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Research Article

Prevalence of overweight and obesity and factors affecting it in affluent adolescents of Raichur city

Niranjan N[1], Sagar Hiremath[2], Akhil Kapoor[3]*, Pramod Kumar Berwal[1]

[1]Department of Pediatrics, Sardar Patel Medical College and Hospitals, Bikaner, Rajasthan, India
[2]Department of Pediatrics, Raichur Medical College and Hospital, Karnataka, India
[3]Department of Oncology, Acharya Tulsi Regional Cancer Treatment & Research Institute, Bikaner, Rajasthan, India

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***Correspondence:**
Dr. Akhil Kapoor,
E-mail: kapoorakhil1987@gmail.com

ABSTRACT

Background: Childhood obesity is associated with increased incidence of hypertension, diabetes mellitus, coronary heart diseases, osteoarthritis and overall increase in morbidity and mortality in adult life. Most of the studies have been done in metropolitan cities of India. This study aims to assess the prevalence of obesity and overweight and to identify the factors influencing adolescent obesity in a smaller district like Raichur, situated in the North-Eastern part of Karnataka.
Methods: A cross-sectional study was done among 984 students aged 10-16 years from 3 schools which cater the well-to-do of Raichur city. Their BMI was calculated and determined as to whether they were obese or overweight. The students were given questionnaire to collect data about type of diet, intake of junk foods, number of hours of sleep, daily exercise, TV viewing and knowledge about obesity and its effects.
Results: The prevalence of obesity and overweight was found to be 4.6% and 11.3% respectively and was found to be higher in girls (6% & 12% respectively) than boys (3.6% & 10.8% respectively). Daily exercise, intake of junk food and duration of sleep of more than 8 hours were found to be significant factors influencing adolescent obesity.
Conclusions: Prevalence of adolescent obesity is an emerging problem of not only Metropolitan cities, but also that of small towns and districts like Raichur. Steps need to be taken to prevent obesity at the onset itself by daily exercise, increasing physical activity, reducing intake of junk foods etc. Further studies are required to elucidate the factors influencing adolescent obesity.

Keywords: Obesity, Overweight, Body mass index, Raichur city

INTRODUCTION

Obesity is defined as a BMI at or above the 95th percentile for children of the same age and sex.[1] Overweight is defined as a BMI at or above the 85th percentile and lower than the 95th percentile for children of the same age and sex.[1] Obesity is an important pediatric public health problem associated with risk of complications in childhood and increased morbidity and mortality throughout adult life.[2]

Childhood obesity was considered a problem of affluent countries. Today the problem has started appearing even in the developing countries. Currently the prevalence of obesity in school children is 20% in the UK and Australia, 15.8% in Saudi Arabia , 15.6% in Thailand, 10% in Japan and 7.8% in Iran.[2] National representative data for childhood obesity in India is unavailable, however available studies of Chennai and New Delhi show prevalence of 6.2% and 7.4% respectively.[3,4] The prevalence of overweight and obesity has also increased in children and adolescents in developing countries, from

8·1% (7.7-8.6) to 12.9% (12.3-13.5) in 2013 for boys and from 8.4% (8.1-8.8) to 13.4% (13.0-13.9) in girls.[5]

Obese children have substantial risk for morbidity such as hypertension, diabetes mellitus type 2 and dyslipidemia even before they reach adulthood. Overweight children tend to remain overweight during follow up periods of up to 20 years.

The family history of obesity, snacking of high energy foods and lack of physical activity are the important influencing factors influencing obesity.[5] Unhealthy eating patterns, wrong choices of food, excessive watching television, inadequate play areas have been stated as the root cause of epidemic of childhood and adolescent obesity in India.[6] This study intends to know the prevalence and factors influencing adolescent obesity in Raichur city, a city of North-Eastern Karnataka.

METHODS

The study was a cross sectional study conducted in three schools of Raichur city catering to the affluent segment of population. A total of 984 students aged between 10 to 16 years were randomly chosen for the study. Informed consent was taken from the parents.

