The Study Of Prevalance Of Childhood Obesity And Associated Risk   Factors In School Going Children Of Aurangabad Munciple Corporation Area

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ABSTRACT:

Background:

Traditionally, a fat child is considered as an 'attractive' child, and is often referred to as a 'healthy' child, one who is likely to survive the rigors of undernourishment and infection. The obesity has been defined as a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be impaired. Obesity can be seen as the first wave of a defined cluster of non communicable diseases called "New World Syndrome" creating an enormous socioeconomic and public health burden in poorer countries.

Objective: 1) To study the prevalence of childhood obesity in study area.

2) To study the associated risk factors for childhood obesity

Materials and Methods: The present cross-sectional study was carried out in Municipal Corporation area among school going children during the period of 1st Sept 2009 to 31st August 2010.We prepared the list of children roll number wise from selected school. From the list of children by systematic random sampling method, we selected 10% children, total 400 school children were selected for study.

Results:

The study conducted among a sample of 400 school children of Municipal corporation area revealed that 30(7.5%) of the children were overweight, 25 (6.3%) were obese and 345(86.3%) of them were normal. The prevalence overweight was higher in vegetarian diet (11.23%) and obesity was maximum in the mix diet (7.4%).The prevalence of overweight (8.9%) and obesity (15.6%) were maximum who's family members having the history of DM.The prevalence of overweight (14.9%) and obesity (17%) were highest in the children who have no physical activity at all. Higher prevalence of overweight (28%) and obesity (52%) were found in those children who take the junk food three times per month. Out of 392 children who had watch television per day, 337(86%) children had normal BMI, 30(7.7%) children were overweight and 25(6.4%) children were obese.

Conclusion: The study conducted among a sample of 400 school children of Municipal corporation area revealed that 30(7.5%) of the children were overweight, 25 (6.3%) were obese and 345(86.3%) of them were normal. Mix diet, family history, physical activity, junk food and television watching these are the risk factors for childhood obesity.

Key words: Body Mass Index, Non Communicable Diseases, Ischemic heart Disease, Diabetes Mellitus.

Introduction: Traditionally, a fat child is considered as an 'attractive' child, and is often referred to as a 'healthy' child, one who is likely to survive the rigors of undernourishment and infection. The obesity has been defined as a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be impaired.[1] The terms "obese" and "overweight" often are used interchangeably. Technically, "obesity" is the upper end of "overweight." Obesity is clinically diagnosed as Body Mass Index (BMI) greater than 25 and overweight in between 23 to25 in children.[2] At least 30% of obesity begins in childhood. 50-80 % of obese children will continue as obese adult [3] and fall into risk group of Diabetes, Hypertension, Coronary Heart Disease and many more obesity related diseases. Complication of adult obesity are made worse if the obesity begins in childhood .Obesity is harder to treat in adults than in children.[4] Effective prevention of adult obesity will require the prevention and management of childhood obesity. Obesity can be seen as the first wave of a defined cluster of non communicable diseases called "New World Syndrome" creating an enormous socioeconomic and public health burden in poorer countries. With the increase in obesity prevalence there is a parallel increase in obesity associated chronic diseases and their clinical onset at ever younger ages. The obesity has reached an epidemic proportion in urban Indian population. If we allow this epidemic to continue we will top the world in Diabetes and CHD earlier than estimated. The cost of treating diabetes mellitus and associated disorders alone will consume a major chunk of our national resources, which we can not afford. Only community-based approaches can address such large numbers of affected children.

Objective: 1) To study the prevalence of childhood obesity in study area.

2) To study the associated risk factors for childhood obesity

Material and Methods: The present cross-sectional study was carried out in Municipal Corporation area among school going children during the period of 1st Sept 2009 to 31st August 2010.

Sample Size: The prevalence of childhood obesity in India was 7.6% in previously published study. By considering, 7.6%~8% as the prevalence, sample size was calculated with the help of practical manual for sample size determination by S.K.Lwanga and S Lemeshow [5] as follows.

Anticipated Prevalence 8 %

Confidence Level 95 %

Absolute precision 5 %

The resultant sample size was 114 children. But we had concluded 400 children from 57 schools in the study.

a) Selection of schools:-

For the selection of schools, the list of all schools (577) belonging to different categories (262 Government school and 315 Private school) was obtained from the school authorities of the local government. From the list of school by systematic random sampling method, we selected 10%schools. i.e. 26 government's school, 31 private schools and total 57 schools were selected for study. First we selected 10th number school and then every 10th school was included in the study.

b) Selection of subjects:

As the standards of the school are divided in to Primary schools, Middle school and Secondary schools, we conducted our study on children of Middle school. i.e. 5th-7th standard.

