



Factors associated with Obesity among Primary School Children in Mangalore and Kasaragod Districts of India. A Cross Sectional Study

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Abstract

Objective: The study was conducted to find out the prevalence of obesity, its association with food habits, activities of daily living; in primary school children aged between 6-12yrs.

Method: Three fifty primary school children, male and female aged from 6 to 12 years were recruited. Height, Weight, Body Mass Index was calculated. The questionnaire was filled by the researcher through interview method and the same was cross verified by the teachers and parents/guardians.

Results: The data was analyzed using frequency, percentage, and Chi-square test. The result showed prevalence of obesity as 12.6%, among them 63.6% were boys and 36.3% were girls. The 97.7 % obese children chose non-vegetarian and 2.2 % chose vegetarian food which indicate the association of non-vegetarian food with the obesity(P=0.03) and there showed no significant association of physical activity on obesity (P=0.15).

Conclusion: The prevalence of obesity among primary school children of Mangalore and Kasaragod was 12.6%. The food habit was the one of the associating factor for obesity in obese children which showed a significant association compared to the non-obese children.

Keywords: Obesity, Prevalence, Food habits, Physical activity

Introduction

Childhood overweight and obesity are assumed to be the result of high caloric and fat intake and have significant impact on physiological and psychological health ¹ Environmental factors, lifestyle, and the cultural practices play pivotal roles in the rising prevalence of obesity worldwide. In school children the genetic factor and dietary habits which involves regular consumption of high calorie food like fast food, cookies or baked foods and certain medical conditions such as hormonal or chemical imbalance and metabolic disorder can also lead to obesity.

Activities like watching television, computer usage and playing video games conspire to keep children inside the home which leads to lack of physical activity. Socio-economic factors also have important influences on caloric imbalance. Seventy percent of obesity children have got high risk to become overweight adults and are already at risk for condition like type 2 diabetes, high blood pressure, and high cholesterol.²

Body Mass Index(BMI) is known to as an inexpensive and easy-to-perform method for screening of different weight categories.³ The health

and nutritional status of children is best defined through the growth assessment, as it provides an indirect measurement of the quality of life of an entire population.⁴ The Indian Academy of Pediatrics (IAP) adopted the data published by Agarwal et al chart for growth monitoring in 2007. This standard growth chart gives us 3rd, 10th, 25th, 50th, 75th, and 97th percentiles which are standard for height and weight charts. Individual falls below 3rd and above 97th percentile are considered out of normal range. The 85th and 95th percentile lines in the BMI chart indicate overweight and obesity cut offs.⁵

Globally death is more linked with overweight and obesity than that of underweight. Secular trends indicate increasing prevalence rates of obesity in India, the rate rising from 9.8 to 11.7% during the year 2006–2009. More than 40 million children under the age of five were overweight in the year 2011.^{6,7} Overweight and obesity among children may put burden on family and country's economic system. Due to this there were many studies conducted on prevalence of obesity and its association with dietary habits and level of physical activities among school children in India. Result of the study among the children between 5-18 years belongs to low, Middle and High income group categories in Delhi, shows that the prevalence rate was much higher in High income group than the children in other groups, and it was assumed to be associated with the change in the dietary pattern and physical activities with the increase in income levels.⁸ A cross sectional study among the high school children in Dakshina Kannada and Udupi district in Karnataka revealed that the prevalence rate was 2.6% and 3.0% respectively. Also found to be higher among males those who are not regularly do exercise.⁹ There were studies to find out the prevalence of obesity among high school children in Dakshina Kannada, but there was no comparative study conducted among primary school children in Mangalore and Kasaragod district. Hence this study aims to check the prevalence of obesity and its associated factor among primary school children in the age group of 6-12 in Mangalore and Kasaragod district.

Material And Methods

This was a cross sectional study conducted among the 350 (Calculated based on Cochran's formula) primary school children aged between 6 to 12 years

studying in the Government and Private schools of Mangalore and Kasaragod educational districts. Children were screened for the inclusion criteria after the getting of informed concerned from the school principals and the Parents/Guardians. Children along with their Teachers /Parents/Guardians were explained about the purpose of the study. Institutional ethical committee approval was taken and verbal advertisement was done in the university.

Those who were willing and fulfilled the criteria were included for the study. The inclusion criteria kept in this study were Primary school children of both male and female children from Mangalore and Kasaragod district, and aged between 6-12 years. Children who were differently abled children, who were having Endocrine disorders, children under medication for any systemic disorders and children have any musculoskeletal disorders, were excluded from the study.

