SHORT ARTICLE

Impact of Sociodemographic factors on prevalence of overweight and obesity among adolescents of urban Meerut

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Abstract

Background: Adolescent obesity is becoming a major public health problem in urban areas of India and its prevalence is increasing in all socioeconomic groups irrespective of religion, region and caste. **Aims & Objectives**: To find out prevalence of overweight & obesity among adolescents and to study its association with sociodemographic factors. **Material & Methods**: This cross-sectional study was carried out in the area covered by Urban Health and Training Centre of Lala Lajpat Rai Memorial Medical College, Meerut. Sample size was estimated by keeping the prevalence as 10% with 95% confidence interval and relative precision of 20%. A total of 872 adolescents were selected randomly using proportional allocation method. **Results**: The prevalence of overweight was found to be 17.4% and obesity 6.9%. The prevalence was significantly higher among females and in those belonging to nuclear families as well as higher socioeconomic status. **Conclusion**: The prevalence of overweight and obesity is quite high in the urban area and there is a need to develop an effective programme for the prevention of obesity in these areas.

Keywords

Adolescent; Sociodemographic; Overweight; Obesity

Introduction

The World Health Organization (WHO) has described obesity as a global epidemic and a major public health problem as its prevalence is continuously increasing in both developed and developing countries (1,2,3). There is a lot of data available for obesity in adult population but still not much data is available regarding prevalence of obesity in adolescents especially in community based studies. In India the problem of obesity has been scantily explored mainly in the affluent population groups. International Obesity Task Force (IOTF) and Who has reported that 10% children worldwide are overweight (4) and as far as the number is concerned 155 million children and adolescents are overweight and around 30-45 million are classified as obese (5). In India different studies have reported that the magnitude of overweight ranges from 9% to 27.5% and obesity from 1% to 12.9% among children (6). No single cause can be attributed for development of obesity and therefore one can state that cause is multifactorial, influenced by many variables such as genetic, demographic and lifestyle factors (7). Of course the genetic and demographic variables such as family history of obesity, age, ethnicity and sex

cannot be modified but lifestyle factors are completely modifiable. Childhood and adolescent if not treated timely leads to a variety of chronic diseases later in life (8).

Aim & Objectives

1. To find out the prevalence of overweight and obesity among adolescents.
2. To study its association with various sociodemographic factors

Material & Methods

Sampling: This community based cross sectional study was conducted in the urban population covered by Urban Health and Training Centre, Surajkund, Meerut, under Community Medicine Department of Lala Lajpat Rai Medical College, Meerut. Study was conducted between the time period June 2016 to October 2017. Adolescents aged 10-19 years (both boys and girls) residing in the study area were included in the study. Sample size was estimated by keeping the prevalence as 10 % (9) (10) with 95% Confidence interval and relative precision of 20 %. By using formula (n= (1.96)2 pq/ d^2), sample size was calculated as 864 (rounded off to 872).

Methods: There are 10 localities registered in the urban field practice area constituting total of 1928 adolescents. Out of these adolescents from each locality proportionate number of adolescents were covered by proportional allocation method. From each locality one house was selected randomly by pen drop method to start the survey. From the centre of the selected locality, pen was dropped and the house in the corresponding direction towards the tip of pen was selected as the first house. Then house to house survey was done picking all the adolescents in the adjacent houses towards right of the first house till the required sample of adolescents for that locality were covered. If the last house had more adolescents than the required number to complete the sample from that locality, all the adolescents of the last house were included for survey. Similarly, proportionately required adolescents from each locality were surveyed to cover the total sample size.

During home visits demographic profile of the family was taken along with the interview and examination of adolescents. For proper response the heads of the families were explained in detail the purpose of study. Consent was taken from the adolescents themselves if they were of age 18 or 19 years and from the parents/guardian if adolescent was less than 18 year old. A detailed information was collected on predesigned and pretested proforma about sociodemographic factors (such as age, sex, type of family, socioeconomic status, education and occupation) responsible for obesity supplemented with anthropometry and clinical examination. Results obtained were statistically analysed and tabulated.

Inclusion Criteria: 1) Adolescents aged 10-19 years.
2) All those who gave consent.

Exclusion Criteria: 1) Subjects with chronic systemic illness
2) Subjects on long term medicine
3) Subjects absent on day of visit or showing hostile behaviour.

Tools of Data Collection: 1) Measuring tape made of non-stretchable steel which measures height to the nearest 0.1 centimeter.
2) Electronic weighing scale with capacity up to 150 kg which measures weight to the nearest 100 grams.
3) Pre-designed and pre-tested questionnaire was used.
4) Pretesting of questionnaire was done on 50 students and was suitably modified before finalization.

Information on Anthropometry: WHO growth standards,(10,11) were used for calculating BMI for age. Based on age and sex specific percentile given by WHO for adolescents, < 3rd percentile was taken as underweight, between 3rd -85th percentile as normal, >85th percentile as overweight and > 97th percentile as obese.

Statistical analysis: Data was collected on MS Excel and analysed using, Epi Info 3.7.1. Pearson's Chi Square test was applied.