Inclusion criteria

1. Children studying in 5th-7th standards
2. School from Municipal corporation area

Exclusion criteria

1. Children below 5th and above 7th standards
2. Schools outside Municipal corporation area

We prepared the list of children roll number wise from selected school. From the list of children by systematic random sampling method, we selected 10% children i.e. 286 government's school children, 114 private schools children and total 400 school children were selected for study. First we selected 10th roll number and then every 10th roll number children was included in the study. Those children who were absent on the day of survey, they were not included.

Data on weight and height were collected for each through direct physical examinations. Height and weight were measured using standard procedure and BMI (kg/m2) was calculated.

Data analysis:

Analysis was done with statistical package for social sciences (SPSS) version 18.0.

Results &Discussion:

Table no. 1- Distribution of children according to age-group.

Age	Normal	Overweight	Obese	Total
9 - 10	36(100%)	0	0	36(9%)
11 - 12	236(89.4%)	12(4.5%)	16(6.1%)	264(66%)
13 – 14	73(73%)	18(18%)	9(9%)	100(25%)
Total	345(86.3%)	30(7.5%)	25(6.3%)	400(100%)

Out of 400 children, 345(86.3%) children had normal BMI, 30(7.5%) children were overweight and 25(6.3%) children were obese.The maximum number of prevalence of obesity (18.1%) were found in the age group of 13-14 and overweight were (9%).The proportion of overweight/obesity was higher (18%) in the age group of 13-14yrs than in   9-10yrs and11-12yrs.

Avula Laxmaiah et al (2007)[6] in their study at Hyderabad found that the prevalence of overweight among girls tended to increase from 6.2% at 12 years to 10.8% at the age of 15 years and gradually decreased at 17 years (9.2%), whereas in boys, it was the highest at the age of 14 years (9.2%) and decreased to 5.3% at the age of 17 years.

Bharati D.R et al (2008)[7] in their study at Wardha, central part of India found that the Overall, 79(3.1%) children were overweight while 32(1.2%) were obese. The proportion of overweight/obesity was higher (5.0%) in late adolescence (>15 yr of age) than in early adolescence (< 15 yr of age). But the difference was not statistically significant.

Table no. 2- Distribution of children according to sex.

Sex	Normal	Overweight	Obese	Total
Male	173(89.2%)	9(4.6%)	12(6.2%)	194(48.5%)
Female	172(83.5%)	21(10.2%)	13(6.3%)	206(51.5%)
Total	345(86.3%)	30(7.5%)	25(6.3%)	400(100%)

$$\chi^2 = 4 \quad df = 2 \quad p > 0.05$$

Out of 400 children, 345(86.3%) children had normal BMI, 30(7.5%) children were overweight and 25(6.3%) children were obese.

In the male, out of the 194(48.5%), 173(89.2%) children had normal BMI,9 (4.6%) were overweight and12(6.2%)were obese. In the female, out of 206(51.5%), 172(83.5%) children had normal BMI, 21(10.2%) children were overweight and 13(6.3%) children were obese. The prevalence of overweight and obesity were higher in girls than boys. The difference found between sex was not statistically significant (p >0.05).

 Kumar S et al (2007)[8] in their study observed that a total of 1496 children studied (975 boys, 521 girls). Prevalence of obesity was 5.74%. Prevalence of obesity was more in girls (8.82%) than boys (4.10%). The difference observed in prevalence of obesity between boy's and girls was highly significant.

Bharati D.R et al (2008)[9] in their study observed that, the proportion of overweight/obesity was 4.4 and 4.3 per cent among boys and girls respectively..

Sumitra Patnaik et al (2011)[10] in their study observed that, out of total 468 school children, 41.9% were boys and 58.1% were girls Out of 468 students examined for the study, 28.68% were either overweight or obese. Overweight and obesity was 33.65% in boys and 25.73% in girls.

Table no. 3- Distribution of children according to class of study.

Sr. no	Class of study	Normal		Overweight		Obese		Total
		Boys	Girls	Boys	Girls	Boys	Girls	
1	5th	29(43.93%)	35(53%)	0	0	2(3%)	0	66(16.5%)
2	6th	66(50.76%)	59(45.38%)	2(1.5%)	1(0.7%)	1(0.7%)	1(0.7%)	130(32.5%)
3	7th	78(38.23%)	78(38.23%)	7(3.4%)	20(9.8%)	9(4.4%)	12(5.8%)	204(51%)
4	Total	173(43.25%)	172(43%)	9(2.25%)	21(5.25%)	12(3%)	13(3.25%)	400(100%)

(Row number 1 and 2 were pooled together)

$$\chi^2 = 33.77 \quad df = 2 \quad p < 0.05$$

Out of 400 children, 173(43.25%) boys, 172(43%) girls in the 5th class children had normal BMI. 9(2.25%) boys, 21(5.25%) female in the 6th class children were overweight and 12(3%) boys,13(3.25%)female children in the7th class were obese.

