Original Research Paper

Community Medicine

PREVALENCE AND FACTORS INFLUENCING OBESITY IN CHILDREN AGED 6-13 YEARS OF KOLKATA CITY : A CROSS-SECTIONAL STUDY

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ABSTRACT

INTRODUCTION: Child hood obesity is a current global public health concern. This condition is caused by an imbalance in the caloric intake and utilization in children, resulting in excess weight in the affected. Rapidly changing dietary practices and a sedentary lifestyle have led to increasing prevalence of childhood obesity (5-19 yr) in developing countries recently: 41.8% in Mexico, 22.1% in Brazil, 22.0% in India, and 19.3% in Argentina. Moreover, secular trends indicate increasing prevalence rates in these countries: 4.1 to 13.9% in Brazil during 1974-1997, 12.2 to 15.6% in Thailand during 1991-1993, and 9.8 to 11.7% in India during 2006-2009. Important determinants of childhood obesity include high socioeconomic status, residence in metropolitan cities, female gender, unawareness and false beliefs about nutrition, marketing by transnational food companies, increasing academic stress, and poor facilities for physical activity.

AIMS AND OBJECTIVES: We find out the factors affecting childhood obesity in a metropolitan city and to assess knowledge & awareness related to prevention of obesity among the parents.

MATERIAL AND METHODS: For this observational study, data was collected, from all children fulfilling the inclusion criteria, presenting to the Community Medicine / Social and Preventive Medicine, Immunization clinic, Life style clinic, College of Medicine & JNM Hospital, Kalyani, Nadia, West Bengal. The expected sample was for this study is calculated as **377**.

Inclusion Criteria
• Children below 13years
• School going children
• Obese and Non-obese children
• Malnourished children
• Male & female both.

Exclusion Criteria
Patients were excluded if:
• Age < 6 year
• Children coming from periphery or villages or places other than metropolitan city.
• Non-cooperative patient's relatives.

RESULTS: We found that 320(84.9%) patients had non vegetarian and 57(15.1%) patients had vegetarian. 39(10.3%) patients had taken outside food and 70(18.6%) patients had drink beverages. The mean weight (mean±s.d.) of patients was 17.9462± 6.1946 kg, the mean height (mean±s.d.) of patients was 1.0045± .0740 metre and the mean BMI (mean±s.d.) of patients was 17.7979± 6.0762 Kg/metre 2. The mean media time (mean±s.d.) of patients was 48.3422 ± 25.2583, the mean indoor activity (mean±s.d.) of patients was 59.6950 ± 30.6540 and the mean outdoor activity (mean±s.d.) of patients was 19.4987± 33.2829.

CONCLUSION: Bad eating behaviours are crucial factors for the development of obesity. Eating habits are usually formed in early childhood and parents play a very important role in their development. Also, high-risk screening, parental awareness and effective health educational programs are urgently needed in developing countries.

KEYWORDS : Child hood obesity, Family history obesity, outdoor and indoor activity, Outside food

INTRODUCTION

As far back as 1997, obesity as a public health problem was highlighted in a World Health Organization (WHO) press release which stated that "obesity's impact is so diverse and extreme, that it should now be regarded as one of the greatest neglected health problems of our time with an impact on health which may well prove to be as great as that of smoking". With the exception of Russia, Poland and urban populations of a few low income countries, there has been a steady increase in the prevalence of overweight and obese children and adolescents in developing and developed countries in the past three decades [1] By 2010, 40% of children in North America, 38% in Europe, 27% in the Western Pacific and 22% in Southeast Asia have been predicted to be overweight or obese. China, India, Pakistan and Indonesia are populous nations with large pediatric populations, undergoing rapid economic development. WHO estimated that 75% of the 43 million overweight and obese children under 5 years of age worldwide will come from low and middle income countries by the end of this decade In lower and middle income countries, a double burden of both obesity and undernutrition frequently exists.[1] This is highlighted in the articles by Senbanjo et al [2] and Ziaoddini et al.[3] Obesity rates in developing countries appear to be linked to socioeconomic development, ethnicity, the population working, living and school environment, diet and activity patterns. In a developing country like China, the prevalence of overweight and obesity can vary from 17% and 10% in boys in Beijing to 4.9% and 1.4% of children in inland rural cities. The increasing prevalence of overweight and obesity in children and adolescents is a public health concern because of the association with adult obesity and increased risk of cardiac events in adulthood. Every organ system can be affected by childhood obesity and comorbidities include hypertension, non-alcoholic liver disease, insulin resistance, dyslipidemia, pulmonary disorders and psychological problems. The clinical approach of identifying children at risk and treating them should be complemented by a public health approach of preventing unhealthy weight gain in the population. In the definition of overweight and obesity, some developed countries use their own national body mass index (BMI) standard. The WHO has adopted the updated BMI reference based on the modified United States NHANES I data collected in 1971-1974 (available at http://www.cdc. gov/ growthcharts) while other countries use the BMI cut off ranges for overweight and obesity with age based on the International Obesity Task Force (IOTF) international growth reference constructed from six representative population growth studies (Brazil, Great Britain, Netherlands, Singapore, Hong Kong and United States). The Scientifi c Advisory Committee on Nutrition in the United Kingdom recommends using the 2006 WHO Child Growth Standard between 2 weeks and 2 years and to use the 1990 UK Growth reference for older children. The United States recommends the use of Center for Disease Control (CDC) derived normative percentiles (85th-94th percentile as overweight, and >95th percentile as obese). The experts in China recommended the use of the 2005 Working Group on Obesity in China

