the rural and urban areas of Kushtia District of Bangladesh.

METHODS:

This cross-sectional analytical study was conducted in the Department of Community Medicine, Rajshahi Medical College, Rajshahi over a period of 12 months from January 2019 to December 2019. The data for the study were collected from the adolescent girls of two secondary girls' school of Kushtia, namely Panti Girls High School in Panti village of Kumarkhali upazilla and Kushtia Govt. Girls High School in urban area of Kushtia district. A total of 314 students (from class 6 to class 10) who voluntarily consented to participate in the study through their school authority (Headmaster) were consecutively included. Of the 314 students, 140 were rural and 174 were urban residents. Students 1) having known chronic diseases like valvular heart diseases or any other systemic diseases that may affect their nutritional status, 2) absent on the day of interview and 3) who refused to participate in the study were excluded. On obtaining ethical clearance from the Ethical Committee of Rajshahi Medical College, Rajshahi and

permission from the school authority (Headmaster), and verbal consent from the students, the data collection began. Before collecting data, all the study subjects were informed verbally about the study design, the purpose of the study and potential benefits derived from and risks involved in the study. The participants were assured that they will have full rights to withdraw themselves from the study at any time for any reasons what-so-ever.

Data were collected from the respondents by face-to-face interview, anthropometric examination (weight, height) using a semi-structured questionnaire containing the variables of interest. Data were processed and analysed using SPSS (statistical package for the social science Inc., Chicago, Illinois USA,) version 25.0. The test statistics used to analyse the data were Chi-square (χ^2) Test and Student's t-Test. While the data presented on categorical scale were expressed as frequency and corresponding percentage and were compared between groups using Chi-squared (χ^2) Test, the data presented on continuous scale were expressed as mean ± SD and were compared between groups using Student's t-Test. For all analytical tests, the level of significance was set at 5% and p-value <0.05 was considered significant.

RESULTS:

There was no significant difference between rural and urban respondents in terms of age and grade of the students (p =0.795 and p=0.905). While farming was the main occupation of the rural respondents, service was the prime occupation of the urban respondents (p<0.001). Although mothers of both groups were predominantly housewife, they were relatively common in rural group (p=0.032). Monthly family income of urban respondents was significantly higher than that of rural respondents with > 45% of the urban respondents' monthly family income being Taka > 30000 as compared to 12% of rural respondents (p < 0.001). Number of children in the family was almost identical between the study groups with majority having 2-3 children (table I). Prevalence of overweight & obesity was considerably higher among urban children than that among rural children with mean BMI of urban and rural children being 22.0 ± 4.5 and 20.9 ± 4.5 kg/m^2 respectively (p=0.030) (Table II). Among a variety of indoor exercises, urban adolescent girls used to practice skipping rope more frequently than their rural counterparts (p<0.001). Rural girls prefer riding a bicycle and running as outdoor exercises more often than the urban girls (p<0.001 & p<0.001 respectively). While watching TV as a pastime was more frequently reported by rural girls (p<0.001), playing games or surfing social media on mobile was more commonly reported by urban girls (p=0.003). Urban girls were significantly fonder of listening music, reading a book and gardening compared to their rural counterparts (p<0.001, p<0.001 & p=0.010). More than 80% of the urban respondents spent >1 hour each day on mobile/TV/computer (table III).

Table I. Distribution of the respondents by their demographics characteristic

Demographics of the respondents*	Group		p-value
	Rural (n = 140)	Urban (n = 174)	
Age (years)			
11-12	27(19.3)	37(20.8)	
13-14	59(42.1)	67(37.6)	0.717
15-17	54(38.6)	70(41.6)	
Grade of students			
Class 6-7	54(38.6)	65(37.4)	
Class 8-10	86(61.4)	109(62.6)	0.825
Father's occupation			
Service	24(17.1)	90(51.7)	
Business	38(27.1)	62(35.6)	< 0.001
Farming	69(49.3)	3(1.7)	
Day labourer	9(6.4)	19(10.9)	
Mother's occupation			
Service	12(8.6)	33(19.0)	
Business/farming	7(5.0)	7(4.0)	0.032
Housewife	121(86.4)	134(77.0)	
Family Type			
Nuclear	113(80.7)	145(83.3)	
Joint	27(19.3)	29(16.7)	0.547
Monthly family income (Taka)			
≤15000	68(48.6)	21(12.1)	
15001 – 30000	55(39.3)	74(42.5)	< 0.001
> 30000	17(12.1)	79(45.4)	
Number of children in family			
1	13(9.3)	17(9.8)	
2 – 3	103(73.6)	135(77.6)	0.534
≥ 4	24(17.1)	22(12.6)	

