

Clinical study of prevalence of obesity and over weight among school going adolescents in the age group of 11-17 years of Kangra district

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Abstract

Introduction: According to the World Health Organization (WHO), obesity can be defined as the accumulation of body fat in an abnormal and/or excessive manner showing serious health problems. The disruption of the normal satiety feedback mechanisms, hyperinsulinism, insulin resistance and genetics are some of the biophysiological causes of obesity and overweight. **Method:** The present study was cross sectional school based study carried out in the department of pediatrics, DR Rajendra Prasad Government Medical College, Kangra Tanda, Himachal Pradesh. All high schools present in Block Kangra, Himachal Pradesh (HP) were enlisted and 10 schools were selected by using simple random method. **Results:** Out of 1300 children included in the study, 669 (51.5%) children were males and 631 (48.5%) children were females with male to female Ratio 1.1:1. Out of 1300 children 37(2.8%) were overweight and 10(0.8%) were obese, prevalence of both overweight and obesity combined was 3.6%. The number of overweight children ranged from 2 to 10 with percentage ranging from 1.1% to 5.4%. The number and percentage of obese children ranged from 0 to 4 and 0% to 2.2% respectively. In the present study 3% (20) and 1.5% (10) of males were over-weight and obese respectively. Out of 631 females 2.7% (17) and 0% (0) of females were over-weight and obese respectively. Out of 47 (3.6%) children identified either overweight or obese, 4.5% being males (30 out of 669) and 2.7% being females (17 out of 631), showed slight preponderance of males over females. **Conclusion:** Overweight and obesity among school-going adolescents is a crisis facing even smaller cities in India. Behaviour change communication should be focused to adolescents, especially of the affluent section, toward restricting fast food intake, and Television (TV) viewing.

Key words: Adolescents, Obesity, Overweight, World Health Organization

Introduction

According to the World Health Organization (WHO), obesity can be defined as the accumulation of body fat in an abnormal and/or excessive manner showing serious health problems. In this scenario, over weight and obesity are considered a serious public health problem, and it is therefore a subject of considerable impact and worldwide interest [1].

Childhood obesity and overweight is defined as Body mass index (BMI) of more than 95 percentile for age and sex and BMI more than 85 percentile for age and sex respectively [2]. There is no single cause to explain all cases of obesity and overweight but most studies

implicate imbalance in the amounts of calories consumed and those expended [3]. Energy break down is said to be less than energy build up. The disruption of the normal satiety feedback mechanisms, hyperinsulinism, insulin resistance, and genetics are some of the biophysiological causes of obesity and overweight [4]. About 50-80% of obese children will continue as obese adults and fall into risk group of Diabetes, Hypertension, Coronary Heart Diseases and many more obesity related diseases. Complications of adult obesity are made worse if the obesity begins in childhood. Obesity is harder to treat in adults than in children [5].

A multicentric study conducted in eleven affluent urban Indian schools found the prevalence of overweight and obesity as 18.2% by the international obesity task force

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(IOTF) classification and 23.9% by WHO standards in children aged 2-17 years [6]. The World Health Organization has described obesity as one of today's most neglected public health problems, affecting every region of the globe. India is the second most populous country in the world that comprises ~17% of the world's population and contributes to 16% of the world's deaths. Nutritional status of the Indian population varies significantly across the regions.

Certain regions are associated with extremely high rates of childhood under nutrition (ranging from 20% to 80%), where as others have a high prevalence of adult under nutrition (>50%), and some have both [7]. This study aimed to determine the prevalence of obesity and overweight among school going adolescents to sensitize the public on the emerging trend of childhood and adolescence obesity and overweight and to provide data for public health professionals and policy planners.

Materials and Methods

Place of study: The present study was carried out in the department of pediatrics, DR Rajendra Prasad Government Medical College, Kangra Tanda, Himachal Pradesh.

Type of study: Cross-sectional study.

