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A cross-sectional study to assess prevalence of malnutrition in school children 6-12 years of age of Bikaner, Rajasthan

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Abstract

Background: Malnutrition is one of the most important global health problems, affecting large numbers of children in developing countries. Undernutrition alone is responsible for more than one-third of child deaths globally and accounts for 11 percent of the global burden of disease. The prevalence of underweight children is 47% in India is among the highest in the world. The objective of this study is to determine the prevalence of malnutrition among school going children.

Method: A cross-sectional study was carried out among 300 school children in the age group 6 to 12 years from public and private schools in Bikaner district of Rajasthan from May'2015- October'2015 with the objective to assess prevalence of malnutrition. The sampling method used was Stratified Random Sampling. The study tool used was a pre-tested questionnaire. Data analysis was performed with help of SPSS17.0.

Results: The prevalence of underweight, overweight and obesity (based on BMI for age) was found to be 30.0% and 18.33 and 1.33% respectively. Hence overall prevalence of malnutrition was found to be 49.66%.

Conclusion: Around half of study population is affected from malnutrition, which requires urgent and prompt interventions simultaneously at various levels- family, community and national level.

Keywords: Malnutrition, school children, public-private.

1. Introduction

Malnutrition is one of the most important global health problems, affecting large numbers of children in developing countries [1]. Globally, malnutrition is an underlying or associated cause in at least half of all childhood deaths. Undernutrition alone is responsible for more than one-third of child deaths globally [2] and accounts for 11 percent of the global burden of disease. It is more prevalent in low and lower-middle income countries [3]. Malnutrition among school age children is a major public health concern. More than 200 million school age children are stunted and underweight; about one billion school children will be growing up by 2020 with impaired physical and mental development [4]. As of 2005, pediatric malnutrition is a risk factor for 16% of the global burden of disease and for 22.4% of India's burden of disease. The prevalence of underweight children is 47% in India is among the highest in the world, and is nearly double that of Sub-Saharan Africa with dire consequences for morbidity, mortality, productivity and economic growth [5].

As today's children are the citizens of tomorrow's world, their survival, protection and development are the prerequisite for the future development of humanity [6]. Good nutrition during school age is critical to cover the deficits suffered during childhood. Dietary intake with respect to adequate availability of food in terms of quantity and quality, ability to digest, absorb and utilize food and the social discriminations against girls can greatly affect the adequate nutrition of these children (WHO 2006) [7].

2. Need of study

In the purview of above mentioned facts it is well obvious that undernutrition is a serious concern for our nation. It jeopardizes children survival, health, growth and development. Along with there are very few data available on nutritional status of school children in Bikaner district. Therefore there is a felt need to study malnutrition and its epidemiology in depth.

3. Material and Methods

A descriptive cross-sectional study was carried out among 300 school children (150 each from public & private school) in the age group 6 to 12 years in Bikaner district, Rajasthan from May 2015 to Oct'2015 with the objective to assess prevalence of malnutrition and to compare the nutritional status among public & private school children. Stratified Random Sampling technique was used to select the study population. The study tool used was a pre-tested questionnaire. The anthropometric measurements were taken following the standard techniques recommended by

Jelliffe [8]. Nutritional status of children was assessed through standardized indices (BMI for age).

4. Statistical analysis

Data entry and statistical analysis was performed with the help of Microsoft Excel and SPSS version 17. Continuous variables were presented as mean and standard deviations, while categorical variables were presented as number and percentage. Suitable statistical tests were used to determine statistical significance.

5. Results

Table 1: Socio-Demographical Profile of study population

(N=300)

Variable	Level of variable	Frequency	Percentage (%)
Age Group	6-9 years	139	46.33
	10-12 years	161	53.67
Gender	Male	154	51.33
	Female	146	48.67
Religion	Hindu	268	89.33
	Muslim	29	9.67
	others	3	1.0
Type of School	Government school	150	50.00
	Private school	150	50.00
Socio-economic Status	I	38	12.67
	II	46	15.33
	III	82	27.33
	IV	127	42.34
	V	7	2.33
Type of family	Joint	92	30.67
	Nuclear	208	69.33

Table-1 shows that 46.33% children were in age group 6-9 years and 53.67% children were in age group 10-12 years. Out of total 300 study population, 154 (51.33%) were male and rest 146 (48.67%) were female. Most of children (89.33%) were Hindu. The majority of the study population (69.33%) was from nuclear family and only 30.67%

children were from joint family. 42.34% of the study population belonged to socio-economic status class IV, then in decreasing number of children in SES class III, II, and I and minimum no. of study population (2.33%) belonged to SES class V.

