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Manifestation of malnutrition among Sunni Muslim Girls of Delhi (6-12 years)

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Abstract

Background: Obesity and undernutrition are the opposite extremes on the scale of adiposity, both of which are the manifestation of malnutrition. Childhood obesity is a global epidemic involving both developed and developing countries. It is a state of over-nutrition with long term complications such as dyslipidemia, hypertension, and coronary artery disease and type-2 diabetes. Underweight is the result of under nutrition and conceptualized in term of thinness which is also an important problem among children of developing countries like India, leading to reduction in growth and development of every body organ especially the Central Nervous System. Long term under-nutrition causes failure in linear growth (height) of the child. **Objective:** To assess the nutritional status among Sunni Muslim girls based on recently developed body mass index (BMI) cut-off points for children and adolescents. **Methods:** The study subjects were selected from educational institutes of Delhi, India. A total of 370 girls aged 6-12 years were measured and included in the present study. Height and weight were measured and BMI was computed using standard formula. New age and sex specific international cut-off points were utilized to assess nutritional status. **Result:** In general, the mean BMI increased with increasing age. The overall prevalence of thinness, normal weight and overweight were 38.37%, 50% and 11.62%, respectively. Present study finds the nutritional stress among girls as evident from the thinness/underweight prevalent among them.

Keywords: Nutrition, Thinness, Overweight, Sunni Muslim, Delhi

Introduction

School children are an important segment of the society. Their growth, development and body weight is of utmost significance and presents general health status of a community and nation as a whole (Vashisht R.N., et al., 2005; Hunshal, S., 2010; Al-Sharbaty, M.M., et al 2001; Fetuga, M.B., et al., 2007). In developing countries such as India, especially in urban populations, childhood obesity

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is emerging as a major health problem (Shetty, 1999; Sharma, A., et al., 2006). Studies from metropolitan cities in India have reported a high prevalence of obesity among affluent school children (Sundaram et al., 1988; Gupta and Ahmed, 1990; Verma et al., 1994; Gupta et al., 1998; Kapil et al., 2002; Ramachandran et al., 2002; Subramanyam et al., 2003). On the other hand, some studies reported a high prevalence of under nutrition among rural school children and children in urban slums (Sachdev, 2003; Bhargava et al., 2004; Bisai, S., et al., 2010). It can be said that children in developing countries presently suffer from double jeopardy of malnutrition - urban children are afflicted with problems of over-nutrition while rural and urban children suffer from effects of under nutrition (Chatterjee, 2002; Luxmi and Sachdeva 2012).

Objective:

The major objective of the present study was to evaluate different grades of thinness and overweight among 6-12 years old Sunni Muslim school girls of Delhi using international cut-off points (Cole et al., 2000 and Cole et al., 2007).

Materials and Methods

Data for the present study comprise 370 Sunni Muslim female ranging in age 6 -12 years. The sample was drawn from educational institutes using random technique of sampling. General information was recorded from each subject before taking the measurement like name, date of birth, date of measurement, father's surname, and maternal uncle's surname. Two measurements on each child including height and body weight were taken. Body Mass Index (BMI) for each child was calculated using the following standard equation which is a statistical correlation of the relationship between the height and weight of an individual arrived at by dividing body weight (kg) and height in m².

$$\text{BMI} = \text{Body Weight (Kg)} / (\text{Height (m)})^2$$

Anthropometric measurements (i.e. height and weight) were performed in all subjects according to the standard procedures (Lohman et al., 1988). Nutritional status such as thinness (Cole et al., 2007) and overweight (Cole et al., 2000) was evaluated following the recently published international BMI cut-off points (Marques-Vidal et al., 2008 and Jeemon et al., 2009). Those children with BMI less than the cut-off value corresponding to the respective age and sex were assigned to the particular grade of thinness. Age and sex specific new international body mass index cut-off points for the assessment of nutritional status among children are shown in **Table 1** These age and sex specific cut-off values were established based on international survey (Cole et al., 2000) and recommended by International Obesity Task Force (IOTF).

Table 1: Age and sex specific new international body mass index (kg/m^2) cut-off points for the assessment of nutritional status among children

Age (Years)	Thinness			Normal	Overweight
	Grade III	Grade II	Grade I		
6	12.32	12.93	13.82	13.82-17.34	17.34
7	12.26	12.91	13.86	13.86-17.75	17.75
8	12.31	13.00	14.02	14.02-18.35	18.35
9	12.44	13.18	14.28	14.28-19.07	19.07
10	12.64	13.43	14.61	14.61-19.86	19.86
11	12.95	13.79	15.05	15.05-20.74	20.74
12	13.39	14.28	15.62	15.62-21.68	21.68

Table 2: Mean and Standard deviation of height, weight and BMI

Age Groups	Number	BMI Mean \pm S.D	Grade
6	55	14.13 \pm 2.13	I
7	74	14.355 \pm 2.21	I
8	77	15.86 \pm 3.06	I
9	61	15.98 \pm 3.11	I
10	73	16.41 \pm 3.07	I
11	11	16.36 \pm 3.79	I
12	12	21.07 \pm 1.42	I

