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SOCIOECONOMIC STATUS, PHYSICAL ACTIVITY, AND SEDENTARY LIFESTYLE OF OBESE SCHOOL CHILDREN 6-15 YEARS OF AGE

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ABSTRACT

Childhood obesity is a major public health crisis nationally and internationally. The prevalence of childhood obesity has increased over few years. These increases have given rise to considerable concern about children's health and well being. Monitoring the prevalence of obesity in order to plan services for the provision of care and to access the impact of policy initiatives is essential. The study included 2562 selected school children between the age group of 6-15 years from different socio economic background. Family income, SES (socio economic status), time spent for physical activities, time spent for sedentary activities and anthropometric measurements were determined using pre-tested questionnaire. Sample selection was carried out using simple random sampling technique. A total of 2562 students were enrolled for the study comprising of 56 percent boys and 44 percent girls. Age adjusted prevalence of overweight was seen among 18.5 percent of boys and 21.5 percent girls, whereas obesity was prevalent among 7.9 percent boys and 6.7 percent girls. Overweight prevalence was noted to be high in children of middle SES, but obesity was highly prevalent among high SES. Overweight and obesity prevalence was lowest among low SES group. Time spent for physical activities was low and time spent for sedentary activities was high among obese individuals. Our analysis clearly depicts that the prevalence of overweight and obesity in children are related to socio economic status, physical activity and sedentary lifestyle.

Keywords: Obesity, Childhood, overweight,

INTRODUCTION

Among the nutritional problems, obesity is now reaching epidemic proportions in both developed and developing countries and is affecting, not only adults but also children and adolescents (Kalpana, et al. 2010). The most important consequence of childhood obesity is its persistence into adulthood with all its health risks. The health risks include cardiovascular diseases, diabetes, osteoarthritis, gallbladder disease and some sexhormone-sensitive cancers (World Health Organisation, 2000).

Adolescent obesity is one of the major global health challenges of the 21st century. India is passing through a transitional phase of socio economic development. There is an increase in women's employment due to economic pressure. The increase in income, may lead to better nutrition for them. Improved health facilities, increase the income, availability of food and decrease in physical activity have contributed to this epidemic form of overweight and obesity especially in the urban areas of the developed and developing countries (Parimalavalli, et al. 2009).

Nayak and Vinodbar (2011) Worldwide, Non-communicable disease (NCD) represent 43 percent of the burden of disease and expected to be responsible for 60

percent of the disease burden and 73 percent of all deaths by 2020. The prevalence of obesity in India is 16 percent in women and 12.1 percent in men (Joseph and Kowsalya, 2011). Recent data from the WHO revealed that the prevalence of childhood obesity worldwide is 16.5 percent and in India it accounts for 12.4 percent in boys and 9.9 percent percent in girls. The results of studies among adolescents from parts of Punjab, Maharastra, Delhi, and south India revealed that the prevalence of overweight and obesity was high, which ranges from 11 percent to 29 percent. A similar study conducted in Chennai, in South India, showed the prevalence of overweight as 17 percent and obesity 3 percent. Atleast 30 percent of obesity begins in childhood. Conversely 50 percent to 80 percent of obese, children become obese adults (Bhave, et al. 2004). Women of high socioeconomic class had rates of 10.4 percent as opposed to 0.9 percent in women of low socioeconomic class.

Children and adolescents spend large amounts of time watching television. Television viewing may be related to obesity and reduced physical activity in children. Thus, the mass media may be an important arena for environmental modifications promoting physical activity in children and adolescents (Goran, et al. 1999).

MATERIALS AND METHODS

A school based survey was carried out among school children in the age group of 6-15 years. Three state Board schools and three CBSE schools were selected randomly from Gobichettipalayam of Erode district, belonging to Tamilnadu state of India. The selection of the schools was based on the willingness to participate on the part of the management and the convenience of the investigator. Administrative permission was obtained from school authorities to collect anthropometric measurements and data.

