



## CHILDHOOD OBESITY AND ITS DETERMINANTS AMONG SCHOOL CHILDREN

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### ABSTRACT

School-aged children are world-wide categorized as being overweight/obese. The factors contributing to increasing childhood obesity are increased intake of high-calorie foods, low intake of vitamins, minerals, eating of more junk foods, drinking of high carbonated drinks, decreasing the physical activity and increasing the indoor games are the risk in developing childhood obesity. The aim of the study is to assess the level of childhood obesity and its determinants among school children and to associate the level of childhood obesity with selected demographic variables among school children. A total of 60 school children with childhood obesity were selected by Purposive sampling technique. Data were collected by interview method on one to one basis. Collected the socio demographic variables and assessed the level of childhood obesity by Calculating Body mass index followed by determinants related to childhood obesity was assessed by interview method using multiple choice question. Data were analyzed by using descriptive and inferential statistics. Out of 60 samples 22 (37%) had over weight, 30 (50%) of them had obese and 8 (13%) of them had severely obese. there is a significant association between the Age, Education, Residence, Hobbies at the level of  $p < 0.05$  with the level of childhood obesity. Chi square test reveals that there is a significant association between Family history, Food habits, Excess carbonated drinks consumption, Junk food intake, physical activity, and Habits of doing exercise at the level of  $p < 0.05$  with the level of childhood obesity.

**KEY WORDS:** School children, Body Mass index, child hood obesity.



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## INTRODUCTION

Childhood obesity has become one of the major issues and is turning to be major health problem of the civilized world. <sup>1</sup>Obesity results when too much fat accumulates in the body, and causes number of social, cultural, behavioral, physiological, metabolic and genetic problems. It is well known that not all obese infants become obese children, and not all obese children become obese adults. Childhood period is the most crucial period where the growth and development process take place.<sup>2</sup> During this period it is important to concentrate about their food habits and food patterns, especially the distribution of adequate intake of carbohydrate, proteins and fats, vitamins and minerals however, the prevalence of obesity increase among the school children. Obesity has emerged as one of the global health problem among the school-aged children, world-wide categorized as being overweight/obese, of which 40-50 million are obese Elangovan 2012. The factors attributing to increasing childhood obesity are increased intake of high-calorie foods, low intake of vitamins, minerals, micronutrients and lack of physical activity. However, the <sup>4</sup>childhood obesity are major risk factors for development of the Type II diabetes mellitus, dyslipidemia, hypertension, sleep apnea, fatty liver disease, orthopedic, psychosocial problems, and metabolic syndrome, polycystic ovarian diseases. World health organization 2016<sup>5</sup> states that abnormal or excessive fat accumulation that may impair health. Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. World Health Organization 2016<sup>5</sup> reports that the worldwide prevalence of obesity more than doubled between 1980 - 2014. In 2014 it is estimated that 41 million children under the age of five years were overweight or obese. It is not only considered as high-economic problem alone but also rises in low and middle-economic countries. The number of children who are overweight or obese has nearly doubled from <sup>6</sup>5.4 million - 10.6 million. Nearly half of the children under the age of five years who were overweight or obese. ICMR 2013<sup>7</sup> reports that the obesity prevalence among private and government school children in TamilNadu 21.4% were overweight in private schools and 4. % were obese in governments schools. Indian Academy of pediatrics 2014 <sup>8</sup>reports that over weight was higher among girls compare to boys .In India the prevalence of obesity increased significantly from 9.8% - 12% .where as underweight decreased from 11.3% to 3%. Elangovan 2014 <sup>9</sup> reported that several characteristics contribute to the widespread childhood obesity problems were Children today lead more sedentary lifestyle. The factors contributing to the increase in childhood obesity include excessive consumption of soda juices, consumption of fewer fruits and vegetables, dependency on readymade food items, decreased physical activity with great popularity of television and computer games, and also shortage of space in many schools for outdoor games. An increase in energy stored, as fat, can lead to obesity and a

number of mechanisms can contribute to an increase in stored energy.<sup>7</sup> Moutusi Raychaudhuri 2012<sup>10</sup> conducted a study on childhood obesity determines, evaluation and prevention .He reports that Diet, physical activity, socio economics status and traditional and cultural issues are the obesity determines. He concluded that targeting food habits and physical activity through parental participation and social support are the cornerstones of preventing childhood obesity. High-risk screening and effective health education programs are urgently needed<sup>8</sup>. Hence the investigator felt to conduct the study to assess the childhood obesity and its determinants among school children with the objectives to assess the level of childhood obesity, and determinants related to childhood obesity, associate childhood obesity with selected socio demographic variables and to associate the childhood obesity with its related determinants among school children.

