

# Prevalence of overweight and obesity among rural early adolescents in central part of Vidarbha, Maharashtra- A Cross Sectional study

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## Abstract

**Background:** According to W.H.O number of over-weight children under the age group of five was estimated to be over 42 million and nearly close to 35 million of these were living in developing countries. Obesity in children and adolescents is defined as a BMI greater than the 95th percentile. **Objective:** To find out the prevalence of overweight and obesity in school going early adolescents. 2) To find out the factors contributing to early adolescent overweight/obesity. **Method:** School-going children between 11-15yrs. A *cross-sectional (observational) study* was carried out in middle- schools (5th to 7th standard) and high-schools (8th to 10th standard) of Alphonsa High School of Sawangi. **Result:** Prevalence of over-weight in early adolescent was found to be 15.83% and obese was 11.18%. Obese school going students who watched television for 1 hour were 02.48%, those watching TV for 2 hours were 03.72% and more than 2 hours were 04.96%. Obesity was found to be more in children watching television for longer duration. **Conclusion:** Overweight/obesity among children are progressing towards epidemic level. Eating habit of junk food is on rise.

**Key words:** Obesity, School Health, Junk Foods

## Introduction

According to W.H.O the prevalence in 2010 the number of overweight children under the age of five, is estimated to be over 42 million. Close to 35 million of these are living in developing countries. As of 2005 the WHO estimates that at least 400 million adults (9.8%) are obese. 7-10% in Indian children.

Obesity in children and adolescents is defined as a BMI greater than the 95th percentile [1]. It was observed that 30% of obesity begins in childhood and out of that 50 to 80% became obese adults [2]. A study conducted by Patnaik L in 2015, observed that the prevalence of overweight, obesity was 27.8% (private schools 45.2%, government

Schools 10.5%). BMI, Waist Circumference and Waist-hip ratio were significantly higher among private school students [3].

Consumption of fast foods has become almost a global phenomenon. India's fast-food industry is expanding at the rate of 40% every year. India ranks 10th in the fast food per capita spending figures with 2.1% of expenditure in annual total spending [4].

Popularity of these food stuffs in this age of urbanization has been attributed to quick preparation and convenience of finishing a meal within no time. Great taste, attractive appearance along with advertising has played a major role in attracting people particularly adolescents to the selling joints [5].

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This increase in childhood obesity has led to increase in life-threatening conditions particularly non communicable diseases in developing countries [6]. Dental cavity was found as another common ailment in school children which results due to dense sugar content in fast foods [7]. Food additives used in these food stuffs were found to be carcinogenic and can be allergic causing asthma and rashes which were also seen frequently among children.

Therefore this study was done to find out the prevalence of overweight, obesity in school going

early adolescents and the factors which contributes to the childhood overweight and obesity

**Aim:** Prevalence of Overweight and Obesity among Rural Early Adolescents in central Part of Vidarbha, Maharashtra- A Cross Sectional Study

### Objectives

1. To find out the prevalence of overweight and obesity in school going early adolescents.
2. To find out the factors contributing to early adolescent overweight/obesity.

## Materials & Methods

**Reference Population:** School going early adolescents of 11-15years

**Study Population:** Students of class 5<sup>th</sup> to 10<sup>th</sup> Std. of Alphonsa High School (322).

**Study Design and Settings:** A *cross-sectional (observational) study* was carried out in middle- schools (5th to 7th standard) and high-schools (8th to 10th standard) of Alphonsa High School of Sawangi.

**Study Duration:** The study was conducted from August to November 2015.

**Sample Size:** Sample size was calculated as 322 with 30% prevalence [2] of obesity in childhood and 5 % of allowable error and power of 95%.

### Sampling Method

- Systematic Random Sampling was done.
- 25 students were selected from each division.

### Total sections

- 1) 5<sup>th</sup> std-3 sec
- 2) 6<sup>th</sup> std - 2 sec
- 3) 7<sup>th</sup> std - 2 sec
- 4) 8<sup>th</sup> std - 3 sec
- 5) 9<sup>th</sup> std-3 sec

Approximately 25 students from each section were selected by systematic random sampling method from attendance register. In case of absentees next roll number was included till the required 25 students from each division was fulfilled and this procedure was repeated in the subsequent class till the required sample size of 322 was attained. A *pre-designed structured* questionnaire was used to interview the study participants to elicit the information on individual characteristics like Age, Sex, Eating habits, and time spent on television viewing and outdoor games. Anthropometric measurements viz. height, weight, waist circumference, hip circumference were measured.

