



Prevalence of obesity and its determinants among adolescents in a rural population of Uttar Pradesh, India-A cross-sectional study

KEYWORDS

Adolescents, Overweight, Obesity

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ABSTRACT *Objective: To find out the prevalence of obesity and its determinants among adolescents in a rural population of Uttar Pradesh, India-A cross-sectional study*

Methods: Data was collected by interviewer-administered method adolescents aged between 15 to 19 years. The sample consisted of 502 subjects. Overweight and obesity were defined by body mass index (BMI) based on the earlier recommendations. The demographic and dietary intake data was collected on pre-designed questionnaire.

Results: The prevalence of obesity was 7% (35/502) being higher in male than females. The percentage of underweight and overweight was found to be 15.3% and 14.3% respectively. The age of the subjects and 24 hour dietary intake were found to be significantly associated with the prevalence of obesity.

Conclusion: The data of this study revealed that the trend of adolescent overweight and obesity is a worrying phenomenon in the national perspective. The findings of the study strongly advocate the need to implement interventional measures for preventing adolescent overweight and obesity.

INTRODUCTION

Overweight and obesity among children and adolescents is a public health concern, both in developed and developing Nations. In the recent past, epidemiological transition is manifesting with increase in prevalence of non-communicable diseases and decline in communicable diseases. Prospective studies have clearly established an association of over-weight/obesity with non-communicable diseases.^[1]

The proportion of children in the general population who are overweight and obese has doubled over the past two decades in both developed and developing countries.^[2] It is observed that 30% of obesity begins in childhood and out of that 50-80% become obese adults.^[3] As obesity in adults is difficult to treat and as there are long-term adverse effects associated with childhood obesity, prevention of childhood obesity has become a public health priority.^[4]

Considering the limited availability of data from study area regarding the distribution of adolescent obesity, the present study was planned to find the prevalence of obesity among adolescents in a rural population.

MATERIAL AND METHODS

This was a cross-sectional study conducted in the villages around Varun Arjun Medical College & Rohilkhand Hospital, Banthra, Shahjahanpur(UP) which is a tertiary care hospital in India. The study population was adolescent of age 15-19 years. The study was approved by the Ethical Committee of the Institute. The consent was taken from each subject before enrolling in the study.

Out of the total villages of catchment area, 4 villages were selected. As per census of India for UP rural, the average size of households is 5, it is decided to cover one fifth of these households. The First house of every village was

selected randomly and then every 5th house was taken as part of the study. In each of the selected household, all the members aged between 15-19 years in the house were included. The socio-demographic profile as well as height, weight and 24 hour dietary intake was recorded.

Measurements

Height and weight measurements were used to calculate BMI, as a measure of overall adiposity. Several criteria have been used to define the overweight and obesity. Body proportions normally change during development and may vary among persons of different socio-demographic groups. The differences in waist-to-hip ratios are difficult to interpret in children and adolescent. Therefore, the obesity was defined on the basis of age- and sex-specific cut-off points of BMI (the weight in kilograms divided by the square of the height in meters) which were developed and published from the centile curves of an international reference population.^[5-6] The criteria for overweight and obesity for adults are defined as having a BMI between 25–29.9 and >30kg/m² respectively.^[7] To define the overweight and obese subjects between 15 and 19 years of age in this study, the published age- and sex-specific cutoff points of BMI defined for 2–19 years old subjects was used, which corresponded to BMI of >25 and >30kg/m² in adult populations, respectively.^[5]

Statistical analyses

The results are presented in proportions. The binary logistic regression was used to find the association of socio-demographic profile and dietary intake. All tests of significance were two-tailed and a P-value of <0.05 was regarded as significant. All the analysis was carried out on SPSS 16.0 version (Chicago, Inc., USA).

RESULTS

A total of 502 subjects were included in the study. Out of these, 47.8% were males and 52.2% were females. The percentage of subjects with age 18 years was 24.7% and 21.1% of age 16 years. There was not much difference in the age between male and female subjects (Table-1).

The prevalence of obesity was 7% (35/502). The percentage of underweight and overweight was found to be 15.3% and 14.3% respectively (Fig. 1).

Table-2 shows the distribution of demographic factors and its association with the prevalence of obesity. The prevalence of obesity was significantly higher among the subjects of age 18 years (24.7%) than the subjects of age 15 years (19.9%) and this 8.68 times higher in the subjects of age 18 years than 15 years (OR=8.68, 95%CI=1.09-69.04, p=0.04). Similarly, the prevalence of obesity was also 15.78 times significantly higher in the subjects of age 19 years compared to 15 years (OR=15.78, 95%CI=1.99-125.08, p=0.009). The prevalence of obesity was also found to be higher in the subjects of age 16 years than 15 years, however, this was statistically insignificant (p>0.05). The prevalence of obesity was observed to be insignificantly (p>0.05) higher among males compared to females. There was no significant (p>0.05) association of obesity with education and occupation of the subjects.

The prevalence of obesity was higher among those who took calorie above RDA (22.4%) than who took below RDA (5%). The prevalence of obesity was 5.52 times significantly higher among who took calorie above RDA than who took below RDA (OR=5.52, 95%CI=2.61-11.74, p=0.0001). The prevalence of obesity was higher among those who took fat above RDA (18.3%) than who took below RDA (4.8%). The prevalence of obesity was 4.47 times significantly higher among who took fat above RDA than who took below RDA (OR=4.47, 95%CI=4.47-9.17, p=0.0001) (Table-3).