## MATERIALS AND METHODS

The research approach used in the study was quantitative approach by using cross-sectional research design among female students from VI to VIII children age between 11-13 years. After obtaining formal permission from school authorities to conduct the study in their respective schools. The purpose of the study was explained to the children as well as to the parents. The children were selected by purposive sampling method with sample size of 60 children studying in the private schools who met the inclusion criteria. Informed parents' of consent and oral consent was obtained from children for their participation in the study. This study was approved by the Institutional Human Ethics Committee of Saveetha university. Inclusion and Exclusion Criteria: Children whose parents agreed participation of their children and gave the informed consent were included. Children who were absent at the time of data collection period, who is known case of systemic illness were excluded. This study was limited to female children and also limited to overweight, obese and severely obese. Data was collected instead by interview method on one to one basis. Collected the socio demographic variables and determinants of obesity by the self administered questionnaire which was printed in both languages Tamil/English and assessed the level of obesity by checking height and weight and calculated by the body mass index. Weight and height was measured to all the children who participated in the study - The student was instructed to stand on by on bare foot by using the portable electronic weighing scale; calibration of the machine was done before it was used. Height was measured by using the stature meter attached to the wall. Each participant were instructed to stand straight, with mass equally distributed between the feet until the reading was stabilized. Then the height was measured and recorded. <sup>11</sup>BMI was calculated using the standard formula.

$$BMI = \frac{\text{weight in kg}}{(\text{height in m})^2}$$

The determinants related to childhood obesity was assessed by interview method using multiple choice question. Privacy and Confidentiality was maintained throughout the study period. Data were analyzed by using descriptive and inferential statistics.

## RESULTS

Out of 60 samples, 22 (37%) were overweight, 30 (50%) were obese and 8 (13%) were severe obese. The mean score of weight was 141.5 with 10.84 standard deviation and the mean score of height was 94.5 with 8.54 standard deviation.

**Table 1**  
**Frequency and percentage distribution of obesity among school children.**

S.No	Classification	Frequency Distribution (N)=60	Percentage Distribution (%)
1	Over Weight	22	37%
2	Obese	30	50%
3	Severely Obese	8	13%

**Table 2**  
**Distribution of determinants related to childhood obesity among school children**

Determinants Related To Child Hood Obesity	Frequency (N)	Percentage Distribution
Family History Of Obesity	Yes	32 53%
	No	28 47%
Food Habits	Veg	20 40%
	Non Veg	40 60%
Excess Carbonate Drinks Consumption	Yes	38 63%
	No	22 37%
Junk Food Intake	Never	12 20%
	Occasional	20 33%
	Often	28 47%
High Caloric Diet	Yes	44 73%
	No	16 27%
Habits of Consuming Fatty Foods	Yes	32 53%
	No	28 47%
Physical Activity	Indoor Game	44 73%
	Out Door Game	16 27%
Academic Stress	Yes	34 57%
	No	26 43%
Habit Of Doing Exercise	Yes	36 60%
	No	24 40%
Exposure To Secondary Causes	Yes	22 37%
	No	38 63%