Ethical Clearance: The protocol of the study was approved by the ethical committee of the institution.

Results

Out of total 872 adolescents 19.3% of adolescents were underweight, 56.4% normal, 17.4% overweight and 6.9% obese with a total of 24.3% of adolescents being over nourished (BMI > 85th percentile). Mean BMI was 20.19 kg/m2 ± 10.71 SD. Table 1 depicts that out of 872 adolescents 53.0% were males and 47.0% were females. Maximum number of adolescents (37.8%) belonged to late adolescence age group 16-19 years followed by early adolescence age group 10-12 years (31.7%) and middle adolescence age group 13-15years (30.5%). Mean age was 14.43 years ± 2.82 SD. Overweight and obesity was significantly

higher in females (27.8%), those belonging to age group, 16-19 years (35.2%), nuclear families (26.5%) and upper and upper middle socioeconomic status (53.3% and 31.4% respectively). Similarly, prevalence was also higher among those adolescents who were educated more than high school and also those who were studying in private schools (26.6%). No significant association found among type of caste and occupational status of adolescents with overweight and obesity. As observed in table 2 a significant association was seen between educational and occupational status of parents with prevalence of overweight and obesity among adolescents. The prevalence of overweight and obesity was higher in those adolescents whose fathers and mothers were educated more than high school (31.5% and 29.5%respectively). Also prevalence was higher in those adolescents whose fathers were engaged in business or service (29.2%) similarly children of working mothers were more overweight and obese (30.0%).When the variables showing significant association at $P < 0.05$ were simultaneously considered in a stepwise logistic regression model with overweight and obesity as a binary outcome it was observed that children having higher socioeconomic status were 2.87 times more overweight and obese as compared to lower socioeconomic status. Similarly, children belonging to age group (16-19 years) were 2.52 times more overweight and obese. A higher odds was also observed for overweight and obesity among female (OR: 1.43), those belonging to nuclear families (OR: 1.57), those studying in private schools (OR: 1.52) and among those who had education above high school (OR: 1.92)

Discussion

The present study reported that out of total 872 adolescents surveyed 17.4% were overweight and 6.9% were obese. Which is near to study done by Brahmbhatt *et al* (9) who reported prevalence of overweight and obesity being 13.3% and 5.4% respectively. In the present study prevalence of overweight and obesity was maximum among the age group 16-19yrs (35.2%) followed by 13-15yrs (21.8%) and 10-12yrs (13.8%). Aggarwal *et al* (12) also reported that prevalence was lower among age group 10-14 years (10.7%) as compared to age group 15 -19 years (14.7%). The present study reveals that the prevalence of overweight/obesity was more among females (27.8%) Aggarwal *et al* (12) also reported a higher prevalence of overweight/obesity among females (15.5%). As reported in the present study prevalence of overweight and obesity was more among those belonging to nuclear family (26.5%) and similar result was observed by Sain *et al* (13). As seen in the present study prevalence of overweight and obesity was more among those belonging to upper class (53.3%) and upper middle class (31.4%) as compared to lower middle class (18.3%) and upper lower class (12.9%). Similarly Kar *et al* (14) also reported that overweight and obesity was significantly increased in prevalence as moved from lower socioeconomic status (2.11% and 10% respectively) to higher socioeconomic status (54.22% and 50% respectively). The present study shows that prevalence of overweight and obesity was highest among those who were educated up to intermediate (36.2%) followed by graduates (33.3%) and high school (27.6%) respectively. On contrary study done by Ghosh *et al* (15) showed that prevalence was more among those who were educated up to primary school (11.5%) as compared to those who were educated up to secondary school (6.5%) and higher secondary school (1.2%). In the present study the prevalence of overweight and obesity was more among those who were studying in private schools (26.6%) and similar results were reported by Aggarwal *et al* (12). In the present study the prevalence of overweight and obesity was higher in those adolescents whose fathers and mothers were educated more than high school (31.5% and 29.5%respectively). Bhargava *et al* (16) also reported that overweight and obesity was significantly higher among those adolescents whose parents (both mother and father) were graduate and above by education (mother 18.2% and father 18.0%) as compared to those whose education level was less than graduate level (mother 5.7% and father 4.5%). As seen in the present study prevalence of overweight and obesity was more among those adolescents whose fathers were doing business and service (29.2%) as compared to those who were unemployed or workers (18.0%). Similarly, prevalence was more among adolescents of working mothers (30.0%) as compared to housewives (18.6%). Bhargava *et al* (16) also reported that overweight and obesity was significantly higher among those adolescents whose parents (both mother and father) were working (professionals, business, and service) as compared to those whose

parents were into other occupation like skilled and unskilled workers.

Conclusion

The present study reveals that prevalence of overweight is 17.4% and obesity is 6.9%. It is quite a high prevalence and females are more affected as compared to males. Prevalence of overweight and obesity is higher in upper socioeconomic group as well as the adolescents of nuclear families and those studying in private schools.

