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Original research article

A cross sectional study on Prevalence of overweight and obesity among school children of 6-12 years age in a rural area in Trichy district, Tamil Nadu

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Abstract

Background: Childhood obesity is emerging as a major public health issue of the twenty- first century with an alarming rise in its prevalence in several developing countries. Obesity has reached epidemic levels in developed countries. It is emerging as a major health problem in developing countries such as India, particularly in urban settings. Most studies related with Obesity and its complications like Hypertension, Diabetes mellitus in early adulthood, but the data's in rural children are less.

Aim: To assess the prevalence of obesity among rural school children of 6-12 years of age and to determine factors associated with obesity

Methods: A descriptive cross-sectional study was conducted among 100 children aged 6-12 years using a semi structured questionnaire. Risk factors like socio-economic status, BMI were taken into account.

Results: The mean age of the children was 9.03±1.8. The prevalence of Overweight, obesity and Underweight is 8%, 6% and 8% respectively and majority of the children, 78% were found to be normal. The proportion of obesity was more among males (4%) than females (2%), whereas the proportion of overweight was more in females 6% compared to males 2%.

Conclusions: This study concluded that the overall prevalence of overweight was higher than obesity with 8% and 6% respectively. There was also an equal proportion of underweight.

Keywords: Obesity, Overweight, Underweight

Introduction

Childhood obesity is one of the most serious public health challenges of the developing world. It is one of the global problem and is steadily affecting many developed and developing countries. Obesity has reached epidemic levels in developed countries. It is emerging as a major health problem in developing countries such as India, particularly in urban settings. Globally 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 [1].

Childhood obesity is Non- communicable diseases (NCD) represent 43% of the burden of disease and is expected to responsible for about 60% of global disease burden [2]. Overweight and obesity in childhood have a significant impact on both physical and psychological health; overweight and obesity are associated with hyperlipidemia, hypertension, and abnormal glucose tolerance [2]. In addition, psychological disorders such as depression occur with increased frequency in obese children [3]. The Center for Disease Control and Prevention defined overweight as at or above the 95th percentile of body mass index (BMI) for age and "at risk for overweight" as between 85th to 95th percentile of BMI for age [4, 5]. European researchers classified overweight as at or above 85th percentile and obesity as at or above 95th percentile of BMI [6]. An Indian research study has defined overweight and obesity as overweight (between ≥85th and <95th percentile) and obesity (≥95th percentile). Another study has followed World Health Organization 2007 growth reference for defining overweight and obesity [7].

Obesity is a multi-factorial condition influenced by many variables, including genetic, demographic and lifestyle factors [3]. Genetic and demographic variables such as family history of obesity, age, ethnicity, and sex cannot be modified [8]. Females are more likely to be obese as compared to males, owing to inherent hormonal differences [1]. However, obesity-associated lifestyle factors are often modifiable

Whether or not obesity persists into adulthood, obesity in childhood appears to increase the risk of subsequent morbidity [9]. Significance of estimating prevalence of childhood obesity thus cannot be overemphasized.

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Materials and Methods

Study Design: Descriptive cross-sectional study.

Study setting: This study was conducted among children of age between 6-12 years attending rural schools in Irungalur village, Trichy district, Tamil Nadu, India.

Study period: One year.

Sample size: The sample size was calculated to be 100.

Study population: The study participants were selected by multistage cluster sampling Technique.

Inclusion criteria: All children between 6 and 12years of age attending rural Schools in Irungalur Village, Trichy

Exclusion criteria

- Children with known causes of obesity (endocrinological causes and prolonged drug therapy)
- Those who were not willing for the study were excluded.

Collection of primary data

This study was conducted in rural schools. Since all the study participants were minors, assent was obtained prior to commencement of the study. After getting permission from the school authority, anthropometric data including age, sex, weight, and height were collected from all the schools in the study regions. Weight and height of the child is measured using digital weighing machine and Steadiometer. Appropriate guidelines were followed while measuring weight and height. Weight was recorded in kg and height in cm. BMI is a measure of weight in relation to height and is an indirect indicator of body fat. It can be calculated by dividing weight (in kilograms) by the square of height (in meters).

