

Original Research Article

A study on nutritional status among rural Bengalee Muslim school going adolescent girls

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ABSTRACT

Background: Adolescent period is in-between period of childhood and adulthood. Studies revealed that rural female adolescents are suffering more than the urban girls, due to insufficient food intake, poor healthcare facilities and socioeconomic differences. Present study was an attempt to survey current malnutrition scenario among rural adolescent girls of Bengalee Muslim community of Cooch Behar district, West Bengal, India.

Methods: A community based, cross sectional study has conducted from April to May, 2023 among rural Bengalee Muslim adolescent girls aged 10-14 years (n=160) of Cooch Behar district, West Bengal, India. Data were collected after informing and explaining the purpose of the present study to school authorities, students and their parents. Three anthropometric measurements like, height, weight, MUAC recorded using standard procedures. Derived variable BMI was calculated and nutritional status was assessed using height for age and BMI for age. The degree of stunting (low height for age) and thinness (low BMI for age) were categorized on the basis of the position of the plot. Age specific mean and standard deviation was done. One way ANOVA was done to find out age specific mean differences in the Anthropometric variables. The p value <0.05 was considered as statistically significance.

Results: Overall prevalence of stunting and thinness was 28.12% and 22.5% respectively. Prevalence of overall severe stunting and thinness was 10.6% and 10% respectively. Overall prevalence of overweight was 11% respectively.

Conclusions: Present study revealed about existence of double burden of malnutrition among rural Bengalee Muslim population.

Keywords: Adolescent, Anthropometry, Bengalee Muslim, Stunting, Thinness, Under nutrition

INTRODUCTION

Adolescent period is in-between period of childhood and adulthood. Several important biological changes and also physical changes occurs during this phase.¹⁻³ Adolescent population shares one of the large amounts of global population. As per UNICEF data, 90% of poorly nourished children founds in Asia and Africa.^{4,5} Less amount food, cheap quality food and its poor absorption in human body can hamper the mental growth and physical growth and responsible for underweight, poor growth and poor work capacity.^{3,6,8-13} During few

decades, developing countries including India are fighting with a problem, called 'double burden of malnutrition', i.e. burden of undernutrition and overnutrition.^{3,14-17} In India, there were another problem, that is, children from rural areas showing higher prevalence of under-nutrition. Moreover, almost all Indian populations, girl child's were less welcomed and boys were more favoured and have comparatively good food and basic requirements than girl child.^{3,18} Infact studies also found that, the rural female adolescents are suffering more than the urban girls, due to insufficient food intake, poor healthcare facilities and socioeconomic inequalities.^{3,8,19-22}

After an extensive literature review, no studies were found on adolescent Bengalee Muslims, in the present study area. Bengalee Muslims are the largest minorities of India. Monitoring health status of Bengalee Muslim population is equally important, just like other communities of India.

The present study was an attempt to survey current nutritional status among rural Bengalee Muslim adolescent girls of Cooch Behar district, West Bengal, India.

METHODS

A community based cross sectional study was conducted from April to May, 2023 among 160 Bengalee Muslim (10-14) years old adolescent girls of rural areas of Guriahati I block, of Cooch Behar district, West Bengal, India. Cooch Behar is a small district, situated at the northern part of West Bengal (latitude 26°22'N, longitude 89°29'E). According to the census 2011, there were 26.54% Bengalee Muslims lived in Cooch Behar district, West Bengal, India.

The studied population was selected using simple random sampling technique. After explaining the purpose of the present study to school authorities, students and their parents, data collection were started. Data were collected using pre-prepared and pre-tested schedule. 160 Bengalee Muslim girls were joined and cooperated in data collection. The subjects were measured and interviewed during school working hours. Age was confirmed on the basis of their birth certificates. Height was measured using anthropometer rod nearest to 0.10 cm. Weight was recorded with a portable weight machine nearest to 500 grams. The measurement of mid upper arm circumference was recorded nearest 0.1 cm by simple measuring tape. Derived variable, body mass index (BMI) was calculated using following formula: $BMI = \text{weight (kg)} / \text{height}^2 (\text{m}^2)$.

