

Nutritional Status of Children in a Rural School of Bangladesh

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Anthropometry is a quantitative method used for assessing nutritional status. Body Mass Index (BMI) is such a tool for adult. BMI percentile ranking has been suggested for assessing growth of the children of age 2-20 years. This descriptive study was carried out at Khwaja Yunus Ali Laboratory School (KYALS- an up dated rural school) as a part of yearly health checkup and day visit program of KYA Medical College students. All students were examined and 137 were brought under study. Age and sex wise BMI was calculated and values were plotted on CDC Growth Charts (Boys and or Girls) for percentile position. Among the school children besides 53.28% normal weight (BMI in between 5th -< 85th percentile), 29.93%, 8.78% and 8.02% were found in underweight (below 5th percentile), overweight (85th -< 95th percentile) and obese (\geq 95th percentile) groups. The mean BMI calculated for age and sex were closed to NHCS/WHO standard mean. Reduced prevalence of underweight with simultaneous increase in overweight and obese group is an alarm of emerging overweight and obesity problem in Bangladeshi children. Development of socio-economic condition with over loaded educational curriculum, improved electronic mass media and reduced outdoor facilities of game are probably responsible for home confinement of the children leading to overweight and obesity in them. Health education program for parents, changes in education curriculum, provision of mid-day school meal and out door game facilities are recommended to combat the problems.

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Key words: Nutritional status, BMI percentile, CDC growth chart

Introduction

Anthropometry is the quantitative method commonly used for the assessment of growth in the children. It is a non-invasive, inexpensive and universally applicable method to assess the size, proportion and composition of human body. World Health Organization has recommended various indices based on anthropometry to evaluate the nutritional status of the school aged children.¹ It is now well established that Body Mass Index (BMI) is most appropriate variable for the assessment of nutritional status for adult and also for children of age

2-19 years.²⁻⁷ CDC and the American Academy of Pediatrics (AAP) have recommended the use of BMI as a screening tool to identify possible nutritional problems especially to screen out for overweight and obese children that begin at 2 years old age.⁸ CDC had developed 'CDC Growth Charts: United States, Girls 2-20 years old' and 'CDC Growth Charts: United States, Boys 2-20 years old' for those purposes. BMI is more nutritionally related than genetically, despite wide variation in weight and height among different human populations.⁹⁻¹² The

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interpretation of BMI in the case of children nutritional status is different.⁸ After calculation of BMI for children, the BMI value is plotted on the CDC growth charts to obtain a percentile ranking. The percentile position of a child falls in the percentile range selected for underweight, normal, overweight and obese indicates his / her nutritional status. This study was done as yearly medical check-up of Khwaja Yunus Ali Laboratory School (KYALS) students in the month of April, 2012. Fourth year students of Khwaja Yunus Ali Medical College were entangled with the study to examine the students as a part of their day visit

Methods

This descriptive study was conducted in the department of Community Medicine of Khwaja Yunus Ali Medical College (KYAMC). Students of 4th year MBBS class collected data as a part of their day field visit program at Khwaja Yunus Ali Laboratory School (KYALS), situated in the campus of KYAMC at village of Enyetpur Sharif, Sirajgonj, Bangladesh. It is a private school where most of the village elites' children read. All school children of every class (Nursery, K G and Class I to VII) were clinically examined for any (Chronic) morbidity and their height and weight were recorded. A total 137 students (81 boys and 56 girls) were included in the study. Their age were recorded from the admission register of the school. BMI was computed using the formula: $BMI = \text{Weight (kg)} / \text{Height}^2 (\text{m}^2)$.

Instead of set criteria of BMI for adults' nutritional status estimation, the students BMI values were plotted on CDC Growth Charts (United States, Boys 2 - 20 years old and Girls 2-20 years old) for percentile position. BMI - less than the 5th percentile, from 5th percentile to less than 85th percentile, from 85th percentile to less than 95th percentile and 95th percentile and above were considered as Under nutrition, Normal, Overweight and Obese status as set standard by CDC and was analyzed. SPSS v-16 software was used for data entry and analysis.

