Pediatrics

RISK FACTORS OF OVERWEIGHT AND OBESITY AMONG CHILDREN ATTENDING TERTIARY CARE HOSPITAL

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ABSTRACT **Introduction:** Overweight and obesity are the fifth leading risk of global deaths[14].Childhood obesity has more than tripled in the past 30 years. The prevalence of obesity among children aged 6 to 11 years has increased from 6.5% in 1980 to 19.6% in 2008. The prevalence of obesity among adolescents aged 12 to 19 years has increased from 5.0% to 18.1%. **Methodology:** Specialized proforma of case sheets with consent form was prepared which included details of the history taking, clinical examinations and laboratory investigations. Each patient was given a code name that is initials of their names. Numbering was done according to their attendance in OPD. **Results:** we see the association between maternal education with BMI , maternal literacy was found to be 53.9% in 152 overweight children out of 282 and 27.7%   in 78 obese children .where as 43.6% overweight and 25.7% obese were associated with maternal illiteracy with Z score 10.6388 with p value 0.0049, hence this was statistically significant. **Conclusion:** overweight (57.6%) and obese (29.3) were more prone to have diabetes mellitus which was statistically significant with p<0.0001 and Z score 19.8281.

KEYWORDS : Overweight and Obesity, BMI, Diabetes Mellitus

INTRODUCTION:

Obesity has reached epidemic proportions in the developed part of the world with as many as 30-40% of adults being already obese and the incidence in children and adolescent is rising. World health organization has declared obesity as one of the most neglected diseases of significant public health importance. The 2002 World Health Report lists overweight as the fifth most serious risk factor for both developed countries and low mortality developing countries. According to the report of International Obesity Task Force (IOTF), in the year 2000 about 10% (a total of 155 million) of the young people aged 5-17 years globally were overweight; among whom 2-3% (30-45 million) were obese, a further 22 million younger children are also affected**.**

Obesity or increased adiposity is defined using the body mass index (BMI), which is an excellent proxy for more direct measurement of body fat. Obesity is perhaps the most prevalent form of malnutrition.[1]

Obesity and overweight are defined using body mass index(BMI) percentiles; children >2 yr old with a BMI ≥95th percentile meet the criterion for obesity, and those with a BMI between the 85th and 95th percentiles fall in the overweight range.[2]

Overweight and obesity are the fifth leading risk of global deaths.Childhood obesity has more than tripled in the past 30 years. The prevalence of obesity among children aged 6 to 11 years has increased from 6.5% in 1980 to 19.6% in 2008. The prevalence of obesity among adolescents aged 12 to 19 years has increased from 5.0% to 18.1%. In 2012, more than 40 million children 2008,in the states of Andhra Pradesh, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu ,Uttarkhand and Mizoram. The survey shows high prevalence of overweight in all age group except in 15-24 years group. Overweight prevalence was higher among females than males. Low prevalence was recorded among lower level of education (illiterate and primary level) and in people whose occupation was connected with agriculture or manual work.[4]

Changes in environmental and social factors are likely the main explanation for doubling of severe childhood obesity over the last 30 years. Obesity is encouraged by such "obesogenic environmental conditions that promote overeating". "Passive over consumption" due to changes taking place in food marketing, consumer behavior (e.g., increases in consumption of food and beverages) and targeted marketing of high calorie dense foods with low nutrients.[5] Consumers respond positively to changes in their environment. Numerous environmental factors that facilitate or limit physical activities have been identified urban housing design and land use influence the physical activity of the residents of that area. Studies have shown that increasing access to physical activity in an organized, structured and supervised manner is effectively beneficial for youth.[6]

METHODOLOGY:

The parents of all children, attending to our institute who were fulfilling the inclusion criteria were informed about this study. Written informed consent from the parents of all children were taken. History regarding birth weight, gestational age, feeding habits, sleep patterns, physical activities and duration of television watching, socio economic status, physical assessment including anthropometry, vital signs and systemic examination were done. The values of laboratory investigation were obtained from our Institute.

INCLUSION CRITERIA:

All children between 2-12 years of ages, attending our hospital outpatient department and those who are   giving consent for participation in our study.

EXCLUSION CRITERIA:
- Children having major congenital malformation.
- Children suffering from any other chronic comorbid conditions.

METHOD OF DATA COLLECTION:

Specialized proforma of case sheets with consent form was prepared which included details of the history taking, clinical examinations and laboratory investigations. Each patient was given a code name that is initials of their names. Numbering was done according to their attendance in OPD.