Nutritional status was assessed using height for age z-score and BMI for age z-score using WHO growth reference 2007. The values were plotted on the basis of age specific WHO charts for height and BMI.²³ The height values and BMI values were classified on the basis of the

plot position and named as, 3SD, 2SD, 1SD, -1SD, -2SD, -3SD. In case of height- for age z-score, values below -3SD were categorized as severe stunting, values between -2SD to -3SD were categorized as moderate stunting, between -1SD to 2SD were categorized as normal.^{24,23} In case of, BMI- for age z-score were calculated as, between -2SD to -3SD were categorized as moderate thinness and values below -3SD were categorized as severe thinness, above 3SD were categorized as obese, the values in between 2SD TO 3 SD were categorized as overweight, and the values in between -1SD to 2SD were categorized as normal.²³⁻²⁵

Statistical analysis was done using statistical package for social science (SPSS Inc., Chicago, IL, version 20.0) and WHO Anthro Plus software. Age specific descriptive statistics was done in terms of mean and standard deviation ($\pm$ SD). Statistical tests like, one way ANOVA was used for calculating age specific mean differences of anthropometric variables. Chi square test was also done to find out association between anthropometric data and age groups. The p value <0.05 was considered as significant.

Inclusion criteria

Bengali Muslim unmarried adolescent girls of age 10 to 14 years, who were present at the time of data collection, were included in the present study.

Exclusion criteria

Bengalee Muslim adolescent girls of age 10 to 14 years, who were absent on the survey day and Bengalee Muslim adolescent girls having chronic illness were excluded in the present study.

RESULTS

Age specific distribution of mean and standard deviations of anthropometric variables were described in Table 1. There was gradual increase of height, weight and MUAC with age can be observed (except BMI). Statistical test one way ANOVA was done and the results showed statistically significance difference between anthropometric mean values with age except BMI.

Table 1: Descriptive statistics (mean $\pm$ standard deviation) of the anthropometric variables.

Age (years)	Sample size	Height (cm)	Weight (kg)	BMI (kg/m ²)	MUAC (cm)
10	27	139.48 $\pm$ 4.15	37.62 $\pm$ 9.80	18.46 $\pm$ 5.10	19.10 $\pm$ 2.40
11	35	142.65 $\pm$ 5.90	37.90 $\pm$ 12.27	19.48 $\pm$ 4.20	20.16 $\pm$ 2.16
12	27	146.10 $\pm$ 8.18	41.31 $\pm$ 12.58	19.26 $\pm$ 4.27	21.42 $\pm$ 2.79
13	32	148.20 $\pm$ 6.67	44.58 $\pm$ 14.19	19.99 $\pm$ 4.69	22.30 $\pm$ 3.37
14	39	148.38 $\pm$ 6.88	48.46 $\pm$ 17.27	21.76 $\pm$ 6.55	22.28 $\pm$ 3.37
Total	160	145.19 $\pm$ 7.25	42.34 $\pm$ 14.24	19.78 $\pm$ 5.25	21.12 $\pm$ 2.89
F value		10.68 ^s	3.88 ^s	2.26 ^{ns}	8.36 ^s

*s = significant, **ns = not significant.

Table 2: Prevalence of stunting among studied population.

Age (years)	Normal	Severe stunting	Moderate stunting	Overall stunting	Chi-square
10	24 (88.9)	2 (7.4)	1 (3.7)	3 (11.1)	9.97 ^{ns}
11	28 (80.00)	3 (8.6)	4 (11.4)	7 (20.00)	
12	19 (70.4)	3 (11.1)	5 (18.5)	8 (29.62)	
13	21 (65.6)	3 (9.4)	8 (25.00)	11 (34.37)	
14	23 (59.0)	6 (15.4)	10 (25.6)	16 (41.02)	
Total	115 (71.9)	17 (10.6)	28 (17.5)	45 (28.12)	

*Values in parenthesis indicates percentage. ** ns=not significant

Table 3: Prevalence of thinness among studied population.

