ORIGINAL ARTICLE

The Impact Of Socioeconomic Status On Childhood Obesity Among 6 To 18 Years Of Age

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ABSTRACT

Introduction: According to WHO Obesity is defined as a condition of abnormal or excessive fat accumulation in adipose tissue to the extent that health may be impaired. Childhood obesity is a single marker of the child at risk for development of various non-communicable diseases later in life. The present study aimed to study the impact of obese and overweight children with socioeconomic status and to find the relationship with family history of obesity.

Material and Methods: Study conducted in Chhatrapati Shivaji Subharti Hospital, Meerut among 6-18 years of age from January 2014 to January 2015. Body Mass Index (BMI) was calculated, Children were categorized into three groups based on BMI as per NELSON guidelines with respect to their age and sex and relationship with socioeconomic status was studied.

Results: Impact of overweight and obese children with socioeconomic status shows that 8% overweight and obese children were of upper class, 68% upper middle, 10% lower middle and 62% of obese and overweight children had positive family history of obesity.

Conclusion: In our study in 62% of obese and overweight children (p<.01 significant) there was positive family history of obesity and maximum number of children 68% (p<.01significant) of total study group belonged to upper middle socioeconomic class. Hence obesity is associated with socioeconomic status.

Keywords: International obesity task force, World health organization, Body Mass Index

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INTRODUCTION

According to WHO Obesity is defined as a condition of abnormal or excessive fat accumulation in adipose tissue to the extent that health may be impaired.

Hypertrophic obesity - Due to increase in fat cell size.

Hyperplastic obesity - Due to increase in fat cell number.

In early onset obesity, there is both hypertrophy and hyperplasia; but in late onset obesity, only hypertrophy is seen. Now a days obesity is regarded as "New World's Syndrome" because its ignorance in childhood leads to increase in adult obesity and is the major cause of most of the diseases. Research needs to examine the most effective strategies of intervention, prevention and treatment of obesity. These strategies should be culture specific, ethnical and consider the socio-economic aspects of the targeting population. Goyal et al in 2010, studied the relationship of socioeconomic status taking 5664 school children of 12-18 years of age and having different SES. The prevalence of overweight among children was higher in middle SES as compared to high SES group in both boys and girls whereas the prevalence of obesity was higher in high SES group compared to middle

SES group.[4] Ramesh k in 2010, compared the family history of overweight/obese children (36.7%) with without family history of overweight/obesity(8.9%) and concluded higher among with family history which was statistically significant.[5] The study was aimed to study the impact of obese and overweight children with socioeconomic status based on Kuppuswamy's 2010 socioeconomic status scale and to Find the relationship of obese and overweight children with Family History of obesity.

MATERIAL AND METHOD

The Present Prospective and Descriptive study was conducted in Chhatrapati Shivaji Subharti Hospital, Meerut based on Kuppuswamy's 2010 socioeconomic status scale. We recruited 50 children out of 15,888 children of age group 6-18 years of age from January 2014 to January 2015 who attended the pediatric OPD.

A Pretested questionnaire was filled by a single observer in presence of parents for the selected children after taking written consent. It recorded age, sex, weight, height, B.P., BMI, Socioeconomic status, Reason for attending hospital/Associated illness, Family history of obesity.

Inclusion and exclusion criteria
Children and Adolescent between 6-18 years of age group who attended OPD with family history of obesity and chief complaint of obesity. Children with known dysmorphic features and endocrinal problems, Long term use of drugs like Steroids, Anti Depressants, Anti Convulsion (phenytoin, valproic acid), Thiazides, Hormonal Contraceptives, Inborn Errors of Metabolisms, Precocious Puberty, Nephrotic Syndrome, Hepatitis were excluded.

Socioeconomic Status
Socioeconomic status of subjects were assessed by Kuppuswamy's 2010 socioeconomic status scale, which takes into consideration the education status, occupation and family income.[6]

Anthropometry
Height: Height was measured with the help of a stadiometer to the nearest 1 millimeter with the patient standing straight with head held in Frankfort horizontal plane.

Weight: Weight was measured to the nearest 0.1 kg using a standard weighing machine without shoes.