Results

Number of boys was more than girls and the boys were also taller in the early age groups than girls. But mean weight of girls were more than boys in almost all age groups. The calculated mean BMI were about to close to the BMI (NHCS/WHO standard) mean standard. It was slightly inferior in the children above 9 years old. Though majority (53.28%) of the students were found possessing BMI percentile position in normal weight group but the prevalence of underweight (29.93%), overweight (8.78%) and obese (8.02%) were also remarkable. The prevalence rate of underweight among the boys (33.33%) was proportionately more than that among the girls (25.00%). On the other hand, overweight and obesity prevalence were proportionately high among the girls (12.50%, 16.07%) than those among the boys (4.93%, 3.72%).

Table I: Age and Sex variation in Anthropometric Characteristics of the studied children of KYALS

Age (yrs)	Sex	Height(cm) Mean \pm SD	Weight(kg) Mean \pm SD	BMI Mean \pm SD	BMI (NHCS/WHO standard) Mean
3	M (n=02) F (n=00)	114.00 \pm 1.41	19.00 \pm 00.00	14.62 \pm 0.36	15.24*
4	M (n=07) F (n=07)	106.64 \pm 4.55 102.57 \pm 4.50	18.36 \pm 3.06 18.64 \pm 5.63	16.09 \pm 2.26 17.61 \pm 4.87	15.21* 15.37*
5	M (n=06) F (n=05)	110.83 \pm 6.71 108.00 \pm 4.42	20.17 \pm 3.87 17.40 \pm 4.28	16.50 \pm 3.43 15.08 \pm 4.46	15.30* 14.85*
6	M (n=15) F (n=09)	120.30 \pm 8.44 116.78 \pm 4.79	20.37 \pm 3.25 21.56 \pm 4.53	14.06 \pm 1.60 15.76 \pm 3.19	15.37 15.32
7	M (n=12) F (n=08)	125.08 \pm 5.43 123.12 \pm 4.45	24.04 \pm 3.96 23.63 \pm 4.66	15.32 \pm 1.85 15.48 \pm 2.00	15.59 15.51
8	M (n=02) F (n=05)	124.50 \pm 0.71 130.60 \pm 11.06	25.00 \pm 1.41 28.00 \pm 8.40	16.13 \pm 1.09 16.30 \pm 3.35	15.87 15.85
9	M (n=06) F (n=03)	134.17 \pm 6.99 129.00 \pm 4.00	23.83 \pm 2.56 29.33 \pm 5.86	13.28 \pm 1.64 17.53 \pm 2.45	16.68 16.32
10	M (n=02) F (n=07)	144.00 \pm 2.82 139.14 \pm 7.86	42.50 \pm 14.45 36.57 \pm 12.14	20.65 \pm 7.97 18.65 \pm 4.82	16.66 16.90
11	M (n=11) F (n=07)	139.18 \pm 9.16 148.00 \pm 11.11	29.82 \pm 6.11 36.29 \pm 8.09	15.28 \pm 1.79 16.61 \pm 3.79	17.20 17.57
12	M (n=14) F (n=04)	154.75 \pm 7.31 147.88 \pm 3.61	38.68 \pm 7.72 32.75 \pm 4.99	16.10 \pm 2.82 14.93 \pm 1.75	17.84 18.36
13	M (n=04) F (n=01)	161.88 \pm 6.88 151.00	46.25 \pm 6.75 45.00	17.63 \pm 2.09 19.74	18.54 19.15

*Calculated by adding lower and higher values divided by 2 to have mean. Other age wise standard means values have been taken from reference 12.

