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Prevalence and risk factor for obesity in urban and rural school going children of Karad taluka, Maharashtra, India

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ABSTRACT

Background: Obesity is defined as the abnormal growth of adipose tissue due to enlargement of fat cells size or increase in their number or a combination of both. The aim was to find out the prevalence of obesity in school going children aged between 10-14 years in urban and rural areas of Karad, Maharashtra, India and to compare its prevalence of obesity with its risk factor.

Methods: A cross sectional randomized study of 360 children from schools in urban and rural areas of Karad, Maharashtra, India was conducted to find out the prevalence of obesity.181 children from urban school and 179 from rural school were included.

Results: The prevalence of overweight and obesity in urban area is 6.6% and 2.2%. The prevalence of overweight and obesity in rural area is 3.4% and 0.6%. Risk factors in urban area were male sex, television viewing >1 hour, transport to school, family history of obesity and diabetes.

Conclusions: The prevalence of overweight/obesity is higher in urban area compared to rural area. Lack of physical activity and family factors are important risk factors.

Keywords: Obesity, Risk factors

INTRODUCTION

Obesity is defined as the abnormal growth of adipose tissue due to enlargement of fat cells size or increase in their number or a combination of both. WHO in 1998 designated obesity as global epidemic. Globally, the prevalence of childhood obesity varies from over 30% in USA to less than 2% in sub-saharan Africa. The prevalence of obesity in school children is 20% in U.K. and Australia, 15.8% in Saudi Arabia, 15.6% in Thailand, 10% in Japan and 7.8% in Iran. The host important age group in all societies, not because they constitute about 40% of the total population, but because

there is a renewed awareness that the determinants of chronic diseases in later life and health behaviour are laid at this stage.⁵ Obesity particularly central adiposity has been accepted as a risk factor for NIDDM and the risk factor is related to both the duration and degree of obesity. Obesity is a womb which gives birth to other non-communicable diseases like hypertension, hyperlipidemia, glucose intolerance, type 2 diabetes mellitus and its long term complications like coronary artery disease, renal failure etc. Childhood obesity is a fast emerging problem for which national representative data is very little. Effective prevention of adult obesity will require prevention and management of childhood

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obesity.⁸ As obesity is a key risk factor in natural history of other non-communicable diseases, the typical time sequence of emergence of chronic diseases following the increased prevalence of obesity is important in public health planning.⁹

METHODS

Study design-A cross sectional randomized study of 360 children from schools in urban and rural areas of Karad Taluka, Maharashtra, India was conducted to find out the prevalence of obesity.

The study in urban area was conducted in Shivaji High School, India while rural area was conducted in Anandrao Chavan High School in Karad city, Maharashtra. 181 children from urban school and 179 children from rural school were obtained by systematic sampling technique for this study. Equal number of girls and boys were randomly selected from each class from 5th to 9th standard. Children aged between 10 to 14 years of both sexes were included in the study. Age below 10 years and above 14 years, confirmed by date of birth. Anybody suffering from any pre-existing disease and on any long term medication were excluded from the study.

The students were interviewed for their diet and lifestyle related questions as according to a pre tested proforma which included type of family, mother and fathers occupation and education, type of diet, 24 hour diet recall, frequency of junk food, soft drinks, chocolates consumption, preference to type of food, the mode of transport to school, hours per day they spend viewing television or computer, outdoor games, exercise and sleeping and family history of obesity, diabetes mellitus and hypertension. The height was recorded using

standard technique in standing position. The weight was recorded using standard weighting machine nearest 0.5 kgs and the hip and waist circumference were recorded using standard non-stretchable tape and standard procedure to the nearest 0.1 cm. BMI was calculated and was classified according to Agarwal KN et al percentiles. ¹⁰ 95th percentile for age and sex was taken as cut off point for obesity and children between 95th and 85th percentile were classified as overweight.

The initial protocol was approved by the institutional ethical committee at Krishna institute of medical sciences, Karad, Maharashtra, India. The consent was obtained from the school authorities for conducting the research and to interview the students. Means (x), standard deviation (SD) and frequency (%) were calculated for the statistical analysis.

Individual t-test was used to compare the mean results of the anthropometrical variables and chi square was used for comparison of frequencies. A "p" value equal to or less than 0.05 was considered to be statistically significant for a 95% confidence interval. The data were analyzed using SPSS and MS Excel.