Sampling method: All high schools present in Block Kangra (H.P) were enlisted and 10 schools were selected by using simple random method. These selected schools were visited and list of students in the age

Results

The present study was a cross sectional study done in 10 schools of Kangra, north India and included 1300 children in the age group of 11-17 years. Out of 1300 children included in the study, 669 (51.5%) children were males and 631 (48.5%) children were females with male to female Ratio 1.1:1. Out of 1300 children 37(2.8%) were overweight and 10(0.8%) were obese, prevalence of both overweight and obesity combined was 3.6%. (Table-1)

Table-1: Distribution of overweight and obese in study population

Total number of study population	Over weight		Obese		Total	
	No.	Prevalence in %	No.	Prevalence in %	No.	Prevalence in %
1300	37	2.8	10	0.8	47	3.6

Out of 1300 children included in the study 1253 (96.4%) had normal BMI. Among them 37 (2.8%) children were overweight and 10 (0.8%) children were obese. The overall prevalence of obesity and overweight combined was 3.6% (47 out of 1300).

The number of overweight children ranged from 2 to 10 with percentage ranging from 1.1% to 5.4%. The number and percentage of obese children ranged from 0 to 4 and 0% to 2.2% respectively. (Table-2)

group of 11-17 years who were apparently healthy obtained. Sample sizes from each school were calculated and students were selected by using simple random method.

Inclusion criteria: All children in the age group of 11-17 years who were apparently healthy from the selected schools were included in the study.

Exclusion criteria: Children with chronic illnesses and or on long term medications, congenital anomalies and children who are absent and not willing to participate were excluded from the study.

Collection of data: A pre-tested semi structured study Performa was developed which has been used to obtain the data.

The information obtained were age, sex, educational level and history of hypertension in the family. This was followed by thorough physical examination, particularly focus on clinical, anthropometric measurements and signs of nutritional disorders.

Statistical methods: Data was compiled, sorted and analyzed using SPSS software package. Mean and standard deviation was calculated for height, weight, age, body mass index and other continuous variables. Comparison between groups with respect to continuous variables was made using student t test. Dichotomous variables were compared using chi-square test. Significance was taken at 5 percent levels i.e. $p < 0.05$.

Table-2: Age wise distribution of prevalence of Overweight and Obesity in the study population.

Age	Normal	Overweight	Obese	Total
11	184 (98.9%)	2 (1.1%)	0 (0%)	186 (100%)
12	179 (96.2%)	4 (2.2%)	3 (1.6%)	186 (100%)
13	180 (96.8%)	5 (2.7%)	1 (0.5%)	186 (100%)
14	179(96.2%)	6(3.2%)	1(0.5%)	186 (100%)
15	180(96.8%)	5(2.7%)	1(0.5%)	186 (100%)
16	181(97.3%)	5(2.7%)	0(0%)	186 (100%)
17	170(92.4%)	10(5.4%)	4(2.2%)	184(100%)
Total	1253(96.4%)	37(2.8%)	10(0.8%)	1300(100.0%)

CC=0.114, P <0.150

In the present study 3% (20) and 1.5% (10) of males were over-weight and obese respectively. 2.7% (17) and 0% (0) of females were over-weight and obese respectively. Out of 47 (3.6%) children identified either overweight or obese, 4.5% being males (30 out of 669) and 2.7% being females (17 out of 631), showed slight preponderance of males over females (Table-3).

Table-3: Sex wise distribution of the prevalence of Overweight and Obesity in the study population.

Sex	Body mass index			
	Normal	Overweight	Obese	Total
Males	639(95.5%)	20(3%)	10(1.5%)	669(100.0%)
Females	614(97.3%)	17(2.7%)	0(0%)	631(100.0%)
Total	1253(96.4%)	37(2.8%)	10(0.8%)	1300(100.0%)

CC = .086, P < 0.008

Discussion

The prevalence of overweight & obesity in children aged between 11 to 17 Yrs in all ethnic groups is reported to be between 5% - 30%. In our study, the prevalence value of adolescent overweight & obesity was 2.8% & 0.8% respectively. But studies conducted by other Indian authors showed high prevalence of both overweight and obesity. Prevalence of overweight and obesity in a study conducted by Gupta et al., was 25.2% and 9.8% respectively. Prevalence of overweight and obesity in a study conducted by Patnaik et al was 14.1% and 14.5% respectively. Other studies conducted by different authors were compared with the present study. (Table-4).

