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Original Article

Prevalence of Overweight and Obesity and Its Possible Associations Among School Adolescents in Urban Kanpur

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ABSTRACT

Background: *Obesity is becoming a worldwide problem affecting all levels of society and is thus being described as a global epidemic. the highest rates of childhood obesity have been observed in the developed countries, its prevalence is increasing in the developing countries also. 50-80% of obese children will continue as obese adults.* ***Aims and Objective:*** *To study prevalence and possible associations of obesity and overweight among school adolescents in urban Kanpur.* ***Methods:*** *A cross-sectional study done among 468 children from 7-10 class. Complete data of each child were collected using a pre-designed, pre-tested questionnaire. Measurement of height & weight will be done using standard procedure with measuring tape (made of non-stretchable steel) & electronic weighing machine respectively. Body mass index(BMI) will be calculated using the formula: WEIGHT (in kg)/HEIGHT (in m sq.) Sex & age specific percentile cut-points (85th percentile for overweight & 95th percentile for obesity) of a reference population according to BMI for Age Classification by CDC will be used. Data will be entered in Microsoft Excel & will be analysed using SPSS software.* ***Results:*** *Prevalence of overweight was 13.6% while prevalence of obesity was 2.9%. Overweight and Obesity was found significantly higher in Children of 5-10 years' age group, with family H/O obesity, not playing outdoor games, not doing regular exercise, watching TV, Computer more than 2 hours daily and consuming junk food regularly.* ***Conclusions:*** *Periodic screening for overweight and obesity should be done in schools followed by counselling of parents of overweight and obese children. Counselling of adolescent children on lifestyle modification should be emphasized.*

Key words: *Adolescent, Body Mass Index (BMI), Overweight, Obesity.*

INTRODUCTION

Obesity is becoming a worldwide problem affecting all levels of society and is thus being described as a global epidemic.[1] On one hand, the highest rates of childhood obesity have been observed in the developed countries, its prevalence is increasing in the developing countries also.[2] 50-80% of obese children will continue as obese adults.[3] Childhood obesity affects self-esteem and negative consequences on the cognitive and social development.[4] Conditions such as type 2 diabetes mellitus, hypertension and hypercholesterolemia which noted primarily in the adults are becoming common among children with the increase in the prevalence of obesity.[5]

India is going through a nutrition transition phase and is now facing the 'double burden' of nutrition disorders.[6] In India, the problem of obesity has been scantily explored even in the affluent population groups. Studies from metropolitan cities in India have reported a high prevalence of obesity among affluent school children.[7,8]

It is estimated that 15-25 % of urban school children in India are at risk of developing Type 2 diabetes at an early age.[9] The emergence of such wide spread prevalence of lifestyle disease in young people is believed to be associated with changes in physical activity and nutrition that are ubiquitous in modern society.

The United Nation's Subcommittee on nutrition held a meeting in Oslo in 1998 which concluded that more data on health and nutrition of school age children are needed to assess the scale of their problem.[10]

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Our main objective was to examine the prevalence of overweight and obesity and its associated factors in school children using internationally based cutoff points and compare the relationship between SES factors and eating habits.

AIMS AND OBJECTIVE: To study prevalence and possible associations of obesity and overweight among school adolescents in urban Kanpur.

METHODS

The present study was a cross sectional study conducted in two Schools of urban Kanpur during July–sept 2016. Ethical clearance from the Institutional ethical committee was obtained. After getting permission from school authorities, the data was collected from students of Class 7 to 10.

We followed the process of multistage sampling. The list of schools was obtained from DIOS office. Then two schools were selected randomly. Two sections from each respective class randomly selected. The total of 467 students were selected from both the schools. All the anthropometric measurement was taken in school premises with standard procedure. We have recorded body weight to the nearest 0.1 kg using a standard balance scale with subjects barefoot and wearing light indoor clothing. Body Height was measured by scale was used up to an accuracy of 1mm. Body mass index (BMI) was defined as the ratio of body weight to body height squared, expressed as kg/m2. Overweight and obesity was assessed by BMI for age. all the students were classified according to BMI scores using CDC 2000 classification for BMI for age[11] and categorized into Underweight (< 5th centile), Normal (5th-85th of centile), Overweight (85th-95th centile) and Obese (>95th centile).