Simple random sampling was used in sample selection. There were three to five sections for each standard in all the six schools. A total of 2562 students were selected. The children were advised to take home the questionnaire to their parents to fill. Filled forms were returned the next day, completed age of the children was noted. Children who were absent from school because of sickness or other reasons were not followed-up.

Standardized protocols were used for all interviews and examinations. Data on weight and height were collected for each through direct physical examinations. Height and weight were measured using standard procedure and BMI (Kg/m²) was calculated. The number of underweight, normal, overweight, and obesity was calculated.

Socio economic status (SES) of parents was classified as higher income group (HIG), Middle income group (MIG), Lower income group (LIG) and Economically weaker sections (EWS) based on the occupations of parents and family income which were found to be a reliable index of SES (MHUPA, 2007-2012). Family income data were collected at the same time children's BMI measurements were collected. Data regarding time spent for physical activity per day at school, at home, reasons for not involved in physical activity and sedentary life style were also collected.

Income Classification:

EWS(Economically weaker section) Less than 3,300

LIG(Lower Income Group) 3,300-7,500

MIG(Middle Income Group) 7,500-14,000

HIG(Higher Income Group)More than 14,000

Data Source: MHUPA- Working Group on Urban Housing, 2007-2012 (Monani, et al. 2012).

RESULTS

Among the selected 2562 school children of 6 to 15yrs of age, 1425(56 percent) were boys and 1137(44 percent) were girls. Prevalence of overweight and obesity among selected school children based on BMI is tabulated below

Table-1 - Prevalence based on Tim cole BMI Classification (2007)

Age in Years	BMI Range	Underweight <5 th Percentile		Normal ≥ 5 th to <85 Percentile		Overweight ≥ 85 th to <95 th Percentile		Obese ≥95 th Percentile		Total	
		NO	%	NO	%	NO	%	NO	%	NO	%
6Yrs	Boys	8	10.7	35	46.7	19	25.3	13	17.3	75	100
	Girls	3	4.4	41	59.4	14	20.3	11	15.9	69	100
7Yrs	Boys	4	4.9	48	58.5	16	19.5	14	17.1	82	100
	Girls	3	4.3	42	60	15	21.4	10	14.3	70	100
8Yrs	Boys	69	33.8	87	42.6	34	16.7	14	6.9	204	100
	Girls	45	33.1	67	49.3	19	13.9	5	3.7	136	100
9Yrs	Boys	58	26.0	109	48.9	39	17.5	17	7.6	223	100
	Girls	45	27.8	71	43.8	37	22.8	9	5.6	162	100
10Yrs	Boys	67	28.7	113	48.5	37	15.9	16	6.9	233	100
	Girls	42	25.0	93	55.3	28	16.7	5	3.0	168	100
11Yrs	Boys	37	29.1	56	44.1	23	18.1	11	8.7	127	100
	Girls	33	30.6	55	50.9	17	15.7	3	2.8	108	100
12Yrs	Boys	27	25.7	51	48.6	21	20	6	5.7	105	100
	Girls	15	15.5	56	57.7	20	20.6	6	6.2	97	100
13Yrs	Boys	31	25.4	53	43.4	30	24.6	8	6.6	122	100
	Girls	22	26.5	38	45.8	19	22.9	4	4.8	83	100
14Yrs	Boys	8	7.9	62	61.4	23	22.8	8	7.9	101	100
	Girls	3	2.9	52	51.0	32	31.4	15	14.7	102	100
15Yrs	Boys	40	26.1	87	56.9	21	13.7	5	3.3	153	100
	Girls	29	20.4	61	43.0	44	31.0	8	5.6	142	100
Total	Boys	349	24.5	701	49.2	263	18.5	112	7.8	1425	100
	Girls	240	21.1	576	50.7	245	21.5	76	6.7	1137	100

