

Original Research Article

A cross sectional study to estimate prevalence of obesity and its risk factors in adolescent school children in Western Maharashtra, India

Jagannath S. Shete*, Anjali V. Wagh

Department of Community Medicine, D. Y. Patil Medical College, Kolhapur, Maharashtra, India

Received: 02 July 2018

Accepted: 27 July 2018

***Correspondence:**

Dr. Jagannath S. Shete,

E-mail: dr.jagannathshete@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: There is an increase in prevalence of childhood obesity and its chronic health effects especially in developing countries like India in last 2-3 decades. This study is small effort to know prevalence and risk factors causing obesity. Aim of the study was to estimate prevalence of obesity and its risk factors in school students of age group 11 to 16 years.

Methods: About 207 adolescent school children from selected school were enrolled in the study. Research tool comprised of questions about demographic characteristics, daily physical activity, frequency of having junk food intake etc. Height and weight were measured on calibrated scales. For statistical analysis MS Excel and SPSS 16 were used.

Results: Among participants 58.9% were boys. 66.7% students were in the 13 to 14 years of age group. As per body mass index, 46.9% children were underweight and 8.7% were obese. 77.3% participants were eating junk food more than once in a week.

Conclusions: Health education on dietary habits and physical activity is needed for adolescent children to prevent development of obesity and complications related to it.

Keywords: Adolescent, Obesity, School children

INTRODUCTION

WHO defined adolescence to period between 10 to 19 years. Early adolescence is between 10 to 13 years, middle adolescence is between 14 to 16 years and late adolescence is between 17 to 19 years.¹

Obesity is defined as an abnormal growth of the adipose tissue due to an enlargement of fat cell size (hypertrophic obesity) or an increase in fat cell number (hyperplastic obesity) or a combination of both. Overweight is usually due to obesity but can arise from other causes such as abnormal muscle development or fluid retention. Obesity is a condition where a person has accumulated so much

body fat that it might have a negative effect on their health. Overweight and obesity are a global pandemic according to WHO report; there are 1 billion overweight people in the world of which 300 million are obese.

India is the third most obese country in world. According to National Family Health Survey-3 15% of females and 14% males are considered obese in India.² The change in lifestyle, lack of physical activity and exercise, improper eating habits and lack of awareness about obesity has become a major problem of school going children. Childhood overweight affects self esteem and has negative consequence on cognitive and social development.

World Health Organization (WHO) estimates that, in 2008, India and China jointly account for total of 15% of total obese population of the world.³ The prevalence of overweight and obesity has increased in most parts of the world among children and adolescents also.

According to 2013 estimates of global burden of disease (GBD), the prevalence of overweight and obesity in boys in developed countries is 23.8% and that in girls is 22.6% Mean. At least 2.8 million people die each year as a result of obesity.⁴

India is experiencing an epidemiologic and nutritional transition with increasing prevalence of non-communicable diseases (NCDs). There are reports from Indian subcontinent of increasing prevalence of overweight among children and adolescents during last decade, with co-existing high prevalence of under nutrition.

METHODS

A cross sectional study was conducted in a Chhatrapati Shahu Vidyalaya, New Palace, Kolhapur, Maharashtra, India on 207 school going children of 11 to 16 years of age group. The school was randomly selected amongst approximately 25 private schools present in Kolhapur. With the help of structured questionnaire, all 207 students from selected age group were interviewed. Each interview was allotted maximum 10 minutes. Research tool comprised of questions about demographic characteristics, dietary pattern, family history, risk factors for obesity and frequency of having junk food. Body mass index (weight in kg/height in meter square) was calculated for each participant by measuring weight and height with calibrated scales.

A prior permission was taken by the Principal of the school to conduct the study. Institutional ethical committee approval was also taken. The study was

conducted in period between September 2017 to January 2018.

Percentage and chi square values calculated using Statistical Package for Social Sciences (SPSS) V16 Software and p value <0.005 was considered as statistically significant.

RESULTS

In the present study, 207 school going children, aged between 11 to 16 years were interviewed through a structured questionnaire. Among them 122 (58.9%) were boys (Table 1). 138 (66.7%) students were in the 13 to 14 years of age group. As per body mass index, 82 (39.6%) children were underweight, 82 (39.6%) were normal weight, 25 (12.1%) were overweight and 18 (8.7%) were obese (Figure 1). 117 (56.5%) participants had meals 3 times in a day. Among students 131(63.3%) were non vegetarian (Table 3). Among study subjects 143 (69.1%) were spending their time on mobile/TV/laptop for more than 4 hrs in a day. About 160 (77.3%) participants were eating junk food more than once in a week (Table 5).

Table 1: Distribution of students according to sex and age.