Mean age of rural respondents: 13.8 ± 1.4 yrs.; **mean age of urban respondents:** 13.9 ± 1.4 yrs. Figures in the parentheses indicate corresponding **%; *Chi-squared Test** (χ^2) was done to analyze the data;

Table II. Respondents' distribution between the study groups by their nutritional status

BMI for age and sex (kg/m²)	Group		p-value
	Rural (n = 140)	Urban (n = 174)	
Mean BMI (kg/m2)	20.9 ± 4.5	22.0 ± 4.5	0.030#
Underweight	8(5.7)	7(4.0)	
Normal nutritional status	98(70.0)	105(60.3)	0.162*
Overweight	20(14.3)	40(23.0)	
Obese	14(10.0)	22(12.7)	

Figures in the parentheses indicate corresponding %; ***Chi-squared Test** (χ^2) was done to analyze the data; #Data were analyzed using **Unpaired t-Test** and were presented as **mean ± SD.**

Table III. Distribution of the respondents by their exercise behavior

Exercise/activities	Group		p-value
	Rural (n = 140)	Urban (n = 174)	
Indoor exercises			
Skipping rope	14(10.0)	48(27.6)	< 0.001
Dancing	42(30.0)	64(36.8)	0.207
Floor wash	38(56.7)	46(50.5)	0.443
Indoor cycling	11(7.9)	8(4.6)	0.229
Indoor yoga	9(6.4)	9(5.2)	0.634
Outdoor exercise			
Walking	11(7.9)	23(13.2)	0.129
Riding a bicycle	90(50.0)	46(26.4)	< 0.001
Running	54(38.6)	11(6.3)	< 0.001
Cricket/ Football	14(10.0)	17(9.8)	0.946
Leisure time activity			
Watch TV	41(29.3)	9(5.2)	< 0.001
Play games or surfing social media	113(80.7)	160(92.0)	0.003
Listening music	24(17.1)	83(47.7)	< 0.001
Reading book	45(32.1)	76(43.7)	< 0.001
Gardening	19(13.6)	44(25.3)	0.010
Hours spent on TV/computer/mobile each day			
≤1 hour	93(66.4)	34(19.5)	<0.001
>1 hour	47(33.6)	140(80.5)	

Figures in the parentheses denote corresponding %; ***Chi-square Test** (χ^2) was done to analyse the data.

Table IV. Association between dietary behaviour of the respondents and their residence

Dietary behaviour	Group		p-value
	Rural (n = 140)	Urban (n = 174)	
Take breakfast			
Always or often	108(77.1)	155(89.1)	0.016
Sometimes	28(20.0)	16(9.2)	
Never	4(2.9)	3(1.7)	
Major meal			
Once	61(43.6)	80(46.0)	
2 times	39(27.9)	68(39.1)	0.007
> 2 times	40(28.5)	26(14.9)	
Light meal or snacks daily			
Once	81(57.9)	78(44.8)	0.033
≥ 2 times	57(40.7)	94(54.0)	
Never	2(1.4)	2(1.2)	
Compositions snacks or light meal			
Fruits/milk/yoghurt etc.	81(57.9)	72(41.4)	< 0.001
Biscuit/crackers/bread etc.	46(32.8)	52(29.9)	
Fried potato/soft drink/burger etc.	9(6.4)	22(12.6)	
Sweet/ice cream/chocolate	4(2.9)	28(16.1)	
Eggs per week			
Daily	33(23.6)	96(55.2)	< 0.001
2-3 times	81(57.9)	35(20.1)	
Occasional	2(1.4)	20(11.5)	
Never	24(17.1)	23(13.2)	
Milk per week			
Daily	39(27.9)	65(37.4)	0.024
2-3 times	51(34.6)	64(36.8)	
Occasional	48(34.3)	37(21.3)	
Never	2(1.4)	8(4.6)	
Fish per week			
Daily	49(35.0)	60(34.5)	0.689
2-3 times	27(19.3)	30(17.2)	
Occasional	40(28.6)	45(25.9)	
Never	24(17.1)	39(22.4)	
Meat per week			
Daily	14(10.0)	71(40.8)	< 0.001
2-3 times	73(52.1)	71(40.8)	
Occasional	50(35.7)	30(17.2)	
Never	3(2.1)	2(1.2)	
Vegetables per week			
Daily	9(6.4)	12(6.9)	0.179
2-3 times	75(53.6)	97(55.7)	
Occasional	50(35.7)	64(36.8)	
Never	6(4.3)	1(0.6)	
Fruits (number of servings per day)			
Daily	58(41.4)	98(56.3)	0.007
2-3 times	41(29.3)	50(28.7)	
Occasional	37(26.4)	21(12.1)	
Never	4(2.9)	5(2.9)	

