



## PREVALENCE OF OBESITY AMONG SCHOOL GOING ADOLESCENTS OF GUWAHATI CITY, ASSAM

### Community Medicine

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### ABSTRACT

**Background:** The prevalence of obesity and overweight among adolescents is increasing in developing countries day by day owing much to the sedentary lifestyle habits like lack of physical activity and increase in intake of junk foods. Obesity is has become a serious public health problem and it is a definite precursor for diseases like CVD, Diabetes etc.

**Objective:** To find out the prevalence of Obesity among the school going adolescents and to assess the various socio-demographic, physical activity and dietary factors related to Obesity.

**Materials and Methods:** This is a school based cross-sectional study carried out in the Government Higher Secondary schools of Guwahati city, Assam. A multistage sampling technique was applied to achieve a sample size of 528 students for the study. A predesigned, pretested semi-structured schedule was used to collect necessary information. Results: The overall prevalence of Obesity was found to be 3.41%. The prevalence of obesity in Boys is 3.03% and in Girls it is 3.79%. It is found that obesity is significantly associated with physical activity, intake of fast food and soft drinks.

**Conclusion:** The high prevalence of obesity and overweight among the students demands an urgent need for awareness raising campaigns to increase their knowledge about health hazards of obesity.

### KEYWORDS

Obesity, Adolescents, School.

### Introduction:

In this era of rapid urbanization and modernization, obesity in our society has clearly established itself as a threat to public health. Obesity leads to serious health consequences like CVD (heart disease and stroke), type 2 DM and carcinomas of breast, colon and endometrium. At least 2.6 million people die every year as a result of being overweight or obese and the worldwide prevalence of obesity has more than doubled between 1980 and 2014<sup>[1]</sup>. The onset of risk behaviors predisposing to obesity often starts in adolescents. WHO identifies adolescence as the period in human growth and development that occurs after childhood and before adulthood, in the age group of 10 to 19 years<sup>[2]</sup>.

Behaviors like insufficient physical activity and unhealthy diet lead to an array of negative physical changes in adolescence such as overweight/obesity, making them more vulnerable for developing NCDs in adulthood. WHO (2010) states that globally 81% of adolescents were insufficiently physically active<sup>[3]</sup>. The overweight adolescents are twice as much likely to develop cardiovascular disease in their adulthood and have seven times greater risk of developing atherosclerosis. This study was carried out with the objective to find out the prevalence of Obesity among the school going adolescents and to assess the various socio-demographic, physical activity and dietary factors related to Obesity.

### Materials and methods:

This cross sectional study was conducted in the Higher Secondary schools of Guwahati city, Assam. The study was carried out from August'2014 to July'2015 among Adolescent school children, from 14-19 years of age, studying in the 9<sup>th</sup> to 12<sup>th</sup> standard. The sample size was calculated out to be around 528 by taking the prevalence of obesity as 5.3%<sup>[4]</sup>, allowable absolute error (L) of 2% with 95% confidence interval by using the formula ( $n=4pq/L^2$ ). The list of all schools of Guwahati city was collected and considered as the sampling frame. From the total of 66 schools, random sampling method was used to select 6 schools. Then, from each school, 88 students were randomly selected (22 students from each class of 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup> and 12<sup>th</sup> standard) to get the desired sample size. It was decided to interview equal numbers of males and females. Finally, a total of 528 students (88×6) were selected for the study. After taking the necessary permission from the school authority, the students from each class were randomly selected using their roll numbers from class registers. All the students who fulfilled the criteria were interviewed using a predesigned and pretested semi-structured schedule and if a student was absent or unwilling to participate in the study, then the student with subsequent roll number was selected for the interview. Beforehand,

each and every student was carefully briefed about the purpose of the study and consent was taken. Modified Kuppuswami socio-economic scale was used to assess their socio-economic status<sup>[5]</sup>. Physical activity was assessed by their involvement in sports, attending physical training classes in school, walking, running or cycling for at least 30 minutes during the day in the last 7 days. Similarly, for dietary factors, recall method of last 7 days was used. Obesity was classified using the criteria of 'BMI for Age and Sex' as per WHO Growth reference data<sup>[6]</sup>. Height was calculated using a measuring tape with proper method and weight was measured using a bathroom type of weighing scale. Approval from the institutional ethics committee was obtained. The findings of the study were tabulated and presented as percentages and Chi-square test and Fischer exact tests were also applied.

