



A Cross Sectional Study to Determine if Breastfeeding is Protective Against Childhood Obesity / Overweight

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ABSTRACT

Aim

To determine whether breastfeeding for more than 6 months is associated with lower incidence of Obesity/Overweight.

Methodology

The cross sectional study was conducted among children between 3-6 years in south Chennai from Sep-2009 to Dec-2010. Children aged 3- 6 years were listed from 3 schools and 638 children were randomly selected. A pre-tested questionnaire was used to collect the information.

Results

Among 638 children studied, 23.7% were overweight and 56.3% were males. 45.9% were belonging to 5 years. Low birth weight children were 2.6times prone for obesity ($P < 0.001$). And breast feeding <6months were 18.4 times prone for obesity ($p < 0.001$). Children viewing television >2hrs, playing outdoor <1hrs were also prone for obesity ($p < 0.001$).

Conclusion Prolonged breastfeeding > 6months has a reduced risk of Obesity/overweight among children.

Keywords : Obesity, percentile, breast feeding.

INTRODUCTION

The increasing prevalence of overweight among preschool-age children in recent times, especially among the affluent society, has been described as an epidemic.^{1, 2} Overweight children are at an increased risk of being overweight adults.^{3, 4} In addition, children who are overweight show related signs of morbidity, including elevated blood pressure, cholesterol, triglycerides, and insulin levels.^{5, 6} Thus, prevention of pediatric overweight is important for the long-term prevention of chronic diseases.

Evidence in the literature has been contradictory regarding whether breastfeeding is associated with a reduction in the risk of overweight.⁷ Many researchers have observed a greater risk of overweight in children and adolescents who had not been breastfed compared with those who had (8, 9) or who were breastfed a shorter duration rather than longer duration (10-14).

Since breast feeding protects against underweight as well as overweight, one would not expect to see an effect on the central tendency of adiposity but only on the extremes (16,17). Nearly all of the studies to date that have shown a protective relationship between breastfeeding and overweight, were conducted in predominantly White, Non-Hispanic populations. Since there is a paucity of data among Indian children, a cross sectional study to determine whether breastfeeding is protective against risk of childhood obesity was undertaken among school children in Chennai

MATERIALS AND METHODS:

Cross sectional study was conducted among children in the age group between 3-6 years. Three schools in south zone of Chennai were selected randomly. Study was conducted from Sep-2009 to Dec-2010.

SELECTION OF CHILDREN:

Permission was obtained from the correspondent of each school for the study. All children aged between the age group 3- 6 years were listed from each school and 638 children

included in the study.

DATA COLLECTION:

The purpose of the study was explained to the parents of each child. Oral consent from the parent of each child was obtained. A pre-tested questionnaire in English was distributed to the parents to collect the necessary details about children. Each child was examined and anthropometric measurements were taken.

DATA ENTRY AND ANALYSIS:

SPSS.10 Software was used to make all the entries and data analysis. Percentages and Pvalue were calculated. 95% confidence interval, odds ratio and Chi square were also calculated.

RESULTS & OBSERVATIONS

Out of 638 children studied 151(23.7%) were found to be over weight (95%CI=20.4-27) and their sex distribution was as follows. details given in figure .1.Among those overweight 85(56.3%) were males. Among those normal 53.4% were males. In the age distribution of children by years, 293 children (45.9%) were belonging to 5 years details given in table 1

AGE AND BMI

Among those overweight / obese, 18.2% were above 85th percentile. The Percentage of under weight children and normal weight children were 11.6% and 64.7% respectively as in table 2.

HEIGHT DISTRIBUTION

Among obese 5.7% & 11.7% of male and female respectively falls below the 3rd percentile. 83.5% & 88.3% of male and female respectively falls between 3rd to 95th percentiles as in figure 2.