The chosen subjects were given a questionnaire to collect data on type of diet, snacking, intake of junk foods, number of hours of sleep, daily exercise, daily games, TV viewing and their knowledge about obesity and its effects. Weight was measured by electronic weighing scale (accuracy up to 100 g). Height was measured using stadiometer with head held in Frankfurt plane. Body Mass Index (BMI) was calculated using the formula,

$$BMI = Weight\ (kg)/Height\ (m^2)$$

Body mass index for age and sex of subjects were compared with BMI for age and sex values of CDC-2000 standard and determine whether the child is normal, overweight or obese. A child is said to be overweight if his BMI is greater than 85th centile for his age and sex, obese if his BMI is more than 95th centile for his age and sex.[7] The prevalence of overweight and obesity was then calculated. The factors affecting obesity were compared between obese and non-obese adolescents. Statistical analysis was done by using Chi-square test.

RESULTS

A total of 984 adolescents were included in the study, out of which 584 (59.4%) were boys and 400 (40.6%) were girls. Overall prevalence of obesity was found to be 4.6% (P = 0.076) and overweight was found to be 11.3% (P = 0.463).

Prevalence of obesity in girls was 6% as compared to 3.6% in boys. Prevalence of overweight was higher in girls which was found to be 12% as compared to 10.78% in boys. Intake of junk food was observed in 66.7% of obese children and 86.58% in non-obese children and found to be significant (P = 0.004) factors influencing obesity in affluent adolescents.

Table 1: Prevalence of obesity and overweight by body mass index.

Age	Number of adolescents (n)	Normal (N)	Overweight adolescents BMI >85th centile	Obese adolescents BMI >95th centile
Boys				
10	113	96 (84.9%)	15 (13.3%)	2 (1.8%)
11	62	54 (87.1%)	7(11.3%)	1(1.6%)
12	69	62 (89.9%)	5 (7.2%)	2 (2.9%)
13	91	81 (89.0%)	6 (6.5%)	4 (4.39%)
14	97	84 (86.6%)	10(10.3%)	3 (3.1%)
15	89	71 (79.8%)	11 (12.3%)	7 (7.9%)
16	63	52 (82.5%)	9(14.3%)	2 (3.2%)
Total	584	500 (85.6%)	63 (10.8%)	21 (3.6%)
Girls				
10	73	60 (82.2%)	12 (16.4%)	1 (1.4%)
11	34	29 (85.3%)	3 (8.8%)	2 (5.9%)
12	51	45 (88.3%)	4 (7.8%)	2 (3.9%)
13	64	51 (79.7%)	6(9.4%)	7(10.9%)
14	66	53 (80.3%)	9(13.6%)	4 (6.1%)
15	57	49 (85.9%)	3 (5.3%)	5 (8.8%)
16	55	41 (72.5%)	11(20.0%)	3 (5.5%)
Total	400	328 (82%)	48(12%)	24 (6%)
Grand total	984	828 (84.1%)	111 (11.3%)	45 (4.6%)

Daily exercise was done by 11.1% obese children as compared to 31.2% of non-obese children and found to be significant (P = 0.004) factors influencing obesity in affluent adolescents. Duration of sleep was more than 8 hours in 28.8% of obese children as compared to 14.38% in non-obese children and found to be significant (P = 0.007) factors influencing obesity in affluent adolescents. Mixed diet was taken by 60% of obese children and 68.47% of non-obese children and found to be an insignificant (P = 0.233) factor influencing obesity in our study. Knowledge about obesity and its effects is very poor (3.35%) among affluent adolescents.

Table 2: Prevalence of obesity and overweight.

	Obese adolescents	Non-obese adolescents	X^2	P value	Over weight	Non over weight	X^2	P value
Boys	21 (3.6%)	563			63 (10.8%)	500 (85.6%)		
Girls	24 (6%)	376	3.144	0.076	48 (12%)	328 (82%)	0.537	0.463
Total	45 (4.6%)	939			111 (11.3%)	828 (84.1%)		

Table 3: Factors influencing obesity.

