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Obesity on School- Aged Children: Prevalence and Causes

Authors
Dr Manish P Shukla[1], Dr Mrunal More[2], Dr Sanket Nagrale[3]
[1]MGM Institute of Physiotherapy, N-6, CIDCO, Aurangabad-431003 Maharashtra
[2]MGM Institute of Physiotherapy, N-6, CIDCO, Aurangabad-431003 Maharashtra
[3]Sancheti Institute College of Physiotherapy, 16, Shivaji Nagar, Pune, Maharashtra- 411005
Corresponding Author
Dr Manish P Shukla
Email:-*manish.shukla20@gmail.com, 9960290614*

Abstract
Description: *The focus on childhood obesity is clinically significant as the problem contributes to the marked decrease in children's health.*
Objective
1) To find out the prevalence of obesity in school going children of Aurangabad and Pune City.
2) To analyze the relationship between obesity and correlation between waist hip ratio BMI and Fat Percentage (%)
3) To find out the factors contributing to childhood overweight and obesity.
4) To analyze the relationship between obesity with physical activity and diet.
Study Design: *Descriptive study*
Settings and Participants: *Clover Dale School, Holycross English high school, Little flower high school, Saint fransis high School, Bharat English high school, Loyola English high school, age group of 6-15 years residing in Aurangabad and Pune City. Sample size was 980 children.*
Statistical Analysis: *Percentage, Range and Mean*
Results: *Prevalence of overweight and obese by standard weight for height and BMI (> 23) was 2.04 % and 7.14 %. Overall 65.3% of children were underweight and 25.5 % were normal.*
Conclusions: *Obesity is a chronic disorder that has multiple causes. Overweight and obesity in childhood have a significant impact on both physical and psychological health.*
Keywords: *Obesity, Overweight, physical activity and diet.*

Introduction

Obesity is one of the most prevalent nutritional disease of children and adolescents in many developed and developing countries.[1] The World Health Organization (WHO) has declared overweight as one of the top ten health risks in the world and one of the top five in developed nations.[2] Existing WHO standards and data from 79 developing countries including a number of industrialized countries suggest that about 22 million children five years old are overweight worldwide.[3] Once considered a problem of affluence, obesity is fast growing in many developing countries also.[4] Even in countries like

India, which are typically known for high prevalence of under nutrition, a significant proportion of overweight and obese children now coexist with those who are under nourished.[5]

Review of the situation in 2000/2001 prior to formulation of the Tenth Five-Year Plan (Planning Commission, 2002) showed that although under nutrition and micronutrient deficiencies continue to be major public health problems, over nutrition and obesity are also emerging as a major problem in many states. There is a paradigm shift in the quality of life in urban population resulting in substantial increase in childhood as well as adult obesity in the urban population. It is observed that 30% of obesity begins in childhood and out of that 50% to 80% become obese adults.[6]

Definition of Obesity

The obesity has been defined as a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be impaired.[7]

Health hazards of overweight and obesity

Epidemiological studies have shown a progressive increase in the incidence of hypertension, diabetes mellitus, and coronary heart disease, sleep apnoea syndrome, and certain cancers in obese persons[8,9,10]. Epidemiological and metabolic studies conducted over the last 15 years have confirmed the notion that a high proportion of abdominal fat (central obesity) is a major risk factor for coronary heart disease, type 2 diabetes mellitus, and related mortality.[11] Epidemiological studies have mainly used ratio of waist-to-hip circumference (waist: hip ratio) to estimate the proportion of abdominal adipose tissue. Visceral obesity is associated with insulin resistance, hyperinsulinaemia, and glucose intolerance.[12,13,14]

Reason for obesity during childhood

The focus on childhood obesity is clinically significant as the problem contributes to the marked decrease in children's health. The effects of obesity are usually seen later during adult life. Overfeeding, Commercial baby foods, Junk food, Social factors, Lifestyle of family, Television/ computer, Lack of activity, Inadequate play areas are the reasons for obesity during childhood.[15, 16]

With this research framework, the study aimed to determine the prevalence and causes of obesity among school-age children in Aurangabad and Pune city. Research to identify preventive actions and successful interventions must consider a wide range of contributing factors and multiple actions to ameliorate childhood overweight and obesity.

Material and Methods

The study was conducted among 6-15 year old children's residing in and around Aurangabad and Pune City. 980 children's were selected, majority on their willingness to cooperate with the study. Height, weight, body mass index were the anthropomrtric parameters assessed. Height and weight were measured using the standard procedures suggested by Jelliffe (1966).[17] The Hip circumference was measured to the nearest 0.1 cm at the greatest horizontal circumference below the iliac crest at the level of greater trochanter. Waist circumference (WC) was measured to the nearest 0.1 cm horizontally at the narrowest point between lower end of the rib cage and iliac crest.[18]

The formula to predict the fat percentage uses current BMI, age, and gender of the child.[19]

Child body fat%= (1.51 X BMI) – (0.70 X Age) – (3.6 X gender) + 1.4

Food intake and dietary habits were assessed through a personal interview using items from the validated Youth and Adolescence Food Frequency Questionnaire.[20, 21] Overweight or obese children were then given a letter requesting them to answer a structured questionnaire to obtain information on the level of physical activity, nutritional habits and other factors that may be contributory to the development of overweight and obesity. The survey form was designed based on the International Physical Activity Questionnaire and consisted of two parts. Part one dealt on the nature and extent of physical activities of each child. Part two consisted of questions and choices reflecting the eating patterns and food preferences of each subject.