Recommendation

As the prevalence is higher in the upper socioeconomic groups as well as in adolescents studying in private schools so it is pertinent to revamp school health programme and more emphasis should be given on prevention of overweight and obesity in the school. Parents should also be informed of the dangers of overweight and obesity and they should be sensitized either at school or health facilities so that the menace associated with overweight and obesity can be prevented in the adolescents as well as adult life. Females should also be given special attention, advised on proper nutritional intake and encouraged to participate in extracurricular and sports activities.

Limitation of the study

The total monthly family income taken to calculate Modified Kuppuswamy Classification may not be correct as families do not always provide correct details.

Relevance of the study

Rising burden of overweight and obesity among children and adolescents has become a matter of serious public health concern leading to various chronic and non-communicable diseases as well as psychosocial problems. In a recent study done in India, there was evidence of the presence of early cardiovascular risk factors in obese children and adolescents.

Authors Contribution

All the authors have made valuable and substantial contribution to the study process and to the drafting of article.

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Tables

TABLE 1 SOCIODEMOGRAPHIC CORRELATES OF ADOLESCENTS IN RELATION TO OVERWEIGHT AND OBESITY (N=872)

Variables	Study Population NO. %		Overweight & obesity (BMI > 85th percentile) NO. %		Chi Square, df p Value
1) Age Groups					
10-12 Years	276	31.7	38	13.8	X2: 38.7, df: 2, P < 0.001
13-15 Years	266	30.5	58	21.8	
16-19 Years	330	37.8	116	35.2	
2) Sex					X2: 5.13, df: 1, P < 0.05
Male	462	53.0	98	21.2	
Female	410	47.0	114	27.8	
3)Caste					X2: 5.02, df: 2, P > 0.05
General	392	45.0	108	27.6	
OBC	252	28.9	50	19.8	
SC/ST	228	26.1	54	23.6	
4) Type of Family					X2: 5.87, df: 1, P < 0.05
Nuclear	626	71.8	166	26.5	
Joint	246	28.2	46	18.7	
5) Socioeconomic Status					X2: 60.5, df: 4, P < 0.001
Upper	60	6.9	32	53.3	
Upper Middle	338	38.8	106	31.4	
Lower Middle	284	32.6	52	18.3	
Upper Lower	170	19.5	22	12.9	
Lower	20	2.3	0	0.0	
6) Education					X2: 20.6, df: 6, P < 0.001
Illiterate	8	0.9	0	0.0	
Just Literate	14	1.6	0	0.0	
Primary	330	37.8	68	20.6	
Middle	214	24.5	50	23.4	
High School	152	17.4	40	26.3	
Intermediate	138	15.8	50	36.2	
Graduate *	12	1.4	4	33.3	
Professional*	4	0.5	0	0.0	
7) Occupation					X2: 1.41, df: 3, P > 0.05
Students	784	89.9	194	24.7	
Service	42	4.8	10	23.8	
Shopkeeper	20	2.3	4	20.0	
Worker	26	3.0	4	15.4	
8) Type of School					X2: 5.43, df: 1, P < 0.05
Government	270	31.0	52	19.3	
Private	602	69.0	160	26.6	

TABLE 2 OVERWEIGHT AND OBESITY IN RELATION TO SOCIODEMOGRAPHIC FACTORS OF PARENTS

Variables	Study Population No. %		Overweight and obesity BMI > 85th percentile No. %		Chi Square, df P Value
1) Educational status of father (N=858)					X2: 27.79, df: 1, P < 0.01
Up to High School	394	45.9	66	16.7	
More Than High School	464	54.1	146	31.5	
2) Occupational Status of Father (N=858)					X2: 13.7, df: 1, P < 0.01
Unemployed and labourer	344	40.1	62	18.0	
Service and business	514	59.9	150	29.2	
3) Educational status of Mother (N=862)					X2: 13.5, df: 1, P < 0.01
Up to High School	456	52.9	86	18.8	
More Than High School	406	47.1	120	29.5	
4) Occupational status of Mother (N=862)					X2: 15.3, df: 1, P < 0.01
Unemployed or housewife	462	53.6	86	18.6	
Working	400	46.4	120	30.0	

TABLE 3 CORRELATES OF OVERWEIGHT AND OBESITY: LOGISTIC REGRESSION ANALYSIS

Sociodemographic Factors		Odds Ratio	95% CI	Coefficient	S.E	p Value
Sex	Male	1.43	1.05-1.95	0.36	0.16	<0.05
	Female					
Age Groups	10-15years					
	16-19 years	2.52	1.84-3.45	0.92	0.16	<0.01
Type of Family	Nuclear					
	Joint	1.57	1.09-2.26	0.45	0.19	<0.05
Socioeconomic Status	Class I &II					
	Class III,IV,V	2.87	2.08-3.96	1.05	0.16	<0.01
Adolescent Education	Up to High School					
	More Than High School	1.92	1.32-2.79	0.65	0.19	<0.01
Type of School	Government					
	Private	1.52	1.07-2.16	0.42	0.18	<0.05