

Prevalence and Epidemiology of Overweight and Obesity among Upper Primary School Children in Latur City

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Research Article

Abstract: Background: Obesity is increasing at an alarming rate throughout the world. Obesity in children is a marker of overweight in adult age, and it shows an association with the chronic non communicable disease. Hence study was undertaken to find out the prevalence of overweight and obesity. **Objectives:** 1. To determine prevalence of overweight and obesity among upper primary school children. 2. To identify factors influencing overweight and obesity. **Material and methods:** A cross sectional study was conducted. 1182 school children studying in 5th to 7th standard were studied. Sociodemographic, anthropometric and dietary data was collected using a pre-tested questionnaire. **Results:** prevalence of overweight and obesity was 8.44% and 1.54% respectively. Higher socioeconomic status, Daily Calorie intake Above RDA, mix type of food and less Physical Activity time were the significant factors for overweight and obesity. **Conclusion:** Increased junk food frequency, low physical activity should be avoided by children. Health education to teachers, parents and students will help for reducing the prevalence of obesity.

Keywords: Obesity, Epidemiology, Latur.

Introduction

The prevalence of child obesity is increasing rapidly worldwide. obesity has become a colossal epidemic causing serious public health concern and contributes to 2.6 million deaths worldwide every year.¹ initially prevalence of obesity was more in developed countries but now higher prevalence is seen in developing countries also. National representative data for childhood obesity in India is unavailable, however available studies of Delhi and Chennai has shown the prevalence of 7.4% and 6.2% respectively.^{2,3} Obesity is a consequence of an energy imbalance; energy intake exceeds energy expenditure over a considerable period. Lifestyle changes and worldwide nutrition transition are important factors for obesity epidemic. Economic growth, modernization, urbanization (increased use of automated transport, technology at home) and globalization of food markets are important factors for increased prevalence of obesity. Obesity is associated with an increased risk of morbidity and mortality as well as reduced life expectancy. 50-80% of obese children will continue as obese adults.⁴ Due to

difficulty in the treatment of obesity in adults and the many long-term adverse effects of childhood obesity, prevention of childhood obesity has now been recognized as a public health priority.⁵ With this background in mind, the present study was undertaken to know the prevalence of overweight and obesity and its influencing factors in upper primary school children (children studying in 5th to 7th std.)

Aim and Objectives

1. To determine prevalence of overweight and obesity among upper primary school children.
2. To identify factors influencing obesity and overweight and association of overweight and obesity with socio-demographic factors, dietary and physical activity patterns.

Methodology

The study was done in 4 schools, which were selected randomly from the list of all schools in an urban area during June 2011-May 2012. Pilot study showed 8% prevalence of obesity among the children.

Sample size was estimated at 5% level of significance with an allowable error of 20%, using the following formula $n = \frac{4pq}{L^2}$. It was 1150 children. The total number of children in all four schools was 1230. Out of these, 48 were excluded from the study as they were absent on the day of examination. Thus, finally the total numbers of children studied were 1182.

The study was approved by the Ethical Committee of the Medical College. Permission was obtained from the authorities of local school. Teaching and administrative staff and students underwent prior orientation about the study. The questionnaire was pre-tested and validated during the pilot study. The questionnaire used to record the data regarding the various socio-demographic variables, various influencing factors with respect to obesity. The data collection from the study subjects

consisted of two steps -the personal interview and the anthropometric measurements. The time selected for undertaking the measurements was during the school working hours. Anthropometric measurements included Weight, Height. The sociodemographic data was filled by the parents. School children were sent to home with parental form one day prior to their interview and measurements. Parental form included sociodemographic data. This parental form was attached with consent form.

Data analysis

Children were classified into according to their BMI as obese, overweight, normal and underweight. IOTF (International Obesity Task Force) cutoff points were used for classifying children into different classes⁶. Data was analyzed using SPSS. As overweight and obesity are having same epidemiology and overweight is a step before obesity, during analysis both the groups i.e. overweight and obesity were merged and statistical tests were applied.

Results

Table 1: Distribution of Children According to their standards

STANDARD	STUDENTS
5 TH	393 (33.24%)
6 TH	409 (34.61%)
7 TH	380 (32.15%)
TOTAL	1182 (100%)