Height was measured by stadiometer to the nearest centimetre without shoes. Weight was measured with light clothing and without shoes to the nearest 100 grams. WC (cm) was measured using plastic tape measure at midpoint between the costal margin and iliac crest in the mid-axillary line in standing position and at the end of gentle expiration. Hip circumference was measured in centimetres at the prominence of buttocks. Body mass index (BMI) was calculated by weight in kg divided by height squared in meter square.

All anthropometric measurements and data collection by questionnaire were done by a trained Medical Social Worker (M.S.W). Children were categorized according to their BMI using BMI percentile curves for Indian boys and girls from 5- 17 years. They were classified as: underweight (BMI <3<sup>rd</sup> percentile), normal (BMI 3<sup>rd</sup> percentile to adult equivalent of BMI <23), overweight (Adult equivalent of BMI 23 to adult equivalent of BMI 27.99) or obese (adult equivalent of BMI  $\geq$  28).

**Consent:** Consent of school authorities was obtained after explaining the objectives as well as the method of study. Verbal consent was taken from the teachers and students.

**Statistical Analysis:** Data was analyzed using SPSS 16.0 and Microsoft Excel. After detailed analysis, data was presented in different tabular forms.

#### World Health Organization Chart for gender-wise distribution of BMI (8).

Age in years	Boys			Girls		
	5 <sup>th</sup> percentile	85 <sup>th</sup> percentile	95 <sup>th</sup> percentile	5 <sup>th</sup> percentile	85 <sup>th</sup> percentile	95 <sup>th</sup> percentile
11	14.5	19.3	21.1	14.4	20.0	22.2
12	14.9	20.1	22.1	14.9	20.9	23.3
13	15.4	20.9	23.1	15.5	21.9	24.4
14	16.0	21.9	24.2	16.0	22.9	25.5
15	16.5	22.8	25.2	16.5	23.7	26.3

## Result

Table I reveals that total standard 5<sup>th</sup> students were 23.52%, 6<sup>th</sup> standard were 15.52%, 7<sup>th</sup> standard were 15.52%, 8<sup>th</sup> standard were 23.29%, 9<sup>th</sup> standard were 22.36%.

Table II shows that students who were underweight were 3.72%, normal were 69.25%, over-weight were 15.83%, obese were 11.18%.

Table III showed that students who consumed Potato chips & snacks and were Overweight were 16.45% and Obese of 03.72%, Similarly Overweight of 25.77% and Obese of 23.29% was found in Chocolate & candy eaters. In Ice creams & cold drink eaters Overweight were 06.21% and Obese 11.18%. In students who consumed other fried food items, prevalence of overweight were 07.76% and Obese were 06.52%.

Table IV revealed that, as the number of hours of watching television increased percentage of overweight and obese also increased. Overweight at watching television for 1 hour was 03.10%, at 2 hours were 04.65% and more than 2 hours were 08.07%. Obese school going students at 1 hour television watching were 02.48% at 2 hours were 03.72% and at more than 2 hours were 04.96%.

**Table-I: Standard and Sex-wise distribution of study population.**

Standard	Sex (%)		Total (%)
	Female (%)	Male (%)	
5 <sup>th</sup>	30 (34.88%)	45(19.06%)	75(23.29%)
6 <sup>th</sup>	16(18.60%)	34(14.40%)	50(15.52%)
7 <sup>th</sup>	12(13.95%)	38(16.10%)	50(15.52%)
8 <sup>th</sup>	11(12.79%)	64(27.11%)	75(23.29%)
9 <sup>th</sup>	17(19.76%)	55(23.30%)	72(22.36%)
<b>Total</b>	86(26.70%)	236(73.29%)	322

**Table-II: Gender-wise distribution of BMI.**

Classification	Male		Female		Total
	No	%	No	%	%
<b>Underweight</b> (<5 <sup>th</sup> percentile)	1	00.42	11	12.79	03.72
<b>Normal</b> (5 <sup>th</sup> percentile to less than the 85 <sup>th</sup> percentile)	168	71.18	55	63.95	69.25
<b>Overweight</b> (85 <sup>th</sup> to less than the 95 <sup>th</sup> percentile)	42	17.79	9	10.46	15.83
<b>Obese</b> (Equal to or greater than the 95 <sup>th</sup> percentile)	25	10.59	11	12.79	11.18
<b>Total</b>	236	100	86	100	100

