

## Childhood obesity: Not so common for adolescents in an urban slum

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### Abstract

Childhood obesity is emerging as a major health problem among early adolescent school children. The present study is a cross sectional, questionnaire based study carried out among 220 early adolescent school children in an urban slum of metropolitan city using WHO (2007) recommended cut-off points. Among the total study population, 58% were boys and 42% were girls. As per age wise distribution, 35% were from 10-11, 31% from 11-12 and 34% from 12-13 years of age group. The overall prevalence rates of underweight, normal, overweight were 75.6%, 19%, 5.45% respectively. Though none of the study subjects were frankly obese, the prevalence of overweight/obese was 5.45%. It was noted that the majority of study subjects 166(75%) were either thin or severe thin. In the context of present study, the high prevalence of under nutrition may be due to their low calorie intake and lack of awareness on proper eating habits. Present study highlighted the existence of childhood under nutrition as a threat, which is likely to persist to adult life among these school children. Hence it is recommended that the teachers and the parents should be sensitized for the maintenance of healthy eating habits among the adolescent age group.

**Keywords:** Obesity, Overweight, Early adolescent, Urban slum.

### Introduction

The term 'obesity' is derived from the Latin word 'obesitas corpulence' meaning an unhealthy accumulation of body fat. According to WHO, obesity is defined as abnormal or excessive fat accumulation that presents a risk to health.<sup>(1)</sup> Obesity is a result of an interaction of genes and lifestyle. As individuals from both developed and developing countries consume more and more quantities of high energy food and have less physical activity, the number of overweight and obese individuals increases to epidemic proportion (WHO 2002).

Adolescence a period of transition between childhood and adulthood is a significant period of human growth and maturation. It occupies a crucial position in life of human beings. The health of adolescents attracted global attention in the past two decades. In India alone, there are approximately 60 million children who are underweight; this prevalence is higher in rural area compared to urban.<sup>(2)</sup> India has one of the highest underweight burdens in the world, even twice that of sub-Sahara region. However, India is now also beginning to experience the emerging problem of overweight.<sup>(3)</sup>

The childhood obesity has reached epidemic proportion in 21<sup>st</sup> Century, with rising rates in both developed as well as developing countries. This can hamper the physical and physiological well-being amongst them. It also affects self-esteem and has negative impact on social development of child.<sup>(4)</sup> According to NFHS 21.1% men and 16% women are found to be overweight and obese in Indian adult population.<sup>(5)</sup> The obesity can harm nearly every system in a child's body - heart, muscles, kidney, digestive tracts as well as hormones that control blood sugar and

puberty and can also take a heavy social and emotional toll. The overweight during adolescent period is often associated with risk factors of obesity related diseases in adulthood. It is potential risk factor for diabetes, hypertension, cardiovascular diseases, osteoarthritis, infertility, cancer etc.

Declining physical activity and poor nutrition intake amongst adolescent makes them prone towards many non- communicable diseases. Obesity at an earlier age leaves their mark during adolescence. As childhood obesity often persists until adulthood, more adults will be at increased risk of these conditions. Due to difficulty in treating morbid obesity prevention of childhood obesity has now been recognized as important public health priority.

Globally, early adolescents are considered to be less vulnerable to disease than the young children or very old. Hence are often neglected and receive scant attention. Since an early adolescent has been a least explored area for research, there is limited data on this issue. Hence, there is need to develop a database on diet and nutritional status of early adolescents, particularly from urban slum school going children in India.

With this background, the present study was undertaken to study the prevalence of obesity among early adolescent children (10-13 years) in urban slum and to study some epidemiological factors in relation to obesity among the study subjects.

### Materials and Method

A cross-sectional study was planned during February 2013 to April 2013 at Vidhya - Sadhana Convent from urban slum of Jaitala area of Nagpur. All the 220 school children studying in 5<sup>th</sup> to 7<sup>th</sup> standard at this convent who consented for this study formed the

study population. The protocol has acquired permission from Institutional Ethical Committee. For ethical consideration a written consent along with permission from school authority was taken after explaining them the purpose of study before conducting this study.

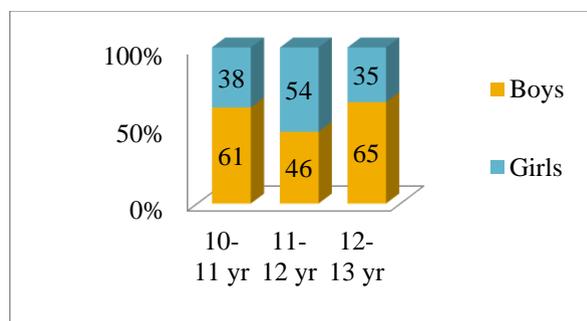
After reaching the concerned school, school teachers and school principal were explained about the purpose of undertaking this study. All the students attending 5<sup>th</sup> to 7<sup>th</sup> classes were selected for this study after the due consent of their parents. All the selected school children were interviewed, examined and investigated as per pre-designed and pre-tested Proforma (Questionnaire). Age of individual children was obtained from birth record maintained in school register.