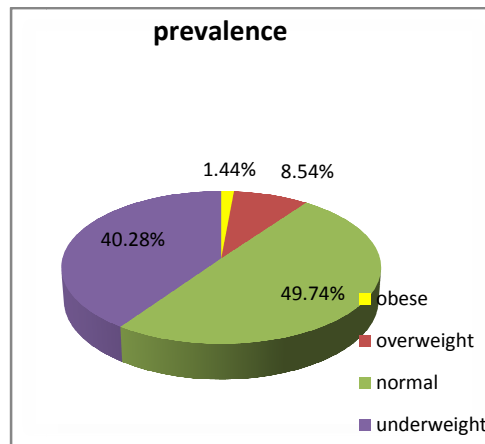


Figure 1: Distribution of Children According to their Body Mass Index

Table 2: Distribution of Children According to their Age and Sex Composition

Age group(years)	Male (%)	Female (%)	Total (%)
9	4 (0.62%)	5 (15.55%)	9 (1.13%)
10	154 (23.54%)	137 (14.60%)	291 (25.94%)
11	250 (38.23%)	157 (15.87%)	407 (29.63%)
12	197 (30.12%)	201(20.63%)	398 (38.06%)
13	49 (7.49%)	23 (17.14%)	72 (4.3%)
14	0 (0%)	5 (16.19%)	5 (0.94%)
Total	654(100%)	528 (100%)	1182 (100%)

Table 3: Risk factors for overweight and obesity in children

Sr No	Variable	Total	Overweight	Obese	P Value	
1	Sex	Female	528(100)	43(8.14)	07(1.33)	$\chi^2 = 0.28$
		Male	654(100)	58(8.87)	10(1.53)	
2	Age	9-11	707(100)	56(7.93)	11(1.55)	$\chi^2 = 0.5$
		12-14	475(100)	45(9.47)	06(1.27)	
3	SES	Higher(I,II)	308(100)	48(15.58)	11(5.94)	$\chi^2=39.00$ P<0.000
		Lower (III,IV,V)	892(100)	53(3.57)	6(0.62)	
4	Working Mother	Yes	189(100)	25(13.23)	05(2.64)	$\chi^2 = 7.91$ P<0.005
		No	967(100)	76(7.86)	12(1.25)	
5	Way To Commuting To School	Motor Vehicle	341(100)	45(13.20)	13(3.81)	$\chi^2 = 26.33$ P <0.000
		Cycle+Walk	841(100)	56()	04()	

6	Physical Activity/ Day	≤ 30 Minutes >30 Minutes	611(100) 571(100)	60(9.81) 41(7.18)	13(2.13) 04 (0.70)	$\chi^2 = 5.43$ P < 0.05
7	TV /Computer/ Day	>2 Hrs ≤2 Hrs	455(100) 727(100)	47(10.33) 54(7.42)	11(2.41) 06 (0.83)	$\chi^2 = 6.29$ P<0.05
8	RDA	>RDA+20% OfRDA ≤ RDA+ 20% Of RDA	448(100) 734(100)	71(15.85) 30(4.09)	14(3.13) 03(0.41)	$\chi^2 = 8.49$ P<0.05
9	Junk Food/ Week	>2 Times ≤2 Times	425(100) 757(100)	55(12.95) 46(6.07)	10(2.35) 07(0.92)	$\chi^2 = 20.83$ P<0.000
10	Type Of Diet	Veg Mixed	653(100) 529(100)	43(6.58) 58(10.96)	07(1.08) 10(1.89)	$\chi^2 = 8.79$ P<0.005

Table 4: Multivariate Regression Analysis of Obesity and Overweight in Children

Variables	B	Std. Error	Wald	P value	OR	95% CI for OR	
						Lower	Upper
Working mother	0.394	0.315	1.560	0.212	1.483	0.799	2.752
Higher socioeconomic status	0.935	0.284	10.822	0.001	1.393	1.093	2.685
Calorie intake> RDA	1.921	0.265	52.597	0.000	6.830	4.063	11.479
Mix diet	1.264	0.243	27.160	0.000	3.540	2.201	5.695
Junk food > 2 times/ week	0.252	0.260	0.943	0.332	1.287	0.773	2.141
Less physical activity	1.219	0.295	17.042	0.000	2.296	1.166	3.527
TV/computer watching > 2hrs/day	0.860	0.281	9.338	0.002	2.363	1.361	4.102
Vehicle transport to school	0.256	0.277	0.857	0.354	0.774	0.450	1.331

Total no of children in the study were 1182. Total no. of students studying in standard 5th, 6th and 7th were 393,409 and 380 respectively. Mean age was 11.2 ± 0.92 years. Range was 9-14 years. Mean age of males and females was 11.21±0.9 years and 11.20±0.85 years respectively. Out of 1182 children 654 (55.32%) were males and 528 (44.68%) were females (Table 2). Among these 1182 school children studied, 101 (8.54%) were overweight, 17(1.44%) were obese and 476(40.28%) were underweight (fig 1). Overall, it was also found that the prevalence of obesity was more among male population (1.53%) as compared to that in females (1.33%). though the difference was not significant. The prevalence of obesity was found to be highest among 9-11 years age group (1.57%) and overweight was maximum in 12-14 year age group (9.47%). Mean weight of obese male was 45.84 ± 9.54kg. and that of obese female was 43.49 ± 7.29 kg. Univariate analysis showed following factors to be associated with overweight and obesity - higher socioeconomic status (p<), working status of mother(p<0.005), use of motor vehicle for commuting to school(p<0.000), less physical activity (p<0.05), intake of extra calories than RDA(p< 0.05), junk food > 2 times a week(p<0.00) and mix type of diet(p< 0.05).(Table 3) Multiple Logistic Regression Analysis was applied and found that higher socioeconomic status, Daily Calorie intake Above RDA,