(WGOC) BMI Reference for screening for overweight and obesity in Chinese children. In recent years, waist circumference >90th percentile of the age, sex and ethnic specific reference has been advocated for defining central obesity.[4]For developing countries, each country should evaluate carefully to acertain the most appropriate growth reference for use in the assessment of growth disorders in their population. A recent study found that the difference in the prevalence of overweight in Asian children using the CDC and IOTF cutoffs was small (<2%-5%), which was similar to the findings from studies on some high-income countries.[5] Although currently there is not enough evidence to recommend screening children for obesity, there are national surveillance programs being implemented to identify children at risk.

Factors affecting childhood obesity in a metropolitan city.
To assess knowledge & awareness related to prevention of obesity among the parents.

MATERIALS AND METHODS
For this observational study, data was collected, from all children fulfilling the inclusion criteria, presenting to Community Medicine / Social and Preventive Medicine, Immunization clinic, Life style clinic, College of Medicine & JNM Hospital, Kalyani, Nadia, West Bengal. The expected sample size that was required for this study is calculated with the help of the RAOSOFT sample size calculator along with Confidence level: **95% and** Human error: 5%, the sample size required for this study is calculated as **377**.

INCLUSION CRITERIA
- CHILDREN BELOW 13 YEARS
- SCHOOL GOING CHILDREN
- OBESE AND NON-OBESE CHILDREN
- MALNOURISHED CHILDREN
- MALE & FEMALE BOTH.

EXCLUSION CRITERIA
Patients were excluded if:
- Age < 6 year
- Children coming from periphery or villages or places other than metropolitan city.
- Non-cooperative patient's relatives.

RESULT AND ANALYSIS
We showed that the mean media time (mean±s.d.) of patients was 48.3422 ± 25.2583. The mean indoor activity (mean±s.d.) of patients was 59.6950 ± 30.6540. The mean outdoor activity (mean±s.d.) of patients was 19.4987± 33.2829. In child obese-no, 83(34.7%) patients had female and 156(65.3%) patients had male. In child obese-yes, 45(32.6%) patients had female and 93(67.4%) patients had male. Association of sex vs. child obese was not statistically significant (p=0.6755). In child obese-no, 88(36.8%) patients had upper class, 70(29.3%) patients had upper middle class and 81(33.9%) patients had middle class. In child obese-yes, 60(43.5%) patients had upper class, 39(28.3%) patients had upper middle class and 39(28.3%) patients had middle class. Association of SES vs. child obese was not statistically significant (p=0.3884). In child obese-no, 62(25.9%) patients had obesity in family history. In child obese-yes, 134(97.1%) patients had obesity in family history. Association of family history obesity vs. child obese was statistically significant (p<0.0001).

We found that in child obese-no, 17(7.1%) patients had homemade/ outside. In child obese-yes, 22(15.9%) patients had homemade/ outside. Association of homemade/ outside vs. child obese was statistically significant (p=0.0066). In child obese-no, 24(10.0%) patients had beverages. In child obese-yes, 46(33.3%) patients had beverages. Association of beverages vs. child obese was statistically significant (p<0.0001). In child obese-no, the mean age (mean±s.d.) of patients was 3.6180± 1.9584 years.In child obese-yes, the mean age (mean±s.d.) of patients was 6.4261± 2.4143 years. Distribution of mean age vs. child obese was statistically significant (p<0.0001). In child obese-no, the mean weight (mean±s.d.) of patients was 15.4385± 4.4611 kg. In child obese-yes, the mean weight (mean±s.d.) of patients was 22.2891± 6.3855 kg. Distribution of mean weight vs. child obese was statistically significant (p<0.0001).

DISCUSSION
Gupta N et al [6] (2012) found that rapidly changing dietary practices and a sedentary lifestyle have led to increasing prevalence of childhood obesity (5–19 yr) in developing countries recently: 41.8% in Mexico, 22.1% in Brazil, and 19.3% in Argentina. **Saraswathi YS et**

al [7] (2011) found that prevalence studies on obesity in school children has been carried out extensively worldwide but such explorations are very limited in Indian populations, especially a comparative account between rural and urban areas. Very few earlier investigations in India have reported an increased prevalence of childhood obesity ranging from 5.5 % to 17%. But we found that 138(36.6%) patients had child obesity. The prevalence of childhood obesity in metropolitan city is very high.

Therapeutic lifestyle changes and maintenance of regular physical activity through parental initiative and social support interventions are the most important strategies in managing childhood obesity.

