Original article

Study on Association between socio-demographic characteristics and nutritional status of adolescents of rural Bangladesh

Ishrat Jahan,[1] Monowar Ahmad Tarafdar,[2] Md. Shamim Ahsan[3]

Abstract

A cross-sectional study was carried out to assess relationship between socio-demographic factors and nutritional status of adolescent of the rural areas. Respondents were from selected villages of Tangail district with a sample size of 108 using an interviewer administered semi- structured questionnaire employing purposive sampling method. Nutritional statuses of the respondents were measured by Body Mass Index (BMI). The BMI of the respondents were calculated on the basis of the height and weight of the respondents. Majority of the respondents (63.9%) were under weight on the basis of BMI and were associated with family monthly income, father's occupation, and house type where the respondents live. On the other hand, health and nutritional status which is calculated by Body Mass Index is associated to sex of the respondents, family monthly income and respondent's education level.

Key words: Socio-demographic Factors, Nutrition, Body Mass Index (BMI).

Introduction

Adolescence is the only time following infancy when the rate of physical growth actually increases.[1] This sudden growth spurt is associated with hormonal, cognitive, and emotional changes that make adolescence an especially vulnerable period of life.[2]

First, there is a greater demand for calories and nutrients due to the dramatic increase in physical growth and development over a relatively short period of time. Second, adolescence is a time of changing lifestyles and food habit changes that affect both nutrient needs and intake. Third, adolescent drive for individuation means more opportunity to assert food choices and expand or narrow healthy options. Poor nutrition during any of these stages can have lasting consequences on an adolescent's cognitive development, resulting in decreased learning ability, poor concentration, and impaired school performance.[3]

Food security in Bangladesh is characterized by considerable regional variations. Factors such as tendency to natural disasters, distribution and quality of agricultural land, access to education and health facilities, level of infrastructure development, employment opportunities, and dietary and caring practices provide possible explanations for this.[4]

In rural Bangladesh, most of the income of a poor household is derived from agricultural wage employment. However, household members may be engaged in a whole range of different activities during the year. Dependency on agricultural wage labor leaves a household vulnerable to cyclical food insecurity as agricultural employment opportunities vary according to season. During the lean seasons, March-April and October-November, prior to harvesting the main rice crops, job opportunities are low, resulting in low wage rates, while food prices are at their highest. Income derived from non-agricultural sources provides a possible safeguard against the cyclical nature of agricultural income and therefore can improve household food security.[5]

Methodology

This is a Descriptive and Cross-sectional study for assessing the association between socio-demographic status and nutritional status of adolescents of rural Bangladesh from selected villages of Tangail district with a sample size of 108 using an pre-tested interviewer administered semi- structured questionnaire employing purposive sampling method for containing questions relating to socio-economic and demographic status, food security and nutritional status of the respondents. Bathroom scale up to the 0.5 kg marking and a wood stand fixed with measuring tape (stadiometer) were used to measure weight and height respectively. Weight was measured in Kg up to the 0.0 marking and which was the nearest with minimum clothing and without shoes and other things by bathroom scale placed on a flat surface and height was measured in cm in standing position and the nearest cm in round figure was taken. The measuring tools were checked each day with a standard subject before the preceding the data collection. After the collection of whole range of data, they were processed and tabulated. Editing, coding and decoding of collected data were also done simultaneously and the data were analyzed with the help of SPSS version 21.0.

1. Lt. Colonel, Medical Officer, Dhaka CMH
2. Professor, Department of Community Medicine, Z H Sikder Women's Medical College, Dhaka
3. Colonel, Assistant Director, Medical Services, Rangpur Cantonment

Address of correspondence: Lt. Col. Dr. Ishrat Jahan, Medical Officer, Dhaka CMH
Email: ishratlydia@gmail.com, Cell: 01769014526

Result:

Socio-demographic and economic variables such as, age of respondents, sex of respondent, religion of respondent, family monthly income, number of family members, family type, education level, occupation of respondents, father's occupation, type of house, marital status, smoking habit, source of drinking water and sanitation status are analyzed and present here.