mix type of food and less Physical Activity time were the significant factors for overweight and obesity.(Table 4)

Discussion

Out of 1182 children 654 (55.32%) were males and 528 (44.68%) were females. These findings were consistent with the study done by Premanath *et al.*⁷ in Mysore, there were 54.5% were males and 46.1% were females. In present study prevalence of overweight was found to be 8.54%. Similar results were found by Kotian *et al.*⁸ (9.9%), Kapil *et al.*² (7.4%), Avula Laxmaiah *et al.*⁹ (7.2%), Kumar *et al.*¹⁰ (5.74%). Prevalence of obesity in our study was 1.44%, similar results were seen by Mishra A *et al.*¹¹ (2.8%), Avula Laxmaiah *et al.*⁹ (1.6%), Mahajan *et al.*¹¹⁸ (2.12%), Kotian *et al.*⁸ (4.4%) and Bharati *et al.*¹² (1.2%) In our study the prevalence of obesity was more among male population (1.53%) as compared to that in females (1.33%). It was also comparable with a study by Kapil *et al.*² males were more (8.3%) as compared to female (5.5%). In contrast to our study Kumar *et al.*¹⁰ found that percentage of obese females (8.82%) was more than males (5.59%). In a study by Kotian *et al.*⁸ from south Karnataka it was found that prevalence of overweight and obesity was more in girls(10.5%) than boys(9.3%) and this difference was not significant (p =0.72). Combined prevalence of overweight and obese children was slightly more in the age group of 12-14 yrs (10.74%) as compared to 9-11 yrs (9.48%). In a

study by Kapil *et al.*² maximum prevalence of obesity was in the pubertal age group 10-12 years. In other studies like S. Kumar *et al.*¹⁰ and Unnithan *et al.*¹³ it was observed that prevalence was higher among children of higher age group as compared to younger ones. The prevalence of obesity was found to be significantly associated with children of Upper Socio Economic Status and they were more likely to get obese and overweight as compared to those of other class. Comparable findings were found in study by Marwah *et al.*¹⁴ and Shabana *et al.*¹⁵ Children of working mother were more likely to get obese and overweight as compared to that of non-working mother. It may be due to 1) Readymade (obesogenic) food is served due to lack of time. 2) working mother has higher socioeconomic status 3) no control over food intake of children. Similar findings were revealed in the study conducted by Tarek Tawfik Amin *et al.*¹⁶ that the prevalence of obesity and overweight was 32.1% in children of working mothers as compared to 22% in children of non-working mothers. ($p < 0.05$).

Use of motor vehicle was statistically associated with the prevalence of overweight and obesity. Similar results were found in a study by Avula Laxmaiah⁹ in Hyderabad. Less or absent physical activity had more risk of falling in obese group as compared to those who had more physical activity. Similar findings were seen in S. Kumar *et al.*¹⁰ (OR: 2, $P < 0.001$) and Kotian *et al.*⁸ (OR: 21.09 95% CI: 2.77-166.8). Those who watch TV for more duration had more chance of getting obese or overweight as compared to the other group. This may also be important because apart from being a sedentary habit, watching television also involve munching in between snacks and also influence of advertisements of junk food, chocolates, soft drinks which increase tendency of the child to eat these items frequently. The findings are comparable to that of study done by Shabana *et al.*¹⁵ (OR -2.5, $p < 0.0001$), Kuriyan *et al.*¹⁷ (OR :19.6 $p < 0.001$) and Kotian *et al.*⁸ (OR 7.3, 95% CI = 3.6-14.66). Children who ate extra calories had more chances of getting obese and overweight as compared to those who ate less calories. These findings were similar to that of study done by Seema Jain *et al.*¹⁸ ($p < 0.05$) and Kapil *et al.*² In present study it was found that junk foods do have a significant role to play in the development of obesity ($p < 0.005$). Study conducted by S Kumar *et al.*¹⁰ in Davengere showed that eating junk food for >2 times per week to be associated significantly with obesity (OR ; 5.6 $p < .001$) and Rajaaat Vohra *et al.*¹⁹ showed similar results (OR=9.17 95%CI=1.28-1.86). Present study revealed that vegetarian or mix diet significantly determine obesity ($p < 0.005$). In a study conducted by Tarek Amin¹⁶ in Saudi Arabia, it was found that obese and overweight children frequently consumed meat and alternatives as compared to non-overweight, non-obese group. (48.9% vs 39.8%) a

study by Gillis and Bar reported that obese children consume significantly more servings of meat and alternatives than that in the non-obese one¹⁶.

