

Prevalence of Childhood Obesity and Overweight in Urban Adolescent Schools Children: A Prospective Study

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ABSTRACT

Background: Childhood obesity is a growing healthcare burden in India and other developing countries. Causes of overweight and obesity are attributed to various socio-economical and environmental factors that influence the food habit and physical activities. Obesity is more prevalent among the rich children of urban area than the rural setting.

Aims and Objectives: To find out the prevalence of overweight and obesity among the school going children.

Material and Methods: Present single centre cross sectional study was performed on 396 children of age 12 to 14 years at one school in January 2019. To capture the demographic and lifestyle data a pre-designed questionnaire was used. Collected data was statistical analyzed using SPSS ver. 20 software. Level of significance was assessed at 5%.

Results: Prevalence of overweight and obesity was 8% and 5% respectively. We observed that the obesity was more prevalent among girls. Fast food was the major cause for obesity and lack of physical activity makes it sever.

Conclusions: Observations of this study shows that overall 13% children were overweight and obese. This study suggest that the physical activities, games, health education and awareness programs should be included in the education system for students, teachers to fight and control the obesity and overweight.

Keywords: life style modification, urban children, health education

malnutrition and towards the better health and food security, this resulted in reduced number of underweight, malnourished, and stunted-wasted children. With changing lifestyle and food habits there is a spike in overweight and obesity not only in adults but also among children. With high prevalence India ranked third in the childhood obesity after the USA and China.^{1, 2}

Abnormal or excessive fat accumulation results into overweight and obesity. This presents a greater risk to health. Obesity can be measured using body mass index (BMI) which is calculated using person's weight in kilograms divided by square of his or her height in meters. BMI of more or equal to 30 kg/m² is considered as obese whereas BMI of more or equal to 25 is defined as overweight.^{1, 2}

Both overweight and obesity are the risk factors for the development of chronic diseases including diabetes mellitus, cardiovascular diseases (CVD) and cancer. Initially obesity was considered the problem of developed countries, but now due to changing the life style, it has become the problem of low- and middle-income countries mainly in the urban populations.¹

Several programs are running to combat malnutrition in India, however India has developed another problem as obesity. Previous data by National Family Health Survey (NFHS-4) have documented the doubling of the obese people in India. This also highlighted the point of increasing the

INTRODUCTION

With social-economic development, India moved away from childhood

obesity among the urban population as compared to rural settings.²

In India nutritional status varies significantly from region to region and childhood malnutrition varies between 20 to 80 % region to region but interestingly there is a rising of prevalence of childhood overweight and obesity in some parts.³ In present study we tried to find out the prevalence of overweight and obesity of school going children of Chandimandir area.

MATERIAL AND METHODS

Three hundred and ninety six school going children having age between 12-14 years from a school of Chandimandir were studied. To capture the demographic and lifestyle data a pre-designed questionnaire based on Global school-based student health survey⁴ was used. It was a cross-sectional single centre study conducted on January 2019.

A prior permission to conduct this study was secured from the Govt. Education Dept. and the school authorities. An informed and written consent was also secured from the participating students and their parents.

For this study only the children in the age group of 12 to 14 years were taken and students with severe and chronic illness and who were unwilling to participate were excluded.

To calculate the body mass index (BMI) height and weight of the subjects was recorded using the digital weighing machine and meter tape. All the subjects were interviewed to record the age, sex, food habits, skipping breakfast, TV watching time, time spent on videogames and social media, time spent on physical activities and games.

Based on the recorded subjects were classified as regularly eating or not eating

breakfast, skipping breakfast or average breakfast in a week.

Children indulge in physical activity for sixty minutes (moderate to vigorous) per day classified as physically active. Moderate activity included brisk walking, dancing, household chores and vigorous exercise includes running, fast cycling, fast swimming, moving heavy load, playing football etc.⁵

BMI was calculated according to the WHO child growth reference and a set of thresholds based on single standard deviation spacing was used in the study.

$BMI = \text{Weight (Kg)} / \text{Height}^2 \text{ (m}^2\text{)}$ (weight in kilograms is divided by square of weight in meter)

Subjects were grouped as Underweight (18.5), Normal (18.5 and 24.9), Overweight (25 and 29.9) and Obese (30 and 39.9).

Recorded data was analyzed using IBM SPSS ver. 20 software and Microsoft Excel. Data is expressed as number and percentage. The risk factors were assessed by using Chi-square test. P value of <0.05 was considered as statistically significant for all the analysis.

RESULTS

In this study we observed that overweight and obesity is more prevalent among school going girls than the boys.

Table 1: Distribution of gender (girls and boys)

Gender	Number	Percentage (%)
Boys	198	50
Girls	198	50

Table 2: BMI distribution in male and female subjects

BMI	Boys	Girls	Total
Normal	133 (67)	129 (65)	262 (66)
Underweight	43 (22)	39 (20)	82 (21)
Overweight	14 (7)	18 (9)	32 (8)
Obese	8 (4)	12 (6)	20 (5)
Total	198 (100)	198 (100)	396 (100)

Data is expressed as no of subjects (percentage), BMI; body mass index

Table 3: BMI distribution among different age groups

Age (years)	Normal	Underweight	Overweight	Obese	Total
12	60 (60)	33 (33)	5 (5)	2 (3)	100 (100)
13	62 (61.4)	31 (30.7)	5 (4.9)	3 (2.9)	101 (100)
14	140 (71.8)	19 (7.4)	22 (11.3)	14 (7.2)	195 (100)
Total	262 (66.2)	83 (20.91)	32 (8)	19 (4.8)	396(100)

Data is expressed as no of subjects (percentage), highest obesity and overweight was observed in the age of 14 years.