Overweight and Obese children was determined by the BMI percentile by plotting the BMI number on the appropriate CDC BMI-for-age growth chart. Sex- and age-specific percentile cut-points of a reference population (≤85th as normal , 85th-95th percentile for overweight and > 95th percentile for obesity).

RESULTS:
TABLE 1: Association between birth wt vs BMI

	BMI			
BIRTH WT	**<85**	**85-95**	**>95**	**TOTAL**
AGA	71	141	68	280
Row %	25.4	50.4	24.3	100.0
Col %	59.7	57.1	50.7	56.0
LGA	26	73	49	148
Row %	17.6	49.3	33.1	100.0
Col %	21.8	29.6	36.6	29.6
SGA	22	33	17	72
Row %	30.6	45.8	23.6	100.0
Col %	18.5	13.4	12.7	14.4
TOTAL	119	247	134	500
Row %	23.8	49.4	26.8	100.0
Col %	100.0	100.0	100.0	100.0

Table 1 depicts that large for gestational age babies had higher chances

of obesity (33.1%) with p=0.1139 and Z score 7.4500 which was not statistically significant.

TABLE 2: Association between EBF for 5-6 months vs BMI

EBF FOR 5-6 MONTHS	BMI			
	<85	85-95	>95	TOTAL
NO	8	127	128	263
Row %	3.0	48.3	48.7	100.0
Col %	6.7	51.4	95.5	52.6
YES	111	120	6	237
Row %	46.8	50.6	2.5	100.0
Col %	93.3	48.6	4.5	47.4
TOTAL	119	247	134	500
Row %	23.8	49.4	26.8	100.0
Col %	100.0	100.0	100.0	100.0

Table 2 depicts that the children who had been in exclusive breast feed were having BMI less than 95th .Out of 237, it had been seen that only 6 children were having the risk of obesity with prevalance of 2.5% with p-value**: <0.0001**.This was statistically significant.

TABLE 3: Association between formula feeds vs BMI

FORMULA FEEDS	BMI			
	<85	85-95	>95	TOTAL
NO	111	119	7	237
Row %	46.8	50.2	3.0	100.0
Col %	93.3	48.2	5.2	47.4
YES	8	128	127	263
Row %	3.0	48.7	48.3	100.0
Col %	6.7	51.8	94.8	52.6
TOTAL	119	247	134	500
Row %	23.8	49.4	26.8	100.0
Col %	100.0	100.0	100.0	100.0

In table 3 ,it was seen that formula feed children were having risk of developing obesity with prevalence of 48.3% with p-value: <0.0001 and Z score of 196.1202 which was statistically significant

TABLE 4: Association between parental obesity vs BMI

PARENTAL OBESITY	BMI			
	<85	85-95	>95	TOTAL
NO	60	70	43	173
Row %	34.7	40.5	24.9	100.0
Col %	50.4	28.3	32.1	34.6
YES	59	177	91	327
Row %	18.0	54.1	27.8	100.0
Col %	49.6	71.7	67.9	65.4
TOTAL	119	247	134	500
Row %	23.8	49.4	26.8	100.0
Col %	100.0	100.0	100.0	100.0

Parental obesity was related to overweight and obesity. 177 children out of 247 were overweight(71.7%) and 91children out of 134 were obese (67.9%) which was statistically significant (p=0.0001).

TABLE 5: Association between maternal education vs BMI

MATERNAL EDUCATION	BMI			
	<85	85-95	>95	TOTAL
ILITERATE	67	95	56	218
Row %	30.7	43.6	25.7	100.0
Col %	56.3	38.5	41.8	43.6
LITERATE	52	152	78	282
Row %	18.4	53.9	27.7	100.0
Col %	43.7	61.5	58.2	56.4
TOTAL	119	247	134	500
Row %	23.8	49.4	26.8	100.0
Col %	100.0	100.0	100.0	100.0

If we see the association between maternal education with BMI , maternal literacy was found to be 53.9% in 152 overweight children out of 282 and 27.7% in 78 obese children .where as 43.6% overweight and 25.7% obese were associated with maternal illiteracy with Z score 10.6388 with p value 0.0049, hence this was statistically significant.