Result

A total of 980 children were screened for prevalence of obesity.

Table 1 Frequency distribution found of males and females in Aurangabad and Pune school

Gender	F
Male	670
Female	310

Overall the prevalence of overweight and obese by standard weight for height and BMI (> 23) was 2.04 % and 7.14 %. Overall 65.3% of children were underweight and 25.5 % were normal.

Table 2 Prevalence of obesity by Body Mass Index (n=980)

B M I	Range	F	% to N
Underweight	< 18.5	640	65.3
Normal	18.5-23	250	25.5
Overweight	23- 27.5	20	2.04
Obese	> 27.5	70	7.14

Out of total 980 children 77.55% were having normal total body fat% while 15.30% of children lies in overweight/obese group.

Table 3 Total body fat percentage

Fat	Range	F	%
Thin	< 10	70	7.14
Normal	10 to 20	760	77.55
Overweight	20 to 25	80	8.16
Obese	> 25	70	7.14

According to WHR 32.83% male are overweight /obese. Where as in Female children 41.93% are overweight and 51.61% are obese

Table 4 Waist to Hip ratio in male and female children

Male				Female		
WHR	Range	f	% to N	Range	F	% to N
WHR I	<0.93	450	67.16	<0.81	20	6.45
WHR II	0.93-1.0	200	29.85	0.81-0.89	130	41.93
WHR III	>1.0	20	2.98	>0.89	160	51.61

When physical activities of a child are compared with their BMI status, there is significantly higher prevalence of overweight/obese in children with no physical activities.

Table 5 Percentage distribution of physical activity in overweight and obese children

% Overweight P.A.	% Obese P. A.
80	45.71
42.85	48.57
65.71	53.33
62.85	26.66
62.85	50
51.42	66.66
54.28	43.33
56.66	

Out of total 77.34% of respondents watch television of various duration (1 to 4 hours) among which 14.28% are overweight and 10% are obese.

Table 6 Percentage distribution of obese and overweight children engaged in T.V. activity

Activity	overweight%	Obese%
T.V.	14.28	10

There is high prevalence of overweight/obesity amongst subjects those who consume junk food and Commercial baby foods.

Table 7 The Percentage distribution of diet category in overweight and obese students

Diet category	Overweight %	Obese %
Good	75%	59.52%
Bad	25%	40.48%

Discussion

In the present study we have randomly selected 980 students out of which 670 male subjects and 310 female subjects are taken within age of 6-15 years old.

The purpose of this descriptive survey study was planned to evaluate in detail, the complete spectrum of childhood obesity (by calculating BMI, Fat % and measuring WHR) and the prevalence of school going children's in Aurangabad and Pune city by taking dietary chart and Physical activity questionnaire. Earlier studies from India have not documented the prevalence of obesity in children by using BMI, Fat% and WHR. Data of Elementary and Higher School children cannot be compared as no study is available in the literature from the country on prevalence of Obesity and Overweight in these category children by utilizing the IOTF's BMI classification.

In present study, the prevalence of obesity is greater in male subjects as compared to female subjects. Similar results have been documented from Punjab, which reported that the prevalence of obesity as well as overweight was higher in boys as compared to girls. This finding is different from the results of the national study where females have a slightly higher incidence in obesity which implies that apparently, male children are engaged in activities that contribute to their gaining more weight as compared to the females. This finding is contrary to the results of a research conducted to determine the prevalence of childhood and adolescent obesity in Cyprus.

Analysis of the association between BMI and physical activity in children revealed that as the amount of physical activity increased, the BMI decreased i.e. the prevalence of overweight and obesity decreased.

The role of decreased physical activity and the choice of food eaten are factors that contribute to the development of overweight and obesity among children. In all the age groups, there appears to be a significant degree of inactivity. The amount of food intake does not seem to be of significance as most of the subjects eat meals three times a day and snacks twice a day. Children need more calories because of their high metabolic demand while in their growth years. The choice of food may, however, be of significance. The average meal of the subjects consisted of rice, meat, chapati or vegetable dishes. But the choices for what is eaten during snack time may be the difference. Diet category in overweight and obese students in present study revealed 75 % overweight are taking good diet and 25 % are taking bad diet and 59.52% obese are taking good diet and 40.48 % are taking bad diet.

Physical education has since been incorporated with arts, music and health: PE is now conducted once a week. Most of the time PE classes covered the theoretical aspects of specific sports. To compound the problem, the conduct of physical activities is likewise limited not only by time but also by the lack of adequate facilities. Participation in either recreational or organized sports among the subjects was then low and other aspects of life continue to decrease.

The present study documented that the prevalence of Overweight and Obesity was higher in the higher school as compared to Elementary for all age groups, highlighting the possible role of change in the dietary pattern and physical activities. Although the percentage of overweight children lower, the latter are still considered predisposed to becoming obese in the future.

On weekends, where the child is not in school, most of the time is spent in front of the TV or computer or playing electronic. This study revealed that obese and overweight students engaged in T.V. activity are overweight is 14.28 % and of obese is 100%.

As per the discussion till now it can be concluded that there is both over-consumption of calories and reduced physical activity are in the main culprits behind childhood obesity. It appears as if primary or secondary prevention could be the key strategy for controlling the current epidemic of obesity and these strategies seem to be more effective in children than in adults. A number of strategies can be implemented that target the built environment, physical activity, and diet.

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