BMI = Weight (kg)/ (Height in m) ^{2}. And the data's were plotted in IAP BMI charts for boys and girls separately. And classified as

3rd percentile as underweight,

>23rd adult equivalent line as Overweight,

>27th adult equivalent line as Obesity

Statistical Analysis

Collected data was entered in Microsoft excel and statistical analysis was carried out using Statistical Package for Social Sciences (SPSS) software. A Chi-square test was done to find out the prevalence of obesity and overweight among different categories with a confidence interval of 95%.

Results

Among the study participants, 6%(6) were found to be obese, 8%(8) were found to be overweight, 8%(8) are underweight and majority of the participants 78%(78) were found to be normal. (Figure 1). The mean age of the participants was 9.03±1.8. Among the study participants, 52%(52) were male and 48%(48) were female children.

The proportion of obesity was more among males (4%) than females (2%), whereas the proportion of overweight was more in females 6%(6) compared to males 2%(2). Fathers who worked as unskilled labours had 3% obese children, 1% of overweight children and fathers who worked as skilled labour had equal share 3% of obese children and 6% of overweight children. Mothers who were housewives had 6% of obese and 6% of overweight children. Employed mothers had no obese children. Fathers who were illiterates had no obese or overweight children. Fathers who had primary education has 3% obese and 2% overweight children. Fathers who had middle school education had equal share of obese and overweight children 2%. Illiterate mothers had 3% of obese children and mothers who had primary education had 4% overweight children.

With regard to socioeconomic conditions, there was no obesity and overweight children in upper class and only 1% overweight in upper middle class. 3% obesity was seen in middle class children and 5% overweight was seen. 4% obesity and 4% overweight was seen in children who had family members more than 4. (Table 1).

A chi-square test was done to find the prevalence of obesity and overweight in association to the risk factors. P value < 0.05 was considered to be statistically significant. Only number of family members was found to be statistically significant

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Table 1: Association between BMI and selected variables (n=100)

Variables		BMI				Chi Square	P value
		Under Weight	Normal	Obese	Over Weight		
Gender	Male	5	41	4	2	3.21	0.35
	Female	3	37	2	6		
Father occupation	Unskilled	5	29	3	1	5.776	0.44
	Semi skilled	1	11	0	1		
	Skilled	2	38	3	6		
Mother Occupation	Housewife	7	61	6	6	2.06	0.55
	Employed	1	17	0	2		
Father education	Illiterate	2	14	0	0	13.35	0.34
	Primary	1	23	3	2		
	Middle	5	18	2	2		
	High/hr sec	0	12	1	2		
	Graduate	0	11	0	2		
Mother education	Illiterate	2	14	3	1	13.17	0.35
	Primary	1	23	1	4		
	Middle	2	23	2	1		
	High/hr sec	0	14	0	1		
	Graduate	0	4	0	1		
Socio economic status	Upper class	0	2	0	0	14.41	0.27
	Upper middle	1	5	0	1		
	Middle	4	24	3	5		
	Lower Middle	0	38	2	2		
	Lower	3	9	1	0		
Family Members	<4 members	7	66	2	4	13.42	0.004
	>4 members	1	12	4	4		