TABLE 6: Association between socio economic status vs BMI

SOCIO-ECONOMIC STATUS	BMI			
	<85	85-95	>95	TOTAL
LOW MID	35	43	28	106
Row %	33.0	40.6	26.4	100.0
Col %	29.4	17.4	20.9	21.2
LOWER	9	12	9	30
Row %	30.0	40.0	30.0	100.0
Col %	7.6	4.9	6.7	6.0
UP.LOW	24	35	25	84
Row %	28.6	41.7	29.8	100.0
Col %	20.2	14.2	18.7	16.8
UP.MID	51	157	72	280
Row %	18.2	56.1	25.7	100.0
Col %	42.9	63.6	53.7	56.0
TOTAL	119	247	134	500
Row %	23.8	49.4	26.8	100.0
Col %	100.0	100.0	100.0	100.0

High proportion of overweight 157(63.6%) and obesity 72(53.7%) were in upper middle class group with p=0.0202 which was statistically significant.

TABLE 7: Association between RBS vs BMI

RBS	BMI			
	<85	85-95	>95	TOTAL
<110	94	137	78	309
Row %	30.4	44.3	25.2	100.0
Col %	79.0	55.5	58.2	61.8
>110	25	110	56	191
Row %	13.1	57.6	29.3	100.0
Col %	21.0	44.5	41.8	38.2
TOTAL	119	247	134	500
Row %	23.8	49.4	26.8	100.0
Col %	100.0	100.0	100.0	100.0

Overweight (57.6%) and obese (29.3) were more prone to have diabetes mellitus which was statistically significant with p<0.0001 and Z score 19.8281.

TABLE 8: Association between TG vs BMI

TG	BMI			
	<85	85-95	>95	TOTAL
Normal	94	137	23	254
Row %	37.0	53.9	9.1	100.0
Col %	79.0	55.5	17.2	50.8
Abnormal	25	110	111	246
Row %	10.2	44.7	45.1	100.0
Col %	21.0	44.5	82.8	49.2
TOTAL	119	247	134	500
Row %	23.8	49.4	26.8	100.0
Col %	100.0	100.0	100.0	100.0

DISCUSSION:

A study from Udaipur, Rajasthan reported in 268 children, with significant increase in overweight (4.85%) and obesity (3.73%) belonged to affluent and upper middle class group[7].

The Delhi study by Marwaha Tandon et.al showed there is significant difference in weight gain between upper and lower socioeconomic children. The prevalence of overweight and obesity in upper socioeconomic children was recorded as 16.75% and 5.59% in boys and 19.01% and 5.03% in girls respectively.[8]

The indicators of maternal education was most strongly associated with children's obesity. In the present study, it had been seen that the children of educated mothers had an almost higher risk to be overweight (61.5%) and obese (58.2%). A study by Shafique et al.[9] reported that rural women with at least 14 years of education were observed to exhibit an 8.10 fold increased risk of factor of being overweight as compared with non educated women in Bangladesh. In contrast to the study done in Germany, children of mothers with no school degree had an almost three times higher risk to be obese than children of mothers with 13years of school [10].

Identification of risk factors is critical to prevent the childhood obesity epidemic. Risk factors that contribute to obesity are multi factorial. In the present study it had been seen that the overweight and obese children were prone to have hypertension, hypercholesteremia, hyper triglyceridemia and high low density lipid level and were also had risk of developing diabetes mellitus and non alcoholic fatty liver diseases in their upcoming age. In our study, the risk of prehypertension is more

common in overweight children (56.8%) ,whereas 30.2% overweight and 55.6% obese children were on risk to develop hypertension, similarly 57.6% overweight   children were more at risk than 29.3% obese children of developing diabetes mellitus. Similar study done in Shanghai, China found that a significant correlation   of childhood obesity with hypertension prevalance. In their study 22.6% of children were in overweight or obese stage [11].

With regard to some lifestyle behaviors, such as physical inactivity and long hours of TV watching, we failed to find a significant relation to children of overweight and obesity , which may be due to limited population of study and time constraint. Yi et al. [12] found that physical inactivity was not significantly associated with obesity in children aged 7–18 years from a city in north China. This was in line with the result from a study conducted among 1,869 adolescent school students in Saudi Arabia[13]. In a cluster-randomized controlled trial, Reilly et al. [14] demonstrated that physical activity did not improve weight status after enhanced program and health education in young children. Although obesity and overweight were found to be associated with watching TV for more than 2   h/d among schoolchildren in the north of Jordan[15], the relationship turned out to be negative in the study conducted in Saudi Arabia using the same cut points. Jabre et al. [16]also failed to detect a significant association between time spent in watching TV and overweight in children aged 6–8 year .

CONCLUSION:
Association of all known risk factors like parental obesity, hypertension, Diabetes mellitus, high serum triglyceride, serum cholesterol and low density lipid level and nonalocoholic fatty liver diseases were significantly high.

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