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Community Medicine

A STUDY ON MALNUTRITION IN SCHOOL AGED CHILDREN BELONGING TO AN URBAN SLUM IN NORTH INDIA

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ABSTRACT **Background:** School age is considered as a dynamic period of growth and development and therefore nutritional adequacy should be maintained in thisage group. **Objectives:** To study the prevalence of malnutrition and its association with age group and gender of school aged children. **Methods:** A Cross sectional Study comprising of 400 school aged children was carried out in an urban slum in Meerut **Results:** The overall prevalence of underweight, overweight and obesity and stunting in 5-14 year old females and males was found to be 44.4% and 51.2%, 13.2% and 13.7% and 32.3% and 29.9% respectively. Only age group and overweight/obesity had a significant association (P< 0.001). **Conclusion:** Malnutrition is highly prevalent in school aged children and needs to be addressed promptly.

KEYWORDS : Malnutrition, Stunting, School aged children

INTRODUCTION:

The school age period (5-14 years) includes both 5-9 year old children as well as 10-14 year old young adolescents. The 5-9 year age group is nutritionally significant because this is the prime time to build up body stores of nutrients in preparation for rapid growth in adolescence.[1] Adolescence is a period associated with rapid growth second only to the growth of infancy.[2]Inadequate nutrition in adolescence can potentially retard growth and sexual maturation, over and above the adverse consequences of chronic malnutrition during infancy and childhood.[3]

MATERIAL AND METHODS:

Study Setting: The present study was conducted in an urban slum among 1867 families registered at Urban Health Training Centre of LLRM Medical College, Meerut.

Study Subjects: Children aged 5-14 years belonging to registered families.

Study Period : February 2011 to June 2011.

Study Design: Cross-sectional study.

Sample Size: Sample size was calculated using the formula:

$$n=Z_{1-\alpha/2}^{2}pq/d^{2}$$

By taking prevalence of malnutrition in school aged children ,

p=50%

d=10% of p

α=5%, $Z_{1-\alpha/2}$=11.96

n=384

Assuming a non response rate of 5%, the total sample size was estimated as 400.

Sampling Technique: Simple random sampling

Data Collection: By House to house visit.

Informed Consent was taken from parents of children. A predesigned and pretested questionnaire was used to collect all relevant data supplemented by physical examination. CDC (2000) BMI for age Growth charts were used for nutritional status assessment. In order to calculate BMI, weight and height of children were measured. Weight was recorded with the help of weighing machine to the nearest 100 grams. Height was measured from head to heels by ordinary measuring tape to the nearest centimeter. BMI was calculated for each child and plotted on the CDC BMI –for –age growth charts (for either gender) to obtain a percentile ranking. Underweight was regarded as < 5th percentile, Healthy weight as 5th- < 85th percentile, overweight as 85th - < 95th percentile and obese as ≥95th percentile.

Stunting was calculated by CDC Stature for age Percentile charts and < than 3rd percentile value was regarded as stunting.

Data was analyzed using SPSS software version 16. Qualitative variables were expressed in percentages. Chi square test was used to test the association between two attributes. P- value less than 0.05 was considered significant.

RESULTS:

We managed to collect data from 400 children who fully cooperated in the study.

Table 1 shows the total as well as age group and gender wise prevalence of underweight and overweight and obesity in the children. Only the difference in the prevalence of overweight and obesity in relation to the different age groups was found to be statistically significant (P < 0.001) but not the difference in the prevalence of underweight in the 2 age groups as well as the difference in the prevalence of both underweight as well as overweight and obesity in both the genders.

Table -1: Prevalence of Underweight and Overweight and Obesity in Children

Age group	Population			Normal Nutritional Status			Malnutrition								
				Normal Weight for age			Underweight for age			Overweight for age			Obese for age		
	F	M	T	F	M	T	F	M	T	F	M	T	F	M	T
5-9 years	87 (47.5)	96 (52.5)	183 (45.8)	32 (58.2)	23 (41.8)	55 (30.0)	38 (41.3)	54 (58.7)	**92 (50.3)**	17 (60.7)	11 (39.3)	**28 (15.3)**	0 (0.0)	8 (100.0)	**8 (4.4)**
10-14 years	102 (47.0)	115 (53.0)	217 (54.2)	48 (48.5)	51 (51.5)	99 (45.6)	46 (46.0)	54 (54.0)	**100 (46.1)**	5 (45.5)	6 (54.5)	**11 (5.1)**	3 (42.9)	4 (57.1)	**7 (3.2)**
Total	189 (47.2)	211 (52.8)	400 (100.0)	80 (42.3)	74 (35.1)	154 (38.5)	84 (44.4)	108 (51.2)	**192 (48.0)**	22 (11.6)	17 (8.1)	**39 (9.8)**	3 (1.6)	12 (5.6)	**15 (3.7)**