**Table- III: Habit of Eating Junk Food Vs BMI (Multiple responses).**

Food Item	Underweight	Normal	Overweight	Obese
potato chips & snacks	10(03.10%)	92(28.57%)	53(16.45%)	12(03.72%)
chocolates & candies	9(02.79%)	122(37.88%)	83(25.77%)	75(23.29%)
ice creams & cold drinks	8(02.48%)	64(19.87%)	20(06.21%)	36(11.18%)
other fried foods	7(02.17%)	59(18.32%)	25(07.76%)	21(06.52%)

**Table-IV: BMI Vs Watching Television.**

BMI	Hours of watching television					
	< 1 hour		1-2 hours		>2 hours	
	No.	%	No.	%	No.	%
<b>Underweight</b>	06	01.86	04	01.24	2	00.62
<b>Normal</b>	91	28.26	76	23.60	56	17.39
<b>Overweight</b>	10	03.10	15	04.65	26	08.07
<b>Obese</b>	08	02.48	12	03.72	16	04.96

## Discussion

In the present study prevalence of students who were underweight were 03.72%, over-weight were 15.83% and obese were 11.18%. A study in Mangalore by Joseph N et al [9] observed that out of 300 participants, 41(13.7%) were overweight and 8 (2.7%) were obese. Goyal JP et. al. [12] observed obesity and overweight 6.55% and 13.9% respectively.

Patnaik L [3] observed that prevalence of overweight / obesity was 27.8% (private schools - 45.2%, government schools – 10.5%).

In our study it was found that Potato chips & snacks eaters had higher incidence of Overweight of (16.45%) and Obese (03.72). Jaisheeba AA [6] observed frequency of daily consumption of junk food among the obese students to be about 33.6%.

Overweight and its relation with watching television for 1 hour was 03.10%, at 2 hours were 04.65% and more than 2 hours were 08.07%. Obese school going students watching television for 1 hour was 02.48%, for 2 hours was 03.72%

and at more than 2 hours was 04.96%. Goyal JP et. al [12] in Gujarat observed significant association between TV viewing and overweight. Jaisheeba AA [6] observed that most of the obese students spend their leisure time by watching television.

Rajat Vohra et al [10] observed that out of total of 407 children of 5th to 12th standard who participated in the study, only 141 (34.64%) were normal, 246 (60.44%) were undernourished, 17 (4.17%) were overweight, and 3 (0.73%) were obese.

Khadilkar VV [11] observed that overall prevalence of overweight and obesity was 18.2% by the IOTF classification and 23.9% by the WHO standards. The prevalence of overweight and obesity was higher in boys than girls.

Jagadeshan S [13] observed that prevalence of overweight/obesity was significantly higher in private compared to government schools both by the IOTF criteria [private schools: 21.4%, government schools: 3.6%].

Ashlesha Datar[14] observed that young children's access to junk foods in school is an important concern due to the strong correlation between childhood overweight and obesity in adolescence and adulthood. Those 5th graders who attend a combined school are much more likely to have junk food availability relative to those in elementary school.

Obesity is one of the numerous diseases of civilization in the contemporary world. It is a risk factor and a direct cause of many severe diseases, not only somatic, but also mental. Obesity can also be a reason for social exclusion. In consequence, obesity can even lead to death. In psychoanalysis the reasons for obesity are sought for in the specific relations in the family of an obese child.

Obesity is not a manifestation of constitutionally-determined developmental disorders of the child but a result of the relation between the father and mother and the parents and child. According to this approach, the obesity of the child is a consequence of failure of the emotional relations in the family.

In the psychosomatic model obesity can be deemed a somatic reflection of failure in the functioning of the mental mechanisms of an individual. Obesity is an effect of inadequate interpretation of the child's cry by its parents. Parents think that a child crying out of emotion actually cries because he or she is hungry. As a consequence the child in emotional discomfort looks for food to satisfy its needs [15].

## Conclusion

Prevalence of overweight and obesity was found to be 15.83% 11.18% respectively. Majority of them consumed Junk Foods. Most of the over-weight and obese adolescents were addicted to watching TV and being a Couch Potato. Thus factors such as consuming the Junk Foods and watching television are related to early adolescent over-weight and obesity.

**Recommendation:** Children form an important of a healthy society. Government, health planners, administrators and individuals, parent are equal partners in delivering this message. Based on our study and experience we recommend few points for better health of the children as well as their parents i.e. healthy food habits, nutritive values, lifestyle and behavioural modifications.

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