Table 01: Distribution of respondents by Age (n=108)

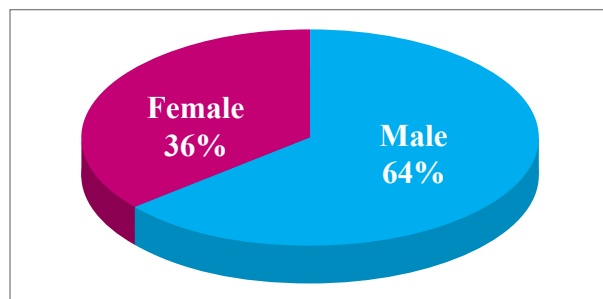| Age group (in years)	Number of respondents	Percentage (%)
10-12	21	19.4
13-14	32	29.6
15-16	34	31.6
17-18	21	19.4
Total	108	100
Mean of 14.54 years (SD ± 2.12)		

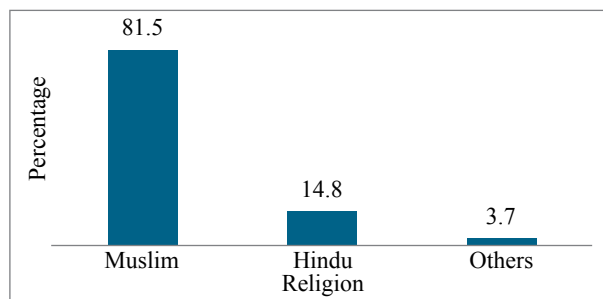**Figure 01: Sex of respondents (n=108)**

Figure 02: Religion of respondents (n=108)

Table 02: Distribution of Family Monthly income (n=108)

Family monthly income (in taka)	Number of respondents	Percentage (%)
< 5,000	25	23.2
5,000-8,000	52	48.1
>8,000	31	28.7
Total	108	100
Mean monthly income = 7245 taka (S D=2126.27).		

Table 03: Distribution of respondents according to their family members (n=108)

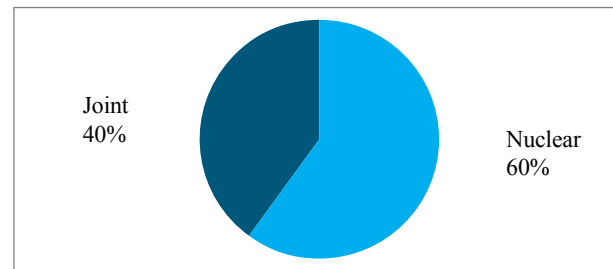| Number of family members	Number of respondents	Percentage (%)
≤ 4	43	39.8
5	48	44.4
≥ 6	17	15.8
Total	108	100
Mean family size is 4.73 (D=0.92).		

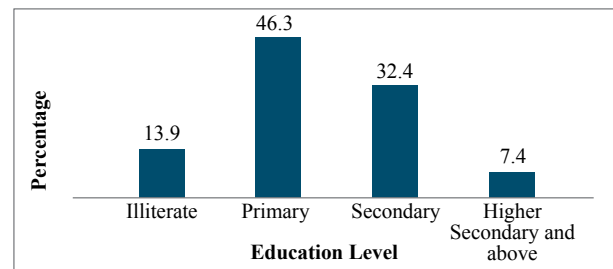**Figure 03: Family type of respondents**

Figure 04: Distribution of respondents as per their education level

Table 04: Type of education of respondents (n=108)

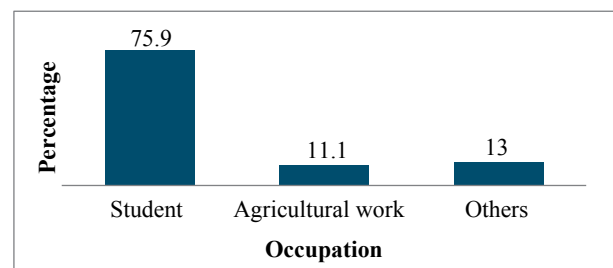| Type of education	Number of respondent	Percentage (%)
Formal	78	72.2
Madrasa	12	11.1
Non-formal	3	2.8
No education	15	13.9
Total	108	100

Figure 05: Distribution of respondents according to their occupation

Table 05: Fathers' occupation of respondents (n=108)

