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SOCIO-DEMOGRAPHIC DETERMINANTS OF OVERWEIGHT AND OBESITY AMONG SCHOOL CHILDREN IN AN URBAN CITY OF CENTRAL INDIA

Garima Namdev[1], Mahesh Kumar Mishra[2], Dinesh Kumar Saxena[3], SwarnaKanta Likhar[4]

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Author's Affiliation:
[1]Asst. Prof, Dept. of Community Medicine, LNMC&RC, Bhopal;
[2]Professor, Dept. of Comm. Medicine, PCMC&RC, Bhopal;
[3]Professor & HOD, Dept. of Comm. medicine, LNMC&RC, Bhopal;
[4]Professor, Dept. of Comm. medicine, PCMC&RC, Bhopal

Correspondence:
Dr. Garimanamdev
namdevgarima50@gmail.com

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ABSTRACT

Background: Childhood obesity with all its adverse health consequences is growing at a very fast rate in developing countries. Identification of obese status during early childhood has substantial health benefits to the children and to the country. Present study aimed to assess prevalence of overweight and obesity and associated socio demographic factors amongst children in Bhopal city.

Methods: A cross sectional descriptive study was conducted for 28 months among students of IX, X, XI, XII classes in both government and private schools of Bhopal. Multistage simple random sampling procedure was used. Anthropometric measurements and a pretested self-administered questionnaire comprised of socio demographic information were used for data collection.

Results: In present study, 256 (5.6%) students were overweight and 46 (1.0%) were obese. Maximum numbers of 2.5% obese students were belonging to upper SES as compared to middle and lower SES.

Conclusion: The overall prevalence of overweight and obesity was found more common in girls and among students of private schools. It was found more in children with their working mothers with higher education.

Keywords: Overweight, Obesity, Body mass index (BMI), Socio economic status (SES)

INTRODUCTION

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health, leading to reduced life expectancy and increased health problems.[1] The World health organization (WHO) describes overweight and obesity as one of today's most important public health problems, which is escalating as a global epidemic.[2]

Obesity in children is emerging as a major public health problem, and is also a well recognized risk factor for adult obesity, which in turn may be the basis of various chronic diseases including hypertension, hyperlipidemia, respiratory diseases, diabetes, orthopedic conditions etc. It is estimated that 10 to 20% of obese infants remain overweight as children, about 40% of overweight children continue to be obese during adoles-

cence, and 75 to 80% of obese adolescents become obese adults.[3]

Obesity in children and adolescents is gradually becoming a major public health problem in many developing countries also, including India.[4] Many socio demographic determinants play a dominant role behind the origin of overweight and obesity which is highlighted by the following research studies done upon school children in our country.

At Manipur, Bishwalataet al[5] found that the prevalence of overweight was associated with higher family income and mother's literacy status, while Premnath et al[6] found more overweight (9.1%) students in private schools as compared with government schools (5.9%) in Mysore city.

Therefore, the current study focuses on the relationship between social class and weight issues in school children because this has implications for the focus of health education as well as health promotion activities. In the view of this, present cross sectional study was conducted to determine the prevalence of overweight and obesity among school children and associated socio demographic determinants in an urban city of central India.

METHODS

ACross-sectional descriptive study was done among children studying in IX, X, XI, XII classes in govt. and private schools of Bhopal city. It is carried out for 28 months duration (July 2011 to Oct. 2013). All students willing to participate in study are included while those who are absent at the day of study are excluded. The sample size was calculated using the following formula[7]: $n = Z^2pq/l^2$ (where - Z = 1.96, p = prevalence of obesity among school children in previous study[8], q = 1-p, l = allowable error). Here, by taking 9 % prevalence, 10% allowable error and 10% non-response error, the sample size was obtained to be 4448.

Multistage simple random sampling method was used to select schools in Bhopal. First of all, a list of all government and private higher secondary schools was obtained from the Ministry of education, Govt. of Madhya Pradesh. Total 38 schools (19 governments and 19 private) were selected by lottery method to fulfill the calculated sample size (4560) and from each school, four classes i.e. IX, X, XI, XII were considered for study. Minimum 120 students from each school were included in the study. Considering 30 students in each class, which is government norm, was selected. On the day of examination, one section from each class was selected by Lottery method. In each section, first 30 students were selected from the attendance register and included under study as per sampling frame.