RESULTS

Out of 360 children, the prevalence of overweight is 18(5%) and obesity is 5 (1.3%), while prevalence of overweight and obesity was higher in urban area 12 (6.6%) and 4 (2.2%) while in rural children is 6(3.4%) and 1 (0.6%) respectively (Table 1). In our study we found that males have higher fraction of overweight and obesity in comparision to females. The children who are playing less than an hour showed higher share of overweight and obesity (Table 3).

Table 1: Prevalence of overweight and obesity in urban and rural areas.

	Normal	Overweight	Obese	p-value
Urban	165 (91.2%)	12 (6.6%)	4 (2.2%)	
Rural	172 (96.1%)	6 (3.4%)	1 (0.6%)	0.140
Total	337 (93.6%)	18 (5.0%)	5 (1.3%)	

Table 2: Age distribution.

	Variable		Normal	Overweight/obese
Urban		10	31 (88.6%)	4 (11.4%)
		11	31 (91.2%)	3 (8.8%)
	Age	12	37 (94.9%)	2 (5.1%)
		13	33 (86.8%)	5 (13.2%)
		14	33 (94.3%)	2 (5.7%)
Rural		10	33 (94.3%)	2 (5.7%)
		11	34 (94.4%)	2 (5.6%)
	Age	12	36 (100%)	0 (0%)
		13	34 (91.9%)	3 (8.1%)
		14	35 (100%)	0 (0%)

Table 3: Test of significance for risk factors (chi-square tests).

	Variable		Normal	Overweight/obese	P value	
Urban	Sex	Male	74 (83.1%)	15 (16.9%)	< 0.001	
		Female	91 (98.9%)	1 (1.1%)		
	Television viewing	<u><</u> 1 hour	106 (98.1%)	2 (1.9%)	< 0.001	
		>1 hour	59 (80.8%)	14 (19.2%)		
	Outdoor activities	≤1 hour	83 (90.2%)	9 (9.8%)	0.650	
		>1 hour	82 (92.1%)	7 (7.9%)		
	Transport to school	<30 min Walking/cycling/bus /car	113 (88.3%)	15 (11.7%)	0.034	
		>30 min Walking/cycling	52 (98.1%)	1 (1.9%)		
	Family h/o Obesity	Present	51 (82.3%)	11 (17.7%)	0.02	
	Talling 170 Obesity	Absent	114 (95.8%)	5 (4.2%)	0.02	
	Family h/o Diabetes Mellitus	Present	21 (77.8%)	6 (22.2%)	0.008	
		Absent	144 (93.5%)	10 (6.5%)	0.008	
	Sex	Male	84 (93.3%)	6 (6.7%)	0.056	
		Female	88 (98.9%)	1 (1.1%)		
	Television viewing	≤1 hour	128 (98.5%)	2 (1.5%)	0.008	
		>1 hour	44 (89.8%)	5 (10.2%)		
	Outdoor activities	<1 hour	89 (92.7%)	7 (7.3%)	0.012	
		>1 hour	83 (100.0%)	0 (0%)		
Rural	Transport to school	<30 min Walking/cycling	114 (95.8%)	5 (4.2%)		
		>30 min Walking/cycling	49 (100.0%) 0 (0%)		0.018	
		Bus/car	9 (81.8%)	2 (18.2%)		
	Family h/o obesity	Present	36 (87.8%)	5 (12.2%)	0.02	
		Absent	136 (98.6%)	2 (1.4%)		
	Family h/o diabetes	Present	20 (100%)	0 (0%)	0.338	
	mellitus	Absent	152 (95.6%)	7 (4.4%)		

Table 4: Comparison of means and standard deviations of height, weight, hip circumference, waist circumference, BMI and waist hip ratio.

		Mean	Standard deviation	t- test
Holaht	Urban	144.79	11.070	n = 0.265
Height	Rural	143.58	9.503	p = 0.265
Weight	Urban	34.058	9.7371	n = 0.024
Weight	Rural	32.081	7.8173	p = 0.034
Hin ainaumfanana	Urban	73.470	8.5544	m — 0.000
Hip circumference	Rural	71.229	7.3085	p = 0.008
Waist circumference	Urban	62.550	8.3355	p = 0.002
waist circumference	Rural	60.031	6.6312	p = 0.002
BMI	Urban	15.982	2.8737	n = 0.022
DIVII	Rural	15.382	2.3846	p = 0.032
Waist him watio	Urban	.8515830	.053269468	n = 0.116
Waist hip ratio	Rural	.8433470	.045689396	p = 0.116

