Original Research Article

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20175328

Overweight and obesity: a rising problem in India

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Received: 11 September 2017 **Revised:** 09 November 2017 **Accepted:** 11 November 2017

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ABSTRACT

Background: Obesity is one of today's most neglected public health problems. Childhood obesity is one of the most serious public health problems. Obesity causes cluster of non-communicable diseases and creating an enormous socioeconomic and public health burden.

Methods: School based cross-sectional study was done in Udaipur city of Rajasthan. Simple random sampling method was used to obtain 1000 study subjects. Questionnaire included their general information, factor contributing to overweight and obesity.

Results: 500 (50.00%) subjects were from the government schools and 500 (50.00%) from private schools. Among study participants 336 (33.60%), 332 (33.20%) and 332 (33.20%) were from 8th, 9th and 10th class respectively. 8.20% Overweight and 2.40% obesity found among school children. Overweight and obesity was found high in private schools 14.00% as compared to government schools 7.20%. The prevalence of overweight and obesity is slightly more in girls 12.60% than boys 8.60%.

Conclusions: Prevalence of overweight and obesity is more than 10% in school children of Udaipur city, The prevalence of overweight and obesity was high among girls, among school children's whose mother were working.

Keywords: Overweight, Obesity, School children, Childhood

INTRODUCTION

Burden of overweight and obesity has increased rapidly over the past decades globally.¹ It is endemic in many parts of the world. Obesity is one of today's most blatantly visible, yet most neglected public health problems.² worldwide obesity has more than doubled since 1980. In 2014, 39% of adults aged 18 years and over were overweight in 2014, and 13% were obese. Most of the world's population lives in countries where overweight and obesity kills more people than underweight.³ According to the National Family Health Survey (NFHS-4), the prevalence of BMI≥25 among female is 20.7%, 14.1% in India and Rajasthan respectively and among male is 18.6%, 13.2% in India and Rajasthan respectively.⁴ The worldwide prevalence

of childhood overweight and obesity increased from 4.2% in 1990 to 6.7% in 2010. This trend is expected to reach 9.1% in 2020.⁵ A consistent increase in the prevalence of childhood obesity has been observed since 1971 in developed countries, however, its prevalence is increasing in developing countries as well.⁶

Childhood obesity is one of the most serious public health challenges of the 21st century. The problem is global and is steadily affecting many low- and middle-income countries, particularly in urban settings. The prevalence has increased at an alarming rate. Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. Body mass index (BMI) is a simple index used to classify overweight and obesity. Body mass index (BMI) is a measure of weight

adjusted for height. It is calculated as weight in kilograms divided by the square of height in meters. Among Asian BMI is equal to or greater than 23 as overweight and equal to or greater than 25 as 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.² It is caused by imbalance between calorie intake and calories utilized. One or more factors (genetic, behavioural, and environmental) cause obesity in children. Physical, psychological, and social health problems are caused due to childhood obesity. Obesity comorbidities include coronary heart disease, hypertension and stroke, certain types of cancer, diabetes, mellitus, gallbladder disease, dyslipidaemia, osteoarthritis and gout, and pulmonary diseases, including sleep apnoea.² In obese persons, general and specific musculoskeletal pain is common. Emerging evidence suggests that obesity modulates pain via several mechanisms such as mechanical loading, inflammation, and psychological status. 10 among obese adolescents have higher lifetime prevalence of anxiety disorders as compared to nonobese.

METHODS

Objectives

To know the prevalence of overweight and obesity and factors contributing to overweight and obesity among school children.

Materials and methods

A school based cross-sectional study was done in Udaipur city of Rajasthan, India. The study was concerned with girls and boys of 8th, 9th and 10th classes of government and private schools of Udaipur city. It was decided to study 1000 students.

A list of government and private schools was obtained from the district education office, for seeking the permission for conduction of this study. It was a simple random sampling procedure for the selection of schools and also the classes of 8th, 9th, 10th as well as students.

It was planned that if the school management refused for conduction of the study, in that case another school would be taken, by the simple random sampling method, till the required number of 1000 subjects are covered. Period of data collection was 1 July 2014 to 30 January 2015. Ethical clearance was obtained from ethical committee of the Geetanjali University, Udaipur.

Inclusion criteria

Students of class 8th, 9th, 10th standard were included.

Exclusion criteria

Exclusion criteria were student with disability were excluded; study subjects who will not be giving consent to participate; students who were not available on the day of school visit.

Methods of data collection

Before a school was taken for the study, head of the institution was contacted and purpose of the study was explained and consent was obtained. Sampled schools were visited on a preferred date. Pilot study was done and necessary modifications were made in the questionnaire. After getting written consent from the school and students, a pretested questionnaire was administered. Questionnaire included their general information, factor contributing to overweight and obesity. Weight and height of the students were taken and body mass index (BMI) was calculated.