Association of certain risk factors and obesity

Among obese 66.8% of children were breast-fed less than six months. Among normal, 90.1% of children were breast-fed more than six months. Among obese, 144 children had

Breast-feeding only. About 13 children out of 638 were not breast fed at all due to various reasons like (Death of mother, puerperal psychosis, hormonal problems, etc.) About 63 children were in the low economic status, based on the per capita income (Prasad classification modified by Kumar). Details given in table no.3

Among obese 73.5% children viewing television for more than two hours in a day. Among normal 82.3% children viewing television for less than two hours in a day. It is been found that those who are viewing television more than 2 hours were 13 times more in developing overweight. Among normal 60.3% of children were playing less than one hour per day. Among normal 83.6% of children were playing more than one hour per day. Those children playing less than one hour per day were having a risk of 7.7 times more in developing overweight, when compared to those playing more than one hour per day. Among 638 children, 13.9% and 8.2% are obese and normal respectively in birth weight less than 2 Kgs. Between 2Kgs - 2.4 Kgs, 26.5% and 12.7% were obese and normal respectively. Between 2.5Kgs – 3.6 Kgs, 59% and 79.1% were obese and normal respectively. 0.6% was more than 3.6 Kgs among obese. Details given in table no.3

DISCUSSION

In our study 23.7% of children in the age group 3-6 years were overweight. This is higher to that of overall incidence of 10.4% of children's 2-5 years reported in literature¹. Our study documented lower incidence of overweight among children who were breastfed for more than six months. This finding is consistent with several previous articles that concluded that breastfeeding is protective against pediatric overweight 11-14. Few of the previous studies examined prolonged breastfeeding, that is, breastfeeding for >1 year. The two studies that did report separately for those who were breastfed for at least 1 year found relatively large effects. Von Kries et al¹¹ found a 57% reduction in the adjusted odds of being overweight at 5 or 6 years of age, in children who were breastfed for at least 12 months when contrasting with those who were never breastfed. Liese et al¹³ found even stronger effects contrasting >1 year of breastfeeding with those who were not breastfed, a 71% reduction in odds.

Gillman et al²⁰ similarly documented slightly higher rates of overweight among those who were breastfed for <3 months compared with those who were never breastfed. Apparently, the protective effects of breastfeeding are gained only when breastfeeding continues for at least 3 months.

Our study also showed that longer breastfeeding is not associated with a decrease in mean BMI but rather with a decrease in the standard deviation of the BMI, leading to simultaneously lower rates of underweight and overweight.

However, there are a few limitations as well. Women who breastfed for longer durations could be different from women who do not breastfeed in ways not measured by the variables that we considered. As Gillman²⁰ pointed out, "The most important question about these studies is whether residual confounding could explain the results". Furthermore, the sample was not representative of all income children. Such children may have characteristics that set them apart from non-participants. In addition, we were unable to examine effects of breastfeeding after the age of 4 years, for which Dewey¹⁵ pointed out those effects seem to be even stronger.

The link between long-term breastfeeding and lower rates of overweight could operate through several possible biological mechanisms. Birch and Fisher²¹ showed that children who were breastfed are better able to adjust intake at a meal in response to a high calorie preload; thus, breastfed children may learn to self-regulate caloric intake better than non breastfed infants do. Also, breastfed and formula-fed infants have a different hormonal response to feeding: formula feeding provokes a greater insulin response, possibly resulting in earlier fat deposition^{22, 23}. Another possibility is that the higher protein intake in formula-fed infants has a programming effect on

glucose metabolism²⁴ finally, breastfed infants adapt more readily to new foods such as vegetables, thus influencing the subsequent caloric density of their diet.

The multiple benefits of breastfeeding are well documented in the United States^{25,26}. Much of the current evidence on the health effects of breastfeeding has been concentrated on shorter durations of breastfeeding, however. The importance of long-term breastfeeding has not been documented extensively in developed countries. In our study the prevalence of over weight was more among the children who are viewing television more than two hours were 13 times in higher risk in developing over weight. The results were consistent with Henry.J et al study, which proved that Television and video games have contributed to more sedentary leisure activities as well as increased snacking and inappropriate food choices due to television advertising. There is a positive correlation between hours of television viewing and overweight, in children's 19. In our study it was found that children playing less than 1 hour per day had a 7.7 times more risk in developing overweight than children playing more than 1 hour per day. The results are consistent with MooreLL et al study, which proved that children who spend less time in moderately vigorous activity are at higher risk to become obese during childhood¹⁸. This study highlights 1 consequence of prolonged breastfeeding and reinforces the rationale for recommendations to breastfeed an infant for six months.

CONCLUSION

- ☐ Prevalence of over weight/ obese among children in the age group of 3-6 years were 23.7% (95% CI= 20.4 – 27).
- ☐ Prolonged breastfeeding is associated with a reduced risk of overweight among children. Breastfeeding longer than 6 months provides health benefits to children well beyond the period of breastfeeding.