The higher prevalence of overweight, obesity was found in the seventh class 13.2%, 10.3% respectively. The maximum number normal children (96.3%) were found in the sixth standards and minimum obesity (1.5%).The difference found between classes was statistically significant ($p < 0.05$). **Kumar S et al (2007)**[11] in their study observed that, A total of 1496 children studied (975 boys, 521 girls), the maximum number of boys from the 6th class and girls from the 5th class.

Haider Javed Warraich et al (2009)[12] in their study observed that, in the 6th class out of total104children, 67 were male and female 37.In the seventh class total were 89 out of that,54 were male and female 35.In the eighth class total were 91 out of that 54 were male and 37 female. The maximum numbers of children was from the sixth class and overall more male (175) involved than girl (109). The overall prevalence of overweight was 8% and obese 6 %.

Table no. 4- Distribution of children according to type of School.

School	Normal	Overweight	Obese	Total
Government	251(87.8%)	19(6.6%)	16(5.6%)	286(71.5%)
Private	94(82.5%)	11(9.6%)	9(7.9%)	114(28.5%)
Total	345(86.3%)	30(7.5%)	25(6.3%)	400(100%)

$$\chi^2 = 2 \quad df = 2 \quad p > 0.05$$

The prevalence of overweight was 9.6 %, obesity 7.9 % in the private school and in the government school were 6.6% & 5.6, which was higher in the private school than government school. The difference found between type of school was not statistically significant (p >0.05).

Premanath M et al (2008)[13] in their study observed that, there were 23527 boys (54.5%) and 19625 girls (45.5%). 36354 (84.2%) children were from private schools and 6798 (15.8%) were from Government schools. Children from private schools were significantly overweight when compared to those from government schools, (9.1% *vs* 5.9%; *P*<0.05), while prevalence of obesity was not different between the two groups (3.6 % vs 2.1%).

Table No .5 Distribution of children according to their Dietary pattern of children

Dietary Pattern	Normal	Overweight	Obese	Total
Vegetarian	89(85.57%)	12(11.23%)	3(2.88%)	104(26%)
Mix	256(86.5%)	18(6.1%)	22(7.4%)	296(74%)
Total	345(86.3%)	30(7.5%)	25(6.3%)	400(100%)

χ^2 =5.61   df = 2   p >0.05

Out of 400 children 74% were taking mix diet and 26% were vegetarian. The prevalence overweight was higher in vegetarian diet (12%) and obesity was maximum in the mix diet. The difference found between dietary pattern was not statistically significant (p >0.05).

Biswajit Mohanty(2008)[14] this study found that 68.2% of vegetarian and 80.9% non vegetarian were underweight,24.8% vegetarian and 14.5% non vegetarian were normal, remaining 6.9%vegetarian and 4.5% non vegetarian were obese

Sumitra Patnaik et al (2011)[15] from their study reported that higher prevalence of overweight and obesity was found in children with mixed diet (28.9%)**.**

Table No.6   Distribution of children according to their Family health status

Sr. no	Disease	Normal	Overweight	Obese	Total
1	IHD	21(84%)	2(8%)	2(8%)	25(6.25%)
2	HT	3(100%)	0	0	3(0.75%)
3	DM	34(75.6%)	4(8.9%)	7(15.6%)	45(11.25%)
4	Normal	287(87.8)	24(7.3%)	16(4.9%)	327(81.75%)
5	Total	345(86.3%)	30(7.5%)	25(6.3%)	400(100%)

 (Row number 1 and 2 were pooled together)

(Overweight and Obese were pooled together)

$$\chi^2 = 4.98 \quad df = 2 \quad p > 0.05$$

The maximum number of the family members (81.75%) had no medical problem or no h/o DM, HT and IHD. The prevalence of overweight (8.9%) and obesity (15.6%) were maximum whose family members having the history of DM. The difference found between family health was not statistically significant (p >0.05).

Sumitra Patnaik et al (2011)[15] from their study reported that higher prevalence of overweight and obesity was found in children with family history of obesity (39.79%).

Table No .7 Distribution of children according to their Physical activity

Sr. no	Physical activity of the children	Normal	Overweight	Obese	Total
1	No Physical activity of the children	32(68.1%)	7(14.9%)	8(17%)	47(11.75%)
2	Exercise	20(95.2%)	1(4.8%)	0	21(5.25%)
3	Sports	273(88.1%)	22(7.1%)	15(4.8%)	310(77.5%)
4	Yoga	20(90.9%)	0	2(9.1%)	22(5.5%)
5	Total	345(86.3%)	30(7.5%)	25(6.3%)	400(100%)

(Row number 2, 3, and 4 were pooled together)

$$\chi^2 = 15.8 \quad df = 2 \quad p < 0.05$$

The prevalence of overweight (14.9%) and obesity (17%) were highest in the children who have no physical activity at all. The difference found between physical activity was statistically significant (p <0.05).