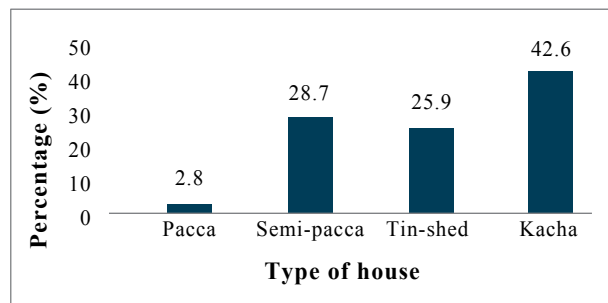| Fathers' Occupation	Number of respondents	Percentage (%)
Service	20	18.5
Business	23	21.3
Dailylabour	39	36.1
Farmer	26	24.1
Total	108	100

Figure 06: Distribution of respondents according to their houses where they live

Table 06: Distribution of respondents according to their source of drinking water and having sanitary latrine

Response	Number of respondent	Percentage (%)
Drink tube well water		
No	3	2.8
Yes	105	97.2
Total	108	100
Use sanitary latrine		
No	36	33.3
Yes	72	66.7
Total	108	100

Nutritional status of the respondents was measured by Body Mass Index (BMI).
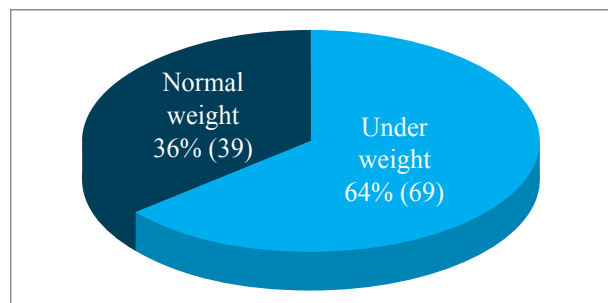

Figure 07: Body Mass Index (BMI) of respondents

Table 07: Relationship between age of respondents and Body Mass Index

Age of respondents (in year)	Body Mass Index		Total	χ² & p-value
	Underweight	Normal weight		
10-12	11, 52.4%	10, 47.6%	21, 100%	
13-14	24, 75.0%	8, 25.0%	32, 100%	
15-16	24, 70.6%	10, 29.4%	34, 100%	χ²=5.989, p=0.112
17-18	10, 47.6%	11, 52.4%	21, 100%	
Total	69, 63.9%	39, 36.1%	108, 100%	

Table 08: Relationship between Household Income and Body Mass Index

Household monthly Income (in taka)	Body Mass Index		Total	χ² & p-value
	Underweight	Normal weight		
<5,000	16, 64.0%	9, 36.0%	25, 100%	
5,000-8,000	38, 73.1%	14, 26.9%	52, 100%	
> 8,000	15, 48.4%	16, 51.6%	31, 100%	χ²=5.132, p=0.077
Total	69, 63.9%	39, 36.1%	108, 100%	

Table 09: Association between Sex of respondent and Body Mass Index

Sex of respondent	Body Mass Index		Total	χ² & p-value
	Underweight	Normal weight		
Male	44, 63.8%	25, 36.2%	69, 100%	χ²= 0.001, p=0.972
Female	25, 64.1%	14, 35.9%	39, 100%	
Total	69, 63.9%	39, 36.1%	108, 100%	

Table 10: Association between Number of family members and Body Mass Index

Number of family members	Body Mass Index		Total	χ² & p-value
	Underweight	Normal weight		
≤ 4	26, 60.5%	17, 39.5%	43, 100%	
5	13, 76.5%	4, 23.5%	17, 100%	χ²=1.425, p=0.490
≥ 6	30, 62.5%	18, 37.5%	48, 100%	
Total	69, 63.9%	39, 36.1%	108, 100%	

Table 11: Association between education level and Body Mass Index

Educational status	Body Mass Index		Total	χ² & p-value
	Underweight	Normal weight		
Illiterate	11, 73.3%	4, 26.7%	15, 100%	
Primary	30, 60.0%	20, 40.0%	50, 100%	χ²=7.792, p=0.050
Secondary	26, 74.3%	925.7%	35, 100%	
Higher secondary ≥	2, 25.0%	6, 75.0%	8, 100%	
Total	69, 63.9%	39, 36.1%	108, 100%	

Table 12: Association between occupation of respondents and Body Mass Index

Occupation of respondents	Body Mass Index		Total	χ² & p-value
	Underweight	Normal weight		
Student	49, 59.8%	33, 40.2%	82, 100%	χ²=2.557, p=0.278
Agricultural work	9, 75.0%	3, 25.0%	12, 100%	
Others	11, 78.6%	3, 21.4%	14, 100%	
Total	69, 63.9%	39, 36.1%	108, 100%	

Discussion and conclusion

According to the results majority of the respondents were Muslim (81.5%) and it was followed by Hindu (14.8%). We had two Christian and two Buddhist in the sample.

