Assessment of Childhood Obesity in school going Children (6 -11years) of a Y–Category City of India

Sucharita Sen[1], Renu Verma[2]

[1]Research Scholar, Home Science (Food and Nutrition), Barkatullah University, Bhopal, Madhya Pradesh, India

[2]Ph.D, Assistant Professor, Department of Home Science (Food and Nutrition), M.L.B. Govt. Girls' College, Bhopal, Madhya Pradesh

Abstract: *Childhood obesity is a health hazard reaching epidemic levels globally. Identification of obesity at an early age is important to prevent the manifestation of its co – morbidities in later adulthood. A cross sectional study of randomly selected 600 school going children (both male and female) of age group of 6 – 11 years was conducted in four different schools of Bhopal District, Madhya Pradesh. Assessment of overweight and obesity was done using BMI cut off points given by International Obesity Task Force(IOTF). Data was analysed based on percentages and relationship between variables and obesity were established using Chi – square test and multivariate logistic regression analysis. The present study highlighted that 26.5% of the school children in Bhopal district were overweight and obese. Prevalence of overweight and obesity was higher in girls (53% and 61.5%, respectively) than in boys (47% and 38.5%, respectively).The study revealed that the important correlates of overweight/obesity were the size of the family (p=0.001), socioeconomic status (p<0.0001) and family history of high Blood Pressure (p=0.050). Sleep pattern of the children were not associated with obesity/overweight.*

Keywords: BMI, Childhood, Obesity, Overweight

1. Introduction

Increasing rates of overweight and obesity has reached epidemic proportions in developed countries and is rapidly increasing in many middle-income and less-developed countries [1]. Developing countries are now facing the double burden of childhood underweight and obesity. The calculated global prevalence of overweight (including obesity) in children aged 5-17 years is estimated by the World Health Organization (WHO), International Obesity Task Force (IOTF) to be approximately 10%. Various studies in India have found that the incidence of childhood overweight/obesity has increased dramatically. In a meta – analysis of 9 studies which included 92,862 subjects, the prevalence of overweight was estimated to be 12.64% and that of obesity tobe3.39%[2]-[4].Obesity is associated with several co-morbid conditions: dyslipidemia, hypertension, hyperglycemia, non-alcoholic fatty liver disease (NAFLD) and a conglomeration of conditions known as the metabolic syndrome.[5].[6]

Obesity is a condition of excessive fatness, either generalized or localized. In early 1900s, the thickness of subcutaneous adipose tissue was measured by taking skin fold thickness measurements, which bases total body fat estimates on the assumption that 50 percent of body fat is subcutaneous [7],[8]. Weight exceeding 125% of the median weight for height is obesity. Overweight persons have a body-fat proportion intermediate between normal and obese. Weight alone is not a good index of fatness as it does not consider height. The most acceptable definition given by World Health Organization (WHO) and IOTF is in terms of BMI [9]-[11]. The Quetlet's index (W/H^2), is a validated measure of nutritional status (Lee and Nieman, 1996).

National illustrative data on childhood obesity is scarce, especially in small cities and towns, thus, the present study was carried out in the school going children of Bhopal District of Madhya Pradesh to assess the prevalence of childhood obesity.

2. Materials and Methods

A cross sectional study was conducted on 600 school – going children of age 6 to 11 years (both male and female), coming from different socio – economic classes of Bhopal district. Respondents were selected by simple random sampling method. Informed oral consent was obtained from school authorities and parents prior to data collection, after explaining the objectives and methods of the study. Predesigned and pretested questionnaire was used to acquire the information about the background and individual characteristics, which were filled by the respondents' parents. Ages of the children were calculated by their birth dates. Anthropometric measurements of the subjects were taken using standard equipments and methods. Weight was taken using a digital weighing machine, to the nearest 0.1kg and height was recorded using an inch tape to the nearest 0.1 cm. Waist, hip and mid arm circumference was also taken using an inch tape to the nearest of 0.5 cm. Bicep and triceps skin – fold thicknesses were taken using a skinfold callipers. All measurements were taken with the respondents' barefoot and wearing light loose clothing.