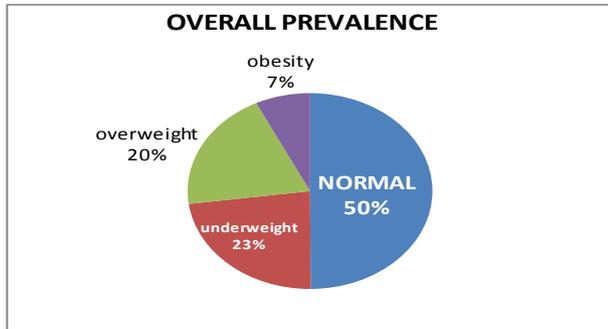
BMI is an inexpensive and easy -to-perform method of screening for weight categories that may lead to health problems (Mei, et al.2002). BMI is a reliable indicator of body fatness for most children and teens.

Of the total 2562 respondents, the prevalence of overweight was 18.5 percent among boys and 21.5 percent among girls. Prevalence of obesity was 7.8 percent in boys and 6.7 percent in girls. Regarding underweight, the prevalence is 24.5 percent in boys and 21.1 percent in

girls. The prevalence of normal weight was 49.2 percent among boys and 50.7 percent among girls.

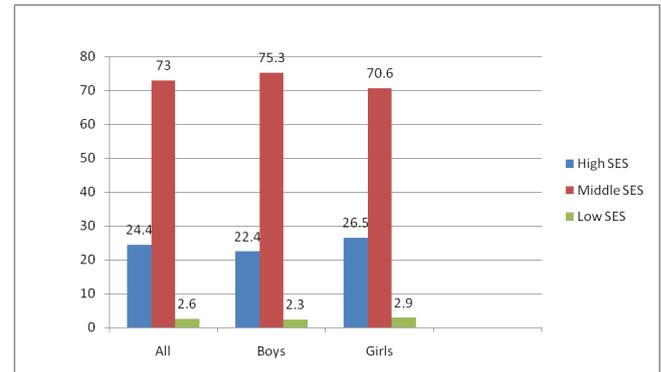
Overweight / obesity is the underlying cause of death for 2.8 million people each year (World Health Organisation, 2009). More than 100 million individuals are obese in India. India is the midst of an obesity epidemic, which has serious health ramifications (Bhalwar, 2009).

FIG-1 - Overall Prevalence of Overweight and Obesity



Regarding the overall prevalence of the selected school children, it is clear from the table that 50 percent were belonging to normal category, 23 percent were

underweight, 20 percent were overweight and seven percent were obese.



Among the selected school children, based on sex and age wise distribution, the prevalence of overweight was more in middle SES and the results are same for both boys and girls.

It is evident from the table, that among the selected school children, the prevalence of obesity was high among high SES group in both the sex.

Table-2- Shows the relationships between obesity and socioeconomic status by sex and age

Age In years	Boys(n=112)						Girls(n=76)					
	High SES		Middle SES		Low SES		High SES		Middle SES		Low SES	
	NO	%	NO	%	NO	%	NO	%	NO	%	NO	%
6	10	11.0	3	14.3	-	-	10	15.6	1	8.3	-	-
7	12	13.2	2	9.5	-	-	8	12.5	2	16.7	-	-
8	13	14.3	1	4.8	-	-	5	7.8	-	-	-	-
9	14	15.4	3	14.3	-	-	7	10.9	2	16.7	-	-
10	13	14.3	3	14.3	-	-	4	6.3	1	8.3	-	-
11	7	7.7	4	18.9	-	-	3	4.7	-	-	-	-
12	5	5.5	1	4.8	-	-	5	7.8	1	8.3	-	-
13	6	6.6	2	9.5	-	-	4	6.3	-	-	-	-
14	7	7.7	1	4.8	-	-	11	17.2	4	33.4	-	-
15	4	4.3	1	4.8	-	-	7	10.9	1	8.3	-	-
	91	100	21	100	-	-	64	100	12	100	-	-

