

Prevalence of obesity among school going children of Pantnagar

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Received: 03.02.2015; Revised: 07.04.2015; Accepted: 22.04.2015

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■ **ABSTRACT** : A cross sectional study was conducted to explore the prevalence of overweight/obesity among the school going children of Pantnagar. The prevalence of obesity among the school going children was assessed by anthropometric measurements viz., height and weight, BMI and total body fat per cent. The overall prevalence of overweight was 16 and 4 per cent in HIG and MIG categories, respectively and prevalence obesity was reported in 3.8 per cent of HIG. The prevalence of overweight/obesity was higher in HIG children, which reflects the economical status on nutritional status.

■ **KEY WORDS**: School going children, BMI, Nutritional status, Obesity

■ **HOW TO CITE THIS PAPER** : Baghel, Suman Singh, Dobhal, Neetu and Raghuvanshi, Rita Singh (2015). Prevalence of obesity among school going children of Pantnagar. *Asian J. Home Sci.*, **10** (1) : 133-136.

In India, under nutrition attracted the focus of health workers, as childhood obesity was rarely seen. But over the past few years, childhood obesity is increasingly being observed with the changing lifestyle of families with increased purchasing power, increasing hours of inactivity due to television, videogames and computers which have replaced outdoor games and other social activities. After 1992 with liberal economical policy adopted by government of India, results in paradigm shift in the quality of life in urban population resulted in substantial increase in childhood as well as adult obesity in the urban population. Kaur *et al.* (2008) in New Delhi revealed the prevalence of obesity and overweight in LIG school children as 0.1 and 2.7 per cent, respectively, amongst MIG school children as 0.6 and 6.5 per cent and in HIG school children as 6.8 and 15.3 per cent, respectively. A cross-sectional study carried out by Bharati *et al.* (2008) in all the 31 middle-schools (5th to

7th standard) and high-schools (8th to 10th standard) of Wardha city, overweight and obesity was found to be 3.1 per cent and 1.2 per cent, respectively, together constituting 4.3 per cent for overweight/obesity. The multivariate logistic regression showed that the important correlates of overweight/obesity were urban residence, father and/or mother involved in service/business, English medium school and child playing outdoor games for less than 30 minutes. Children are the world's most valuable resource and its best hope for the future", it is indeed true that the future is in the hands of the children. Hence, the health and well being of children go a long way in nurturing them into better adults. So the present study was conducted to find out the prevalence of obesity in school going children of Pantnagar.

■ RESEARCH METHODS

A cross-sectional study was conducted during

October to November, 2012 on private and government schools of Pantnagar to assess the prevalence of obesity among school going children. The category of school reflects the socio-economic status of the children which depends upon the fee structure. Stratified random sampling was done to select 50 children *i.e.* 25 girls and 25 boys from different socio-economic group families of Pantnagar. The criteria used for the assessment of SES was that the children studying in private schools paying monthly fees of more than Rs. 1000/month and Rs. 500-1000/month were considered as belonging to HIG and MIG family, respectively and children studying in govt. primary schools paying no fees were considered as belonging to LIG families. There is no school in Pantnagar which may be considered in MIG category; therefore, information was collected from HIG and LIG category only. A semi-structured questionnaire was developed to collect information regarding age, sex and type of school by interview method. Anthropometric measurement like height and weight were measured as per standard methods (Jelliffe, 1966).

BMI was computed using the formula weight in kilograms divided by height in meter square. Reference charts for children–BMI values for adults are age and sex independent. However, in children, BMI changes physiologically with age and sex. At birth the median BMI is as low as 13 kg/m², increasing to 17 kg/m² at age 1, decreasing to 15.5 kg/m² at age 6, then increasing to 21

kg/m² at age 20. The American Obesity Association uses the 85th percentile of BMI for the age and sex as a reference point for overweight and the 95th percentile for obesity in children.

Total body fat per cent was calculated using the formula given by Jackson *et al.* (2002). The formula to predict the fat percentage uses current BMI, age and gender of the child.

$$\text{Child body fat \%} = (1.51 \times \text{BMI}) - (0.70 \times \text{Age}) - (3.6 \times \text{gender}) + 1.4$$

where, male gender = 1, female = 0.

It is an estimate of the fraction of the total body mass that is adipose tissue, as opposed to lean body mass (muscle, bone, organ tissue, blood etc.). Total body fat percentage consists of essential fat and storage fat essential fat is 2-5 per cent in men, and 10-13 per cent in women. Storage fat consists of fat accumulation in adipose tissue.