BMI was calculated using Quetlet's Index as weight in kilograms/ (height in m)^2.Prevalence of obesity and level of dispersion in the population were calculated using statistical equations and methods like mean, median, maximum, minimum, standard deviation, coefficient of variance and were presented as percentage. Cole's cut off values for BMI in children were used to assess overweight and obesity in children.[10] Chi – square test and multivariate logistic regression analysis was done to establish relationship between associated variables and to find out the risk factors of obesity in these children. SPSS 16.0 and Microsoft Excel 2007 were used for data analysis.

3. Results

In the present study, 600 respondents were assessed (6 – 11 years), out of which 300 (50%) were females and 300 (50%) were males who came from different socio – economic backgrounds.

3.1. Prevalence of Childhood Obesity in the respondents
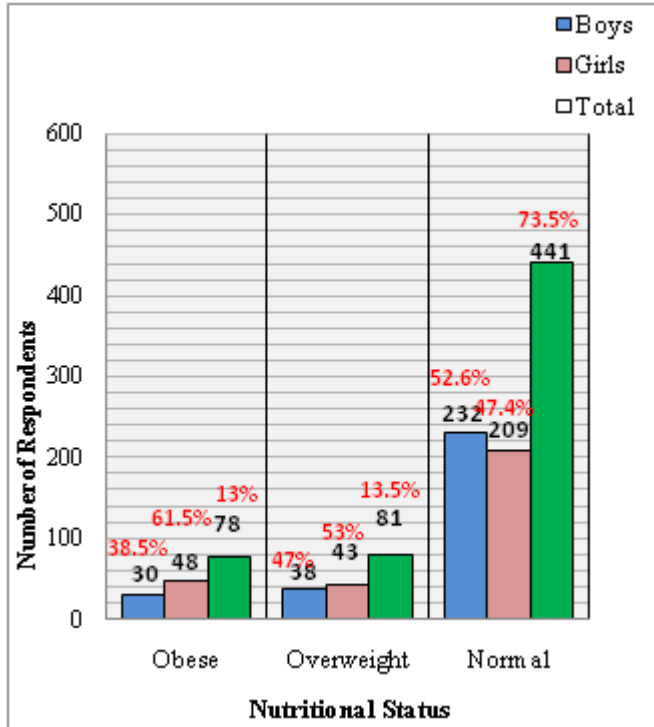

Figure 1: Nutritional Status of the respondents according to BMI

According to BMI, 13.5 % respondents were found overweight who, if not taken care, might become obese in future. 13% were obese out of which 61.5% were girls and 38.5% were boys (Fig.1).
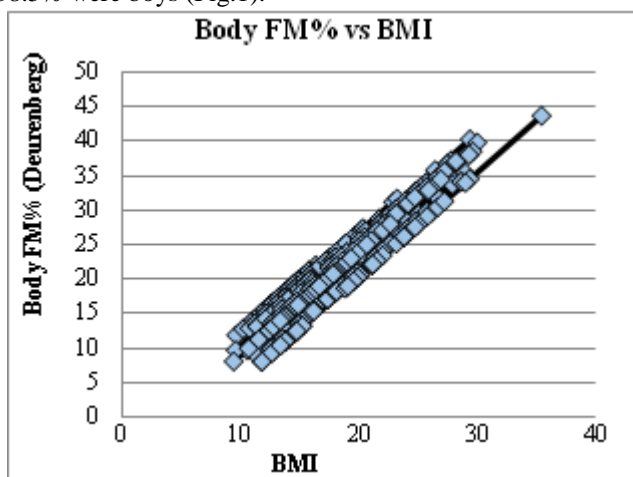

Figure 2: Relationship between BMI status and Body Fat Mass% in the respondents

Fig.2.visually compares the distributions and summary statistics of BMI of the respondents and their Body FM% and shows the trend of BFM% and BMI status. Body FM% was calculated using skin-fold thickness and Deurenberg

formula. BFM% overlaps the BMI status, thus, it can be interpreted that body fat mass percentage is higher in obese respondents.