Table 3: Percentage distribution of nutritional status based on age of the studied subjects

Age (Years)	N	Thinness			Total Thinness	Normal	Overweight
		Grade III	Grade II	Grade I			
6	55	6(10.90%)	12(21.81%)	9(16.36%)	27(49.07%)	25(45.45%)	3(5.45%)
7	74	16(21.12%)	5(6.75%)	16(21.62%)	37(49.49%)	32(43.24%)	5(6.75%)
8	77	2(2.59%)	4(5.19%)	13(16.88%)	19(24.66%)	45(58.44%)	13(16.88%)
9	61	5(8.19%)	10(16.39%)	9(14.75%)	24(39.33%)	31(50.81%)	6(9.83%)
10	73	4(9.58%)	5(6.84%)	13(17.80%)	22(34.22%)	43(58.90%)	8(10.95%)
11	18	0	2(11.11%)	8(44.44%)	10(55.55%)	6(33.33%)	2(11.11%)
12	12	0	0	3(25%)	3(25%)	3(25%)	6(50%)
Total	370	33(8.91%)	38(10.27%)	71(19.18%)	142(38.37%)	185(50%)	43(11.62%)

Results

The mean BMI and standard deviation of the subjects are presented in table 2. In general, the mean BMI increased with increasing age. Mean BMI for age fall into normal category for all age groups. Table 3 presents the percentage distribution of nutritional status based on age of the studied subjects. The overall prevalence of thinness, normal weight and overweight were 38.37%, 50% and 11.62%, respectively. 8.9% of total girls fell under grade III, 10.27% fell under grade II and 19.18% fell under grade I. Age - wise prevalence of thinness was 49.07%, 49.49% , 24.66%, 39.33%, 34.22% , 55.55% and 25% among 6years, 7 years , 8 years , 9 years , 10 years , 11 years and 12 years, respectively. Age wise prevalence of overweight was 5.45%, 6.75%, 16.88%, 9.83%, 10.95%, 11.11% and 50% among 6 years, 7 years, 8 years, 9 years, 10 years, 11 years and 12 years, respectively.

Discussion

Undernutrition is a significant problem and continues to be a cause of morbidity and mortality among children in developing countries like India (UNICEF, 2006). The recent study of Cole et al. (2007) has stated that undernutrition is better assessed as thinness (low body mass index for age) than as wasting (low weight for height). However, the results of the present study clearly indicated that the nutritional situation of these girls was not satisfactory with thinness to 38.37%. The comparison of prevalence of under-nutrition among Indian children is presented in table 4. Barring one study which reported lower prevalence of under-nutrition than the present study (Bose et al., 2008) most of the studies show higher prevalence of under-nutrition (Chakraborty et al., 2009, Medhi et al., 2006, Bisai et al., 2010, Bose and Bisai ,2008 and Das et al., 2012)

Malnutrition (under-nutrition and over-nutrition) continues to be a problem of considerable magnitude in most developing countries of the world (Som et al., 2006). In the present study, results reveal that the prevalence of overweight was 11.62%. Earlier reports have revealed that in recent years malnutrition among the children has increased (Chatterjee, 2007). Improvement in child nutrition which leads to better growth and development in the children has been regarded as one of the universal humanitarian goals (Rajaram et al., 2003) and nutritional intervention in Indian children is urgently required.

Table 4: Comparison of the prevalence of under nutrition among different studies with present study of India.

Studied Children	Age group	Number	Method	Prevalence (%)	Reference
School children , Bankura district , west Bengal	6-14	454	BMI/age z score	23.10	Bose et al., 2008
School children purba medinipur ,west Bengal	5-10	569	Thinness by BMI	62.20	Charaborty and Bose , 2009
School children Dibrugarh district , Assam	6-14	304	Thinness by BMI	53.30	Medhi et al., 2006
Kora –Medi tribal children ,Paschim medinipur ,West Bengal	2-13	119	Thinness by BMI	67.20	Bisai et al., 2010
Paschim Medinipur and puruliya district, west Bengal	10-15	2016	Thinness by BMI	44.50	Bose and Bisai, 2008
Paschim medinipur, West Bengal	6-12	500	Thinness by BMI	77.00	Das et al., 2012
Sunni Muslim girls , Delhi	6-12	370	Thinness by BMI	38.37	Present study

Conclusion

The present study revealed that both under and over nutrition is present among Sunni Muslim school girls. It is striking to note that underweight is more common in girls. Underweight/thinness at this age will retard the growth and development of various system of the body. It will also reduce the linear growth (increase in height) of the child. This may be attributed to the poor dietary intake, lack of awareness about the balanced diet. Appropriate steps need to be taken to address this problem. Health education and school based intervention programs can improve the dietary intake of children.

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