Age (years)	Severe thinness	Moderate thinness	Overall thinness	Normal	Overweight	Chi-square
10	4 (14.8)	4 (14.8)	8 (29.62)	16 (59.3)	3 (11.1)	6.40 ^{ns}
11	4 (11.4)	8 (22.9)	12 (34.28)	19 (54.3)	4 (11.4)	
12	4 (14.8)	4 (14.8)	8 (29.62)	19 (59.3)	3 (11.1)	
13	3 (9.4)	4 (12.5)	7 (21.87)	22 (68.8)	3 (9.4)	
14	4 (10.3)	1 (2.6)	5 (12.82)	27 (69.2)	7 (17.9)	
Total	16 (10.0)	20 (12.5)	36 (22.50)	106 (66.3)	18 (11.3)	

*Values in parenthesis indicates percentage. ** ns=not significant

Table 2 showing prevalence of stunting among the studied population. Overall severe stunting and moderate stunting among the Bengalee Muslim adolescent girls were 10.6% and 17.5% respectively. Prevalence of stunting increased with age (Table 2). 71.9% early adolescent girls found normal.

Table 3 showing prevalence of thinness among the studied population. Prevalence of severe thinness and moderate thinness were 10% and 12.55% respectively. 66.3% early adolescent Bengalee Muslim girls found normal. Prevalence of overweight among the studied population was 11.3%. No girls found obese in the present study. Prevalence of thinness decreased with age except age 11 years.

DISCUSSION

In the present study, anthropometry was used for assessing nutritional status. Anthropometry is one of the direct methods of nutritional status assessment, which is low cost and very effective.¹ Stunting, i.e. low height for age and thinness, i.e. low BMI for age, both are the indicator of chronic undernutrition.²⁶ In the studied population, overall prevalence of stunting was 28.12%. Prevalence of stunting found increased with age. Prevalence of severe stunting and moderate stunting among Bengalee Muslim adolescent girls were 10.6% and 17.5% respectively. Overall higher prevalence of stunting found at age 14 years.

Different studies were conducted among rural adolescent girls in different states of India (Figure 1) and showing different prevalence of stunting.²⁷⁻³⁰

Prevalence of stunting among the studied population though increased with age, still there were no statistically significance difference between ages ($p=0.267$). A study was conducted a study among rural adolescent population and concluded that prevalence of stunting found higher among late adolescents (15-19 years) as compared to early adolescents (10-14 years).³¹

Among the rural Bengalee Muslim adolescent population, prevalence of overall thinness was 22.5%. Prevalence of severe thinness and moderate thinness among the studied population were 10% and 12.5% respectively. Higher prevalence of thinness found in 11 years. Prevalence of thinness decreased with age (except 11 years), and there was no statistically significance difference found between ages ($p=0.404$). Different studies were conducted among adolescent girls in different parts of India (Figure 2) and showed different prevalence of thinness.^{28,30,32,33} A study revealed that prevalence of thinness decreased as ages were increased.²⁰ Studies significantly came to the conclusion that prevalence of thinness found higher among early adolescent group.^{18,23,34}

Prevalence of overall over weight was 11.3%. No Bengalee Muslim girls found obese. Higher prevalence of overweight was found at age 14 years. Studies revealed that prevalence of overweight among adolescents were 11.80% in Uttar Pradesh and prevalence of overweight and obesity among adolescents were 6.25% and 5.72% respectively in Lucknow.^{35,36}