3.2. Risk Factors of Obesity in the respondents

Table 1: Risk factors of obesity associated with Background characteristics

Background Characteristics	AOR	Sig.	95%C.I.for AOR	
			Lower	Upper
Gender				
Boy	Ref			
Girl	1.569	0.021	1.069	2.301
Income				
Lower income group	Ref			
Middle income group	2.246	0.074	.923	5.462
Higher income group	6.261	<0.0001	2.509	15.624
Type of family				
Joint	Ref			
Nuclear	2.614	0.001	1.494	4.572
Constant	0.044	<0.0001		

Girls are more likely (*AOR = 1.569, 95% CI of AOR 1.069-2.301, p=0.021*) to be obese. Children from higher income group families are 6 times at higher risk of obesity (*AOR=6.261, 95% CI=2.509-15.624, p<0.0001*). Children from nuclear families are 2.5 times more at risk of obesity (*AOR=2.614, 95% CI=1.494-4.572, p=0.001*).

Table 2: Risk factors of obesity associated with Family history of any disease

Family History of any disease	AOR	Sig.	95% C.I.for AOR	
			Lower	Upper
Obesity				
No	Ref			
Yes	1.415	0.327	0.707	2.834
Diabetes				
No	Ref			
Yes	0.922	0.837	0.423	2.009
High Blood Pressure				
No	Ref			
Yes	1.631	0.050	1.000	2.662
Cardiac Problems				
No	Ref			
Yes	0.416	0.289	0.082	2.109
Constant	0.323	<0.0001		

Table2. Shows that the family history of high blood pressure is significantly associated with obesity. Children with family history of blood pressure were 1.6 times at higher risk of obesity (*AOR=1.631, 95% CI=1.000-2.662, p=0.050*)

4. Discussion

The prevalence of obesity in the present study is 13% which is analogous with the studies conducted at Indore (14.97%)

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1489

[12] and Bengaluru (13.1%) [13]. Some of the studies reported a very low prevalence[14] – [17] and some showed a very high prevalence [18], this may be due to difference in various associated factors or the methodology used. In the present study the prevalence of overweight and obesity is higher in girls (53% and 61.5%, respectively) than in boys (47% and 38.5%, respectively), which was also proved statistically (AOR = 1.569, 95% CI = 1.069-2.301, p=0.021), a similar result was seen in a studies conducted in Puducherry and Devangere City [19], [20]. Assessing the prevalence of overweight is also important because, if not taken care they might advance to obesity. Children who were obese and overweight had higher BFM%.

High blood pressure of the parents showed a significant relationship with obesity in the children (AOR=1.631, 95% CI=1.000-2.662, p=0.050). Type of family and socioeconomic status can have an influence on the BMI status of the children. Children from nuclear families were 2.5 times more at risk of obesity (AOR=2.614, 95% CI=1.494-4.572, p=0.001) and children from higher income group families were 6 times at higher risk of obesity (AOR=6.261, 95% CI=2.509-15.624, p<0.0001). Various other studies conducted in different parts of India have analogous results [12], [20] – [23]. With the improving economic status and decreasing size of families, people are spending more on eating out, junk food, ready to cook meals, etc. and socializing which may again involve indulging in wrong choices of food. Also, with more purchasing power families are spending more on convenience gadgets and electronic items leading to sedentary lifestyle of children.

Effective measures needs to be incorporated in the children to prevent/treat obesity at an early age. With modification in lifestyle, eating habits and increased physical activities, this can be achieved. Intervention and awareness programs should be introduced to educate and encourage children, parents and teachers. Parents are usually concerned that their children are very thin and then they tend to forcefully over – feed the child which in turn can lead to obesity. Thus, parents should be edified and made aware by dieticians and healthcare professionals that healthy is not a synonym of fat, children need not be chubby or fat in appearance, rather their activity and immunity levels should be high. Children should be encouraged and taught to develop healthy eating habits by their parents and teachers. Also, along with studies and other hobbies, children should be encouraged to be physically active.