Conclusion

Hence concluded that prevalence of overweight and obesity in study area was 8.54% and 1.44% respectively. Higher socioeconomic status, Daily Calorie intake Above RDA, mix type of food, less Physical Activity time and sedentary time for TV computer were the significant factors for overweight and obesity in children.

References

1. World Health Organization. Preventing chronic diseases: A vital investment. World Global Report, Geneva: 2005: 199-205
2. Kapil U, Singh P, Pathak P, Dwivedi SN, Bhasin S.: Prevalence of obesity among Affluent adolescent school children in Delhi. Indian Pediatrics : 2002 ; 39: 449-452.
3. Vedavathi S, Jayashree R, Mohammad Rafi. Prevalence of overweight and obesity in affluent adolescent girls in Chennai in 1981 and 1998. Indian Pediatrics 2003; 40: 332-336.
4. Styne D.M: childhood obesity and adolescent Obesity: PCNA, 2001; 48: 823-847.
5. Park K: Park's Textbook of Preventive and Social Medicine: Banarsidas Bhanot Publishers, 20th Edition, 2011; 345-349.
6. T. J. Cole, M. C. Bellizzi, K. M. Flegal, and W. H. Dietz, "Establishing a standard definition for child overweight and obesity worldwide: international survey," British Medical Journal 2000; 320(7244):1240-1243.
7. M Premanath, H Basavana Gowdappa, M.A Shekar, S.B. Vikram, D Narayanappa Mysore Childhood Obesity Study, Indian pediatrics volume 47, february 2010
8. Kotian M, Kumar G, Kotian SS. Prevalence and Determinants of Overweight and Obesity Among Adolescent School Children of South Karnataka. Indian Journal of Community Medicine, January 2010; 35: 176-178
9. Avula Laxmaiah, B. Nagalla, K. Vijayaraghavan, M. Nair Factors Affecting Prevalence of Overweight Among 12- to 17-year-old Urban Adolescents in Hyderabad, India
10. Kumar S, Mahabalaraju DK, Anuroopa MS. Prevalence of Obesity and its influencing factors among affluent school children of Davengere City. Indian Journal of Community Medicine, January 2007; 32: 15-17.
11. Misra A, Shah P, Goel K, Hazra DK, Gupta R, Seth P, The high burden of obesity and abdominal obesity in urban Indian schoolchildren: a multicentric study of 38,296 children. Annals of Nutrition and Metabolism. 2011; 58: 203-11
12. D.R. Bharati, P.R. Deshmukh and B.S. Garg, Correlates of overweight and obesity among school going children of Wardha city, Central India Indian J Med Res June 2008; 127: 539-543
13. Unnithan A.G., Syamakumari S. Prevalence of overweight, obesity and underweight among school going children in Thiruvananthapuram, Kerala. International Journal of Nutrition and Well-being, May 2010; 23: 132-136.
14. Marwaha RK, Tandon N, Singh Y, Aggarwal R, Grewal K, Mani K. A study of growth parameters and prevalence of overweight and obesity in school children from Delhi. Indian Pediatrics Nov 2006; 43: 943-953.

15. Shabana T, Viswanathan V. Impact of Socioeconomic Status on Prevalence of Overweight and Obesity among Children and Adolescents in Urban India. *The Open Obesity Journal*, 2009;1:9-14.
16. Tarek TA, Ali Ibrahim, Ayub A. Overweight and obesity and their association with Dietary Habits and Sociodemographic Characteristics among Male School Children in Al-Hassa, Kingdom of Saudi Arabia. *Indian journal of community medicine* 2008;33:3:172-181
17. Kuriyan R, Bhat S, Thomas T, Vaz M and Kurpad AV. Television viewing and sleep are associated with overweight among urban and semi-urban South Indian children. *Nutrition Journal*, Sep 2007;6:25.
18. Jain S, Pant B, Chopra H, Tiwari R. Obesity among Adolescents of Affluent Public Schools in Meerut. *Indian Journal of Public Health* September 2010;54:158-160
19. Rajaat Vohra, Pankaj Bhardwaj, Jyoti P. Srivastava, Overweight and obesity among school-going children of Lucknow city. *Journal of Family and Community Medicine*. 2011 May-Aug; 18(2): 59–62.