



## PREVALENCE OF OVERWEIGHT AND OBESITY IN CHILDREN aged BETWEEN 2-12 Years

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### ABSTRACT

**Introduction:** There is growing evidence that in present condition, perhaps due to physical activities, sedentary lifestyle, altered eating patterns and increased fat content of the diet, children and adolescents of affluent families are overweight as compared to their contemporaries in the past. **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. **Results:** In comparison, if we consider, BMI values in different age group, it was found that age group of  $\leq 48$  months, overweight children were 7(20.6%) and obese was 1(2.9%) whereas overweight 109 (53.7%) prevalence more in age group of 49 to 108 months, while in  $\geq 109$  months age group, overweight children were 131(49.8%) and obese were 126(47.9%). p-value was  $<0.0001$  which was statistically significant. **Conclusion:** We observed that the higher incidence of overweight and obesity in upper middle class family and educated mothers.

**KEYWORDS :** Overweight, Obesity, Children

### INTRODUCTION:

Throughout much of the history of mankind the overt manifestation of bodyweight gain in children and adult have been considered as a sign of personnel health and family wealth and an indicator of the economic prosperity of the society. As developing societies are industrialised and urbanised, the standards of living continued to rise, obesity and weight gain began to pose a growing threat to the health of the citizens. The World Health Organisation (WHO), in 1998 designated obesity as a global epidemic<sup>1</sup>. India is also facing the epidemic of obesity and its associated diseases, especially in children and adolescents<sup>2</sup>. Childhood obesity is associated with an increased mortality and morbidity inform of coronary artery diseases, diabetes mellitus, hypertension and dyslipidemia<sup>3</sup>.

There is growing evidence that in present condition, perhaps due to physical activities, sedentary lifestyle, altered eating patterns and increased fat content of the diet, children and adolescents of affluent families are overweight as compared to their contemporaries in the past<sup>3</sup>.

Centers for Diseases Control and Prevention (CDC) of the United State of America suggest that body mass index (BMI) is the most appropriate and easily available method to screen for childhood obesity. Age and gender cut-off for BMI are readily available. Obesity is increasing globally taking an epidemic significance with merely half a billion of world's population now considered to be overweight and obese<sup>4</sup>.

Since very limited data is available from India regarding this malady, the present study was undertaken to compare the prevalence of overweight and obesity among 2 to 12 years children of different socio-economic group, relation with physical activities, in terms of gestational age, in relation to exclusive breast feeding and formula feed, and with parental obesity and also the risk factors.

### METHODOLOGY:

**Study area:** The study was conducted in OPD of Paediatric Department

**Study population:** Children between 2 to 12 years of age

**Sample size:** The number of subjects for this study will be 500.4 ~ 500 with power 87%. (From the different studies done, expected proportion of the patients, amongst the cases had been assumed to be 60%).

**Study design:** Cross-sectional study

**Definition of obesity and overweight:** They were defined using CDC standards.

### 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.

### Data Collection:

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.

### RESULTS:

**TABLE1: Association between age vs BMI**

Age (Months)	BMI (PERCENTILE)			TOTAL
	<85	85-95	>95	
<b><math>\leq 48</math></b>	26	7	1	34
Row %	76.5	20.6	2.9	100.0
Col %	21.8	2.8	0.7	6.8
<b>49-108</b>	87	109	7	203
Row %	42.9	53.7	3.4	100.0
Col %	73.1	44.1	5.2	40.6
<b><math>\geq 109</math></b>	6	131	126	263
Row %	2.3	49.8	47.9	100.0
Col %	5.0	53.0	94.0	52.6
<b>TOTAL</b>	119	247	134	500
Row %	23.8	49.4	26.8	100.0
Col %	100.0	100.0	100.0	100.0

**TABLE 2: Association between sex vs BMI**

SEX	BMI			TOTAL
	<85	85-95	>95	
<b>Female</b>	55	100	54	209
Row %	26.3	47.8	25.8	100.0
Col %	46.2	40.5	40.3	41.8
<b>Male</b>	64	147	80	291
Row %	22.0	50.5	27.5	100.0
Col %	53.8	59.5	59.7	58.2
<b>TOTAL</b>	119	247	134	500
Row %	23.8	49.4	26.8	100.0
Col %	100.0	100.0	100.0	100.0

In comparison, if we consider, BMI values in different age group, it was found that age group of  $\leq 48$  months, overweight children were 7(20.6%) and obese was 1(2.9%) whereas overweight 109 (53.7%)

pevalance more in age group of 49 to 108 months, while in  $\geq 109$  months age group, overweight children were 131(49.8%) and obese were 126(47.9%). p-value was  $<0.0001$  which was statistically significant.

Table 2 depicts that 100 female out of 209, overweight were 47.8% and 147 male out of 291, overweight were 50.5%. where as in obese children, 54 female out of 209 were 25.8% and 80 male out of 209 were 27.5%. So, the p-value was 0.5341, which was statistically not significant

**TABLE 3: Association between tv viewing >2hrs vs BMI**

TV VIEWING > 2 HRS	BMI			TOTAL
	<85	85-95	>95	
<b>NO</b>	42	63	32	137
Row %	30.7	46.0	23.4	100.0
Col %	35.3	25.5	23.9	27.4
<b>YES</b>	77	184	102	363
Row %	21.2	50.7	28.1	100.0
Col %	64.7	74.5	76.1	72.6
<b>TOTAL</b>	119	247	134	500
Row %	23.8	49.4	26.8	100.0
Col %	100.0	100.0	100.0	100.0

Table 3 shows that overweight children were 184(74.5%) and obese children were 102 (76.1) with p-value: 0.0818 which was Statistically not significant.