The anthropometric measurements were recorded using standardized methodology as recommended by WHO. The students were weighed when standing motionless, without shoes and heavy clothes, using standardized weighing machine with an error of  $\pm 100$ gm. The weighing scale was regularly standardized with known standard weights. The height was measured by a portable anthropometric height measurement unit with an error to the nearest of 0.1cm, and using standard procedure with the subject standing in the erect position with the head in the ear-eye plane. Then Body Mass Index (BMI) was calculated from these cut off parameters given by WHO 2007.

Those students with health morbidities were referred to Urban Health and Training Centre for their treatment. All the students with under nutrition or obesity were imparted required health education regarding diet modification and exercise schedule required for their management.

## Results

In this cross sectional study in an urban slum, 220 early adolescent school children were examined. Out of total 220 early adolescent study subjects, 127(58%) were boys and 93(42%) were girls. As per age wise distribution is considered, 77 (35%) were from 10-11 years of age group, 69(31%) were from 11-12 and 74(34%) were from 12-13 years of age group (Fig. 1). It has been seen that 214(97%) were Hindus. Most of them 181(82%) were having nuclear family. The majority 196(89%) mother were working as a housewife. While the majority 171 (78%) of the study subjects had their father as skilled workers. As the majority 174 (79%) of the study subjects belong to nuclear families they have less than 3 as their family members.



**Fig. 1: Age wise distribution of participants**

When the study subjects were studied according to the food pattern it was seen that 145(66%) were taking mixed diet as compared to 75(34%) study subjects who were taking pure vegetarian diet. Though the junk food consumption was universal among study subjects, majority 119(54%) of them were having junk food less than a week. The majority 156(71%) of study subjects were having the fruit intake for 2-3 times a week and only minority 27(12%) were taking on daily basis. When the study subjects were studied in relation to expected calorie intake, it was surprisingly noted that all 100% were having the calorie intake less than the expected. When the study subjects were studied in relation to mode of transport the majority 182 (83%) were using automobile (Bus, Autorikshaw) for reaching the school. It was surprising to observe that only 146 (66%) were spending more than 30 min on any sport activity. The majority of 134(61%) were spending more than 30 minutes on television viewing (Table 1).

**Table 1: Demographic distribution of participants**

Religion	
Hindu	214(97%)
Other	6(3%)
Type of family	
Nuclear	181(82%)
Joint	25(12%)
3 Generation	14(6%)
Mother's occupation	
Housewife	196(89%)
Working	24(11%)
Father's occupation	
Skilled	171(78%)
Unskilled	49(22%)
No. of family members	
Less than 3	174(79%)
3-5	27(12%)
More than 5	19(9%)
Food habits	
Pure veg	75(34%)
Mixed	145(66%)
Junk food consumption	
Less than 2 days a week	119(54%)
2-3 days a week	67(30%)

More than 3 days a week	34(16%)
<b>Fruit intake</b>	
Daily	27(12%)
2-3 days/ week	156(71%)
2-3 days/ month	37(17%)
<b>Calorie intake</b>	
Boys – less than 2190	127(100%)
Girls – less than 2010	93(100%)
<b>Mode of transport</b>	
Cycling/Walking	38(17%)
Automobile	182(83%)
<b>Time spent on sport activity</b>	
Less than 30 min.	74(34%)
More than 30 min.	146(66%)
<b>TV viewers</b>	
Less than 30 min.	86(39%)
More than 30 min.	134(61%)

The overall (age combined) prevalence rates of underweight, normal, overweight were 75.6%, 19%, 5.45% respectively. Though none of the study subjects were frankly obese, the prevalence of overweight/obese was 5.45%. It was noted that the majority of study subjects 166(75%) were either thin or severe thin. There was significant association between ages—with that of underweight. ( $X^2=16.54$  and  $p$  value = 0.01) Thus there was significant increase in number of underweight students as age increase. In case of boys prevalence of underweight, normal and overweight was 73.2%, 19.6%, 7% respectively. And similarly in case of girls the prevalence was 78.5%, 18.2%, 3.2% respectively. Thus the prevalence of overweight was more common in boys (7%) as compared to girls (3.2%) in these 11-13 years of age group (Table 2).