Base line data including Height, Weight, Waist Height Ratio, were measured. A questionnaire was filled by the interview method which aimed to collect the details including General information, Academic and Non academic activities, Leisure time activities, Food habits, and Physical activities. The same was cross verified by the teachers and parents/guardians.

Body mass index was calculated by 'a person's weight in kilograms divided by the square of his height in meters (kg/m²)'. The children were categorised as obese or over weight as per the criteria given by the Khadilkar VV.et.al.⁵

Statistical Analysis

The whole collected data was analyzed by using frequency, percentage, and Chi-square test was done to find the association of food habits on obesity and physical activity on obesity by using SPSS version 17. Level of significance was set as P<0.05

Results

Prevalence of obesity among study population was 12.6% (44 children). Among obese children 28(63.6%) were male and 16(36.3%) were female, and 38(86.3%) were day scholar and 6(13.6%) were hostelites.

Study included 175 children each of age group 6-12 years residing at Mangalore and Kasaragod districts, out of which 49.7% and 50.2% belongs to

government school at Mangalore and Kasaragod respectively. 50.2% and 49.7% belongs to private schools at Mangalore and Kasaragod respectively. (Table 1 & 2)

Among children of government schools 4.5% residing at Mangalore were hostelites and 95.4%

were day scholars, and among children of government schools residing at Kasaragod 100% were day scholars. Children of private schools residing at Mangalore were 100% day scholars and 73.5% were hostelites and 26.4% were day scholars residing at Kasaragod. (Table 1 & 2)

Table 1: Distribution of Age, Sex, and accommodation, both government and private school study population of Mangalore.								
Mangalore - n = 175 (50%)								
Age	Government- n = 87 (49.7%)				Private- n = 88 (50.2%)			
6-12	Hostel n = 4 (4.5%)		Day scholar n = 83 (95.4%)		Hostel n = 0 (0%)		Day scholar n = 88 (100%)	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
	4 (100%)	0 (0%)	39 (46.9%)	44 (53%)	0 (100%)	0 (100%)	45 (51.1%)	43 (48.8%)

Table 2: Distribution of Age, Sex, and accommodation, both government and private school study population of Kasaragod.								
Kasaragod - n = 175 (50%)								
Age	Government - n = 88 (50.2%)				Private - n = 87 (49.7%)			
6-12	Hostel n = 0 (0%)		Day scholar n = 88 (100%)		Hostel n = 64 (73.5%)		Day scholar n = 23 (26.4%)	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
	0 (100%)	0 (100%)	44 (50%)	44 (50%)	32 (50%)	32 (50%)	12 (52.1%)	11 (47.8%)

Table 3: Distribution of BMI categorization of Mangalore and Kasaragod study Population				
Description	Mangalore n = 175		Kasaragod n = 175	
	Frequency	%	Frequency	%

Obesity	18	10.2	26	14.8
Overweight	50	28.5	33	18.8
Normal	87	49.7	96	54.8
Under weight	20	11.4	20	11.4

Table 4: Prevalence of obese children and their characteristics

Description		Frequency	%
Obese children	Total Number	44	12.6
	Male	28	63.6
	Female	16	36.3
	Day scholar	38	86.3
	Hostelites	6	13.6

Table 5: Time spent by the obese children at school and for tuition

Description	Options	Frequency (n=44)	%
Time spent by obese children at school	3Hrs	0	0
	4-6Hrs	0	0
	More than 6 hrs	44	100
Tuition	Children who goes for tuition	15	34
	Children who do not go for tuition	29	66

Table 6: The mode of transport used, attendance of extracurricular activities and time spent in watching TV or Video games by the obese children

Description	Option	Frequency (n=44)	%
Transport	Fueled vehicle	27	61.3
	Cycle	1	2.2
	Walking	16	36.3
Extracurricular	Involved in extracurricular activities	32	72.7
	Not involved in extracurricular Activities	12	27.2

Watching TV	1-2 hrs	20	45.4
	2-4 hrs	15	34
	More than 4 hrs	4	9
	Never watches	5	11.3

Table 7: The choice of food habit by the obese children, and their frequency of intake of hotel food

Description	Option	Frequency (n=44)	%
Food	Veg	1	2.2
	Non Veg	43	97.7
Hotel food	> 6 times a year	16	36.3
	4-6 times a year	5	11.3
	2-4 times a year	15	34
	1-3 times a month (12-36 in a year)	5	11.3
	Once a week (48 in a year)	1	2.2
	> once a week (> 48 in a year)	2	4.5

Discussion

Primary school children in the age group of 6-12 in Mangalore and Kasaragod were included in the study. Out of total study population 12.6% were obese, 23.1% were overweight, 52.8% were normal and 11.4% were under weight. According to BMI categorization the frequency of obese 10.2% and overweight 28.5% children was more in Mangalore, compared to Kasaragod obese 14.8% and overweight 18.8% primary school children. This shows that, the obesity and overweight prevalence rate higher in Mangalore population than Kasaragod population. Regarding the normal children, the distribution was more in Kasaragod 54.8% population compared to Mangalore 49.7% study population. But there was no difference seen in distribution of underweight children in Mangalore and Kasaragod district (Table 3).