Table 4: Factors and behaviors of obesity and overweight subjects

Factors/Behaviors	Overweight and obese		Underweight and Normal		p value*
	Yes	No	Yes	No	
Breakfast skipping	17 (33)	35 (67)	41 (12)	303 (88)	p<0.001
Lack of physical activities	34 (65)	18 (35)	148 (43)	196 (57)	p=0.001
More indulgence on TV/video game/pc/mobile phones	29 (55)	23 (45)	155 (45)	189 (55)	p=0.095
Family history of overweight and obesity	8 (15)	44 (85)	28 (8)	316 (92)	p=0.042
Intake of Junk/Fast food/Carbonated sweet drinks	34 (65)	18 (35)	121 (35)	223 (65)	p<0.05

Total obese and overweight are 52 and 344 were underweight and normal. * first p value between "Yes" response

DISCUSSION

We included 396 subject of either sex between 12 to 14 years of age. Subjects were divided in to four groups as normal, underweight, overweight and obese based on their BMI. Results showed that prevalence of obesity and overweight was 5% and 8% respectively which shows over all prevalence of 13%.

Similar reports were generated by the Vairagade et al⁶ and Tapnikar et al⁷; as per these studies among school children of Aurangabad combined prevalence was 10% (overweight:7%; obesity:3%) which was closer to ours and slightly higher in a study in Nagpur i.e. a combined prevalence of 14% (overweight:12%; obesity:2%). Our results resonate with the study by Jacob et al in which WHO growth reference charts, 2007 was used like ours but sample size was only 150. In Kerala it was 10.7% (overweight: 7.56%; obesity: 3.10%) respectively though the school children belonged to rural area of Kerala unlike ours.⁸ Bhargava et al concluded that in the hill states of India prevalence of overall overweight and obesity was 15.6 % which is higher than our result.⁹

On analysis of age wise distribution of BMI in our study prevalence of 12 % overweight and 8 % obesity was found to be highest in 14 year of school children and similar findings were observed by Kavitha et al in their study at Gulbarga where prevalence of overweight and obesity were more among 15 years students followed by 14 year age group of children.¹⁰

We also found that there is higher prevalence of overweight and obesity i.e. 9% and 6% respectively among girls than those of boys i.e. 7% and 4% respectively. Which is in agreement to finding of Jacob et al, among rural children of Kerala where

more girls were found to be overweight (9.09%) than boys (5.96%). But in terms of obesity unlike our findings boys were more obese (3.35%) than girls (2.85%).⁸ Jagadesan et al also conclude that prevalence of overweight and obesity were more among females with 17.74% and 6.45% respectively compared to males (4.55% and 1.44% respectively) and gender was significantly associated with overweight and obesity unlike in current study.¹¹

Major factors and behaviors responsible for overweight and obesity are unhealthy food habits and lack of physical activity. These risk behaviors among overweight and obese children were compared with non-obese children. In our study we found the association between fast food eating and obesity significant (p<0.05). More percentage of obese children was taking fast food compared to that of non-obese children. Similar observations were reported by Martha "At present, Indians and teens in particular do prefer to eat American chains shunning traditional cuisines".¹²

Another common observation among obese subjects was skipping of breakfast, our findings are similar to Thompson et al who observed a high prevalence of both overweight (41%, including 15% who were obese) and breakfast skipping (68%) and on multivariate analysis found that more frequent breakfast skipping was associated with greater odds of overweight.¹³ With easy availability of modern electronic media and gadgets, children spends more time around them instead of actual physical activity, which are now regarded as the most modifiable risk factors of childhood obesity. We also observed that around 55% of both obese and non-obese children were used to

TV watching and videogames and association of TV viewing and obesity was not found significant. ($P=0.0956$, $P>0.05$). Similar findings were reported by Saha from Mehsana, Gujarat.¹⁴

Our study found that 15% obese children had family history of overweight/obesity compared to that of non-obese children (7.5%) which was found significant. ($p=0.0425$, $p<0.05$), which is in resonance to the meta-analysis by Kanciruk who concluded that the children with a family history of obesity were at an elevated risk for overweight and obesity compared with children who did not have a family history of obesity.¹⁰

Cross sectional nature was the main drawback of the present study due to that present study results cannot be applied to larger population. Second limitation was that we included the subjects from only one school; we would have included more school subjects to get more realistic results. A large randomized clinical trial is required to strengthen the present study findings.

CONCLUSION

Based on observation we found that the prevalence of overweight and obesity 13% among school going children. There is also a gender factor which hints that obesity is more common in girls than that of boys of same age group. Other major factors like food habit, time spent on physical activity and family history of obesity also significant factors of obesity.

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