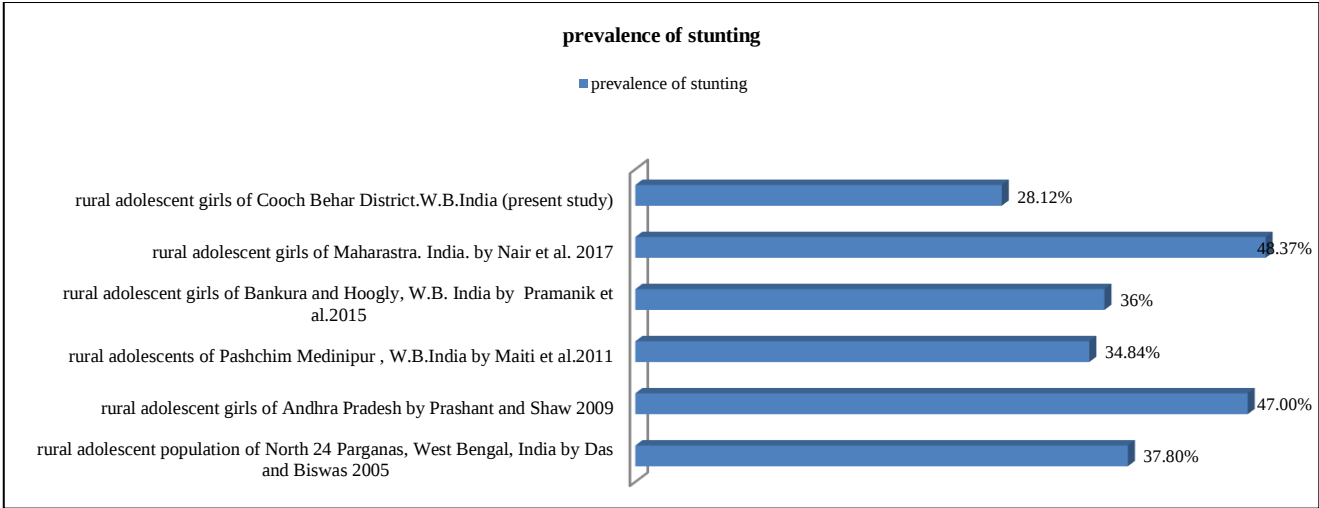


Figure 1: Comparison of prevalence of stunting among rural adolescent girls of India with the present study.

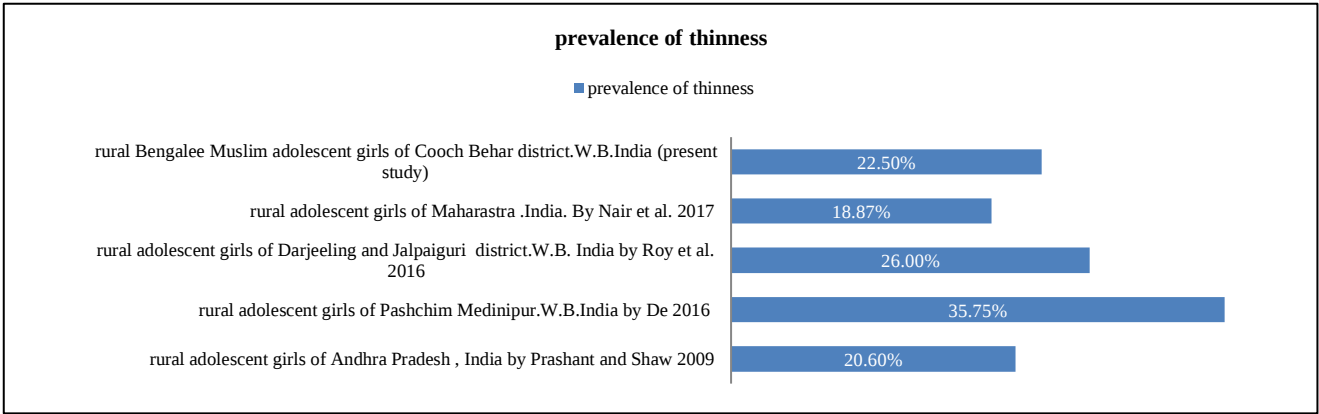


Figure 2: Comparison of prevalence of thinness among rural adolescent girls of India with the present study.

One of the major limitations of the present study was that it was a cross-sectional study with limited sample size. A longitudinal study and large sample size can properly describe the current malnutritional status of Bengalee Muslim population. Present study was that this study includes anthropometric measurements, and did not study socio economic and demographic factors, hence could not make relationship with socio economic and demographic factors

CONCLUSION

The present study assessed nutritional status using WHO growth reference 2007. Present study revealed moderate prevalence of stunting and thinness among rural Bengalee Muslim adolescent population. Overall, 28.12% Bengalee Muslim girls found stunted and 22.50% Bengalee Muslim girls found thin. No Bengalee Muslim adolescent girls found obese in the present study. But, 11.3% girls found overweighted. This study clearly revealed existence of double burden of malnutrition in the studied population. Nutritional interventions needed to control the situation.

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