

The Rising trend of obesity among secondary school children of rural background

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ABSTRACT

Background: Earlier obesity was a disease of the affluent but with changing trend, modernization, sedentary lifestyles overweight/ obesity is increasing in the rural population too. Children of the present generation are prone to obesity which will hamper life in the future. Scientific evidence shows that unhealthy diet and physical inactivity are major global determinants of non-communicable diseases. **Aim & Objectives:** To estimate the prevalence of obesity, to study the life style factors and to analyze the socio-demographic factors that influence obesity. **Materials & Methods:** A cross-sectional study was carried out in 400 children between the age group of 12–15 years. Informed consent was obtained from school authorities to collect information from the children. Height and weight were measured using standard procedure and BMI (kg/m) was calculated. Overweight and obesity was assessed by BMI following the WHO guidelines. The questionnaire assessed life style, physical activity, dietary habits and socio-demographic data. **Results:** Prevalence of obesity was 25.2% (101 children). The statistically significant ($p < 0.05$) factors which influenced obesity was transport to school, physical activity, watching television while eating, consumption of ready made food items, eating in between meals and the socioeconomic status. **Conclusion:** The prevalence of overweight and obesity was 25.2% as per the BMI (WHO) classification. Use of motor transport, lack of physical activity and sedentary life are major factors.

KEYWORDS: Body mass index, Lifestyle factors, Obesity

INTRODUCTION

Worldwide, non-communicable diseases (NCD) currently represent the burden of disease and are expected to be responsible for 60% of the disease burden. Most of this increase will be accounted for by emerging non-communicable disease epidemics in developing countries. [1] Scientific evidence shows unhealthy diet and physical inactivity are major global determinants of non-communicable

diseases. [2] Earlier NCD's thought to be of importance mainly for developed world and now conditions like obesity, diabetes, smoking, alcohol consumption, low physical activity is also increasing in developing part of the world. These are the risk factors for development of non-communicable and chronic diseases mainly affecting the cardiovascular and nervous systems. [3] Excessive body fat and hypertension are known major risk factors associated with coronary heart disease (CHD), a major cause of morbidity and mortality in many parts of world. [4] The age group (12-15 years) is important physically, mentally and emotionally. This is the period of transition when individuals are entering adulthood. [5] However considering the lack of studies on adolescents' overweight and obesity at the state and district level, it is essential to study the obesity and overweight status of adolescents in Telangana which is fast developing with respect to economy and education. **Objectives:** To estimate the prevalence of obesity, the life style factors that influence obesity and to analyze the socio-demographic factors that influence obesity among secondary school going rural children.

Material & methods

This cross-sectional study was conducted after institutional ethical committee approval was obtained. Study Population consisted high School children (boys & girls) belonging to VIII, IX and X class of private schools. Considering the prevalence of obesity as 20% the sample size was calculated for the study using the formula $N = 1.96 * 1.96 * pq / L^2$ (absolute precision). $p = 20\% = 0.2, q = 0.8$ ($1-p$), $L = 5\% = 0.05$

$$N = 1.96 * 1.96 * 0.2 * 0.8 / 0.05 * 0.05 = 0.6146 / 0.0025 = 246$$

The minimum sample size required for the study was 246 patients with the above formula. As the study progressed a total of 400 children were taken into consideration. Study variables were anthropometric measurements – Height, Weight and BMI measurement. Dietary pattern-: frequency of eating, consumption of junk foods and carbonated drinks. Physical activity: Walking, games and other sports activities. Habits: Smoking and tobacco chewing. Socio-demographic

variables: Education of parents, occupation of parents and socio-economic status of family. Criteria used to diagnose overweight and obesity BMI: $> 95^{th}$ percentile for obesity and $> 85^{th}$ percentile for overweight, greater than 2 SD above and greater than 1 SD according to the growth charts designed by WHO. [6] Based on this criterion subjects were classified as obese, overweight, normal and underweight. However, for assessing the significance of differences with respect to various parameters, underweight and normal were taken as one category and overweight and obese as another category. Written informed consent was obtained from all the subjects and through them the consent of their parents. For all the subjects the demographic information was collected. It consisted of name, age, sex, class, address, religion, contact number and the occupation of the guardian parent. After the completion of the questionnaire, anthropometric measurements were taken. The collected data was coded, entered into Microsoft excel work sheet and exported to SPSS. Data was analyzed using SPSS version 21. Data is presented as percentage in categories and then presented as tables and graphs. Chi-square test used for test of significance, odd's ratio and 95% confidence interval were used.

