

Research Article

Nutritional status and morbidity among school going children: A scenario from a rural India

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Abstract: School health has been regarded as a high priority intervention in developing countries. However it has not been prioritized in India for many years. Malnutrition is one of a major public health concern affecting a significant number of school children influencing their health, growth and development and school academic performance. The objective of this study was to find out the nutritional status and morbidity pattern in school going children. A cross sectional descriptive study was conducted using a structured questionnaire and anthropometric measurements to assess underweight, stunting and thinness for 561 children at 5 to 18 years age, including 285 boys and 276 girls at Dhaura Tanda, Bareilly district, Uttar Pradesh. The prevalence of malnutrition was calculated using World Health Organization (WHO) Anthro Plus software. This study shows that prevalence of under-nutrition in both male and female was 44.56 and 37.32% respectively. The prevalence of chronic malnutrition (stunting) in male was 26.31% and in females was 21.37%. The prevalence of acute malnutrition in both males and females according to the BMI-for-age was 38.24% and 34.05% respectively. The most common morbidities were upper respiratory tract infection 240 (42.78%), diarrhea 81 (14.44%), carbuncle/furuncle 78 (13.90%) and scabies 63 (11.23%). Malnutrition in the form of underweight, stunting and thinning were 41.00%, 23.28% and 36.18% respectively among school going children. URTI & Diarrhea were the most common morbidity.

Keywords: Cross-sectional study, Underweight, Stunting, Thinness, World Health Organization (WHO) Anthro Plus

INTRODUCTION

Nutritional status is the condition of health of an individual as influenced by nutrient intake and utilization in the body. Malnutrition is major public health problem in developing countries. Freedom from hunger and malnutrition is a basic human right and their alleviation is fundamental prerequisite for human and national development. Usually referred to as silent emergency, it has devastating effects on children, society and future humankind.

Although the World Bank has included school health as one component of its essential public health package for cost effective health program, the nutrition and health of school- age children in the developing world has received a little attention [1]. WHO in 1997, developed 10 recommendations for school health, and initiated a global school health initiative in ten countries, of which 8 were developing countries [2]. Despite such initiatives, school health has not been focused on in India for many years and donor initiated school health projects have come and gone sporadically over the decades.

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 school age period is nutritionally significant because this is the prime time to build up body stores of nutrients in preparation for rapid growth of adolescence. Nutrition plays a vital role, as inadequate nutrition during childhood may lead to malnutrition, growth retardation, reduced work capacity and poor mental and social development [3]. In children, protein/calorie deficient diet results in underweight, wasting and lowered resistance to infection, stunted growth and impaired cognitive development and learning.

Under nutrition continues to be a primary cause of ill-health and premature mortality among children in developing countries [4]. Under nutrition among children is prevalent in almost all the states in India [5]. The children living in rural areas of India disproportionately suffer from under nutrition compared with their urban counterparts [6].

The best global indicator of children's well being is growth. Poor growth is attributable to a range of factors closely linked to overall standards of living and the ability of populations to meet their basic needs, such as access to food, housing and health care. Assessment of growth is the single measurement that best defines the nutritional and health status of children, and provides an indirect measurement of the quality of life of the entire population.

According to modern concepts, school health service is an economical and powerful means of raising community health and more important in future generations. By simply doing periodic medical examination and daily morning inspection of students, we can detect many more problems and treat accordingly. The health problems of students vary country to country. The most prevalent health problems are malnutrition, infectious disease, intestinal parasites, and diseases of skin, eye, ear and dental caries.

Keeping this in view, this study was carried out with the objective to assess the nutritional status and morbidity pattern among school going children of Bareilly District, UP. This age group is on the threshold of adulthood on whom the progress and welfare of the nation depends.

METHODOLOGY

A hospital based cross sectional study was carried out in the field practice area of rural health training centre (RHTC), Dhaura Tanda, Dept. of Community Medicine, SRMS Institute of medical sciences, Bareilly. A minimum sample size of 561 school children (5-18 yrs) was selected for study. The study was conducted from month of July to September 2013. The methodology comprised of interview and physical examination. Socio-economic status (SES) is determined by using Modified Prasad's scale [7]. The information was collected on pre designed and pre tested proforma.

WHO anthropometric classification was used for the assessment of malnutrition. Based on the age, body weight and height, a number of indices such as weight-for-age, height-for-age and BMI-for-age have been suggested⁸. The children are classified using three categories: 'underweight' (low weight-for-age), 'stunting' (low height-for-age) or 'thinning' (low BMI-for-age). Low anthropometric values are those more than 2 SD away from the CDC 2000 (Centers for Disease Control and Prevention) standards [8-10].