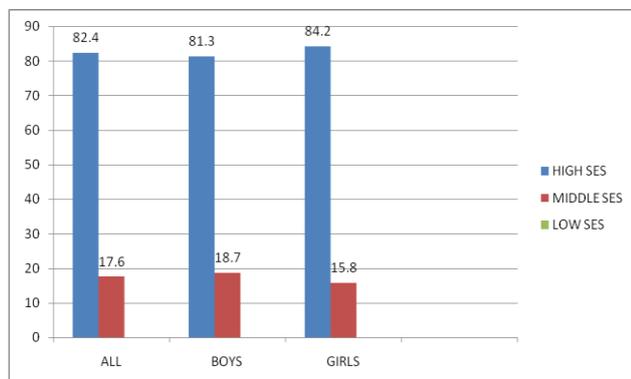


Figure-3 presents the prevalence of obesity and its relationships with socioeconomic status among the selected children.

It is clear from the figure-3 that the overall prevalence of obesity was high in high SES, low in middle SES, and

nil in low SES. The result was same for both boys and girls.

During the two decades there has been a major alteration in lifestyle and activity pattern among all segments of population, with the ready availability of cooking gas, piped water supply and labour saving gadgets and ready transport which led to a substantial reduction in the physical activity pattern and energy expenditure especially in middle and upper income group. However, the dietary intake has not undergone any reduction; in fact ready availability of fast foods and junk foods, ice creams and other energy rich food items at affordable costs have resulted in increased energy consumption of these by all members of the family. All these have led to increasing energy intake over and above the requirement especially among urban and rural affluent population and consequently obesity in these segments of population (BalaSubramaniam and Bhuvanewari. 2013).

Chi-square test was applied to find the socioeconomic status of boys is significantly related to their BMI. The calculated value of chi-square was 177.59 which is found to be significant at 1% level. Hence it is inferred that socioeconomic status of boys has significant association with BMI and the hypothesis is rejected.

Chi-square test was applied to find the socioeconomic status of girls is significantly related to their BMI. The calculated value of chi-square was 121.68 which is found to be significant at 1% level. Hence it is concluded that socioeconomic status of girls has significant association with BMI range and the hypothesis is rejected.

Among boys 19 percent of obese, 30 percent of overweight, and 38 percent of normal spent 30 minutes to 1 hour. Among girls 6 percent of obese, 33 percent of overweight and 42 percent normal spent 30 mins to 1 hour for physical activity at school per day. The calculated values of chi-square were 98.52 which is found to be significant at 1 percent level. Hence it is referred that time spent for physical activity at school performed by boys has significant association with BMI.

Chi-square test was applied to find the time spent for physical activity at school by girls is significantly related to their BMI. The calculated values of chi-square was 97.83 which is found to be significant at 1 percent level. Hence it is referred that time spent for physical activity at school by girls has significant association with BMI and the hypothesis is rejected.

Regarding spending 30mins to less than 1 hour for physical activity at home, 8 percent of obese boys, 32 percent of overweight boys and 41 percent of normal boys are involved. Whereas among girls, none of the obese, 17 percent of overweight and 34 percent of normal are involved in this category.

Chi-square test was applied to find the time spent for physical activity at home among boys is significantly related to their BMI. The calculated value of chi-square was 40.73 which is found to be significant at 1 percent level. Hence it is confirmed that the time spent for physical activity at home among boys has significant association with BMI and the hypothesis is rejected.

Chi-square test was applied to find the time spent for physical activity at home among girls is significantly related to their BMI. The calculated value of chi-square was 57.83 which is found to be significant at 1% level. Hence it is concluded that the time spent for physical activity at home among girls has significant association with their BMI and the hypothesis is rejected.

This study reveals that among boys, 45 percent of obese, 26 percent of overweight, and 30 percent of normal and among girls, none of the obese, 41 percent of overweight and 40 percent of normal spent 30 minutes to one hour for physical activity both in school and home.

