Original Article

Prevelence of malnutrition among schoolchildren with reference to overweight and obesity and its associated factors.

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Abstract

Research Question: What influence does diet and physical activity have on the occurence of overweight and obesity in school aged children?

Objectives: To study the diet and physical activity factors influencing overweight and obesity in school aged children.

Study Design: Cross sectional Study.

Settings: Field Practice area of Department of Community Medicine, LLRM Medical College, Meerut. **Participants:** 400 children between 5-14 years age group

Statistical Analysis: Chi Square Test

Results: The prevalence of overweight and obesity in children was 9.8% and 3.7% respectively. Among dietary factors, a significant association was seen in the prevalence of overweight and obesity with consumption of >3 meals per day($P<0.001$), habit of eating in between meals($P<0.05$) and in having dinner as the heaviest meal of the day ($P<0.02$). Among physical activity factors, a significant association was seen in the prevalence of overweight and obesity with the habit of not playing outdoor games ($P<0.001$), not participating in household activities($P<0.001$), using some vehicular transport to go to school ($P<0.001$) and watching T.V. for more than 3hrs/day($P<0.001$).**Conclusion:**Diet and Physical activity have an influence on occurrence of overweight and obesity in school aged children. Dietary and lifestyle modification must be advised to children to prevent occurrence of overweight and obesity in them.

Key words: Diet, physical activity,overweight,obesity, school aged children

Introduction:

Children are the wealth of any nation as they constitute one of the important segments of the population. Children in the age group of 5 - 14 years are often considered as school age.The school age group spans the period between preschool years and adult life.The foundation of good health and sound mind is laid during the school age period. So, it is a basic milestone in the life of an individual and responsible for many changes that take place during later life. School age is considered as dynamic period of growth and development because children undergo physical, mental, emotional and social changes[1]. Malnutrition has been defined as "a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients". It comprises four forms -undernutrition, overnutrition, imbalance and specific deficiency of nutrients[2]. In developing countries like India various forms of malnutrition affect a large segment of population and both macro and micronutrient deficiencies are of major concerns. The most recent estimates (1996-2005), in developing world, state that approximately 146 million children are underweight, out of these 57 million children live in India[3]. At the other end of the spectrum are the urban affluent children among whomovernutrition has steeply increased because of sedentary lifestyles and intake of energy-dense junk foods.In view of the fact that overnutrition in childhood and adolescence is associated with an increased risk of developing CVDand other non communicablediseases in adult life,it is essential to improve physical activity and promote balanced food intake inschool aged children[4].

There are many school based studies to assess the nutritional status of school aged children but very few community based studies to assess the same.Hence this study was undertaken at the community level with thefollowing objectives:

1.To assess the prevalence of malnutrition in school aged children and

2.To study the dietary and physical activity factors associated with overweight and obesity in school aged children.

Material and Methods:

Study Area: The present study was conducted in the population registered at Urban Health Training Centre,

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Surajkund which is the Field Practice area of Department of Community Medicine. It is catering to a population of approximately 10,000 residing in the nearby areas. The data for this study was collected from February 2011 to June 2011.

Study Design: Cross-sectional(observational) study.

Sample Size: By taking prevalence of malnutrition in school aged children as 50% with a relative precision of 10% at 95% confidence level, an optimum sample size for study was calculated as 384. Assuming a non response rate of 10%, final sample size of 422 was arrived at. Children were selected by systematic random sampling technique by taking family as primary unit of study covering all the children of every fourth family of the total 1867 registered families.

Data Collection: In order to have an effective completion of study, a house to house survey was done from locality to locality. An informed consent was taken verbally from all parents of school going children willing to participate in thecurrent study. The dietary and lifestyle history of the children was recorded on a predesigned and pretested schedule.The nutritional status was assessed by BMI for age as recommended for school aged children by CDC. In order to calculate BMI,weight and height of the children were measured.The weight was recorded with the help of weighing machine to the nearest 100 grams. The heightwas measured from head to heels by an ordinary measuring tape to the nearest centimeter.

Data Analysis: The data thus collected, was first coded & then transferred on to Excel master chart, from which simple as well as co-relation tables were prepared, analyzed & statistically evaluated.