Underweight is defined as low weight-for-age and it reflects past (chronic) and present (acute) undernutrition. Children with z-scores < -2.00 are said to be underweight.

Stunting is defined as a low height-for-age for children, and it measures the past (chronic) child undernutrition. Children with z-scores < -2.00 are said to be stunted.

Thinning is defined as low BMI-for-age for children, and it is a measure of current or acute undernutrition. Children with z-scores < - 2.00 are said to be thinned.

Data compilation and analysis

Epi-info software 3.4.1 was used in the analysis of the data with use of MS Excel. p value was used to determine the relation between variables. Data of the nutritional survey was assessed by using WHO Anthro software for personal computers, version 3.1, 2010 [11].

Criteria for age and diagnosis

Exact age of the child was established from birth certificate/ school identification card, immunization card or recall method (to the nearest month using calendar of local events). Diseases were accepted as such as diagnosed by pediatrician, skin specialist and medical officer.

Referral Services

Those who were very sick requiring emergency treatment were referred to emergency unit of SRMS IMS Bareilly.

Inclusion criteria

Children of 5-18 year attending outpatient department (OPD)

Exclusion criteria

Children who were seriously ill, too agitated & unwilling for anthropometric measurements were excluded from the study.

RESULTS

A total of 561 school age children participated in the study. Out of them 285 (50.80%) were boys and 276 (49.20%) were girls between the age of 5 to 18 years. Table 1 show that 41.00% children were underweight, 23.88% children were stunted and 36.18% were thinned. Prevalence of malnutrition was comparatively more among boys than girls.

Among malnourished children, males dominate the females while the reverse in the case of normal children. According to weight for age 44.56% boys and 37.32% girls were found to be undernourished. As per their height for age, 26.32% boys and 21.38% girls were stunted and as per BMI for age, 38.25% boys and 34.07% girls were thinned. Here association of malnutrition with normal children was found statistically non-significant ($p > 0.05$).

Table 1: Percentage of underweight, normal weight and over weight in study population

Perc entile	Weight/Age (%)			Height/Age (%)			BMI/Age (%)		
	Boys (%)	Girls (%)	Total (%)	Boys (%)	Girls (%)	Total (%)	Boys (%)	Girls (%)	Total (%)
<3	127 (44.56)	103 (37.32)	230 (41.00)	75 (26.32)	59 (21.38)	134 (23.88)	109 (38.25)	94 (34.07)	203 (36.18)
3-97	154 (54.04)	163 (59.06)	317 (56.51)	191 (67.01)	201 (72.83)	392 (69.52)	172 (60.35)	179 (64.86)	351 (62.56)
>97	4 (1.40)	10 (3.62)	14 (2.49)	19 (6.67)	16 (5.79)	35 (6.24)	4 (1.40)	3 (1.08)	7 (1.25)
Total	285 (50.80)	276 (49.20)	561 (100.0)	285 (50.80)	276 (49.20)	561 (100.0)	285 (50.80)	276 (49.20)	561 (100.0)
	P value 0.08			P value 0.17			P value 0.30		

Table 2: Age and gender wise distribution of malnourished study subjects

AGE (Years)	Under Weight			Stunting			Thinness		
	Boys (%)	Girls (%)	Total (%)	Boys (%)	Girls (%)	Total (%)	Boys (%)	Girls (%)	Total (%)
5-9	78 (61.42)	59 (57.28)	137 (59.56)	50 (66.67)	27 (45.76)	77 (57.46)	73 (66.97)	54 (57.44)	127 (62.56)
9-13	25 (19.68)	28 (27.18)	53 (23.04)	8 (10.67)	11 (18.64)	19 (14.07)	14 (12.84)	20 (21.27)	34 (16.75)
13-18	24 (18.90)	16 (15.53)	40 (17.39)	17 (22.66)	21 (36.59)	38 (28.35)	22 (20.18)	20 (21.27)	42 (20.69)
Total	127 (55.22)	103 (44.78)	230 (41.00)	75 (55.97)	59 (44.03)	134 (23.88)	109 (53.69)	94 (46.31)	203 (36.18)

Table 2 shows that most of the children belonging to 5-9 year age group were more

malnourished. Prevalence of stunting & thinning among boys of 5-9 years age group were same.