### Results:

Table 1 shows that the prevalence of Obesity was found out to be 3.03% in Boys and 3.79% in Girls, whereas 10.61% of Boys and 11.74% of Girls were found to be Overweight. Table 2 shows the distribution of the Obese students as per their socio-demographic characteristics, where among the students 2.19% belonged to 14-15 years age group and 4.33% belonged to 16-19 years age group. Majority of Obese students (5.3%) belonged to 11<sup>th</sup> standard. Also, Obesity was found to be higher in Upper SE group (13.64%). Table 3 shows the association of Obesity with different important determinants. It is found that Obesity is significantly associated with intake of Fast food, Soft drinks and Physical activity.

**Table 1: Distribution of students as per their BMI:**

Category	Boys		Girls		Total	
	Number	%	Number	%	Number	%
Obesity	8 (44.44)	3.03	10 (55.56)	3.79	18	3.41
Overweight	28 (47.46)	10.61	31 (52.54)	11.74	59	11.17
Normal	152 (49.51)	57.57	155 (50.49)	58.71	307	58.14
Underweight	76 (52.78)	28.79	68 (47.22)	25.76	144	27.27
Total	264 (50)	100	264 (50)	100	528	100

**Table 2: Table showing relationship of obesity with socio-demographic parameters:**

Parameters	Obese	Non-obese	Total	
Age group	14-15 years	5 (2.19)	223 (97.81)	228
	16-19 years	13 (4.33)	287 (95.67)	300
Educational Level	9 <sup>th</sup>	2 (1.52)	130 (98.48)	132

	10 <sup>th</sup>	4 (3.03)	128 (96.97)	132
	11 <sup>th</sup>	7 (5.3)	125 (94.7)	132
	12 <sup>th</sup>	5 (3.79)	127 (96.21)	132
Religion	Hindu	10 (2.45)	398 (97.55)	408
	Islam	6 (5.77)	98 (94.23)	104
	Christian	2 (12.5)	14 (87.5)	16
Type of Family	Nuclear	11 (2.28%)	471 (97.72%)	482
	Joint	7 (15.22%)	39 (84.78%)	46
Socio-economic status	Upper	3(13.64)	19(86.36%)	22
	Upper Middle	8(4.49)	170(95.51)	178
	Lower Middle	5(2.5)	195(97.5)	200
	Lower class(combined)	2(1.56)	126(98.44)	128

**Table 3: Table showing relationship of obesity with dietary factors and physical activity:**

	Parameters	Obese	Non-obese	Total	p-value
Fast food	< 3 days	5(1.52)	323(98.48)	328	<0.05
	> 3 days	12(6)	188(94)	200	
Intake of fruits	< 3 days	11(5.29)	197(94.71)	208	>0.05
	> 3 days	7(2.19)	313(97.81)	320	
Soft drinks	< 3 days	5(1.50)	328(98.5)	333	<0.05
	> 3 days	12(6.15)	183(93.85)	195	
Physical activity	<3 days	15(4.89)	292(95.11)	307	<0.05
	>3 days	3(1.36)	218(98.64)	221	