■ RESEARCH FINDINGS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Anthropometric measurements

To assess the prevalence of obesity among school going children in Pantnagar, 50 school going children aged 8-10 years were selected from campus and primary

Table 1 : Anthropometric measurements

Variables	LIG		HIG	
	Boys	Girls	Boys	Girls
Height (cm)	123.94±8.69	118.81±6.85	130.15±7.16	127.16±6.59
Weight (kg.)	23.87±5.30	19.73±3.53	26.65±6.57	23.63±2.84
BMI (kg./m ²)	15.01±2.98	16.04±2.25	16.38±4.31	17.82±3.34
Body fat (%)	15.38±1.96	13.94±1.48	16.28±6.57	14.72±2.38

Table 2 : Distribution of children according to BMI

BMI	Group	LIG	HIG
<18.5	Nutritional deficiency	24 (96)	21(84)
18.5 – 23	Healthy range	1 (4)	4 (16)

Values in parenthesis shows percentage value

Table 3 : Distribution of boys according to total body fat per cent

Body fat	Group	LIG	HIG
<10	Thin	0	0
10-20	Normal	11(91.7)	10 (76.9)
20-25	Overweight	1(8.3)	3(23.1)
>25	Obese	-	1(7.7)

* Criteria as per American Dietetic Association; Values in parenthesis shows percentage value

Table 4 : Distribution of girls according to total body fat per cent

Body fat	Group	LIG	HIG
<15	Thin	4 (30.8)	3(25)
15-25	Normal	9(69.2)	8(66.7)
25-30	Overweight	-	1(8.3)

* Criteria as per American Dietetic Association; Values in parenthesis shows percentage value

school. The mean anthropometric measurements of school going children of 8-10 years of Pantnagar are presented in Table 1.

The mean body height, weight and BMI of boys and girls of LIG were 123.94 ± 8.69 , 23.87 ± 5.30 , 15.38 ± 1.96 and 118.81 ± 6.85 , 19.73 ± 3.53 , 13.94 ± 1.48 , respectively. The mean body height, weight and BMI of boys and girls of HIG were 130.15 ± 7.16 , 26.65 ± 6.57 , 16.28 ± 6.57 , and 127.16 ± 6.59 , 23.63 ± 2.84 , 14.72 ± 2.38 , respectively. The findings of the study revealed that the children of HIG families were having better growth with respect to the height and weight, which showed a positive correlation between the family income and the anthropometry.

The distribution of children according to their BMI is presented in Table 2. The findings of the study were striking, which revealed that only 4 and 16 per cent of children of LIG and HIG, respectively, were in healthy range and rest were in nutritional deficiency category. None of the children was found to be overweight/ obese on the basis of BMI. According to CDC, 2000, the 90th percentile BMI for the age group of 8-10 years is 19 kg/m². The average BMI value (16.32 kg/m²) obtained from the present study was lower than CDC standard. Similar finding (16.5 kg/m²) was obtained in a study conducted by Mohanty (2008) in the urban children (8-10 years) of Pondicherry.

The findings showed that 91.7 per cent LIG and 76.9 per cent HIG boys were having normal total body fat per cent while 8.3 per cent and 23.1 per cent of LIG and HIG boys, respectively, lies in overweight group (Table 3). Only 7.7 per cent of HIG boys were found under the category of obesity which is comparable with findings of Mohanty (2008) as 7.5 per cent for urban boys of Pondicherry. The proportion of overweight/obese boys was higher in HIG (22.5 %) than in LIG boys (1.1 %). Bikshapathi *et al.* (2009) and Bansal and Singh (2012) studied on the related topic and Nalawade and Prabhu (2012) worked on the abdominal obesity in working adults of Mumbai.

Out of total 25 girls 69.2 per cent and 66.7 per cent girls of LIG and HIG, respectively, were having normal total body fat per cent while 30.8 per cent and 25 per cent girls of LIG and HIG were thin. The proportion of thin girls was higher in LIG (30.8%) than in HIG girls (25%). Total 8.3 per cent of girls of HIG were overweight and none of the girls was found obese (Table 4).

Conclusion :

The present study was planned to find out the prevalence of overweight/obesity among the 8-10 years school age children of Pantnagar. The findings showed the overall prevalence of overweight and obesity was 16 and 4.2 per cent in HIG and MIG categories, respectively and 3.8 per cent in LIG, respectively. The prevalence of overweight/obesity was higher in HIG children, which reflect the economical status on nutritional status.

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