Figures in the parentheses denote corresponding %; ***Chi-square Test** (χ^2) was done to analyse the data.

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Table V. Association between pattern of exercise and residence.

Pattern of exercise taken*	Group		p-value
	Rural (n = 140)	Urban (n = 174)	
Time of exercise			
Morning	96(68.6)	53(30.5)	
Before bathing	8(5.7)	23(13.2)	
Evening	28(20.0)	80(46.0)	< 0.001
Night	3(2.1)	12(6.9)	
Morning and evening	5(3.6)	6(3.4)	
Days practice in a week			
< 5 days	54(38.6)	145(83.3)	< 0.001
≥ 5 days	86(61.4)	29(16.7)	
Duration of exercise each day (minutes)			
< 60 minutes	95(67.9)	145(83.3)	0.001
≥ 60 minutes	45(32.1)	29(16.7)	

Figures in the parentheses indicate corresponding %; ***Chi-squared Test** (χ^2) was done to analyze the data

Table VI. Association between dietary behaviour of the respondents and their residence.

Dietary behaviour	Group		Odds Ratio (95% CI of OR)	p-value
	Rural (n = 140)	Urban (n = 174)		
Unhealthy	79(56.4)	71(40.8)	1.8(1.2-2.9)	0.006
Healthy	61(43.6)	103(59.2)		

Figures in the parentheses indicate corresponding %; ***Chi-squared Test** (χ^2) was done to analyze the data

Probing into the dietary behaviour of the respondents, it was revealed that majority (89.1%) of the urban girls used to take breakfast more or less regularly as compared to 77.1% of the rural girls. While habit of taking major meals > 2 times a day was significantly higher in the rural cohort than that in the urban cohort (p=0.007), taking light meals or snacks ≥ 2 times a day was significantly higher among the latter cohort (p=0.033). While incidence of taking fruits, milk/ yoghurt was relatively common in rural girls, incidence of taking soft drinks, burger/pizza or sweet/ ice-cream/ chocolate were more often taken by the urban girls (p<0.001). Consuming milk and eggs 7 days in a week were more often reported by the urban girls than the rural girls (p<0.001 and p=0.024 respectively). Consumption of meat was also much higher in the urban cohort than that in the rural cohort (p<0.001). Although there was no difference between the groups in terms of intake of vegetables, consumption of fruits was much higher in the urban girls than that in the rural girls (p=0.007) (Table IV).

Two-thirds (68.6%) of the rural girls used to take exercise in the morning and 20% in the evening; whereas 46% of the urban girls have had exercise in the evening and 30.5% in the morning (p < 0.001). Over 60% of the rural girls took exercise 5 or > 5 days in a week as compared to only 16.7% of the urban girls (p < 0.001). About one-third of the rural cohort used to having exercise 60 or > 60 minutes each day as opposed to 16.7% of the urban girls (p = 0.001) (Table V). Over 55% of the rural girls had unhealthy dietary behaviour as opposed to 40.8% of their urban counterparts. The risk of having unhealthy dietary behaviour was 1.8(95% CI = 1.2-2.9) times more likely in rural girls than that in urban girls (p = 0.006) (Table VI).