The characteristics of obese among primary school children are explained in the following paragraphs. This study shows the obesity prevalence rate as 12.6%, in which 63.6% were boys and 36.3% were girls, which shows that boys are more obese than girls. The study also points out that majority of obese children 86.3% were day scholars and only 13.6% were hostelites. The availability of food at home or the freedom of choice over the quality, quantity, and frequency of food is more for day scholars compared to hostelites; this could be one of the reasons to develop large number of obesity in day scholars (Table 4).

Among the obese children 100 % spent more than 6 hours a day at school, on top of that 34 % goes for tuition, indicates that those children who goes for tuition may reduce their physical activity, which may be a reason for their obesity (Table 5). This result agrees with the previous study conducted among primary school children in Dhaka, which shows that

access of more food and less physical activities contributed to the higher prevalence of obesity and its associated factors.¹⁰

About the mode of transportation among the obese children, 61.3% used fueled vehicles, where 2.2% preferred cycling and 36.3 % walking. The usage of fueled vehicle for transportation increases the sedentary activity among these children which could be another major reason for obesity among them (Table 6). This finding is also in agreement with the previous data on the basis of measurements taken on 4298 school students, shows that the sedentary activity of more than 1 hour per day which includes longer than 30 minutes fueled vehicles transportation was associated with a significantly increased risk of overweight or obesity.¹¹ Regarding the extracurricular activities of the obese children 72.7% had involved in extracurricular activities and 27.2% did not involve in extracurricular activities (Table 6). This is good, as participating in physical activity more than 7 times a week was associated with a decreased risk of overweight.¹¹ Though the majority of obese children were having extracurricular activities it is not necessary this alone can reduce the risk of overweight or obesity. For a better outcome, in future the study may be done by including when the games were started, type of games, and duration spend on each games/other activity by the students so that suggestions may be made to modify the activities done to intervene among obese.

Along with unhealthy food choices, TV viewing is receiving attention as a modifiable risk factor for childhood obesity. The American Academy of Pediatrics recommended limiting children's total media time (including TV viewing) to no more than 2 hours per day.¹² It was observed in this study, among obese children 34% watched TV 2-4 hours, and 9% watched TV for more than 4 hours (Table 6), which may increase the sedentary activity among obese children.

A previous study showed that analysis on type of diet, junk food and chocolate eating habits and frequency of restaurant visit per week played has a special role in obesity and they found that junk food and chocolate eating habit had high positive relation with prevalence of obesity and overweight.¹³ The same result has been observed in the present study i.e. the intake of deep fried food, junk food etc by the

obese children was shown as an associated factors for obesity. Though the likeliness toward the food items was similar among the obese and non-obese, the choice of food habit and frequency of hotel food among the obese children was turned out be the major associating factor for obesity which agrees with the finding of Sultana S.¹⁰ Among obese children 97.7 % chose non-vegetarian and 2.2 % chose vegetarian food which indicate the association of non-vegetarian food with the obesity (Table 7).

Food prepared by restaurants is generally regarded as high in salt, sugar and fat. Some of them may contain high levels of trans fat, which may leads to obesity. In the present study it was observed that 36.3% had dined outside more than 6 times a year, 11.3% had 4-6 times a year, 34% had 2-4 times a year, 11.3% had 12-36 times a year, 2.2% had around 48 times a year and 4.5% had more than 48 times a year (Table 7), thus suggesting that it is important for parents to look for healthier dishes when dining out.

This study established that the prevalence of obesity among primary school children of Mangalore and Kasaragod was 12.6 %. Obesity was more prevalent in boys (63.6%) compared to girls (36.3%). The physical activity did not show any significant ($P=0.15$) association on obesity, but the food habits of obese children on their obesity showed a significant ($P=0.03$) association compared to the non-obese children. The obese children had a habit of consuming high calorie non-vegetarian food but as far as the likeliness towards food items is concerned, the result showed no much difference among obese and non-obese children. This indicates that the parents and children need to be educated about the dietary habits, so that we can prevent childhood obesity and thereby bringing up a better healthy and productive nation.

Conclusion

The prevalence of obesity among primary school children of Mangalore and Kasaragod was 12.6%. The food habit was the one of the associating factors for obesity in obese children which showed a significant association compared to the non-obese children.

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