**Table 2: Age wise and sex wise distribution of overweight in participants**

Age	Severe thin	Thin	Normal	Overweight	Chi square test	P value
11(n=77)	17(22%)	34(44%)	19(25%)	7(9%)	16.54	0.01
12(n=69)	8(12%)	47(68%)	12(17%)	2(2.8%)		
13(n=74)	6(8%)	54(73%)	11(14.2%)	3(4%)		
Total(n=220)	31(14%)	135(61%)	42(19%)	12(5.4%)		

Gender	Severe thin	Thin	Normal	Overweight	Chi square test	P value
Boys(n=127)	19(15%)	74(58%)	25(20%)	9(7%)	2.15	0.54
Girls(n=93)	12(13%)	61(66%)	17(18.2%)	3(3.2%)		
Total(n=220)	31(14%)	135(61%)	42(19%)	12(5.4%)		

Age	Underweight	Normal	Overweight
11(n=77)	51(66%)	19(25%)	7(9%)
12(n=69)	55(80%)	12(17%)	2(3%)
13(n=74)	60(81%)	11(14%)	3(4%)

When the results were analyzed for the association of underweight or obesity among study subject, it was seen that none of the above were associated either with diet pattern ( $p$  value=0.19) or with the mode of transport ( $p$  value= 0.95) or the time spent on television viewing ( $p$  value=0.67). The prevalence of obesity had the significant association with the sport activities less than 30 minute ( $x^2=6.20$  and  $p$  value = 0.001) and the junk food consumption ( $x^2 = 7.07$  and  $p$  value =0.007).

## Discussion

The cross sectional study was carried out in 220 early adolescent (10-13 years) school children in an urban slum of Nagpur, to find out the prevalence of overweight and obesity among early adolescent school children aged 11-13 years. The result of this study showed that though 42 (19%) were normal and there was low prevalence of overweight and obesity 12 (5.45%) but 166(75%) study subjects showed high prevalence of underweight. Similar result found in study conducted by Deshmukh PR et al in rural Wardha, among adolescents where they stated that majority 53.8% were thin and only 2.2% were overweight.<sup>(6)</sup> The Maibam Samson Singh and RK Neeta Devi in the year 2012 in the study among the urban Meitei children and adolescents of Manipur, Northeast India found that underweight were 30.21% and that of overweight were 3.12% which was to some extent closer to this study. Ramchandran et al reported that the prevalence of overweight /obese adolescents ranged from 22% in better off school and 4.5% in lower socioeconomic group school in Chennai<sup>(7)</sup> which matches with present study. One possible

reason for low prevalence of overweight and obesity and high prevalence of under nutrition could be attributed to their low dietary intake and the ignorance for healthy food habits.

The prevalence of overweight in present study was 7% in boys and 3.2% in girls, which was not statistically significant. This higher prevalence of overweight amongst boys could pose a risk factor for adulthood obesity. It was surprising that all 127(100%) boys and 93(100%) girls were having calorie intake less than 2190 and 2010 respectively which was the expected calorie intake for that age group.<sup>(8)</sup> And this low calorie intake which was universal among all the study subjects could be attributed to high prevalence 75% of under nutrition amongst them. No significant association was found between overweight/obesity and the factors like parent's occupation, religion and the type of family. The prevalence of obesity had the significant association with the sport activities less than 30 minute ( $\chi^2 = 6.20$  and p value = 0.001) and the junk food consumption ( $\chi^2 = 7.07$  and p value = 0.007).

The majority 182 (83%) were using automobile (Bus, Autorikshaw) for reaching the school. Similarly the substantially large number of study subjects (66%) were spending more than 30 minute for watching television. But these factors were not in any way associated with either the prevalence of underweight or obesity amongst them. In the present study, no significant association was found between overweight/obesity and with the factors like diet pattern (vegetarian /mixed diet) (p value=0.19), fruit intake (p value=0.26), calorie intake (p value= 0.21), mode of transport (p value = 0.95) and television viewing (p value = 0.67).

However, Mohanty B in the study among school going children in Pondicherry noted that there was a significant association between prevalence of overweight with that of junk food consumption, vegetarian diet, parent's occupation, vehicular transport to school, watching television<sup>(9)</sup> which is contradictory to this present study. This present study had provided a baseline data from the information gathered about early adolescent's life style among urban slum schools.

### Limitations

The main limitation of this study was that study population does not represent the whole population of adolescents of Nagpur urban slum, as it was conducted only in one school. We could have also included other school children. In addition, some other factors that are associated with self-reporting studies such as, accuracy of recall, personal bias could also have affected, in some ways the results of this study.

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