A pretested self-administered questionnaire was used for data collection. Questionnaire comprised of socio demographic information regarding age, sex, class, type of school, mother's education, mother's occupation and socio economic status. Socio economic status was calculated according to modified Kuppuswamy classification [9]. However, for the purpose of this study, SES is classified in upper, middle and lower category only.

Anthropometric measurements were also taken to calculate Body mass index (BMI). BMI classification for South East Asians[10] given by WHO is used to calculate overweight and obesity in present study. Body weight was measured by using an electronic weighing machine to the nearest 100 grams with the subject standing barefooted with light minimal clothing. Height was measured to the nearest 0.5 cm with the subject standing barefooted using a portable, stadiometer. The data was processed and analyzed by the Statistical Packages for Social Sciences (SPSS) version 20 software programme. The Study was approved by the Institutional Ethical Committee (IEC). As the study subjects were students, the informed consent was obtained from the principal of school. Students were explained in detail about study and verbal consent was obtained from them.

RESULTS

Out of 4560 students, 2398 (52.6%) were from private schools and 2162 (47.4%) from government schools comprising of 2596 (56.9%) girls and 1964 (43.1%) boys. Maximum number of students 2787(61.1%) were in the age group 15-17 years and majority of students 3720 (81.6%) were belonging to middle SES. (Table 1)

In our study, we observe that 256 (5.6%) students were overweight and 46 (1.0%) were obese. The number of overweight 162(6.8%) and obese 27(1.1%) students was reported little higher in private schools as compared with government schools which was highly statistically significant. ($\chi^2 = 54.04$, df = 3, p= < 0.0001) as shown in Table

2. It entails us that students belonging to private schools have a more tendency to become overweight and obese.

Girls are significantly more overweight 148(5.7%) and obese 31(1.2%) as compared to boys with 108(5.5%) overweight and 15(0.8%) obesity (χ^2 = 18.47, df = 3, p= < 0.0001). Maximum 171(6.1%) overweight and 33(1.2%) obese students were belonging to the age group 15-17 yr. as compared to minimum 73(4.7%) overweight in 12-14 yr. age group and 1(0.5%) obese student belonging to 18-19 yr. age group. (χ^2 = 15.96, df = 6, p= 0.01).

Table 2 shows that as we proceed from lower to upper SES, the prevalence of obesity was found to be increasing from 0.7% to 2.5% which were found highly statistically significant (χ^2 = 100.60, df = 6, p= < 0.0001), while no such pattern was observed among overweight students.

It was also observed that maximum prevalence of overweight 18(12.7%) and obese 3(2.1%) students belong to graduate mothers. (Table 2) It was found highly statistically significant. (χ^2 = 161.77, df = 12, p= < 0.0001). The prevalence of overweight and obesity was very much less reported among students with their mother possessing middle education.

Mothers of 5.9% overweight and 2.3% obese students were working and also found highly statistically significant as shown in Table 2 (χ^2 = 21.55, df = 3, p= < 0.0001). It also tells us that the tendency to become overweight and obese was found to be less in those students whose mothers were home maker i.e. the BMI is associated with mother's occupation.

Table1.Socio demographic distribution of School children (n = 4560)

Variables	No. (%)
Type of school	
Government	2162 (47.4)
Private	2398 (52.6)
Class	
IX	1142 (25.0)
X	1140 (25.0)
XI	1141 (25.0)
XII	1137 (24.9)
Age	
12-14 yr.	1563 (34.3)
15-17 yr.	2787 (61.1)
18-19 yr.	210 (4.6)
Gender	
Boys	1964 (43.1)
Girls	2596 (56.9)
Socioeconomic status (SES)	
Upper	122 (2.6)
Middle	3720 (81.6)
Lower	718 (15.7)
Mother's education	
Illiterate	1099 (24.1)
Primary	1722 (37.8)
Middle	1067 (23.4)
High	530 (11.6)
Graduate	142 (3.1)
Mother's occupation	
Working	475 (10.4)
Home maker	4085 (89.6)

Table 2: Association of BMI of School Students with various socio-demographic indicator