RESULTS

The age of the subjects ranged between 12 and 15 years with the mean age being 14.3 ± 1.96 years. There were 180 (45.0%) subjects above 15 years and 220 (55.0%) subjects were below 15 years. The study consisted of, females 205 (51.2%) and males 195 (48.8%). 141 subjects (35.3%) belonged to ninth standard and remaining 138 subjects (34.4%) and 121 (30.3%) subjects belonged to tenth standard and eighth standard respectively Table 1. Using WHO criteria of BMI for age and sex cut-offs the nutritional status of the study subjects was calculated and compared. Figure 1 shows 299 (74.8%) subjects were underweight/normal and the prevalence of obesity in the study was 101 (25.2%).

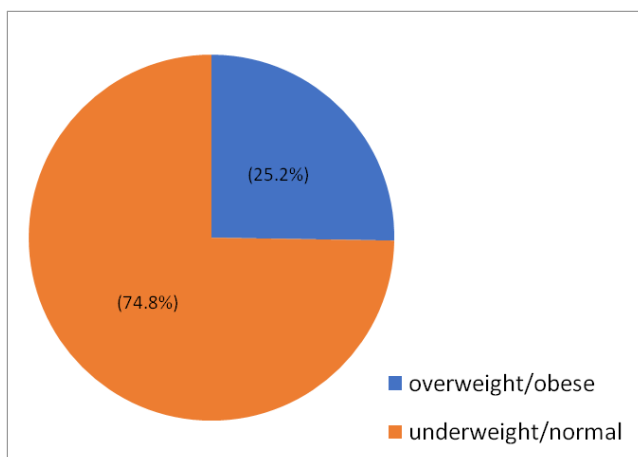


Figure 1: Prevalence of obesity according to BMI (n=400)

Age (years)	No.	%
12	7	1.8
13	70	17.5
14	143	35.7
15	180	45.0
Sex		
Males	195	48.8%
Females	205	51.2%
Class		
10th std	138	34.4%
9th std	141	35.3%
8th std	121	30.3%

Table 1: Socio-demographic distribution

The comparison of overall use of transport between home and school shows type of transport subjects prefer as per their socioeconomic status and attitudes towards physical activity the difference in use of type of transport was statistically significant ($p < 0.001$). Out of 101 (overweight & obese) subjects, 70 (19.8%) were found to be playing in school during the games period regularly whereas 31 (67.3%) subjects not playing in school.

Among the 400 subjects there was no history of physical activity in 46 subjects. Among the 46 subjects it was found that there were 31 (67.3%) subjects who were obese as compared to 15 (32.6%) normal subjects. This was statistically significant as $p = 0.02$. Out of 101 subjects between the ages 12 to 15 years all the subjects had the habit of watching TV daily Table 2. The duration varied from 60 to 240 minutes. It was not statistically significant. Overall, 76.5% of the subjects had the habit of eating while watching TV. Among those who had the habit, 29.7% were above the normal BMI as per BMI classification as compared to 1.6% subjects above the normal BMI, without the habit. This difference was statistically significant ($p < 0.001$) with odd's ratio = 3.55 and confidence interval ranging between 1.76 – 7.16.

Predominant diet of 369 subjects was non vegetarian, and the remaining 31 subjects were vegetarian based. Among the overweight/obese subjects (25.2%) 24.6% subjects were non vegetarians and 29.0% subjects were vegetarians. There was no statistical significance between the weights and predominant diet. 94 (27.1%) subjects of 101 obese subjects had the habit of eating ready-made food items apart from home-made ones. There was a statistically significant difference with respect to the habit of eating ready-made food items ($p = 0.03$). Among the 101 (25.3%) overweight/obese subjects it was observed that 85 (30.3%) gave history of eating in between regular meals and 16

Factors	Overweight / Obese	Underweight / Normal	95 % CI	OD	p-value
Transport					
Motor Vehicle	38	55		1.00	<0.001
Bicycle	11	55		0.29	
Walking	52	189		0.4	
Physical activity					
Yes	70	284	0.061 - 0.233	0.119	0.02
No	31	15			
Screen time					
1-2 hours	69	220		1	0.56
2-4 hours	20	47		1.357	
>4 hours	12	32		1.196	
Tv & eating together					
Yes	91	215	1.76 - 7.16	3.55	<0.001
No	10	84			
Type of diet					
Veg	9	22	0.55 - 2.77	1.23	0.61
Non-veg	92	277			
Consumption of readymade food apart from homemade					
Yes	94	253	1.06-5.60	2.44	0.03
No	7	46			
Eating in between meals					
Yes	85	191	1.67-5.39	3.00	<0.001
No	16	108			

Table 2: Association of lifestyle factors influencing obesity.