Body Mass Index: Body Mass Index was calculated using formula (Quetelet's Index)

$$BMI = \frac{\text{Weight in kg}}{(\text{Ht. in meters'})^2}$$

Body Mass Index (BMI) was calculated based on the formula- BMI = Weight in kg/Height in mt[2]. Children were categorized into three groups based on BMI as per NELSON guidelines with respect to their age and sex.[7]

Body Mass Index (BMI) Classification of children and adolescents[7]
Goup1: Normal Weight: 5th–84th percentile
Group2: Overweight/At risk of Overweight: 85th – 94th percentile
Group3: Obese/Overweight: ≥ 95th percentile

STATISTICAL ANALYSIS

Data was analysed by SSPC (Fisher Exact Test) and (Z score- Double Sample Proportion Test) in which, where the data/distribution is bivariate and categorical in nature than the relationship/association between two variable is measured with the help of chi-square test statistic (non/normal/non parametric test). Necessary and sufficient condition for applying chi-square statistic is that each self frequency should be > 5 and sample should be overall 50 or more in size but where the above set requirement are not fulfilled than the alternate test statistic which may be applied is known as Fischer exact test. The level of significance is adopted according to research criteria it may be .05 or .01 and if p value less than .05 or .01 is considered as significant.

OBSERVATIONS AND RESULTS

We categorized the study population into three groups Normal weight/BMI, Overweight, and Obese children. Table1 signifies that 8% children in the study group were recruited in group1 that was normal weight 5th – 84th percentile, 14% in group 2 Overweight 85th -94th percentile and 78%

were obese $\geq 95^{th}$ percentile and there was significant difference present p<.01 by Double Sample Proportion Test.

Table2 shows that 8% overweight and obese children were of upper class, 68% upper middle, 10% lower middle, 6% upper lower and the relationship between overweight and obese children among 6 to 18 years of age with socioeconomic status was statistically significant at 0.01 level of significance. Table3 reveals that 64% of total children had positive family history of obesity and 36% had negative history of obesty and relationship between overweight and obese children among 6 to 18 years of age with family history of obesity was statistically significant at .01 level of significance.

Graph1 shows that maximum number of obese and overweight children (68%) of total study group belongs to upper middle socioeconomic class. Graph2 shows that in 62% of obese and overweight children of total study group family history of obesity was present and 30% of them had negative history of obesity.

DISCUSSION

Obesity is an important pediatric public health problem associated with risk of complications in childhood and increased morbidity and mortality throughout adult life. The prevalence of childhood obesity has increased, and the prevention and treatment of obesity has emerged as an important focus of pediatric research and clinical care. Childhood Obesity is a single marker of the child at risk for development of various non-communicable diseases later in life. Childhood obesity is associated with many long term complications like Coronary Heart Disease, Hypertension, Stroke, certain types of cancer, NIDDM, Gallbladder disease, Dyslipidemia, Osteoarthritis, Gout, Pulmonary diseases including Sleep apnea etc.

Family History of obesity
Obesity is a curse given to us through our family as seen by many studies such as: Ramesh K in 2010, On exploring the family history the prevalence of overweight/obese children was higher among single parent history(52.3%) followed by both parents(36.4%).[5]

Goup1 Normal Weight 5th – 84th percentile	Group2 Overweight 85th – 94th percentile	Group3 Obese ≥ 95th percentile
4(8%)	7(14%)	39(78%)

Table-1: Catagorization of group.

Groups	Upper	Upper Middle	Lower Middle	Upper Lower	Lower
Normal Weight 5th–84th percentile	0	2	1	1	0
Obese ≥ 95th percentile	3	29	4	3	0
Overweight 85th–94th percentile	1	5	1	0	0
Total	4(8%)	36(72%)	6(12%)	4(8%)	0(0%)
	Probability of fisher exact test=.0000; p<.01 (significant)				

Table-2: Differentiation of socioeconomic status in the study

Groups	Family H/O Obesity	
	YES	NO
Normal Weight 5th-84th percentile	1	3
Overweight 85th -94th percentile	6	1
OBESE ≥95th percentile	25	14
Total	32(64%)	18(36%)
	Probability of fisher exact test=.0002; p<.01 (significant)	

Table-3: Relationship with family h/o obesity in the study

GRAPH-1: RELATIONSHIP BETWEEN OBESITY AND OVERW WITH SOCIOECONOMIC STATUS.