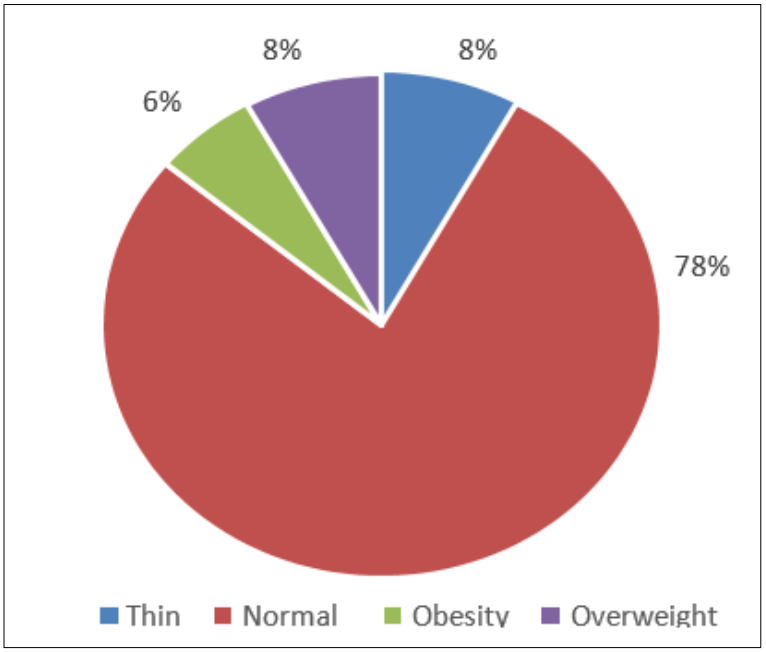

Fig 1: Prevalence of obesity and overweight

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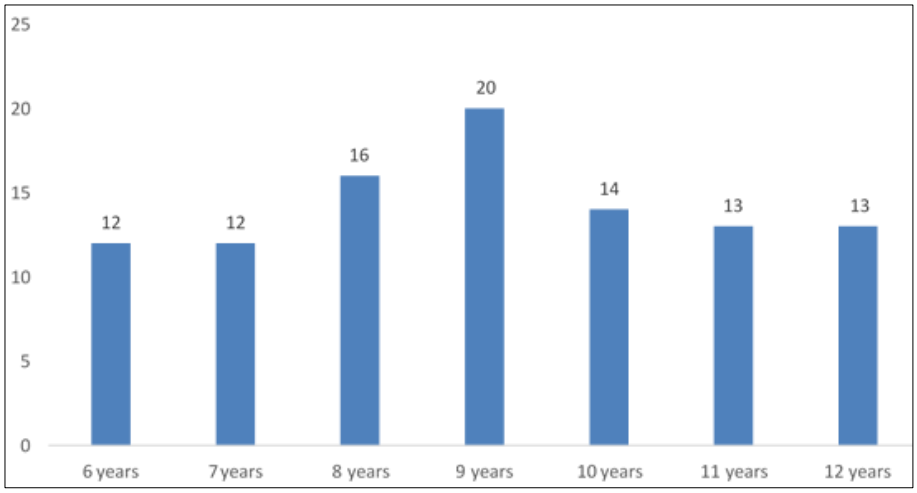

Fig 2: Age distribution

Discussion

There has been a phenomenal rise in proportions of children having obesity in the last 4 decades especially in the developed world. Studies emerging from different parts of India (19- 24) within last decade are also indicative of similar trend [10]. Our study showed higher prevalence of obesity in male children and high prevalence of overweight in female children. Similar findings were seen in a study conducted in Chennai by Jagadesan S *et al* [10]. In a study conducted in Karnataka by S. V. M, Kotyal B. M *et al*, the prevalence of obesity was found more in boys and prevalence of overweight was found more in girls [11].

In a study conducted by Danasekaran R *et al*, kanchipuram, Tamil Nadu, the prevalence of obesity was found to be 4.4% [12]. A study conducted in Coimbatore by Shanmugam K *et al*, too revealed that prevalence of obesity was more in boys, prevalence of overweight was higher in girls [13]. Compared to the other studies the prevalence of obesity and overweight among school children in our study is similar. In our study undernutrition is more than obesity and equal to overweight. There is a significant association with total number of family members with obesity.

Detailed diet history, physical activity, phone usage, family history of obesity were not assessed due to feasibility of constraints. This study has given a valuable information regarding childhood obesity and overweight in a rural area. This information can be used for implementation of appropriate interventional measures in lifestyle modifications

Conclusion

This study concluded that the overall prevalence of overweight was higher than obesity with 8% and 6% respectively. There was also an equal proportion of underweight.

Limitations

It was a cross sectional study, done in smaller size sample group in and around Irungalur. This did not represent the whole rural population. Comparison between rural and urban population would have been more accurate to interpret the increased prevalence, but the present study was restricted to rural population only.

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Declarations

Funding: No funding was availed

Conflict of interest: No conflict of interest

Ethical approval: Institutional human ethics committee approval was obtained

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