Table-4: Comparison of Prevalence of overweight and obesity

Study	Overweight	Obesity
Kumar et al, (2007)[8]	----	5.74%
Gupta et al.,(2011)[9]	25.2%	9.8%
Patnaik. et al.,(2011)[10]	14.1%	14.5%
Maitis et al.,(2012)[11]	7.6%	1.7%
Nawab.T. et al.,(2016)[12]	9.8%	4.8%
T.K.M.Eshwar et al.,(2017)[13]	15.3.%	11%
Present study	2.8%	0.8%

In the present study, the prevalence of overweight was more in boys (3%) than girls (2.7%). Similar prevalence was seen other Indian studies. The prevalence of overweight in boys and girls by a study conducted by Gupta et al., were 25.9% for boys and 24% for girls. In a study conducted by Nawab.T. et al., the prevalence of overweight in boys and girls were 11.3% and 7.9% respectively. In a study by T.K.M. Eshwar et al., the prevalence of overweight in boys and girls were 16.9% and 9.3% respectively (Table-5)

Table-5: Comparison of prevalence of overweight in boys and girls:

Study	Boys	Girls
Gupta et al,(2011)[9]	25.9%	24%
Nawab.T. et al.(2016)[12]	11.3%	7.9%
T.K.M.Eshwar et al.(2017)[13]	16.9%	9.3%
Present study	3%	2.7%

In the present study, the prevalence of obesity was more in boys (1.5%) than girls (0%). Similar prevalence was seen other Indian studies. The prevalence of overweight in boys and girls by a study conducted by Kumar et al., for boys and girls were 4.4% and 8.8% respectively. In a study conducted by Gupta et al., were 11.5 % for boys and 12% for girls. In a study conducted by NawabT. et al, the prevalence of overweight in boys and girls were 5.5% and 3.9% respectively. In a study by T.K.M. Eshwar et al., the prevalence of overweight in boys and girls were 12.8% and 4.5% respectively (Table-6)

Table-6: Comparison of prevalence of obesity in boys and girls:

Study	Boys	Girls
Kumar et al., (2007)[8]	4.4%	8.8%
Gupta et al.,(2011)[9]	11.5%	12%
Nawab.T. et al.,(2016)[12]	5.5%	3.9%
T.K.M.Eshwar et al.,(2017)[13]	12.8%	4.5%
Present study	1.5%	0%

Conclusion

The nutritional evolution in most Asian countries has markedly increased the burden of obesity. India is also undergoing a nutrition transition. Rapid urbanization has created an obesogenic environment by promoting motorized transport, unsafe roads and traffic, eating up open spaces and playgrounds on one hand and on another by providing more opportunities for sedentary leisure pursuits and fast food consumption outlets.

This has been reported to be the cause of rising trend of obesity in the larger cities of India, especially the affluent section of society. Interestingly, even smaller but fast developing cities are also witnessing the problem of overweight and obesity. Behaviour change communication should be focused to adolescents, especially of the affluent section, toward restricting fast food intake, and TV viewing. Present study is a school based study and this cannot be generalized to the whole population. A larger study conducted in schools as well as the general adolescent population can provide more conclusive results about overweight and obesity and their risk factors.

What is this study adds in existing knowledge? In our study prevalence of over weight and obesity is 3.6% which is less compared to global prevalence (18.2%). Overweight prevalence is more in boys (3%) compared to girls (2.7%) and obesity prevalence is also more in

boys (1.5%) compared to girls (0%). Hence routine screening for school children is necessary to identify overweight and obesity. This helps in life style modification to prevent complications of over weight and obesity.

List of abbreviations

WHO-World Health Organisation, **HP**-Himachal Pradesh, **BMI**-Body Mass Index, **IOTF**-International Obesity Task Force, **SPSS**-Statistical Package for the Social Sciences, **TV**-Television.

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