#### Discussion:

In this study it was observed that among the 528 students, the prevalence of obesity was 3.41% and overweight was 10.61. In a multicentric study by Misra et al (2011)[4], the prevalence of obesity and overweight was found to be 5.3% and 18.5% respectively. Kotian and co-workers (2010)[7] found that obesity was 4.8% and overweight was 9.9% among the adolescents and the results are at par with the present study findings. This study also highlights the relation of obesity with different demographic parameters. Obesity was found to be significantly associated with religion, type of family and socio-economic status. The prevalence of obesity in the Upper class, Upper-middle and Lower-middle class were 13.64%, 4.49% and 2.5% respectively. A study by Laxmaiah et al (2007)[8] in Hyderabad found that obesity was significantly higher among the adolescents of high SES (15%) compared with those of low SES (3.3%). Sedentary lifestyle habits have a definite role in development of overweight/obesity. In this study, obesity was found to be significantly associated with intake of fast food, soft drinks and physical activity. Similar to this study, significant association between obesity and fast food intake was also elicited in the study by Nawab et al (2014)[9]. Goyal et al (2011)[10] observed that the students who consumed soft drinks daily and more than 3 times a week had 19.7 times and 6.9 times chance of developing overweight or obesity. Significant association between obesity and physical activity was also observed by S Kumar et al (2007)[11] in Davangere city. S Kaur et al (2008)[12] also mentioned that physical activity and BMI showed a statistical negative correlation in the LIG and MIG children.

#### Conclusion:

The high prevalence of Obesity and Overweight among the students demands an urgent need for awareness raising campaign to increase their knowledge about health hazards of obesity. Physical training should be made a mandatory part of school curriculum as it was seen that many schools offered sports as an option to other club activities. Health education regarding ill-effects of junk foods and insufficient physical activity should also be provided. Parents and guardians also have a definite role to play in prevention of development of such risk habits.

#### References:

- 10 Facts on Obesity. [internet] .World Health Organization. [cited 2015 Sep] Available from <http://www.who.int/features/factfiles/obesity/facts/en/index1.html>
- Sawyer SM, Afifi RA, Bearinger LH, Blakemore SJ, Dick B, Ezech AC et al. Adolescence: a foundation of future health. *Lancet* 2012; 379: 1630-40
- Physical Activity: WHO Factsheet [internet]. Switzerland.

World Health organization, 2015. [Updated 2015 Jul cited 2015 Sept 28] . Available from

<http://www.who.int/mediacentre/factsheets/fs385/en/>

- Misra A, Shah P, Goel K, Hazra DK, Gupta R, Seth P, et al. The high burden of obesity and abdominal obesity in urban Indian schoolchildren: A multicentric study of 38,296 children. *Ann Nutr Metab.* 2011;58:203-11
- Oberoi SS. Updating Income Range for Kuppuswamy's Socio-Economic Status Scale for the Year 2014. *Indian J Public Health.* 2015 Apr-Jun; 59(2): 156-157.
- Onis M, Onyango AW, Borghi E, Siyam A, Nishida C, Siekmann J. Development of a WHO growth reference for school-aged children and adolescents. *Bulletin of the World Health Organization* 2007; 85(9):660-667.
- Kotian MS, Ganesh KS, Kotian SS. Prevalence and Determinants of Overweight and Obesity Among Adolescent School Children of South Karnataka, India. *Indian J Community Med.* 2010 Jan; 35(1): 176-178.
- Laxmaiah A, Nagalla B, Vijayaraghavan K, Nair M. Factors affecting prevalence of overweight among 12- to 17-year-old urban adolescents in Hyderabad, India. *Obesity (Silver Spring)* 2007; 15(6):1384-1390
- Nawab T, Khan Z, Khan IM, Ansari MA. Influence of behavioural determinants on the prevalence of overweight and obesity among school going adolescents of Aligarh. *Indian J Public Health.* 2014 Apr-Jun; 58(2): 121-4.
- Goyal JP, Kumar N, Parmar I, Shah VB, Patel B. Determinants of Overweight and Obesity in Affluent adolescent in Surat City, South Gujrat region, India. *Indian J Community Med.* 2011 Oct; 36(4): 296-300
- Kumar S, Mahabalaraju DK, Anuroopa MS. Prevalence of Obesity and its Influencing Factor Among Affluent School Children of Davangere City. *Indian J Com Med.* 2007; 1(1): 15-17
- Kaur S, Sachdev HPS, Dwivedi SN, Lakshmy R, Kapil U, Sareen N. Association of Obesity with Hypertension Amongst School-Age Children Belonging to Lower Income Group and Middle Income Group in National Capital Territory of Delhi. *Indian J Community Med* 2013 July; 38(3): 175-79