The study conducted in Wardha city, revealed that time spent ≥ 30 minutes in outdoor games results in less prevalence of overweight and obesity and it was found to be significant.

DISCUSSION

During the past two decades, the prevalence of overweight and obesity in children has increased worldwide. Obesity in childhood and adolescence has adverse consequences on premature mortality and physical morbidity in adulthood (Reilly and Kelly, 2001) and is associated with impaired health during childhood itself. Among Indian children, various studies report the magnitude of overweight to be from 9 to 27.5 percent and that of obesity from 1 to 12.9 percent (Khadilkar. et al, 2012).

The present study showed that the prevalence of overweight was high among selected school children 18.5 percent in boys, 21.5 percent in girls. The obesity was seen in 7.9 percent boys and 6.7 percent girls.

The prevalence of obesity was found to be higher among boys as compared to girls. This could be due to cultural preferences in terms of diet and not giving them to do any household activities. But girls were found to be more overweight than boys. Our findings are consistent with Studies by Kapil et al, also indicated that the prevalence of obesity was lower in girls(6 percent) as compared to boys(8 percent) (Kapil, et al. 2002) .

In our study, prevalence of overweight was high among 13 to 14 years age group and are consistent with studies conducted in Delhi and Chennai (Kaur, et al. 2005), perhaps because of increased adipose tissue and overall body weight in children during puberty. The prevalence of obesity was high in 6 to 7 years of age, which is consistent with studies conducted in rural areas of Ernakulam district, Kerala state, India (Jacob, et al. 2014).

Our analysis shows that childhood overweight and obesity is related to SES although the relationships differ little among gender. Our study demonstrated that socioeconomic status in children influenced prevalence of overweight and obesity, this was associated with lifestyle and dietary management. In general our findings regarding the relationships between obesity and SES are consistent with the findings from many previous studies (Parsons, et al. 1999), (Sobal and Stankard, 1989), (Ibrahim, et al. 1999), (Murray, et al. 2000), Ramachandran, et al. 2002 Bhuvaneswari and Nazni, 2011 and Kaur, et al. 2005).

Overweight and obesity relationship in developing countries such as India is that the influence of SES on people's lifestyle such as diet, food consumption patterns and public services such as health care and transportation and physical activity may differ. Richer people have better access to meat and other energy dense foods (which are much more expensive than other foods such as vegetables) than the poor. In contrast, middle SES groups usually consume more vegetables and fruits, which are less energy-dense, than high SES groups. The low economic group probably reflects nutritional imbalance as a result of poverty (Ge, et al. 1996). Hence in our study overweight prevalence was noted to be high in children of middle SES group, but obesity prevalence was found to be high among high SES group. Overweight and obesity prevalence was lowest among low SES group.

Regular physical activity was an important factor in reducing prevalence of overweight and obesity. The prevalence was significantly lower in the children who participated regularly in household chores, played outdoor games, and performed physical exercise. The diets of the children in the higher socioeconomic group are known for their higher fat content, and the subjects are involved in more sedentary activities. Our results are consistent with results of previous studies (Patrick, et al. 2004).

Our study also confirms that children spent very less time for physical activity and were forced to study in their play time. In addition, the prevalence of overweight and obesity were higher among children who were involved in sedentary activities such as spending ≥ 3 h/d on television viewing and our results are consistent with (National council for applied and economic research, 2001; Nazni and Bhuvanewari, 2010; Klesges, et al 1993) also reported the effect of watching television on metabolic rate and overweight and obesity in children.

CONCLUSION

Our study confirms that overweight and obesity are related to socioeconomic status, physical activity, and sedentary lifestyle. Hence our plan on strategies to prevent obesity should focus on factors that prevent its development. This problem needs to be addressed at early age to prevent the complications in later life. Sedentary life style should be discouraged. Increase physical activity like playing outdoor games, walking, cycling should be encouraged in children. Health education should be given to parents, teachers and children regarding dietary habit, physical activity, and sedentary life style.

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