Factor	Incidence among		X^2	P value
	Obese	Non obese		
Daily exercise	5 (11.1%)	293 (31.2%)	8.210	0.004
Intake of junk food	30 (66.7%)	813 (86.5%)	13.873	0.001
Duration of sleep >8 hours	13 (28.8%)	135 (14.38%)	7.077	0.007
Mixed diet	27 (60%)	643 (68.47%)	1.42	0.233

DISCUSSION

The prevalence of obesity (4.6%) among adolescents of Raichur city is comparable to the prevalence of 5.74% in Davangere city of Karnataka.[2] Other studies in Delhi and Chennai have shown prevalence of obesity of 7.4% and 6% respectively.[4,3] The results of this study signifies that the prevalence of obesity in Metropolitan cities in India and smaller districts of India are pretty similar. This can be explained by the life style changes like excessive intake of junk food, decreased physical activity and increased TV viewing occurring even in children and adolescents of small towns.

In our study, prevalence of obesity is more in girls (6%) as compared to boys (3.6%). The observation is similar to the observation of Agarwal et al.[9] and S Kumar et al.[2] Prevalence of overweight in girls was 12% in our study, which is comparable to 10% found in study of Chennai.[3] This might be because adolescent girls gain more fat than muscle mass as compared to adolescent boys and are at a greater risk for becoming overweight. Thus, the adolescent girls are at higher risk of becoming overweight and obese as compared to boys.

The maximum prevalence of obesity in our study is between the ages of 13 to 15 years. In a study done by Kapil et al., the maximum prevalence has been found to be between 10 to 12 years,[4] while it was between 10 to 13 years in the study by Vedavati et al.[3] This may be associated with the increase in adipose tissue and overall weight gain during pubertal growth spurt.[8] The difference of ages in maximum prevalence of obesity might be explained by the difference in onset of pubertal growth spurt.

In our study, among the factors studied, intake of junk food (P = 0.001), daily exercise (P = 0.004), sleep more than 8 hours (P = 0.007) had significant effect on obesity. Adolescents who did not exercise daily, had high intake of junk food, slept for more than 8 hours were likely to be at high risk of becoming obese. Mixed diet was not significantly (P = 0.233) associated with obesity. Other studies have revealed that family history of obesity, snacking of high energy foods and lack of physical activity as important influencing factors of obesity in children and adolescents.[2,5]

Daily exercise plays an important role in preventing and reducing obesity. Therefore, inculcating the habit of exercise in adolescence will help prevent adolescent obesity. Intake of junk food is another contributory factor to childhood and adolescent obesity. Often the junk foods are given to them as rewards or pacifiers for children. It is advisable to stop the trend of using junk foods as rewards and gross reduction in the total intake of junk foods.

In our study, type of diet, mixed or vegetarian did not have significant influence on adolescent obesity. Adolescents on mixed diet i.e. non-vegetarians, were not found to be more obese than vegetarians. In the study done at Davangere et al., the type of diet did not significantly influence prevalence of obesity.[2]

Viewing TV and outdoor games have been studied as influencing factors with variable results.[10] In this study,

all children viewed TV and played games daily. Further studies are required with quantification of time (hours/week) involved in these activities to exactly know their role in leading to obesity.

Limitations of the study

Further studies may be required with exact quantification of foods eaten to know the effect of type of diet on obesity. Duration of sleep affected the prevalence of obesity in this study. This factor has not been studied in any of the previous studies till date. It might require further studies with exact duration of sleep to know its significance accurately.

CONCLUSION

The prevalence of overweight in affluent adolescents of Raichur city is 11.3% and obesity is 4.6%. The prevalence of obesity is higher in girls (6%) as compared to boys (3.6%).The prevalence of overweight is higher in girls (12%) as compared to boys (10.78%). The present study indicates that adolescent obesity is an emerging problem of smaller districts of India. Also, knowledge about obesity and its effects is very poor among these adolescents. This would make imperative that adequate steps are taken to impart knowledge about obesity among children and adolescents and also take appropriate steps to prevent obesity in this population. Appropriate steps to prevent obesity are promotion of daily exercises, development of active life style, and promotion of sensible eating and play more outdoor games daily.

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