The students were interviewed regarding their habits related to playing outdoor games, doing regular exercise, watching TV, Computer in hours per day, frequency of consuming junk food and dietary habits. A p value below or equal to 0.05 was considered to be statistically significant. Influence of various factors on prevalence of underweight, normal, overweight and obesity were expressed in form of percentage. The data was entered in MS-Excel and analyzed by using SPSS software version 21(Trial version).

RESULTS

Table 1- Age wise distribution of students according to their BMI

Age	Under Weight	Normal	Over Weight	Obese	Total
11-12	14(14.3)	75(76.5)	6(6.1)	3(3.1)	98
13-14	34(13)	193(74)	29(11.1)	5(1.9)	261
15-16	3(2.8)	90(83.3)	13(12)	2(1.9)	108

Table 1 shows that prevalence of underweight was 14.3% in 11-12 years, 13% in 13-14 years and 2.8% in 15-16 years. The prevalence of overweight and obesity was 6.1% and 3.1% in 11-12 years, 11.1% and 1.9% in 13-14 years and 12% and 1.9% in 15-16 years respectively.

Table 2- Sex wise distribution of students according to their BMI

Sex	Under Weight	Normal	Over Weight	Obese	Total
Male	23(11)	160(76.2)	22(10.5)	5(2.3)	210
Female	28(11)	198(77)	26(10.1)	5(1.9)	257

In this table it shows, majority of male and female adolescents were classified as having normal BMI. The prevalence of underweight among males was 11% and also 11% among females. 22(10.5%) and 5(2.3%) of males were overweight and obese respectively where as 26(10.1%) and 5(1.9%) were overweight and obese among females. The prevalence of overweight was more among females.

TABLE 3: Association of overweight and obesity with demographic profile of study subjects

VARIABLES	Overweight/ Obesity	
	NO(n=409)	YES(n=58)
AGE		
11-12(n=98)	89(90.8)	9(9.2)
13-14(n=261)	227(87)	34(13)
15-16(n=108)	93(86.1)	15(13.9)
X^2= 1.246, **p= 0.536**		
SEX		
Male(n=210)	183(87.1)	27(12.9)
Female (n=257)	226(87.9)	31(12.1)
X^2= 0.067, **p= 0.796**		
PER CAPITA INCOME		
<2651 (n=265)	242(91.3)	23(8.7)
>2651(n=202)	167(82.7)	35(17.3)
X^2= 7.880, **p= 0.005**		

DISCUSSION

The overall prevalence of overweight and obesity in the school children of 7-10 class was found to be 12.33% (overweight – 10.19% and obesity – 2.14%). Table 1 and 2 depicts prevalence in overweight and obesity among different age groups and among male and females. These are studies correlating with the findings seen in the urban area. The GSHS survey[12] 2007 involving 8130 school students reveal prevalence of overweight students to be 13%.

Table 4: Association of overweight/ obesity with dietary practices of study subjects

VARIABLES	Overweight/ obesity	
	NO (n= 409)	YES (n= 58)
INTAKE OF VEGETABLES		
Nil (n=23)	21(91.3)	2(8.7)
1 time/day (n= 253)	219(86.6)	34(13.4)
2 or more times/day (n=191)	169(88.5)	22(11.5)
X^2= 0.667, **p= 0.713**		
INTAKE OF FRUITS		
Nil (n=100)	90(90)	10(10)
1 time/day (n=296)	262(88.5)	34(11.5)
2 or more times/day (n=71)	57(80.3)	14(19.7)
X^2= 4.252, **p= 0.119**		
INTAKE OF SOFT DRINKS		
Nil (n=229)	206(90)	23(10)
1 time/day (n=190)	163(85.8)	27(14.2)
2 or more times/day (n=48)	40(83.3)	8(16.7)
X^2= 2.546, **p= 0.280**		
INTAKE OF FAST FOODS		
Nil (n=74)	64(86.5)	10(13.5)
1 time/week (n=274)	241(88)	33(12)
3 or more times/week (n=119)	104(87.4)	15(12.6)
X^2= 0.127, **p= 0.941**		
INTAKE OF SNACKS FROM VENDOR		
<once a day (n=400)	352(88)	48(12)
Daily (n=67)	57(85.1)	10(14.9)
X^2= 0.452, **p= 0.502**		
INTAKE OF BREAKFAST		
Yes (n=408)	355(88.5)	46(11.5)
No (n=59)	54(81.8)	12(18.2)
X^2= 2.346, **p= 0.126**		
INTAKE OF SWEETS/ CHOCOLATES		
Yes (n=302)	262(86.8)	40(13.2)
No (n=165)	147(89.1)	18(10.9)
X^2= 0. 535, **p= 0.464**		