DISCUSSION

In the present study, the prevalence of overweight and obesity among the adolescents were 14.3% and 7%, respectively. The prevalence rates of overweight and obesity were lower when compared to adolescents from Portugal (20.3% and 11.3%)^[8] and higher than Brazil (9.65% and 2.1%)^[9]. In the Indian sample, the prevalence of overweight and obesity among affluent girls aged 10-15 years in Chennai was 9.6% and 6.2%, respectively.^[10] Another study by Goyal et al showed that the prevalence rates of overweight and obesity were 11.75% and 2.2%, respectively.^[11] The results of this study were consistent with other studies indicating that obesity is epidemic in 21st century in Indian continent. In the given situation, if the trend of overweight and obesity is not managed, it may lead to adult overweight and obesity.^[12] The prevalence of obesity was found to be insignificantly higher among male and female in this study which was inconsistent with the study by Parekh et al indicating that both male and females were affected by obesity.^[13]

The age of the subjects was significantly associated with the prevalence of obesity in the present study. However, education and occupation was not associated with the prevalence of obesity in this study. Dietary intake was found to have the impact on the prevalence of obesity. Increased economy is negatively correlated with excessive body weight in both adolescents and adults in developed countries.^[14] On the contrary, increased economy is associated with increased body weight in developing countries like India.^[15] Increased economy may provide an opportu-

nity to have choice and preparation of food. In developed countries, it is assumed that children belonging to families of disadvantaged economic status, because of their lower earning power and decreased knowledge of healthy nutrition, were more exposed to high calorie foods and simple carbohydrates, which are cheaper and easier to access. A reverse trend is being in force in developing countries. Modernization and urbanization offer calorie rich foods for the children being known that it may lead to develop obesity and associated complications. This association appears to be characteristic of a region in an economic transition.^[3]

Emerging problem of childhood obesity is of high importance in developing countries like India. India is going through concurrent transitions related to epidemiological, demographic and nutritional factors. Further, India is currently in the fourth phase of nutritional transition which is the shift of nutritional intake from basic to diet related non-communicable diseases. These shifts are largely associated with behavioral changes in dietary profile and lifestyle and decreased indulgence in physical activity.^[16]

CONCLUSION

The data of this study revealed that the trend of adolescent overweight and obesity is a worrying phenomenon in the national perspective. The findings of the study strongly advocate the need to implement interventional measures for preventing adolescent overweight and obesity.

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Table-1: Age and sex distribution of study subjects

Age in years	Sex				Total	
	Male		Female		No.	%
	No.	%	No.	%		
15	48	48.0	52	52.0	100	19.9
16	48	45.3	58	54.7	106	21.1
17	50	54.3	42	45.7	92	18.3
18	58	46.8	66	53.2	124	24.7
19	36	45.0	44	55.0	80	15.9
Total	240	47.8	262	52.2	502	100.0

Table-2: Distribution of demographic factors and its association with the prevalence of obesity

Demographic factors	No. of subjects		Obese		Non-obese		Odds ratio (95%CI)	p-value
	No.	%	No.	%	No.	%		
Age in years								
15	100	19.9	1	1.0	99	99.0	Ref.	
16	106	21.1	8	7.5	98	92.5	8.08 (0.99-65.83)	0.05
17	92	18.3	5	5.4	87	94.6	5.69 (0.65-49.64)	0.11
18	124	24.7	10	8.1	114	91.9	8.68 (1.09-69.04)	0.04*
19	80	15.9	11	13.8	69	86.2	15.78 (1.99-125.08)	0.009*
Sex								
Male	240	47.8	18	7.5	222	92.5	1.16 (0.58-2.32)	0.65
Female	262	52.2	17	6.5	245	93.5	Ref.	
Education								
Illiterate	28	5.6	0	0.0	28	100.0	-	

Below 10th	248	49.4	15	6.0	233	94.0	0.64 (0.13-3.01)	0.57
Pre graduate	204	40.6	18	8.8	186	91.2	0.96 (0.20-4.47)	0.96
Graduate	22	4.4	2	9.1	20	90.9	Ref.	
Occupation								
Student	452	90.0	32	7.1	420	92.9	1.19 (0.35-4.04)	0.77
Others	50	10.0	3	6.0	47	94.0	Ref.	

OR-Odds ratio, CI-Confidence interval, Ref-Reference, *Significant

Table-3: Association of obesity with dietary intake

Dietary intake	No. of subjects	Obese		Non-obese		OR (95%CI)	p-value
		No.	%	No.	%		
Calories							
Above RDA	58	13	22.4	45	77.6	5.52 (2.61-11.74)	0.0001*
Below RDA	444	22	5.0	422	95.0	1.00 (Ref.)	
Fat							
Above RDA	82	15	18.3	67	81.7	4.47 (2.18-9.17)	0.001*
Below RDA	420	20	4.8	400	95.2	1.00 (Ref.)	

OR-Odds ratio, CI-Confidence interval, Ref-Reference, RDA: Recommended dietary intake, *Significant

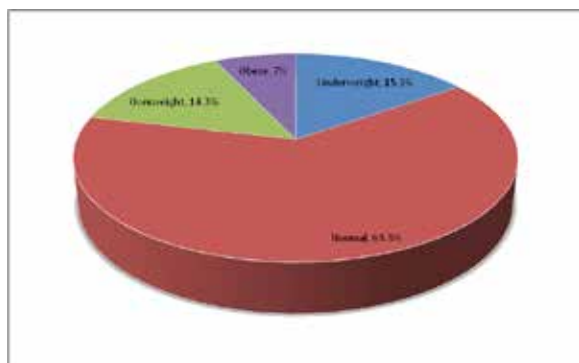


Fig. 1: Distribution of BMI

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