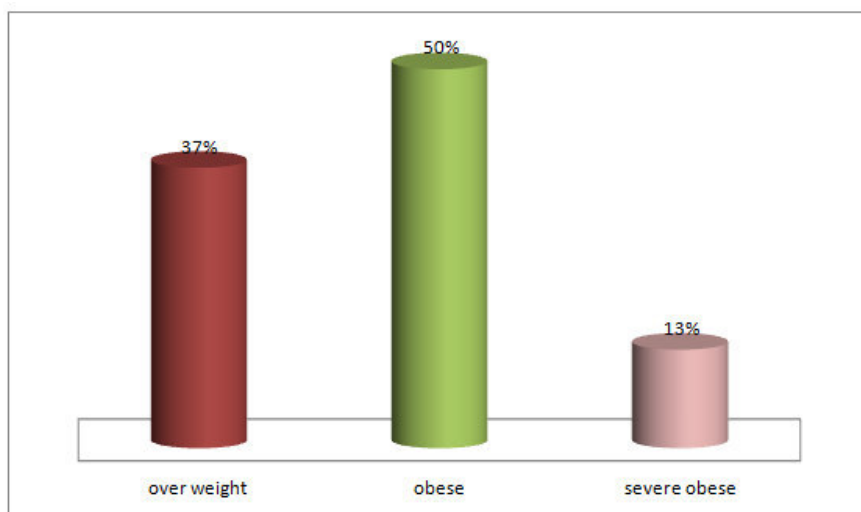
Out of samples 22 (37%) were overweight, 30 (50%) were obese and 8 (13%) were severely obese. there is a significant association between the Age, Education, Residence, Hobbies at the level of  $p < 0.05$  with the level of childhood obesity.

**Table 3**  
**Association between the level of obesity and determinants related to Childhood obesity among school children**

S.No	Determinants Related To Childhood Obesity	Classification Of Obesity			Chi square
		Over Weight	Obese	Severe Obese	
1.	Family History Of Obesity	Yes	12	18	$\chi^2$ - 24.72, Df-2 P<.05Significant
		No	10	4	
2.	Food Habits	Veg	10	8	$\chi^2$ - 12.06, Df-2 P<.05Significant
		Non Veg	20	10	
3.	Excess Carbonate Drinks Consumption	Yes	18	04	$\chi^2$ - 32.97, Df-2 P<.05Significant
		No	04	04	
4.	Junk Food Intake	Never	04	02	$\chi^2$ - 34.74, Df-2 P<.05Significant
		Occasional	10	02	
		Often	08	10	
5.	High Caloric Diet	Yes	14	04	$\chi^2$ - 43.21, Df-2 P<.05Significant
		No	08	04	
6.	Habits Of Consuming Fatty Foods	Yes	08	06	$\chi^2$ - 35.58, Df-2 P<.05Significant
		No	14	02	
7.	Physical Activity	Indoor Game	10	16	$\chi^2$ - 43.21, Df-2 P<.05Significant
		Out Door Game	08	06	
8.	Academic Stress	Yes	12	04	$\chi^2$ - 13.51, Df-2

	No	10	12	04	P<.0.05Significant
9. Habit Of Doing Exercise	Yes	10	22	04	$\chi^2= 11.45, Df-2$
	No	12	08	04	P<.0.05Significant
10. Exposure To Secondary Causes	Yes	18	16	04	$\chi^2= 13.51, Df-2$
	No	04	14	04	P<.0.05Significant

*Chi square test reveals that there is a significant association between Family history of obesity , Food habits, Excess carbonated drinks consumption, Junk food intake, physical activity indoors and out door games, and Habits of doing exercise at the level of p<0.05 with the level of childhood obesity.*



**Figure 1**  
**Level of Childhood obesity among School children**

## DISCUSSION

School children are more vulnerable group to develop childhood obesity due to the changes in the food pattern, high calorie and fatty food intake, excessive consumption of the carbonated drinks and excessive intake of the junk foods and lack of physical activity due to the technological advancement in the indoor games children are becoming high risk for the obesity. The present study findings reported that Out 60 samples, 22 (37%) were overweight, 30 (50%) were obese and 8 (13%) were severe obese with the mean weight was 141.5 with 10.84 standard deviation and the mean score of height was 94.5 with 8.54 standard deviation. This study was supported by Sonya Jagadesaran et al (2015)<sup>12</sup> conducted a study on Prevalence of Overweight and Obesity among School Children and adolescents in Chennai. The study showed that the overall prevalence of obesity is high in urban Chennai. This was predominantly dictated by the high prevalence of obesity in private schools as compared to government schools. The prevalence of obesity was higher in girls than boys, in adolescents than children, in private schools than government schools and higher on using the Khadilkar's criteria , compared to the IOTF criteria The 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%, (OR: 7.4, 95% CI:6.3-8.6; P<0.001) and by Khadilkar criteria (private school: 26.4%, government schools: 4.6% OR: 6.9, 95% CI:6.2-7.8; P<0.001). Overweight/obesity was higher among girls (IOTF: 18%, Khadilkar: 21.3%) compared to boys (IOTF: 16.2%, Khadilkar: 20.7%) and higher among adolescents (IOTF: 18.1%, Khadilkar: 21.2%) compared to children (IOTF:

15.5%, Khadilkar: 20.7%). Prevalence of hypertension was 20.4% among obese/ overweight and 5.2% among With (non-obese (OR 4.7, 95%CI: 4.2-5.3, P<0.001 regards to determinants of obesity, 32(53%) were family history of obesity, 28 (47%) were no family of obesity , food habits of non-vegetarian diet, 40 (60%) and 20(40%) were belongs to vegetarian diet, 38 (63%) were excess carbonate drinks consumption, 28(47%)were often consuming Jung food, 44 (73%) were consuming high caloric diet, 32 (53%) were consuming fatty foods,44 (73%) were engaged with indoor games, 34 (57%) were academic stress and 24 (40%) were not doing exercise/yoga 22(37% ) had exposure to secondary diseases and also significant association with the determinant factors such as junk food intake, excessive carbonate conception, habits of consuming fatty foods, academic stress, and habits of doing exercise/yoga with level of childhood obesity. Dorothy Jaganathan et al (2011)<sup>13</sup> conducted a study on Dietary Pattern of Obese Children in Erode District of Tamil Nadu. 500 children both male and female in the age group of 5 to 10 years from each district were selected for the study. Height and weight were taken and Body Mass Index was calculated. The calculated Body Mass Index of each child was compared with the standard percentile chart for children (Centre for Disease Control, 2000) so as to infer the nutritional status of children and identify the obese subjects. The results showed that food habits 448(90%) are belongs to the non vegetarian Eating at fast food restaurants is very common among young children with 75% of 7th to 12th grade students consuming fast food in a given Form of fleshy food preferred: Cooking is In (weekly) deep fat frying food is submerged in hot oil or fat.

Shallow frying is the cooking of food in small quantity. Data shown in the table III reveals that there is a significant association, Family history of obesity, Food habits, Excess salt consumption of carbonated drinks, Junk food intake, high calorie consumption, Habits of consuming fatty foods, physical activity, academic, Stress, and Habits of doing exercise/yoga at the level of  $p < 0.05$  with the level of childhood obesity. There is a significant relationship between the height and weight at the level of  $p < 0.05$ . This study was supported by M. Anita Rani 2013<sup>13</sup> conducted a study on behavioral determinants for obesity, a cross-sectional study among the urban adolescents in India. She concluded that, the prevalence of risk factors for obesity was quite high among the adolescents. 40.7% of the students ate fruit one or more times per day and 74.5% of the students

ate vegetables one or more times per day. Nearly 20% of the students ate fast food items on 4 to 7 days during the previous week. Among the students, 30.4% watched television for more than two hours per day. Nearly 68% of the girls and 22% of the boys did not participate in outdoor sports activities. When the pattern of physical activity of the students was assessed, it was observed that 15.6% were inactive, 43.4% were minimally active, and the remaining 41.0% belonged to the category of health enhancing physical activity. Among the students, 6.2% were overweight and 5.2% were obese. Also, the study showed that a great proportion of overweight/obese adolescents had a correct perception of their body weight and they were making efforts to modify risk factors such as television viewing, computer use, a sedentary lifestyle, and unhealthy dietary habits<sup>1</sup>.

## CONCLUSION

The findings of the study concluded that school children are a risk group for developing obesity ranging from overweight, obese, and severe obese and also prone to develop complications like cardiovascular problems, Type II diabetes mellitus, Hypertension, hyperlipidemia due to, life style modification, habits and dietary pattern, lack of physical activity. These findings suggested that school children periodically assessed for weight and height, and awareness must be created regarding the risk factors of obesity and bring the positive changes in the lifestyle there by can prevent the impact of childhood among children, parents need to be involved in their child's measurement programs to be aware about their health concept of their children, and also encourage the society to move forward on Healthy Diet promotes the healthy children. Recommendations similar study can be conducted with a large number of samples, interventional study and with both genders.

## CONFLICT OF INTEREST

Conflict of interest declared none.

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