Biswajit Mohanty(2008)[14] this study found that the those students were engage in the physical activity 81.5% were underweight , 14.5% were normal ,3.9% were obese/overweight and those not engage in physical activity 77.2%were underweight ,16.7% were normal and 6 %were obese. When physical activities of a child are compared with their BMI status, there is significantly higher prevalence of overweight/obese in children with no outdoor activities.

Sumitra Patnaik et al (2011)[15] from their study reported that higher prevalence of overweight and obesity was found in children with history of not playing outdoor games (40.8%), not doing regular exercise (33.9%).

Table No.8 Distribution of children according to their intake of junk food per month

Sr. no	Junk food of children per months	Normal	Overweight	Obese	Total
1	1 time	29(93.5%)	2(6.5%)	0	31(29.80%)
2	2times	29(64.4%)	10(22.2%)	6(13.3%)	45(43.26%)
3	3times	5(20%)	7(28%)	13(52%)	25(24.03%)
4	>3times	2(66.7%)	0	1(33.3%)	3(2.88%)
5	Total	65(62.5%)	19(18.3%)	20(19.2%)	104(100%)

 (Row number 1 and 2 were pooled together)

(Row number 3 and 4 were pooled together)

$$\chi^2 = 28.43 \quad df = 2 \quad p < 0.05$$

Higher prevalence of overweight (28%) and obesity (52%) were found in those children who take the junk food three times per month. The difference found between junk food consumption per month was statistically significant ($p < 0.05$).

Biswajit Mohanty(2008)[14] In this study those were taking the junk food 68%were underweight , 31.1%were normal and 9.8%were obese

Sumitra Patnaik et al (2011)[15] from their study reported that higher prevalence of overweight and obesity was found in children with family history of consuming junk food regularly (42.86%) .

Rebecca Kuriyan et al (2007)[16] from their study reported that among eating behaviours, the consumption of fried food items, more than 6 times/week, was associated with significantly higher odds of being overweight (3.1, p = 0.014) when compared to fried food consumption less than 2.5 times/week. None of the other eating behaviours were found to be significantly associated with being overweight.

Table No .9 Distribution of children according to their Watching Television

Sr. no	Watching Television	Normal	Overweight	Obese	Total
1	1 hr	188(90%)	6(2.9%)	15(7.2%)	209(53.31%)
2	2hrs	114(77.6%)	23(15.6%)	10(6.8%)	147(37.5%)
3	3hrs	19(95%)	1(5%)	0	20(5.1%)
4	4hrs	5(100%)	0	0	5(1.2%)
5	>4hrs	11(100%)	0	0	11(2.8%)
6	Total	337(86%)	30(7.7%)	25(6.4%)	392(100%)

 (Row number 3, 4, and 5 were pooled together)

$$\chi^2 = 14.65 \quad df = 2 \quad p < 0.05$$

Out of the 400 children 392 children were watching the television and maximum number of children (53.31%) who watch the television1hr of the day. The higher prevalence of overweight (15.6%) found in the children who watched the television two hrs of the day and obesity in (7.2%) the children who watched the television one hr of the day. The difference found between watching television was statistically significant ($p < 0.05$).

Biswajit Mohanty(2008)[14] from their study reported that out of total 87.4% of respondents watch television of various duration (1 to 4 hours) among which 4.5% are overweight/obese. Where as 3.8% of those who do not watch televisions are overweight/obese.

Sumitra Patnaik et al (2011)[15] from their study reported that the higher prevalence of overweight and obesity was found in children with family history of watching TV, Computer for more than 2 hours daily (32.5%).

Shashidhar Kotian M et al (2010)[17] in this study they observed out of 900 students 48 % students watch the TV less than 2 hrs which were higher than other students. The higher prevalence of overweight

(19.5%), obesity (15%) was found in the students who watch the TV more than 4 hrs and statistical difference was statistically significant.

Conclusion: The study conducted among a sample of 400 school children of Municipal corporation area revealed that 30(7.5%) of the children were overweight, 25 (6.3%) were obese and 345(86.3%) of them were normal. Mix diet, family history, physical activity, junk food and television watching these are the risk factors for childhood obesity.

Recommendation: 1.There should be regular class hours on healthy food habits, nutritive values of different food items, lifestyle and behavioral modification.2. Every student should take part in outdoor games and sports.3. Each student should monitor his/her anthropometric parameters in their health dairy, at least once in a month.

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