Age group (in years)	Boys (%)	Girls (%)	Total (%)
11 to 12	11(52.4)	10(47.6)	21(100)
13 to 14	78(56.5)	60(43.5)	138(100)
15 to 16	33(68.8)	15(31.2)	48(100)
Total	122(58.9)	85(41.1)	207(100)

Table 1 shows, total study participants were 207. Among them 122(58.9%) were boys and 85 (41.1%) were girls. Among them 21 participants were from 11 to 12 years of age group, 138 were from 13 to 14 years of age group and remaining 48 students were from 15 to 16 years of age group.

Table 2: Age group wise distribution of boys and girls according to body mass index.

BMI	11 to 12		13 to 14		15 to 16		Total	Percentage
	Boys	Girls	Boys	Girls	Boys	Girls		
Underweight	4	7	42	27	12	5	82	39.60
Normal	7	3	28	29	19	6	82	39.60
Overweight	1	2	4	6	5	7	25	12.10
Obese	0	0	8	4	2	4	18	8.70
Total	11	10	78	60	33	15	207	100.0

In above table, 82(39.6%) students were underweight, among them 11 were from 11 to 12 years of age group and 4 were boys and 7 were girls. In the age group 13 to 14 years 69 students were underweight, among them 42 were boys and 27 were girls. Total 17 students were

underweight who were from 15 to 16 years of age group, among them 12 were boys and 5 were girls. About 25 (12.1%) participants were overweight, among them 12 were from 15 to 16 years of age group and 5 were boys and girls were 7. Also, total 18 (8.7%) subjects were

obese, among them 12 were from 13 to 14 years of age group and 8 were boys and 4 were girls.

Table 3: Dietary habits.

	Frequency	Percentage
Frequency of meals in a day		
Two times	71	34.30
Three times	117	56.52
More than 3 times	19	9.18
Type of diet		
Vegetarian	76	36.70
Non-vegetarian	131	63.30

Table 3 shows, frequency of students who were taking meals for two times in a day was 71 (34.3%). Whereas 117 (56.52%) students were taking meals for 3 times in a day and only 19 (9.18%) students were taking meal for more than 3 times in a day.

Also, it is observed that 131 (63.3%) were non vegetarian and remaining 76 (36.7%) were vegetarian.

Table 4: Frequency of students spend time on mobile/TV/laptop.

Time spend on mobile/TV/laptop	Frequency	Percentage
<4hrs in a day	64	30.9
>4hrs in a day	143	69.1
Total	207	100

In Table 4, numbers of children spending their time on mobile/TV/laptop for more than 4 hrs in a day were 143 (69.1%) and remaining 64 (30.9%) children spend time less than 4 hrs in a day on mobile/TV/laptop.

Table 5: Frequency of junk food eating.

Eating Junk food	Frequency	Percentage
Daily	3	1.45
More than once in a week	160	77.29
Once in a week	32	15.46
Occasionally	12	5.80
Total	207	100

Table 6: Association of Frequency of eating junk food and BMI.

BMI	Eating junk food				Total
	Daily	More than once in a week	Once in a week	Occasionally	
Underweight	0(0.0%)	48(58.5%)	32(39.0%)	2(2.4%)	82(100%)
Normal	0(0.0%)	82(100%)	0(0.0%)	0(0.0%)	82(100%)
Overweight	3(12.0%)	12(48.0%)	0(0.0%)	10(40.0%)	25(100%)
Obese	0(0.0%)	18(100%)	0(0.0%)	0(0.0%)	18(100%)
Total	3(1.4%)	160(77.3%)	32(15.5%)	12(5.8%)	207(100%)

Pearson Chi square test, value = 141.6, df = 9, p < 0.01 (Statistical Highly Significant), Fishers Exact Test, value = 104.2, df = 9, p < 0.01 (Statistical Highly Significant). (p < 0.05 Statistical Significant, p < 0.01 Statistical Highly Significant)

Table 5 shows, number of students eating junk food daily was 3 (1.45%). Whereas 160 (77.29%) study participants were eating junk food/fast food more than once in a week, 32 (15.46%) participants were eating junk food once in a week and 12 (5.8%) were eating junk food occasionally.

In table 6, 3 (12.0%) participants were overweight eating junk food daily and 18(100%) obese respondents were having junk food more than once in a week. Association between frequency of eating junk food and Body Mass Index was found highly significant (p < 0.01).

DISCUSSION

In South Karnataka, India similar study was conducted on adolescent school children, it was observed that 51.2% participants were boys and mean BMI was 17.3Kg per meter square.⁵ 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. According to the Body Mass Index cut off values, 23.9% were underweight, 60.6% were normal, 11.4% were overweight, and 4% were obese. The risk of overweight was 7.3 times higher among those who reported watching television and playing games on the computer for ≥4 hours/day.