To prevent major infirmities like CVD, DM, renal problems, BP, respiratory problems, etc in adulthood, obesity needs to be prevented and treated in early years of life itself.

5. Conclusion

Based on the findings of the study, the overall overweight and obesity prevalence in the population came out to be 13.5% and 13%, respectively. Family history of high BP showed a significant relationship with obesity. Associated socioeconomic factors having a statistical significance with obesity in these children were type of family and family income. Nuclear family and higher socioeconomic status were risk factors for obesity and overweight. Prevalence of obesity and overweight was higher in girls than boys. Sleeping habits and pattern were same in almost all the children in the sample and thus, it did not show any significant relation with obesity.

6. Future Scope

As discussed earlier, childhood obesity is the root cause for many adult medical conditions. Obese children are more likely to be obese in adulthood than healthy-weight children. This places them at increased risk for adult health problems such as heart disease, type 2 diabetes, stroke, multiple types of cancer and osteoarthritis.

In addition to the long-term health effects, obese children are more likely to have cardiovascular risk factors such as high cholesterol or high blood pressure. Obese children are also more likely to have pre-diabetes, placing them at an increased risk for development of diabetes. Social problems such as stigmatization and poor self-esteem are also apparent with childhood obesity.

A large sum of nation's money is utilized to deal with these non – communicable diseases, by preventing and treating childhood obesity at an early age, onset of these conditions can be delayed and restricted. Important data regarding evaluation of childhood obesity prevention schemes can be collected and can be used to make stronger and more effective strategies including policy building to reduce future childhood obesity rates.

Assessment of prevalence of childhood obesity is thus important so that its aetiology and causative factors can be studied. Once identified, effective prevention and treatment programmes can be designed by the health care providers and nutritionists to educate the parents, teachers and children. The present study illustrates that childhood obesity in India is not only confined to metro cities, but is slowly emerging in other, comparatively small, cities and towns as well, emphasizing the role of lifestyle alterations with increase in the standard of living. Currently, data on childhood obesity in India is scarce and thus more studies and researches needs to be done to get a clear picture of the spread of obesity in Indian children.

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Author Profile

Sucharita Sen, M.Sc *Research Scholar of Home Science (Food and Nutrition), Barkatullah University, Bhopal, Madhya Pradesh.* Currently pursuing her Ph.D from Barkatullah University, Bhopal, Madhya Pradesh she is an able and experienced Dietician with over 4.5 years of experience in the field of Nutrition and Dietetics. She has obtained her M.SC Health Sciences (Dietetics) degree from University of Pune, Maharashtra in the year 2008 and was associated with Aditya Birla Memorial Hospital, Pune, VLCC Institute, Mumbai and Abbott Health Care, Mumbai.

Dr. Renu Verma, Ph.D is *Assistant Professor of Food and Nutrition (Home Science), M.L.B. Govt. Girls' College, Bhopal, Madhya Pradesh.* Dr. Renu Verma teaches in the undergraduate and post – graduate programmes of Food and Nutrition discipline of Home Science. She has been in the teaching profession for over 25 years. Her published work deals with importance of maternal nutritional education on weaning and child health, anaemia in pregnant women its relation to age income group & gestation period, response and mode of action of some drug on human, female foetus with reference to sex ratio, behavioural changes of health officials working under different illumination on night duties and physical and behavioural changes in living organism due to night time lighting. As an assistant professor in MLB college Bhopal, she is also working as Administrative officer of the college and is a member of planning board-U.G.C and IQAC. She has completed her Ph.D in the year 2003 and has obtained her M.HSc degree with Gold Medal in the year 1981.

Paper ID: SUB156723

1491