(12.9%) did not give history of eating between meals. It was statistically significant ($p < 0.001$) with an odd's ratio of 3.0 and 95% CI ranging 1.67-5.39.

The education status of majority of subjects fathers were secondary (43.8%) followed by primary (27.2%), illiterate (19%) and degree (10%) and the education status of subjects mothers were illiterate (35.5%), primary (29.7%), secondary (28%) and degree (6.8%) respectively. Occupation of the father where 23.0% are self-employed followed by skilled (22%), unskilled (18.0), semi-skilled (15.5%). Few subjects' fathers are in service (like govt. jobs) (8.7%). 12.8% were unemployed. Majority of mothers occupation was unskilled (34.5%) followed by skilled (20.8%), unemployed (20.8%), self-employed (16.5%), semi-skilled (4%) and service (3.4%) respectively Table 3.

It is revealed from Table 4 that among 69 upper class subjects, 21 (30.4%) subjects were overweight/ obese and 48 (69.6%) normal/underweight. Followed by upper middle 68 subjects (47.1% obese and 52.9% were normal), middle 108 subjects (22.2% obese and 77.8% normal), lower middle 47 subjects (34% obese and 66.1% normal, lower class 9 subjects (44.4% obese and 55.6% normal) and unknown 99 subjects (4% obese and 96% normal). In the present study a statistically significant association ($p < .001$) was observed between social class and obesity.

DISCUSSION

The study shows an increasing trend of obesity/ overweight in rural school children population. Many other studies have also suggested similar findings. Khadilkar et al.^[7]

in Pune studied the prevalence of obesity and overweight which, according to the international cut off points (BMI criteria) were found to be 5.7% and 19.9% respectively. When Indian standards were used, the prevalence of overweight and obesity was 8.1% and 25.1% respectively. So, they found that national criteria showed a significantly higher percentage of overweight and obesity than the international cut-offs. The BMI criterion has been developed on the percentile level of the BMI for age, sex of the adolescents of the affluent and developed European countries, whereas the Asian adolescent show the evidence of obesity at a lower level of BMI. [8, 9] A similar study was conducted by Prasanna K et al. [10] In India among adolescent school children (12-15 years) in 2012, where 65% of the subjects used motorized transport. Akhil Kant Singh et al. [11] in their study observed that about two fifths (18.3% boys and 22.2% girls) responded as not being physically active for one hour per day at least three days in a week. Also 54.4% of boys and 69.3% of girls replied as not being engaged in sports at school. Laxmiah et al. [12] in their study on adolescents in Hyderabad reported that the prevalence of overweight among adolescents who were sedentary, watching television 3 hours a day, was significantly higher (10.4%) compared with those who watched 0 or >3 hours a day (5.9% to 6.3%). They concluded that an increase in dietary energy intake combined with decreased energy expenditure contributes to weight gain.

The duration of watching TV also had a significant effect on the overweight and obesity status as shown by the studies by Verity Cleland et al. [13] and Robert McMurray et al. [14] Verity Cleland et al. [13] observed that, among Australian young adults the eating habits were increased with the increase in TV watching duration revealed its association with overweight/obesity. Ruchika Chugh et al. [15] also observed that nearly all the subjects in their study were indulged in snacking, irrespective of their nutritional status. They concluded that snacking outside food items apart from home food was common among adolescents. A study conducted by Nazeem et al. [16] the study subjects were classified into different socioeconomic classes in order to study the effect of social class on obesity. It is evident that an increasing pattern of obesity was apparent as we move from lower socioeconomic class to towards upper class. The Highest prevalence rates of obesity were found in children belonging to higher class (35%); however, it was 15% & 13% in middle & lower class respectively.