In a study conducted by Kumar et al the prevalence of obesity was 5.74%. Similar finding were obtained by Chatwal et al[13] on school adolescents, aged 9-15 years, in Ludhiana. Kapil et al[14] conducted a study in one public school of Delhi catering to affluent segment of population. The overall prevalence of obesity according to international cut offs points (BMI criteria) was found to be 7.4%.

Table 5 : Association of overweight and obesity with physical activity pattern of study subject

VARIABLES	OVERWEIGHT/ OBESITY	
	NO (n= 409)	YES (n= 58)
VIGOROUS PHYSICAL ACTIVITY		
<3 days / week (n=193)	163(84.5)	30(15.5)
3 or more days / week (n=274)	246(89.8)	28(10.2)
X^2= 2.952, **p= 0.086**		
STRENGHENING EXERXCISES		
<3 days / week (n=344)	297(86.3)	47(13.7)
3 or more days / week (n=123)	112(91.1)	11(8.9)
X^2= 1.855, **p= 0.173**		
MODERATE PHYSICAL ACTIVITY		
<5 days/week (n=151)	132(87.4)	19(12.6)
>5 days /week (n=316)	277(87.7)	39(12.3)
X^2= 0.005, **p= 0.941**		
NO. OF DAYS OF PHYSICAL EDUCATION CLASSES/ WEEK		
<5 days/week (n=395)	345(87.3)	50(12.7)
>5 days/week (n=72)	64(88.9)	8(11.1)
X^2= 0.134, **p= 0.714**		
TIME SPENT IN WATCHING TV/ COMPUTER		
<2 hours (n= 412)	362(87.9)	50(12.1)
>2 hours (n= 55)	47(85.5)	8(14.5)
X^2= 0.259, **p= 0.611**		

In a study conducted by Sharma et al[15] among affluent adolescent children (aged 4-17 years). 22% were overweight and 6% were obese. In a study conducted by Swaminathan et al[16] among adolescent school children (aged 7-15 years) in south India. Of these 7.2% of children were overweight and 1% were obese. Prevalence of obesity was more in girls (8.82%) than boys (4.10%). In a school based cross sectional study[17] carried out by Naresh pal S et al among adolescent school children aged 12-15 years in south India, the overall prevalence of overweight among adolescents was 9.9% and obesity was 4.8%. The prevalence of overweight was 9.3% among boys and 10.5% among girls; 5.2% and 4.3% were obese respectively. In a school based cross sectional study done by Mahajan P et al, among adolescent school children aged 6-12 years in union territory of Puducherry.[18] The true prevalence of overweight and obesity was 4.98% and 2.24% respectively. In a study conducted by Shabana Tharkar et al[19] in

Chennai the overall prevalence of overweight was 12.1% among the children and 15.5% among the adolescents.

Prevalence of overweight and obesity is significantly higher among upper income class group (p= 0.005). Also, prevalence of overweight and obesity is higher among students having sedentary lifestyle, less intake of vegetables, more intake of carbonated water, fast foods and intake of snacks from vendors, more intake sweets/chocolates, also among students skipping breakfast. We have not able to be established the statistical significance of these variables may be due to small sample size. Kotian MS et al[20], 2010 in their study among school children of 12-15 years, reported higher prevalence obese children with physical activity of < 1 hour and watching TV, computer > 2 hours daily. Amin TT et al[21], 2008 in their study reported a significant difference between obese and overweight children and the lean children with regard to the frequency of consumption of fast food. In the study by Kumar S et al[22], 2007 they found significant association between overweight and obesity with family history of obesity, lack of physical activity and snacking of high energy foods (P<0.001).

CONCLUSION

To conclude, considering the burden of overweight and obesity among the school children there is a need for periodic screening for overweight should be done in schools followed by counselling of parents of overweight children. Counselling of adolescent children on lifestyle modification should be emphasized. School health programmes with special focus on educating students and teachers regarding possible adverse effect of overweight and obesity should be carried out.

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