Data analysis

Data was entered into Microsoft excel sheet and analysed using SPSS 20 software. Descriptive statistics like frequency, percentages, and inferential statistical tests like chi-square analysis were used.

RESULTS

In this study out of 1000 study subjects, 500 (50.00%) subjects were from the government schools and 500 (50.00%) from private schools. Among study participants 336 (33.60%), 332 (33.20%) and 332 (33.20%) were from 8^{th} , 9^{th} and 10^{th} class respectively. Majority 305 (30.50%) were of 15 years of age followed by 299 (29.90%), 275 (27.50%), 113 (11.30%), 8 (0.80%) were \geq 16, 14, 13 and 12 years of age respectively. 834 (83.80%) were belonged to Hindu religion followed by 95 (9.50%), 61 (6.10%), 6 (0.60%) were belonged to Muslim, others (Jain and Sikh) and Christian Religion respectively. Among study participants, 333 (33.30%) were belonged to joint family and 667 (66.70%) were belonged to nuclear family (Table 1).

Out of 1000 study subjects, prevalence of overweight was 82 (8.20%) and obesity 24 (2.40%). 63(12.60%) and 43 (8.60%) overweight and obesity among girls and boys respectively. In the present study, prevalence of overweight and obesity was 70 (14.00%) in private schools and 36 (7.20%) in government schools. 83 (22.73%) of overweight and obese children were those whose mothers were working and 23 (3.62%) of overweight and obese children were of non-working mothers. In this study majority 76 (29.92%) of overweight and obese children were those whose family history was present for overweight and obesity and 30 (4.02%) of overweight and obese children did not have any family history of overweight and obese study subjects were

those who were sleeping less than 8 hours in a day and 17 (2.29%) of overweight and obese study subjects were

sleeping more than and equal to 8 hours in a day (Table 2)

Table 1: Socio-demographic profile of study subjects.

	Boys n (%)	Girls n (%)	Total n (%)	
Distribution of the study subjects according to type of school				
Government	250 (50.00)	250 (50.00)	500 (100)	
Private	250 (50.00)	250 (50.00)	500 (100)	
Distribution of the study subjects according to class				
8 th class	168 (33.60)	168 (33.60)	336 (33.60)	
9 th class	166 (33.20)	166 (33.20)	332 (33.20)	
10 th class	166 (33.20)	166 (33.20)	332 (33.20)	
Distribution of the study subjects according age				
12 years of age	6 (1.20)	2 (0.40)	8 (0.80)	
13 years of age	54 (10.80)	59 (11.80)	113 (11.30)	
14 years of age	135 (27.00)	140 (28.00)	275 (27.50)	
15 years of age	153 (30.60)	152 (30.40)	305 (30.50)	
≥16 years of age	152 (30.40)	147 (29.40)	299 (29.90)	
Distribution of the study subjects according to religion				
Hindu	424 (84.80)	414 (82.80)	838 (83.80)	
Muslim	47 (9.40)	48 (9.60)	95 (9.50)	
Christian	3 (0.60)	3 (0.60)	6 (0.60)	
Others (Jain and Sikh)	26 (5.20)	35 (7.00)	61 (6.10)	
Distribution of the study subjects according to type of family				
Joint	159 (31.80)	174 (34.80)	333 (33.30)	
Nuclear	341 (68.20)	326 (65.20)	667 (66.70)	
Total	500 (100)	500 (100)	1000 (100)	

Table 2: Prevalence and factors contributing of overweight and obesity.

	Non overweight and non-obesity n (%)	Overweight & Obesity n (%)	Total n (%)		
Prevalence of the overweight and obesity according to gender					
Girls	437 (87.40)	63 (12.60)	500 (100)		
Boys	457 (91.40)	43 (8.60)	500 (100)		
χ2=4.221 p<0.039926 df- 1 significant at p<0.05					
Prevalence of the overweight and obesity according to type of school					
Government	464 (92.80)	36 (7.20)	500 (100)		
Private	430 (86.00)	70 (14.00)	500 (100)		
χ2=12.198 p<0.0004 df- 1 significant at p<0.05					
Association of the overweight and obesity with working status of the mother					
Not working mother	612 (96.37)	23 (3.62)	635 (100)		
Working mother	282 (77.26)	83 (22.73)	365 (100)		
χ2=89.390 p<0.00001 df- 1 significant at p<0.05					
Association of the overweight and obesity with family history of overweight and obesity					
Positive family history of overweight/obesity	178 (70.07)	76 (29.92)	254 (100)		
Absent family history of overweight/obesity	716 (95.97)	30 (4.02)	746 (100)		
χ2=134.128 p<0.00001 df- 1 significant at p<0.05					
Association of the overweight and obesity with sleeping hours					
Sleeping hours Less than 8 hrs	170 (65.63)	89 (34.36)	259 (100)		
Sleeping hours More than equal to 8 hrs	724 (97.70)	17 (2.29)	741 (100)		
χ2=208.275 p<0.00001 df- 1 significant at p<0.05					