Table 3: Distribution of study subjects according to morbidities

Common diseases	Boys n=285	Girls n=276	Total (%)n=561
Abdomen pain	6	16	22(3.92)
Carbuncle/Furuncle	45	33	78(13.90)
Defective vision	7	4	11(1.97)
Constipation	2	0	2(0.36)
Dental caries	1	5	6(1.07)
Diarrhea	40	41	81(14.44)
Hernia	2	0	2(0.36)
Measles	3	2	5(0.89)
Otitis media	8	3	11(1.97)
Scabies	40	23	63(11.23)
TB	2	2	4(0.71)
Trauma	2	1	3(0.53)
URTI	114	126	240(42.78)
Vitilago	3	9	12(2.14)
Vomiting	3	4	7(1.25)
Worm infestation	7	7	14(2.50)

Various illnesses were observed among the school children at the time of examination. Majority of the children were suffering from upper respiratory tract

infection 240 (42.78%) followed by diarrhea 81 (14.44%), carbuncle/furuncle 78 (13.90%) and scabies 63 (11.23%).

Table 4: Distribution of morbidities according to socio-economic status

Common diseases	SES-I n=26	SES-II n=31	SES-III n=62	SES-IV n=212	SES-V n=230	Total (%) n=561
Abdomen pain	1	1	3	5	12	22(3.92)
Carbuncle/Furuncle	7	4	10	33	24	78(13.90)
Defective vision	0	0	2	5	4	11(1.97)
Constipation	0	0	0	2	0	2(0.36)
Dental caries	3	0	0	1	2	6(1.07)
Diarrhea	0	5	7	31	38	81(14.44)
Hernia	1	0	0	1	0	2(0.36)
Measles	0	0	0	1	4	5(0.89)
Otitis media	1	0	1	3	6	11(1.97)
Scabies	7	2	8	17	29	63(11.23)
TB	0	0	0	1	3	4(0.71)
Trauma	0	0	0	2	1	3(0.53)
URTI	5	17	27	95	96	240(42.78)
Vitilago	0	0	1	6	5	12(2.14)
Vomiting	0	0	0	5	2	7(1.25)
Worm infestation	1	2	3	4	4	14(2.50)

According to B G Prasad classification, as the socio-economic status of the children increases, the number of morbidities increases. The prevalence of morbidity was highest in children belonging to socio-economic class IV & V, which is similar to study done by Neelu Saluja *et al.*[12].

DISCUSSION

Malnutrition is associated with about half of all child deaths worldwide. Malnourished children have lowered resistance to infection; they are more likely to die from common childhood ailments like diarrheal diseases and respiratory infections; and for those who survive, frequent illness saps their nutritional status, locking them into a vicious cycle of recurring sickness, faltering growth and diminished learning ability. Most of the studies on malnutrition are done among children under five. In the present study, an attempt was made to find the prevalence of malnutrition and morbidity pattern among school going children of 5 – 18 years age group in Bareilly district of UP. UP registers one of the high child malnutrition rates in India. India is a rural country where most of population lives in villages.

In the present study, the overall age and sex combined prevalence of underweight, stunting and thinness were 41.00%, 23.28% and 36.18%, respectively. The rates of malnutrition in the present study were higher than those reported by K Bose *et al.* [13] among school aged children.

School health surveys give excellent chance to screen a huge number of pediatric populations with minimum resources. The survey shows that prevalence of most common morbidities were URTI (42.78%), diarrhea (14.44%), carbuncle/furuncle (13.90) and scabies (11.23%) in both sexes in school age children. Similar finding of URTI prevalence (38.2%) was found in urban school children by Mayavati *et al.* [14].

The proportion of malnourished is slightly more among boys than girls. 44.56% of boys and 37.32% of girls were malnourished in the selected 561 study subjects. Studies conducted in Ecuador in 1999 [15] and in Tanzania in 2000 [16] shows boys were more commonly affected than girls. The female children from very poor families do not attend hospital and this could be the reason for slightly low prevalence of malnourishment among girls compared to male children.

CONCLUSION

It is clear that the problem of malnutrition in India is of alarming magnitude. A major part of this problem is contributed by rural population. Tackling malnutrition in rural area requires a holistic approach, especially when targeting populations of school children. The health and nutritional standards of school going children in this study were found to be unsatisfactory. Among different morbidities; URTI and diarrhea is found most common morbidity.

The present study put more emphasis on the need for initiation of school health program in the school with more on prevention of disease like respiratory, diarrheal, scabies infection/infestation and improvement of their nutritional status. The development of a country depends upon the development of children thus; if we help these children today the nation will get civilized citizen tomorrow.

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