(F- Females, M- Males, T-Total)

Note: Figures in brackets show the percentages

For calculation of $\chi 2$,overweight and obese have been clubbed together.

$\chi 2$= 0.70; df=1; P> 0.1 (for age group and underweight)

$\chi 2$ = 11.00; df= 1; P < 0.001 (for age group and overweight and obesity)

$\chi 2$= 1.81; df=1; P > 0.1 (for gender and underweight)

$\chi 2$= 0.02;df=1; P >0.5 (for gender and overweight)

Table -2 : Prevalence of Stunting in Children

Age in years	Total Population				Normal Height for age				Stunted			
	Females		Males		Females		Males		Females		Males	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
5-9 years	87	46	96	45.5	58	66.7	66	68.8	29	33.3	30	31.2
10-14 years	102	54	115	54.5	70	68.6	82	71.3	32	31.4	33	28.7
Total	189	100	211	100	128	67.7	148	70.1	61	**32.3**	63	**29.9**

$\chi 2$= 0.27;df= 1; P> 0.5(for gender) and $\chi 2$=0.24;df=1;P>0.5(for age)

Table 2 shows the total as well as age group and gender wise prevalence of stunting in the children.

The difference in prevalence of stunting in children in relation to gender of the child as well as age group of the child was not found to be statistically significant(P> 0.5).

DISCUSSION:

The overall 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) [4] in their study.

In the present study, no statistically significant difference was seen in the prevalence of underweight in children in relation to age which was 50.3% and 46.1% in 5-9 years and 10-14 years respectively (P>0.1) which is similar to the findings of Medhi et al (2006) [5] whereas Suvarna and Itagi (2009) [6] found the prevalence of underweight in children,higher in younger age group in contrast to Mian et al (2002) [7] reporting the prevalence of malnutrition higher among older children than younger ones.

In the present study, the prevalence of underweight was 51.2% and 44.4% in male and female children respectively (P> 0.1) compared to 43.8% and 30.1% respectively as reported by Anand et al (1999)[8] . Mian et al (2002)[7] and Suvarna and Itagi (2009) [6] also reported no sex difference in prevalence of underweight while Shariff et al (2000) [9] reported higher underweight in boys and Shakya et al (2004) [10] reported higher underweight in girls.

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 ≥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) [11] and higher than the findings of Bharati et al (2008) [12] who found overweight (3.1%) and obesity (1.2%) in school going children (a total of 4.3%) and Jafar et al (2008) [13] who reported the prevalence of overweight and obesity as 3% in Indo Asian school aged children.
The prevalence of overweight and obesity in 5-9 years and 10-14 years age group was found to be 19.7% and 8.3% respectively (P< 0.001) which is in contrast to the findings of Kumari (2005) [14] who reported that the mean weight of the children increased with age in both the sexes.

The prevalence of overweight and obesity in males and females was found to be 13.7% and 13.2% respectively (P> 0.5) as compared to 6% and 5.6% respectively as reported by Shariff et al (2000) [9]

In the present study,the overall prevalence of stunting in 5-14 year old girls and boys was found to be 32.3% and 29.9% respectively. The overall prevalence of stunting in 5-14 year old children was found to be 31% which is lesser than 38.5% reported by Anand et al (1999) [8] The prevalence of stunting in the present study is higher than 29.7% and 26.1% as reported by Malhotra and Passi (2007) [4] and Bisai et al (2008). [15]

CONCLUSION:

There is a high prevalence of both malnutrition as well as stunting amongst school aged children and adequate corrective measures should be promptly taken at all levels to address this grave problem in this extremely important age group.

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