DISCUSSION:

The present study revealed that age of the respondents of secondary school girls ranged from 11 to 17 years with mean age being nearly 14 years in both rural and urban cohorts. Sedibe and colleagues in a similar study demonstrated mean age of rural and urban respondents to be 13 and 14 years respectively. In the present study urban adolescent girls were heavier (in terms of BMI) than their rural counterparts (22 and 20.9 kg/m² respectively). In another study, > 60% of urban secondary school girls were overweight and obese.[18] Adolescents who perceived themselves as being overweight were more likely to report insufficient physical activities/ exercise as compared to those who perceived themselves as having a normal weight.[11] While farming was the main occupation of the rural respondents, service was the prime occupation of the urban respondents. Mothers of both groups were predominantly housewife. Monthly family income of urban respondents was significantly higher than that of rural respondents. Number of children in the family was almost similar between the study groups with majority having 2-3 children.

The predominant indoor and outdoor exercises adopted by rural and urban girls were jumping rope and walking respectively. While urban adolescent girls used to skip rope more commonly, rural girls prefer riding a bicycle and/or running as outdoor

exercises more often than the urban girls indicating that pattern of exercise is highly significant with residential status. However, Mohammadi et al[14] did not find any association between physical activities (PA) and the residence. In the present study one-third (32.1%) of the rural girls and 17% of the urban girls met the WHO criteria of PA. Consistent with the findings, Turconi and associates[19] reported that only 18.5% of the students take physical activity or exercise as recommended by WHO. Sharma and associates[11] showed that 78% of adolescents did not meet the WHO recommendation of physical activity/exercise for the particular age and sex. Investigating into how the school girls pass their leisure time, it was revealed that rural girls more frequently watch TV, while urban girls prefer playing games or surfing social media on mobile or computer as a pastime. Besides, the urban girls were fond of listening music, reading a book and gardening compared to their rural counterparts with majority of the urban girls spent > 1 hour each day on mobile/ TV/computer.

Asked about dietary behaviour of the respondents, it was revealed that nearly 90% of the urban girls used to having breakfast more or less regularly as compared to 77% of the rural girls. Habit of taking major meals > 2 times a day was significantly higher in the rural group than that in the urban group. However, taking light meals or snacks 2 or > 2 times a day was much higher among urban respondents. While incidence of taking fruits, milk/yoghurt was more or less common in rural girls, incidence of taking soft drinks, burger/pizza or sweet/ice-cream/ chocolate were more often liked by the urban girls. Consuming milk, eggs and meat in most of the days in a week were readily practised by the urban girls than that by the rural girls. Although intake of vegetables was almost identical between the groups, consumption of fruits was much higher in the urban girls than that in the rural girls. In a study, nearly 60% of the school children had their breakfast every day.[3] In another study, almost half of the children reported that they generally consume breakfast.[2] Smetanina[3] reported that over one-quarter (27.1%) of the adolescent girls consumed fruits daily, with 13% used to take different types of fruits more than one servings a day in rural area, whereas only 4.5% did so in the urban area.[3]

There was significant association with dietary habit and residence with more than 55% of the rural adolescent girls having unhealthy dietary behaviour as opposed to 41% of urban girls. The odds of having unhealthy dietary behaviour were nearly 2-fold (95% CI=1.2-2.9) higher in rural girls than that in urban girls. Among Brazilian adolescent girls, approximately half have had healthy eating habits bearing consistency with the findings of the present study.[2] In another study, only 37% of the adolescent girls show healthy eating habits.[19]

CONCLUSION:

The study concluded that urban adolescent girls are generally heavier than the rural girls. While urban adolescent girls used to jump rope more commonly, rural girls prefer riding a bicycle or running as outdoor PA or exercises more often than the urban girls. About one-third of the rural girls and one in six urban girls meet the WHO criteria of physical activity/exercise indicating that rural girls are more likely to have good exercise behaviour than the urban girls. There was significant association with dietary habit and residence with odds of having unhealthy dietary behaviour in rural girls is almost double than that of urban girls.

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