In another similar study done in Hyderabad, India total of 1208 adolescents (48.5% boys) in the age group of 12 to 17 years of age, with a mean age of 14.5 years, were studied.⁶ Among them 91% reported watching television on school days. Approximately 22% of adolescents preferred to consume junk foods. The mean BMI of the sample was 18.0kg/m². The prevalence of overweight among adolescents was 7.2%. In present study, 58.9% students were boys and 66.7% students were in the 13 to 14 years of age group. As per body mass index, 39.6% children were underweight, 39.6% were normal weight, 12.1% were overweight and 8.7% were obese. Among participants 63.3% were non vegetarian and 69.1% study

participants were spending their time on mobile/TV/laptop for more than 4 hrs per day. 77.3% participants were eating junk food more than once in a week.

CONCLUSION

The prevalence of overweight and obesity were 12.1% and 8.7% respectively. Among study participants 69.1% students spend their time on mobile/TV/laptop for more than 4 hrs per day. Frequency of eating junk food for more than once in a week was 77.3%. Health education on obesity targeting adolescent school students and their parents, and routine screening camps for obesity and its complications by healthcare providers. Awareness regarding healthy-balanced diet, daily physical activity, obesity and its complication will definitely help in reducing the prevalence of overweight and obesity.

ACKNOWLEDGEMENTS

Authors would like to thank undergraduate students Kirti Katiyar, Radhika Kadam, Rajwardhan Kadam, Sweta Gajapure for their valuable help in completing the study. We also thank the Principal of concern school for giving us permission for conducting study.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. World Health Organization. The health of young people: A challenge and a promise. 1993:11. Available at: <http://apps.who.int/iris/handle/10665/37353>.
2. National Family Health Survey (NFHS-3) 2005-06. International Institute for Population Sciences (IIPS) and Macro International. Mumbai: India. 2007;1:333. Available at: <http://www.measuredhs.com/pubs/pdf/OD59/OD59.pdf>.
3. World Health Organization. Obesity and overweight. 2018. Available at: <http://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>.
4. Ng M, Fleming T, Robinson M, Thomson B, Graetz N, Margono C, Mullany EC, et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: a systematic analysis for the global burden of disease study 2013. *Lancet*. 2014;384(9945):766-81.
5. Kotian MS, Kumar G, Kotian SS. Prevalence and determinants of overweight and obesity among adolescent school children of South Karnataka, India. *Indian J community medicine: official publication Ind Association Pre Soci Med*. 2010 Jan;35(1):176.
6. Laxmaiah A, Nagalla B, Vijayragawan K, Nair M. Factors affecting the prevalence of overweight among 12-17 year old urban adolescents in Hyderabad, India. *Obesity*. 2007;15:1384-90.
7. National Nutrition Monitoring Bureau. Diet and Nutritional Status of Rural Population. Hyderabad, India: National Institute of Nutrition, Indian Council of Medical Research; 2002.
8. Ramachandran A, Snehalatha C, Vinitha R, Thayyil M, Kumar CK, Sheeba L, et al. Prevalence of overweight in urban Indian adolescent school children. *Diabetes Res Clin Pract*. 2002;57:185-90.
9. Sharma A, Sharma K, Mathur KP. Growth pattern and prevalence of obesity in affluent schoolchildren of Delhi. *Public Health Nutr*. 2007;10:485-91.
10. Vikram NK, Misra A, Dwivedi M, Sharma R, Pandey RM, Luthra K, et al. Correlations of C-reactive protein levels with anthropometric profile, percentage of body fat and lipids in healthy adolescents and young adults in urban North India. *Atherosclerosis*. 2003;168:305-13.
11. Gavaravarapu SM, Rao KM, Nagalla B, Avula L. Assessing differences in risk perceptions about obesity among "normal-weight" and "overweight" adolescents-a qualitative study. *J Nutrition Education Behavior*. 2015 Nov 1;47(6):488-97.
12. Raj M. Obesity in Indian children: Time trends and implications. *Indian J Pediatr*. 2009;77:S6-8.
13. Aggarwal T, Bhatia RC, Singh D, Solti PC. Prevalence of obesity and overweight in affluent adolescents from Ludhiana, Punjab. *Indian Pediatr*. 2008;45:500-01.
14. Singh AK, Maheshwari A, Sharma N, Anand K. Lifestyle associated risk factors in adolescents. *Indian J Pediatr*. 2006;73(10):901-6.
15. Subramanya V, Jaya Shree R, Rafi M. Prevalence of overweight and obesity in affluent adolescent girls in Chennai in 1981 and 1998. *Indian Pediatr*. 2003;40:332-6.

Cite this article as: Shete JS, Wagh AV. A cross sectional study to estimate prevalence of obesity and its risk factors in adolescent school children in Western Maharashtra, India. *Int J Res Med Sci* 2018;6:3072-5.