■ NORMAL WEIGHT 5th - 84th percentile
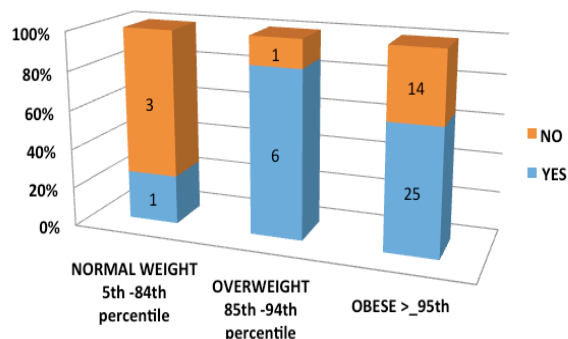■ OBESITY ≥_95th percentile
■ OVERWEIGHT 85th-94th percentile
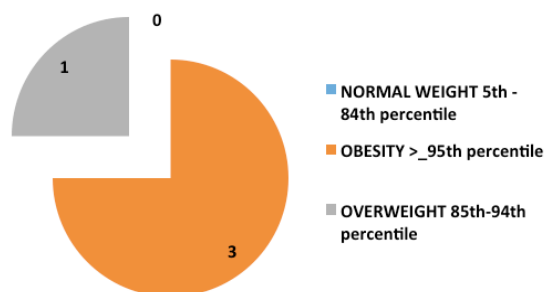
Family History of diabeties
Goyal et al in 2010, found that the prevalence of overweight and obesity was more in children with

family history of diabeties and obesity. In their study they concluded that family history of obes-

GRAPH-2: RELATIONSHIP OF OBESITY AND OVERWEIGHT WITH FAMILY H/O OBESITY

ity was more likely to have more prevalence of obesity and overweight than those having family history of diabeties.[4] Obese and overweight children with family history of diabeties (23.3%) had higher prevalence than without family history of diabeties.

Socioeconomic Status
Obesity is a disease of affluency with increasing socioeconomic status the chances of overweight and obesity increases as seen in many previous studies: Chhatwal et al. in 2004, showed childhood obesity was seen highest among socioeconomic class I and decreasing progressively to 0% in lowest class (V) applicable to both boys and girls.[8] Gupta et al. demonstrated the relationship of overweight/obesity with higher socioeconomic status from 2006 to 2009 in New Delhi (North India).[9] Bharati et al. in 2008,correlated overweight and obesity with parents occupation, children schooling in English medium and shows significant effect on childhood obesity.[10]

CONCLUSION

In our study 62% of obese and overweight children (p<.01 significant) there was positive family history of obesity and maximum number of obese and overweight children 68% (p<.01significant) of total study group belonged to upper middle socioeconomic class. Hence obesity is associated with socioeconomic status. Limitations of the study : The number studied was less as compared to the other studies due to

time limitation. Study area taken was limited to hospital only, hence not true representative of the population.

REFERENCES

1. Hager A. British Medical Bulletin 1981; 37:287.
2. World Health Organization. Obesity: preventing and managing the global epidemic.Technical Report Series No. 894, Geneva: WHO; 2000.
3. Wong JPS, Ho SY, Lai MK, Leung GM, Stewart SM, et al. Overweight, obesity, weight- related concerns and behaviors in Hong Kong Chinese Children and adolescents. Acta Paediatr 2005;94:595-601.
4. Goyal RK, Shah VN, Saboo BD, Phatak SR, Shah NN, Gohel MC, et al. Prevalence of Overweight and Obesity in Indian Adolescent School Going Children : Its Relationship with Socioeconomic Status and Associated Lifestyle Factors. JAPI 2010; 58:152-8.
5. Ramesh K. Prevalence of overweight and obesity among high school students of Thiruvananthapuram City Corporation, Kerala, India. AMJ 2010; 3:650-61.
6. LakshmanaSwamy A. Clinical Pediatrics 3rd Ed . Walter Kluwer Health India.2010; p 17-18.
7. Kliegman. Nelson Text Book of Pediatrics vol 1; 18th Ed 2008; p 234-36.
8. Chhatwal J, Verma M, Riar SK. Obesity among preadolescents of a developing country (India). Asia Pac J Clin Nutr 2004;13:231-5.
9. Gupta DK, Shah P, Misra A, Bharadwaj S, Gulati S, et al. Secular Trends in Prevalence of Overweight and Obesity from 2006 to 2009 in Urban Asian Indian Adolescents Aged 14-17 Years. PLoS ONE 6(2): e17221.
10. Bharati DR, Deshmukh PR, Garg BS. Correlates of overweight & obesity among school going children of Wardha city, Central India. Indian J Med Res. 2008; 127: 539-43.