Cantarero A et al [8] (2016) found that no significant interactions between the adjusted prevalence of obesity over time and any of the sociodemographic subgroups. We found that in child obesity, 60(43.5%) patients had upper class, 39(28.3%) patients had upper middle class and 39(28.3%) patients had middle class. Association of SES vs. child obesity was not statistically significant (p=0.3884).

Corica D et al [9](2018) found that family history of obesity is important risk factor for precocious obesity onset in childhood and are related to the severity of obesity.

Kuźbicka K et al [10] (2013) found that obesity is undoubtedly one of the biggest medical problems of the 21st century. The lack of physical activity, sedentary lifestyle and energy-rich diet are the main causes of an excess body fat accumulation. Because of improper eating behaviours children consume an excess amount of energy; and their diet is deficient in elements necessary for proper development. The examples of such bad eating habits are: snacking highly processed and calorie-rich foods between meals eating in front of the TV screen, skipping breakfasts, drinking sugar-sweetened beverages, "eating out" frequently.

Roblin L et al [11] (2007) found that poor eating habits, including inadequate intake of vegetables, fruit, and milk, and eating too many high-calorie snacks, play a role in childhood obesity. Grain products provide the highest percentage (31%) of daily calories, followed by "other foods," which have limited nutritional value (22% of daily calories). Snacks account for 27% of total daily calories, which is more than the calories consumed at breakfast (18%) and lunch (24%), but not dinner (31%). For Canadians older than 4 years of age, more than 41% of daily snack calories come from other foods, such as chips, chocolate bars, soft drinks, fruit drinks, sugars, syrup, preserves, fats, and oils. Habits that protect against childhood obesity include eating more vegetables and fruit, eating meals with family, and being physically active. Children's food habits and choices are influenced by family, caregivers, friends, schools, marketing, and the media. Successful interventions for preventing childhood obesity combine family- and school-based programs, nutrition education, dietary change, physical activity, family participation, and counseling.

Varnaccia G et al [12] (2017) found that childhood obesity was significantly associated with physical activity. We found that in child obese-no, the mean outdoor activity (mean±s.d.) of patients was 23.1381 ± 35.8465. In child obese-yes, the mean outdoor activity (mean±s.d.) of patients was 13.1957 ± 27.2918. Distribution of mean outdoor activity vs. child obese was statistically significant (p=0.0051). Gupta N et al [6] (2012) found that therapeutic lifestyle changes and maintenance of regular physical activity through parental initiative and social support interventions are the most important strategies in managing childhood obesity.

Table: Association of HOME MADE/ OUT SIDE and BEVE RAGES: child obese(yes/no)

CHILD OBESE (YES/NO)						
		CHILD OBESE - No	CHILD OBESE - Yes	TOTAL	Chi-square value	p-value
HOME MADE/ OUT SIDE	No	222	116	338	7.3530	0.0066
	Row %	65.7	34.3	100.0		
	Col %	92.9	84.1	89.7		
	Yes	17	22	39		
	Row %	43.6	56.4	100.0		
	Col %	7.1	15.9	10.3		
	TOTAL	239	138	377		
	Row %	63.4	36.6	100.0		
	Col %	100.0	100.0	100.0		

BEVERAGES	**No**	215	92	307	31.3889	<0.0001
	Row %	70.0	30.0	100.0		
	Col %	90.0	66.7	81.4		
	Yes	24	46	70		
	Row %	34.3	65.7	100.0		
	Col %	10.0	33.3	18.6		
	TOTAL	239	138	377		
	Row %	63.4	36.6	100.0		
	Col %	100.0	100.0	100.0		

Table: Distribution of mean media time, Indoor activity and Outdoor activity: child obese(yes/no)

		Number	Mean	SD	Minimum	Maximum	Median	p-value
Media time	No	239	42.0544	27.5725	0.0000	75.0000	50.0000	<0.0001
	Yes	138	59.2319	15.5504	0.0000	75.0000	65.0000	
Indoor activity	No	239	52.1423	32.5609	0.0000	120.0000	60.0000	<0.0001
	Yes	138	72.7754	21.5694	0.0000	130.0000	75.5000	
Outdoor activity	No	239	23.1381	35.8465	0.0000	130.0000	0.0000	0.0051
	Yes	138	13.1957	27.2918	0.0000	120.0000	0.0000	

CONCLUSION

We found that median age childhood obesity was 6 yrs that also statistically significant and male child was higher than female child. Childhood obesity was significantly associated with family history of obesity, non vegetarian, outside food and beverage. It was found that childhood obesity was significantly related with high media time, low outdoor activity and high indoor activity.

In general, overweight and obesity are assumed to be the results of an increase in caloric and fat intake. Steps need to be taken to prevent obesity at the onset itself by daily exercise, increasing physical activity, reducing intake of junk foods etc. Bad eating behaviours are crucial factors for the development of obesity. Eating habits are usually formed in early childhood and parents play a very important role in their development.

Also, high-risk screening, parental awareness and effective health educational programs are urgently needed in developing countries.

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