DISCUSSION

In the present study, the overall prevalence of overweight and obesity was 10.60% among school going children of Udaipur city. 8.20% and 2.40% was prevalence of overweight and obesity respectively. Similar prevalence of overweight and obesity found in study conducted at Ahmedabad reported that the overall prevalence of overweight and obesity was 14.00% and the prevalence of overweight and obesity was 11.80% and 2.20% respectively. In another study conducted in Latur City which reported the overall prevalence of overweight and obesity was 9.98% and the prevalence of overweight and obesity was 8.54% and 1.44% respectively. Similar overall prevalence of overweight and obesity was 9.63%. study conducted at Mandya city, Karnataka.

In the present study overweight and obesity was found more in girls as compared to boys with the odds of 0.65 and the difference was found to be statistically significant. Similar finding was reported study conducted in south India, overweight and obesity was more in girls as compared to boys. 15 In another study carried out at Tanzania in which overweight and obesity was more in girls 26.7% as compared to boys 17%. 16 In a study conducted in eastern Ethiopia, overweight and obesity was more in girls 20.90% as compared to boys 20.30% though the difference was not significant.¹⁷ Overweight and obesity was more in girls 2.60% as compared to boys 1.2% in Shimla city. ¹⁸ This may be due to that during puberty, females have tendency to accumulate more fat. It is recognizing that weight gain during puberty is physiological so in puberty girls are more likely to overweight and obese as compare to boys.

In the present study, prevalence of overweight and obesity was more in private school as compared to government school with the odds of 2.098 times among private school children and the difference was found to be statistically significant. Similar findings were observed in a study carried out in Aurangabad City, Maharashtra in which the prevalence of overweight and obesity was 8.14% in government school and 11.43% in private school. 19 A study conducted at district Anantnag among school going children, the prevalence of overweight and obesity was 4% in the government schools and 20% in the private schools. ²⁰ In another study conducted at Shimla city, observed that the prevalence of overweight and obesity was 0.40% in the government schools and 3.40% in the private school children. 18 It may be due to children studying in private schools are not belonging to low socio-economic background which shows that high socio-economic status plays a major role in the contributing factor of overweight and obesity.

In the present study majority of overweight and obese children were those whose mothers were working as compared to those whose mothers were not working with the odds of 7.832 and the difference was found to be statistically significant. Similar findings were revealed in

the study conducted at Mysore city that overweight and obesity was 15.80% in children of working mothers as compared to 10.00% in children of non-working mothers. Similar findings were observed studies conducted at Latur City. It may be due to working mothers have higher socioeconomic status or no control over food intake in children.

In the present study majority of overweight and obese children were those who had a family history for overweight and obesity and significant association were found between overweight and obesity and family history of overweight and obesity. The prevalence of overweight and obesity was found to be significantly high among the students whose family history of overweight and obesity studies conducted at Kerala.²² and Mysore city.²¹ It may be due to genetic factors, dietary pattern and life style practices in the household.

In the present study majority of overweight and obese study subjects were those who were sleeping less than 8 hours in a day as compared to those who were sleeping more than and equal to 8 hours in a day. Statistically significant association was found between overweight and obesity and duration of sleeping hours in a day. Similar finding was observed in study conducted at Mandya city but it was not statistically significant. Another study conducted in Nagpur, Maharashtra which showed majority of overweight and obesity were those who sleep less than 8 hours in a day. Short sleep duration modulates the hormones such as leptin and ghrelin, the reduced levels of which increase hunger and appetite and its influence can cause weight gain.

CONCLUSION

The prevalence of overweight and obesity in children were observed to be 8.20% and 2.40% respectively. Overweight and obesity was found high in private schools 14.00% as compared to government schools 7.20%. The prevalence of overweight and obesity is slightly more in girls 12.60% than boys 8.60%. Family history of overweight and obesity had a definite influence of overweight and obesity in children. Majority of overweight and obesity found among those who sleep less.

Recommendations

On the background of prevalence pattern of overweight and obesity in school children, there is a need for educating and counselling children's for do at least 30 to 45 minutes of cumulative moderate physical activity at least 5 days in a week. The school curriculum should include regular classes on nutritive values of different food stuffs, healthy food habits and life style. Multisectoral approach of different sectors like education department, food industry, media and people will contribute in halting this problem of childhood obesity.

ACKNOWLEDGEMENTS

The authors are grateful to school authority for support and permission to conduct the study and special thanks to all study participants because without them study could not be completed.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee of the Geetanjali University, Udaipur, Rajasthan, India

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Cite this article as: Meharda B, Sharma SK, Singhal G, Dilip KL. Overweight and obesity: a rising problem in India. Int J Community Med Public Health 2017;4:4548-52.