	Normal weight (%)	Underweight (%)	Overweight (%)	Obese (%)	Total (%)	P value
n (%)	1982(43.5)	2276(49.9)	256(5.6)	46(1.0)	4560	
Type of school						
Government	850(39.3)	1199(55.5)	94(4.3)	19(0.9)	2162(47.4)	< 0.0001
Private	1132(47.2)	1077(45.0)	162(6.7)	27(1.1)	2398(52.6)	
SES						
Upper	44(36.1)	66(54.1)	9(7.4)	3(2.5)	122(2.6)	< 0.0001
Middle	1713(46.0)	1781(47.9)	188(5.1)	38(1.0)	3720(81.6)	
Lower	225(31.3)	429(59.7)	59(8.2)	5(0.7)	718(15.8)	
Mother's education						
Illiterate	331(30.1)	696(63.3)	55(5.0)	17(1.5)	1099(24.1)	< 0.0001
Primary	807(46.9)	795(46.1)	103(6.0)	17(1.0)	1722(37.8)	
Middle	555(52.0)	466(43.7)	46(4.3)	0(0.0)	1067(23.4)	
Secondary	242(45.6)	245(46.2)	34(6.4)	9(1.7)	530(11.6)	
Graduate	47(33.0)	74(52.1)	18(12.7)	3(2.1)	142(3.1)	
Mother's occupation						
Working	168 (35.4)	268 (56.4)	28 (5.9)	11 (2.3)	475(10.4)	< 0.0001
Home maker	1814 (44.4)	2008 (49.1)	228 (5.6)	35 (0.9)	4085(89.6)	

DISCUSSION

In our study, the overall prevalence of overweight and obesity among school children was found to be 5.6% and 1.0% respectively. Some studies reported higher prevalence of overweight and obesity than our study like Tilaki et al(2006)[11] and Warrich et al (2008)[12] while Bishwalata et al (2005)[5] ,Bharti et al (2008)[13]and Vohra et al (2010)[14] reported lower prevalence of overweight & obesity. The possible explanation behind these findings may be the difference in the cultural pattern of area of study and dietary preference for non vegetarian food items.

The studies conducted in metropolitan cities by Kapil U.et al (2002)[15], Sharma et al (2005)[16], Chhatwal (2004)[17] and Kamath et al (2012)[18] found very much higher prevalence of overweight and obesity among school children. The possible reason of very high prevalence of overweight and obesity may be rapidly altered dietary habits and sedentary life style of metropolitan cities. These studies have small sample size and included school children only from affluent society and different criteria used for overweight and obesity. In our study, we included a large sample size of school children comprising wider age group of 12-19 yrs. and children selected from both private and government schools, may be the reason for relatively lower prevalence of overweight and obesity.

In present study, the prevalence of overweight and obesity is significantly higher in private schools as compared to government schools. This finding is supported by various studies done by Manu raj et al (2003-05)[19], Premnath et al (2005)[6] and Tilaki et al (2006)[11]. The possible reason for higher prevalence of overweight and obesity in private schools may be because of different lifestyle pattern of students. Secondly, economic status of parents is higher and belonging to well to do families.

Maximum prevalence of obesity was found in students belonging to upper SES (2.5%) followed by middle and lower SES (1.0% & 0.7%) in current study. Kaur et al (2007)[20] supports our findings while Goyal et al (2008)[21] found that the middle income group have higher prevalence of overweight & obesity which is contrary to our study.

These differences might be due to several reasons. Firstly, the scale used for assessing the SES was different in various studies. Secondly, with higher SES, associated lifestyle changes leading to inappropriate diet and increasing levels of sedentary activities may occur.

In present study, maximum prevalence of overweight (12.7%) and obese (2.1%) students were reported in graduate mothers. The minimum prevalence of overweight (4.3%) and no obese student was found with mother possessing middle education. It is almost similar with the findings of a study done by Bishwalata et al (2005).[5] The possible reason behind this finding is that, although more educated mothers are well aware of hazards of sedentary lifestyle pattern and adverse effect of consumption of junk food but still, they have enough capacity to fulfill their child's each and every demand.

In our study, in 5.9% overweight and 2.3% obese students, the mothers were working as compared to 5.6% overweight and 0.8% obese students with home maker mothers. It may be due to working mothers are independent and have strong economy to possess luxurious material and a variety of food items for their children.

CONCLUSION

In present study, the overall prevalence of overweight and obesity was 5.6% & 1.0% respectively in school children of 15-17 yr. age group. It was more common in girls and among students of private schools. There is high prevalence of overweight and obesity in students belonging to upper SES and in working mothers.

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