Table II: Nutritional status of Boys and Girls

Nutritional Status	Sex of the students				Total		P value
	Boys		Girls		No	%	
	No	%	No	%			
Underweight*	27	65.85 (33.33)	14	34.15 (25.00)	41	100.0 (29.92)	0.042
Normal weight [#]	47	64.38 (58.02)	26	35.62 (46.43)	73	100.0 (53.28)	0.014
Overweight**	4	36.36 (04.93)	7	63.64 (12.50)	11	100.0 (08.02)	0.366
Obese***	3	25.00 (3.72)	9	75.00 (16.07)	12	100.0 (08.78)	0.083
Total	81	59.12 (100.0)	56	40.88 (100.0)	137	100.0	

* Underweight = BMI < 5th percentile.

Normal weight = BMI 5th to < 85th percentile

** Overweight = BMI 85th to <95th percentile

*** Obese = BMI ≥ 95th percentile.

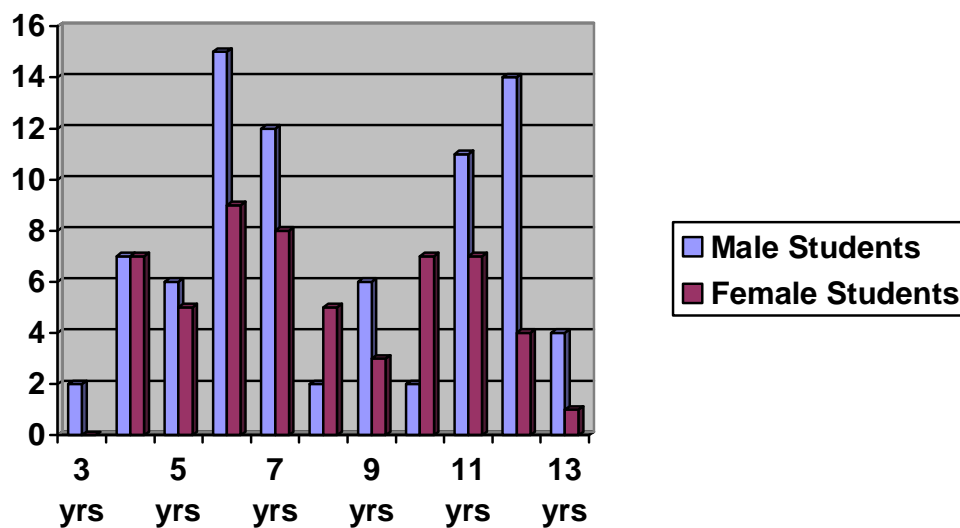


Figure 1. Bar Chart: Age and sex of the studied students of KYALS

Discussion

Nutritional assessment by BMI percentile used in this research had effectively diagnosed under nutritional and overweight-obese problems among the children in the studied rural school. Beside underweight problem, overweight and obesity are emerging problems in school children in Bangladesh even in rural area. Though prevalence of underweight in boys was significantly more but more overweight-obese in girls was insignificant. The calculated mean BMI for every ages and sex were closed to NHCS/WHO standard mean indicates that nutritional status of Bangladeshi children at present is at improved level in contrast with the past. Reduction of under nutrition and simultaneously increased overweight-obese prevalence indicates emerging new nutritional problem in Bangladeshi children.¹¹ The studied school is situated in KYAMC (the only one medical college in complete rural setting in Bangladesh) campus and here children of the village elite people read who can afford the cost. Yet being in a rural background, their life style differs a little with the other villagers. Reduced facilities for outdoor games, overloading of educational curriculum, T V and other electronic media have confined the children in home along with more fast-food affinity for improvement of socio-economic condition seemed important factors for increased prevalence of over weight and obesity in school children. Besides under nutrition, the emerging overweight-obese trend, BMI percentile plotting is an appropriate technique of assessment of malnutrition in children.

Recommendation

Health education program for parents is essential to make them be sensitized about the nutritional status of their children that include diet, food habit and food choice for their children to combat both for under nutrition as well as obesity. Appropriate educational

curriculum and provision of compulsory outdoor game might prevent indoor confinement and development of obesity. There should be provision of mid-day school meal with appropriate composition and restriction of fast food may be the additional measure.

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