**TABLE 4: Association between physical activity (mins) vs BMI**

PHYSICAL ACTIVITY (MINS)	BMI			TOTAL
	<85	85-95	>95	
<b>NO</b>	66	162	82	310
Row %	21.3	52.3	26.5	100.0
Col %	55.5	65.6	61.2	62.0
<b>YES</b>	53	85	52	190
Row %	27.9	44.7	27.4	100.0
Col %	44.5	34.4	38.8	38.0
<b>TOTAL</b>	119	247	134	500
Row %	23.8	49.4	26.8	100.0
Col %	100.0	100.0	100.0	100.0

Out of 247, 85 (44.7%) overweight and 52 (27.4%) obese were related to physical activity with p value of 0.1699, which was statistically insignificant.

**TABLE 5: Association between wks of gestation at birth vs BMI**

WKS OF GESTATION AT BIRTH	BMI			TOTAL
	<85	85-95	>95	
<b>Preterm</b>	47	67	30	144
Row %	32.6	46.5	20.8	100.0
Col %	39.5	27.1	22.4	28.8
<b>Term</b>	72	180	104	356
Row %	20.2	50.6	29.2	100.0
Col %	60.5	72.9	77.6	71.2
<b>TOTAL</b>	119	247	134	500
Row %	23.8	49.4	26.8	100.0
Col %	100.0	100.0	100.0	100.0

Here in table 5 it was seen that term children were more prone to be overweight (72%) and obese (77.6) which was statistically significant with p-value of 0.0080.

**DISCUSSION:**

Childhood obesity has now reached epidemic proportion. It does not seem to have spared the developing nations and India is no exception too. It is indeed an irony that the problem of obesity is spreading over. In the present study, the prevalence of overweight (53.7%) was more in age group of 4.1 to 9 years where as obese is 47.9% more in the age group of 9.1 to 12 years. A similar finding was reported from another study in Puducherry that showed increased prevalence of overweight and obesity was highest ( 7.89% and 3.8% respectively) in age group 11<sup>5</sup>. Another study conducted in Kerela that showed increased prevalence of overweight and obesity from 4.94% and 1.26% in 2003 to 6.57% and 1.89% in 2005 with particular rise in the age group 5-11 years<sup>6</sup>. A similar study where the prevalence of obesity and eating behaviors conducted in Bucharest, Romania was reported that

prevalence of overweight and obese was significantly higher among the age group of 9-10.9 years (43.8%) followed by children of 6-8.9 years, with 37.8% and 11-13.9years (32%), and lower in older children of 14-17.9 years , with 21.3%<sup>7</sup>.

Our study showed more prevalence of overweight and obesity among males than females but it was statistically insignificant due to less number of female children than males. In contrast, the prevalence of obesity and overweight more in females in the study conducted in Puducherry by Preetam B Mahajan et.al.

The present study shows that term babies with large for gestational age (33.1%) are more prone to develop overweight and obesity with prevalence of 72.9% and 77.6% compare to preterm babies but there is no significant association with birth weight. In contrast, the study conducted by Ronnesia B. Gaskins concluded that preterm with SGA with the prevalence of 24% were obese and 16.7 % were overweight.

Here in our study it had been seen that those who were on exclusive breast feed till 5 to 6 months of age had low risk of developing obesity(2.5%) where as those who were in early formula feed were at high risk of developing overweight (48.7%) and obesity (48.3%). Similar study done by Jing Yan et.al<sup>8</sup> showed that breastfeeding was associated with a significantly reduced risk of obesity in children (adjusted odd ratio = 0.78; 95% and confidence interval of 0.74, 0.81). Another study on relation to formula feed with BMI by Wilson et al.<sup>9</sup> in their Dundee cohort of 674 infants, showed that, in infants with early introduction of complementary food (<15 weeks), weight and percentage of body fat increased significantly at 7 years of age than the ones with late introduction of complementary food ( $\geq 15$  weeks). A.D. Liese et.al<sup>10</sup> reported that the prevalence of overweight was substantially higher in children who had never been breast fed (Dresden, 16.4%; Munich, 24.3%) than those who had been breast fed (Dresden, 9.9%, Munich, 15.2%) in a cross sectional study with 9-10 years of children from two different cities of Germany.

In our study it had been seen that out of 246 overweight children 176 were related to parental obesity with prevalence of 71.5% and that of obese child 91 out of total 134 were associated with parental obesity with prevalence of 67.9%. Similar study done in Greek children by Yannis Manios showed that the prevalence of being overweight in age group of 1-5 years was significant greater for children with one or two obese parents and increases as the number of obese parents increases (p-value for trend  $<.001$  in both sexes). Further , more the prevalence of being overweight or at risk for overweight in age group 3-5 years was significantly greater for children with one or two obese parents<sup>11</sup>.

Association between maternal education and socioeconomic status with BMI. Our study showed that the prevalence of overweight, 157 (63.6%) and obese, 72 (53.7%) children were from upper middle class family. Similar study from Jaipur showed that among 237 children from middle class and upper middle class, 24(10.1%) were obese<sup>12</sup>.

**CONCLUSION:**

- The prevalence of overweight (53.7%) was more in age group of 4.1 to 9 years where as obese is 47.9% , more in the age group of 9.1 to 12 years, while there was no significance in sex differentiation.
- The term babies were at more risk to develop overweight and obesity with prevalence of 72.9% and 77.6% respectively.

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