CONCLUSION

The prevalence of overweight and obesity was 25.2% as per the BMI (WHO) classification. The subjects in the study area used motor transport and less of walking for walkable distances. Decreased duration of outdoor play beyond the school time was another lifestyle factor present in them. Sedentary activities were also observed like watching TV, use of computer games. The subjects also had the habit of consuming outside ready-made food items. These factors can lead to excess calorie intake and decreased calorie

Factor	Father	Mother
Education		
Primary	109 (27.2%)	119 (29.7%)
Secondary	175 (43.8%)	112 (28%)
Degree	40 (10%)	27 (6.8%)
Illiterate	76 (19%)	142 (35.5%)
Total	400	100%
Occupation		
Service	35 (8.7%)	14 (3.4%)
Skilled	88 (22%)	83 (20.8%)
Semi-skilled	60 (15.5%)	16 (4%)
Unskilled	72 (18%)	138 (34.5%)
Self employed	92 (23%)	66 (16.5%)
Unemployed	51 (12.8%)	83 (20.8%)
Total	400	100%

Table 3: Sociodemographic factors influencing obesity

SES	Obese	Normal	Total
Upper	21 (30.4)	48 (69.6)	69 (100)
Upper middle	32 (47.1)	36 (52.9)	68 (100)
Middle	24 (22.2)	84 (77.8)	108 (100)
Lower middle	16 (34.0)	31 (66.1)	47 (100)
Lower	4 (44.4)	5 (55.6)	9 (100)
Unknown	4 (4.0)	95 (96.0)	99 (100)
Total	101	299	400

p < 0.001

Table 4: Association of socioeconomic status with obesity

expenditure which could increase the risk of lifestyle related disorders. Subjects with the habit of eating in between regular meals and eating snacks while watching TV were found to be overweight/ obese. The central obesity was higher among the subjects who did not involve in physical activity, those subjects who played outdoor games <1 hour beyond the school time, the habit of eating readymade food items apart from homemade foods and subjects with the habit of eating in between regular meals.

REFERENCES

1. Noncommunicable Disease Surveillance, Monitoring and Reporting ;. Available from: http://www.who.int/ncd_surveillance/dtrstrategy/en/.

2. WHO. Nutrition in adolescence : issues and challenges for the health sector : issues in adolescent health and development. In: WHO discussion papers on adolescence. Geneva: World Health Organization ; 2005, . .
3. Dehghan M, Danesh N, Merchant A. Childhood obesity, prevalence and prevention. *Nutrition Journal*. 2014;4:24–24.
4. Cara BE, Dorota BP, David SL. Childhood obesity: Public health crisis, common sense cure. *Lancet*. 2012;360:473–82.
5. Chhabra P, Grover VL, Aggarwal K, Kannan AT. Nutritional status and Blood Pressure of Medical Students in Delhi. *Indian Journal of Community Medicine*. 2006;31(4):248–52.
6. Kaneria Y, Singh P, Sharma DC. Prevalence of Overweight and obesity in relation to Socio-economic Conditions in Two Different Groups of School-age children of Udaipur City (Rajasthan). *JACM*. 2006;7(2):133–138.
7. Khadilkar VV, Khadilkar AV. Prevalence of Obesity in Affluent School boys in Pune - letter to the editor. *Indian Pediatrics*. 2014;17(41):857–865.
8. Inoue S, Zimmet P, Caterson I, Chunming C, Ikeda Y, Dato et al. Redefining obesity and its treatment: The Asia Pacific perspective. WHO. 2000;p. 1–56.
9. Marcie B, Schneider, Brill SR. obesity in Children and Adolescents. *Pediatr Rev*. 2005;26(5):155–62.
10. Prasanna K, Girish M, Deepthi R, Muninarayanc. Prevalence of overweight and obesity among adolescent school going children (12-15years). *Int J Cur Res Rev*. 2012;4(20):99–105.
11. Singh SK, Maheshwari A, Sharma N, Anand K. Lifestyle associated risk factors in adolescents. *Indian J Pediatr*. 2006;73(10):901–907.
12. Laxmaiah A, Nagalla B, Vijayaraghavan K, Nairm. Factors affecting prevalence of overweight among 12 to 17 year old urban adolescent in Hyderabad. *India OBESITY*. 2007;15(6):1384–91.
13. Cleland VJ, Schmidt MD, Dwyer T, Venn AJ. Television viewing and abdominal obesity in young adults: is the association mediated by food and beverage consumption during viewing time or reduced leisure time physical activity? *Am J Clin Nutr*. 2015;87:1148–55.
14. McMurray RG, Harrell JS, Deng S, Bradley CB, Cox LM, Bangdiwala SI. The influence of physical activity Socio-economic status and Ethnicity on weight status of adolescents. *Obes Res*. 2000;8:130–139.
15. Ruchika C, Puri S. affluent adolescent girls of Delhi: eating and weight concerns. *British Journal of Nutrition*. 2006;86:535–577.
16. Nazeem I, Bose. Prevalence and trends of obesity in school children of different socio-economic class. *Indian Journal of Basic & Applied Medical Research*. 2012;5(2):393–98.

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