DISCUSSION

The present study highlights the increase in prevalence of obesity in both urban and rural areas. In present study the

overall prevalence of overweight and obesity is 5% and 1.3% (Table 1). The results are comparable to those of Bharti et al. 11 who reported prevalence of overweight and obesity as 3.1% and 1.2% in Wardha. According to Shah

C et al. 12 The prevalence of overweight and obesity was 9.25% and 5.55% in Bhavnagar, Aggarwal T et al reported 12.7% and 3.4% from Ludhiana, Kumar S et al reported prevalence of obesity as 5.74% in Davangere and Khadilkar V V's research in Pune on school going boys showed prevalence of overweight and obesity as 19.9% and 5.7% respectively. 8,13,14 Chhatwal J et al reported prevalence of overweight and obesity as 14.2% and 11.1% respectively in Ludhiana. 15 The study in Chennai by Vedhavati S et al reported the prevalence of obesity as 6.2% and a similar study in Delhi by Kapil U et al reported prevalence of obesity as 7.4%. 16,17

In present study the prevalence of overweight and obesity was higher in urban area (6.6% and 2.2%) compared to rural area (3.4% and 0.6%), but there was no statistical significance (Table 1). This was comparable to results by Bharti et al who reported prevalence of obesity/overweight in urban and rural areas or Wardha as 5.3% and 1.8% respectively. But according to Mohan B et al the prevalence of overweight was higher in urban children (11.6%) compared to rural children (4.7%) but that of obese was higher in rural children (3.6%) compared to urban children (2.3%) of Ludhiana. Secondary compared to urban children (2.3%) of Ludhiana.

Present study reports high proportion of overweight and obesity in males compared to females in both urban and rural areas, but the difference was significant only in urban area (Table 3). This was comparable to research by Chhatwal J et al, Bharti et al, Aggarwal T et al and Mohan B et al, who al reported prevalence of obesity more in males than in females as against Shah C et al. 11-15,18 And Agarwal KN et al who reported the prevalence of overweight and obesity was higher in females than in males S Jain et al reported prevalence of overweight and obesity as 19.7% and 5.3% respectively in girls and 18.36% and 10.82% respectively in males. 10,20

Goyal RK et al reported prevalence of overweight to be 14.3% among boys and 9.2% among girls whereas the prevalence of obesity was 2.9% in boys and 1.5% in girls.²¹

Most of the reports reported increasing trend in overweight and obesity, but this study did not show any such trend. The interesting thing observed in the study was that a peak was observed at age 13 in both urban and rural areas, otherwise no statistical significance was seen (Table 2).

In present study the prevalence of overweight/obesity was higher in children who spent more than 1 hour watching television or in front of computer than those spending less than 1 hour per day. This difference was statistically significant in both urban and rural areas (Table 3). Bharti et al reported that children who spent more time watching television or on computers had higher BMI and were physically less active and were more prone to overweight and obesity. 11

Kuriyan R et al also reported significant relation with television viewing and overweight/obesity. 19 S Jain et al also reported a similar relation. 20

The study also reported higher prevalence of overweight/obesity in children playing less than 1 hour a day. This difference was statistically significant in rural area but not in urban area (Table 3). Bharti et al also reported higher prevalence of overweight/obesity in children who play less than 30 minutes outdoor games. Similar relation was reported by S Jain et al. 11,20

In the study it was observed that in children who took more than 30 minutes to walk or cycle to school the prevalence of overweight/obesity was less compared to those who took less than 30 minutes to walk or cycle to school or those who came by bus, car or other vehicle. This difference was statistically significant both in urban and rural areas (Table 3).

The family history of obesity was significantly related to the childhood obesity. This was significant in both urban and rural areas. The family history of diabetes mellitus also significantly associated with development of childhood obesity in urban area but not in rural area (Table 3). Goyal RK et al also reported a relation of child hood obesity with family history of obesity and diabetes.²¹ This suggests family or genetic factor influencing childhood obesity.

CONCLUSION

The prevalence of overweight/obesity is higher in urban area compared to rural area. The prevalence is significantly higher in urban males than females, in those who watch television or use of computers for more than 1 hour in a day, in those who spend less time playing outdoor games, in those who take less than 30 minutes to walk or cycle to school or who come by bus or car, in those who have family history of obesity and diabetes mellitus.

Thus lack of physical activity and family factors are important risk factors in the development of childhood obesity. None of the dietary factors seemed to have significant effect over the prevalence of childhood obesity. The children should be encouraged to play more outdoor games instead of television and computers. Children especially males should be given special attention to prevent obesity in them in childhood as well as adulthood.

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