RECOMMENDATIONS

- a. Encourage exclusive breastfeeding.
- b. Calculate and plot BMI once a year in all children and adolescents.
- c. Use change in BMI to identify rate of excessive weight gain relative to linear growth.
- d. Routinely promote physical activity, including unstructured play at home, in school, in childcare settings, and throughout the community.
- e. Recommend limitation of television and video time to a maximum of 2 hours per day.

LIMITATIONS

1. Present calorie intake could not be included in view of unreliable information given.
2. Associated morbidity such as lipid profile, blood pressure and serum insulin levels were not studied.

Figure .1.

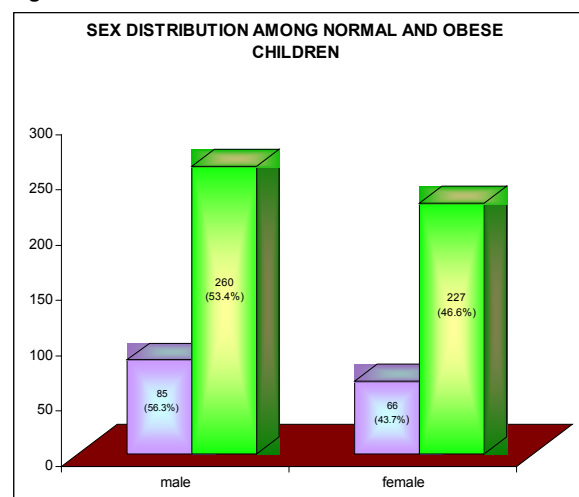


Figure.2
HEIGHT DISTRIBUTION AMONG CHILDREN

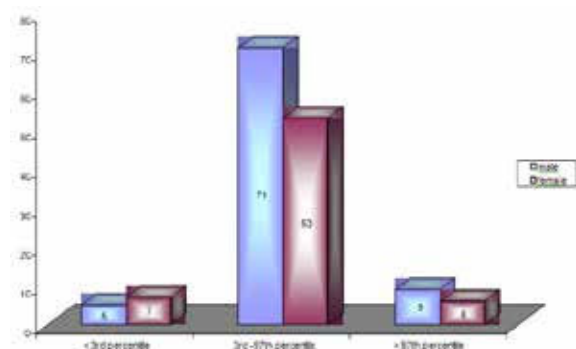


Table 3

Category	Obese		Odds Ratio	CI 95%	P value
	Yes	No			
Duration Breast feeding			18.4	11.5 - 29.8	<0.001
< 6months	101	48			
>6 months	50	439			
Socio economic status					<0.001
Low (<Rs.300)	8	55	1		
Middle (Rs.300-Rs.999)	53	52	7.1	2.9 - 17.7	
High (>Rs.1000)	100	360	3.7	2.3 - 5.9	

Table.1

Age in years	Obese		Total
	yes	no	
3Years	5 (33%)	10 (67%)	15 (100%)
4Years	46 (34%)	90 (66%)	136 (100%)
5Years	59 (20.1%)	234 (79.9%)	293 (100%)
6Years	41 (21.1%)	153 (78.9%)	194 (100%)
Total	151 (23.7%)	487 (76.3%)	638 (100%)

Chi square: 11.25

P – value: <0.005

Category	Obese		Odds Ratio	CI 95%	P value
	Yes	NO			
T.V viewing in hours/24hrs			13	8.2 - 20.4	<0.001
> 2 hrs	111	86			
< 2 hrs	40	401			
Outdoor Play in Hours			7.7	5.1 - 11.8	<0.001
< 1 hour/day	91	80			
> 1 hour/day	60	407			
Birth Weight			2.56	1.7 - 3.6	<0.001
<2.5 kg	61	102			
>2.5 kg	90	385			

Table. 2

Age Group In years	Under Weight	Normal Weight	Overweight / Obese		Total
			>85th percentile	>95th percentile	
3Yrs	3 (20%)	7 (46.7%)	3 (20%)	2 (13.3%)	15 (100%)
4Yrs	20 (14.7%)	70 (51.5%)	33 (24.3%)	13 (9.5%)	136 (100%)
5Yrs	38 (13%)	196 (66.9%)	46 (15.7%)	13 (4.4%)	293 (100%)
6Yrs	13 (6.7%)	140 (72.2%)	34 (17.5%)	7 (3.6%)	194 (100%)
Total	74 (11.6%)	413 (64.7%)	116 (18.2%)	35 (5.5%)	638 (100%)

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