Results:

As 400 children responded to the questionnaire and cooperated in the examination hence the actual study population comprised of 400 children of 5-14 years age group. Table 1 shows the nutritional status of children according to the CDC BMI for age Percentile criteria. The prevalence of underweight, healthy weight, overweight and obesity in children was found to be 48.0% , 38.5% , 9.8% and 3.7% respectively.

Table 2 shows the association of overweight and obesity with various dietary factors. A statistically significant difference was found in the prevalence of overweight and obesity in children consuming 2, 3 and >3 meals per day which was 8.8%, 12.7% and 42.8% respectively(P<0.001), in children having the habit of eating in between meals and in those not having the same habit which was 15.9% and 5.4% respectively(P<0.05), and in children having breakfast, lunch or dinner as the heaviest meal of the day which was 9.8% ,10.5% and 21.8% respectivelyb(P<0.02).

Table 3 shows the association of overweight and obesity with various physical activity factors. The prevalence of overweight and obesity in childrenwho did not play outdoor games and those who played for <3 hrs/ week and more than 3 hrs /week was found to be 49.1%, 25.5% and 1.9% respectively (P<0.001), who did not participate in household activities and those who did was 17.9% and 6.0% respectively (P< 0.001), who walked to school, used a bicycle or some other transport to go to school which was 6.2%, 8.0% and 22.1% respectively (P<0.001) and in children who did not watch T.V. and those who did for less than 1 hr/day, <2 hrs/day, < 3hrs/day and more than 3 hrs/day being nil, 0.7% ,4.4%, 45.5% and 57.4% respectively(P<0.001).

Table 1: Nutritional Status of children according to BMI for age Percentile Criteria (CDC)

Nutritional Status	Number	Prevalence (%)
Underweight(< 5th Percentile)	192	48.0
Healthy Weight(5th to < 85th Percentile)	154	38.5
Overweight (85th to < 95th Percentile)	39	9.8
Obese(=95th Percentile)	15	3.7
Total	**400**	**100.0**

Table 2: Overweight and obesity in relation to dietary factors

1-Number of meals consumed									
Number of meals	Population		Overweight		Obese		Total		
	No.	Percentage (%)	No.	%	No.	%	No.	%	
2	79	19.8	5	6.3	2	2.5	7	8.8	χ^2=17.45;df=2; P<0.001
3	300	75.0	29	9.7	9	3.0	38	12.7	
>3	21	5.2	5	23.8	4	19.0	9	42.8	
2-Habit of eating in between meals									
No	92	23.0	3	3.2	2	2.2	5	5.4	χ^2=6.66;df=1; P<0.05
Yes	308	77.0	36	11.7	13	4.2	49	15.9	
3-Heaviest meal of the day									
Breakfast	51	12.8	3	5.9	2	3.9	5	9.8	χ^2=8.92; df=2; P<0.02
Lunch	239	59.7	16	6.7	9	3.8	25	10.5	
Dinner	110	27.5	20	18.2	4	3.6	24	21.8	
Total	**400**	**100.0**	**39**	**9.8**	**15**	**3.7**	**54**	**13.5**	

Table 3: Overweight and obesity in relation to physical activity factors

1-Habit of playing outdoor games/sports									
Play outdoor games	Population		Overweight		Obese		Total		
	No.	Percentage (%)	No.	%	No.	%	No.	%	
No	53	13.3	16	30.2	10	18.9	26	49.1	*χ^2=97.2; df=2; P<0.001*
<3 hrs/week	90	22.5	19	21.1	4	4.4	23	25.5	
=3 hrs/week	257	64.2	4	1.6	1	0.4	5	1.9	
2-Participation in household activities									
No	251	62.7	32	12.7	13	5.2	45	17.9	*χ^2=11.32;df=1; P<0.001*
Yes	149	37.3	7	4.7	2	1.3	9	6.0	
3-Mode of conveyance to school									
Walking	162	40.5	7	4.3	3	1.9	10	6.2	*χ^2=20.30; df=2; P<0.001*
By Bicycle	62	15.5	3	4.8	2	3.2	5	8.0	
Any other Transport	176	44.0	29	16.5	10	5.7	39	22.1	
4-T.V.watching									
Do not watch T.V. [1]	14	3.5	0	0.0	0	0	0	0.0	*χ^2=149.50; df=2; P<0.001 For calculating χ^2 1 ,2 and 3 have been merged together*
= 1 hr/day [2]	140	35.0	1	0.7	0	0.0	1	0.7	
< 2 hrs/day [3]	159	39.7	2	1.3	5	3.1	7	4.4	
< 3 hrs/day	33	8.3	12	36.4	3	9.1	15	45.5	
= 3 hrs/day	54	13.5	24	44.4	7	13.0	31	57.4	
Total	**400**	**100.0**	**39**	**9.8**	**15**	**3.7**	**54**	**13.5**	