Among the respondents, 64 % were male and rests of the respondents (36%) were female. There was no association between sex of the respondents and their body mass indices (p=0.972). Similar result had been found in a study conducted in Ethiopia which evident that girls were more likely than boys to report being food insecured themselves.6

While investigating association between Age of respondents and Body Mass Index, it was found that there is no association exists (p-0.112) in different socio-demographic conditions. But in a study conducted in Selangor, Malaysia, it was found that age ($p = 0.003$) and sex ($p = 0.0001$) have significantly associated with socio-demographic characteristics.7

In the current study, it was also found that there was no association between Household Income and Body Mass Index (p=0.077), Sex of respondent and Body Mass Index (p=0.972) and occupation of respondents and Body Mass Index (p=0.278). Association between Number of family members and Body Mass Index was found just significant (p=0.490), similar association was also existed between education level and Body Mass Index (p=0.050).

It was found in a study in Japan that low economic status was significantly associated with BMI ($p=0.001$),8,9 and Sex was found to be one of the best predictors of BMI in a study conducted in the year 2019 in Poland.10

Prevalence of Obesity in developing countries is increasing. This is a seriously issue because it can overburden the health care systems resulting in lower the quality of life. Our study tried to identify the social patterning of BMI. BMI and obesity were thought to be negatively associated with education, and BMI was positively associated with income.

References

1. WHO. Available from: URL: https://www.who.int/maternal_child_adolescent/topics/adolescence/development/en/

2. Burnett S, Thompson S, Bird G, and Blakemore SJ. Pubertal development of the understanding of social emotions: Implications for education, Learn Individ Differ. 2011 Dec; 21(6): 681–689. doi: 10.1016/j.lindif.2010.05.007

3. Popkin B M, Adair L S, and Wen Ng S. NOW AND THEN: The Global Nutrition Transition: The Pandemic of Obesity in Developing Countries, Nutr Rev. 2012 Jan; 70(1): 3–21. doi: 10.1111/j.1753-4887.2011.00456.x

4. Nath N C. Food Security of Bangladesh: Status, Challenges and Strategic Policy Options, The Paper for presentation at 19th Biennial Conference of the BEA on the Theme" Rethinking Political economy of Development" to be held on 8-10 Januaryr, 2015. Available from: URL: https://bea-bd.org/site/images/pdf/080.pdf

5. Rapsomanikis G. The economic lives of smallholder farmers An analysis based on household data from nine countries, Food and Agriculture Organization of the United Nations Rome, 2015. Available from: URL: http://www.fao.org/3/a-i5251e.pdf

6. Belachew T, Hadley C, Lindstrom D, Gebremariam A, Michael KW, Lachat C, and Kolsteren P. Gender Differences in Food Insecurity and Morbidity Among Adolescents in Southwest Ethiopia; Pediatrics. 2011 Feb; 127(2): e398–e405. doi: 10.1542/peds.2010-0944

7. Rahim NNA, Chin YS, and Sulaiman N. Socio-Demographic Factors and Body Image Perception Are Associated with BMI-For-Age among Children Living in Welfare Homes in Selangor, Malaysia, Nutrients. 2019 Jan; 11(1): 142.Published online 2019 Jan 11. doi: 10.3390/nu11010142

8. Mizuta, A., Fujiwara, T. & Ojima, T. Association between economic status and body mass index among adolescents: a community-based cross-sectional study in Japan. *BMC Obes* 3, 47 (2016). https://doi.org/10.1186/s40608-016-0127-z

9. Zhang J et al. Gender differences in the association between body mass index and health-related quality of life among adults:a cross-sectional study in Shandong, China, BMC Public Health. 2019; 19: 1021. Published online 2019 Jul 31. doi: 10.1186/s12889-019-7351-7

10. Oniszczenko W, Stanisławiak E. Association between sex and body mass index as mediated by temperament in a nonclinical adult sample. Eat Weight Disord. 2019 Apr;24(2):291-298. doi: 10.1007/s40519-018-0617-8. Epub 2018 Nov 17. PMID: 30448969; PMCID: PMC6441449.