Discussion:

The prevalence of thinness or underweight in children (BMI for age <5th percentile) in the present study was observed as 48%. This is higher than 30.6% reported by Malhotra and Passi (2007)[5] in their study. In the present study, 9.8% children were found to be overweight (BMI for age 85th to <95th percentile) and 3.7% were found to be obese (BMI for age more than 95th percentile), together constituting 13.5% for overweight/obesity which is lesser than the findings of overweight (17.73%) and obesity (4.99%) by Unnithan et al (2008)[6] and higher than the findings of Bharati et al (2008)[7] who found overweight (3.1%) and obesity (1.2%) in school going children; together constituting 4.3 per cent for overweight/ obesity and Jafaret al (2008)[8] who reported the prevalence of overweight and obesity as 3% in urban Indo Asian school-aged children. The prevalence of overweight and obesity in present study was significantly associated with meals frequancy per day with maximum in children consuming more than 3 meals/day (42.8%). This is in contrast with the findings of Wolfe et al(1993)[9] whose study showed a link between obesity and skipping meals and Siega-Riz et al (1998)[10] who reported that adolescents with a consistent meal pattern (i.e., three meals a day) were leaner than those with an inconsistent meal pattern. The prevalence of overweight and obesity in present study was significantly associated with the habit of eating in between meals and in those not having the same habit being 15.9% and 5.4% respectively. This is in accordance with the findings of Goyal et al(2010)[11] who reported that in adolescent school going children, eating habit like junk food, chocolate, eating outside at weekend have a remarkable effect on prevalence of overweight and obesity. In the present study statistically significant difference was found in the prevalence of overweight and obesity in relation to heaviest meal of the day being maximum in those having dinner as the heaviest meal of the day (21.8%). This is in accordance with the findings of Maffeis et al (2000)[12] who reported that a higher percentage of intake of energy at dinner time is associated with an increased risk of overweight.

The prevalence of overweight and obesity in the present study was significantly associated with habit of playing out door games and was higher in children not playing outdoor games (49.1%). This is in accordance with the findings of Gordon et al (2002)[13], Warraich et al (2009)[14], Kotian et al (2010)[15], Moore et al (2003)[16]and Rennie et al (2005)[17].

The prevalence of overweight and obesity in the present study was associated with participation in household activities and was higher in those not participated in house hold activity (17.9%). Similar findings have been reported by Nair et al (2007)[18] that the prevalence of overweight and obesity was significantly higher among the adolescents who did not perform any household activities (18.6%) compared with those participating in various household chores (4.7%). In this study statistically significant difference was found in the prevalence of overweight and obesity in relation to mode of conveyance to school and was maximum (22.1%) in children using transport other than bicycle or walked on foot. Nair et al (2007)[18] also found that the prevalence of overweight and obesity was significantly lower among adolescents who either walked to school or came on bicycle (6.4%) than among the adolescents who used vehicular transport such as motorcycles or cars (9.9%). The statistical association of the prevalence of overweight and obesity with T.V. watching being higher in children watching T.V. for more than 3hrs/day(57.4%) is in accordance with the findings of Crespo et al (2001)[19], Saelens et al (2002)[20], Gordon et al (2002)[13] and Nair et al (2007)[18] whereas Olivares et al (2004)[21] found no association between nutritional status and television viewing.

Conclusion:

Diet and Physical activity have an influence on occurrence of overweight and obesity in school aged children. Health education should be used as a vehicle for promoting healthy practices and healthy attitudes among children. Parents on their part,should enforce healthy eating practices at home and should encourage children to pursue some outdoor physical activity on a daily basis.

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