Table 2: Anthropometric measurement of the study population

Anthropometric Indices	Minimum	Maximum	Mean	Std. Deviation
Weight (kg)	14.00	59.00	28.21	7.94
Height (cm)	110.00	152.00	131.88	8.90
BMI (kg/meter ²)	7.30	28.85	16.04	3.55
Head circumference (cm)	45.00	57.50	52.90	2.34

The mean weight of the study population was found 28.21±7.94 kgs ranging from 14 kgs to 59 kgs, mean height was found 131.88±8.90 cms ranging from 110 cms to 152 cms, mean BMI was found 16.04±3.55 kg/mtr² ranging from

7.30 kg/mtr² to 28.85 kg/mtr² and mean head circumference of the study population was found 52.90±2.34 cms ranging from 45.0 cms to 57.50 cms.

Table 3: Comparison of Anthropometric indices of study population with WHO growth references

Age (years)	Mean Height (cm)		Mean Weight (kg)		Mean BMI(kg/meter ²)	
	Study population	WHO Reference	Study population	WHO Reference	Study population	WHO Reference
6	120.70±8.76	116.0	17.5±2.37	20.5	12.02±1.14	15.3
7	123.76±7.83	121.7	20.88±4.41	22.9	13.59±2.3	15.5
8	127.61±10.77	127.3	24.25±5.61	25.4	14.92±2.85	15.7
9	131.33±7.93	132.6	26.26±6.44	28.1	15.14±3.13	16.0
10	133.52±7.03	137.8	29.55±7.41	31.2	16.44±3.30	16.4
11	134.93±6.95	143.1	32.51±7.96	34.4	17.79±3.91	16.9
12	139.50±5.26	149.1	36.22±4.49	37.9	18.73±2.90	17.5

In present study, mean weight of the study population was less than WHO growth standards for all age group. Mean height was more than WHO references in age group 6 to 8 years and lower than WHO references in age group 9 to 12 years. Mean BMI was found to be less than WHO references in age group 6 to 9 years and higher than WHO references in age group 10 to 12 years.

Table 4: Nutritional status of the study population

Nutritional status	Number	Percentage (%)
Normal	151	50.33
Underweight	90	30.00
Overweight	55	18.33
Obesity	4	1.33
Total	300	100.00

The table shows that 90 (30%) children were found underweight for their age, 55(18.33%) were found overweight and 4(1.33%) were found obese. The overall prevalence of malnutrition (including underweight, overweight and obesity) was found to be 49.67%.

Table 5: Comparison of nutritional status between school children of public and private school

BMI for Age	Public school	Private school	Total
Underweight	74 (49.33%)	16(10.67%)	90 (30.0%)
Normal	49 (32.67%)	102 (68%)	151 (50.33%)
Overweight and obesity	27(18%)	32 (21.33%)	59 (19.67%)
Total	150 (50%)	150 (50%)	300 (100%)
$\chi^2=56.404$ at $df=2$, $p=0.000^*$			

The table shows that based on BMI-for-age criteria, 30% children were found underweight and 19.67% were overweight and obese. The prevalence of underweight was found more in public school children, while overweight and obesity was found more in children of private school. Statistically significant difference was found in type of school and nutritional status of school children ($p<0.05$).

6. Discussion

Keeping in view the importance of health status of school children, a onetime observational cross sectional study was carried out to assess the nutritional status of children of private and government schools of Bikaner city, Rajasthan.

In this study, equal proportion of the study population (50%) was taken public schools and private schools. Almost similar proportion of children among government and private schools was also observed in studies conducted by Singh R *et al.* (2009) [9] and Amruth M *et al.* (2008) [10].

In present study, study population comprised of school children of 6 to 12 years of age. Maximum (25.67%) children were in age group 10 years and minimum (3.33%) children were in age group 6 years. Almost similar age profile of the study population was observed in other studies conducted by Chowdhary SD *et al.* (2006) [11] and Al-mekhlafi MSH *et al.* (2005) [12].

In present study, the proportion of boys was greater (51.33%) than girls (48.67%). Similar gender composition of the study population was also observed in study by Singh R *et al.* (2009) [9] in Jhansi city (52.98% male and 47.02% females).

In present study, majority of the study population 208 (69.33%) were from nuclear family and only 92 (30.67%) children were from joint family. This is similar to study conducted by Hasan I *et al.* [13] and Singh A *et al.* [14] In which majority of children (55.40% and 54.29% respectively) were belonging to nuclear family.

In the present study, the prevalence of malnutrition among the school children was 49.67%. The prevalence of underweight, overweight and obesity was found to be 30%, 18.33% and 1.33% respectively. The prevalence rate of malnutrition was found to be 49.5% by Saluja Neelu *et al.* (2007) [15] in Meerut, 50%, in rural areas and 38% in urban areas by World Bank (2009) [16], 52% by Hasan I *et al.* (2011) [13] in Bangalore, 55% in Madhya Pradesh by UNICEF (2008) [17], 60.9% by Osei A *et al.* [18] in Garhwali Himalayan Villages of India and 61% by Shakya SR *et al.* [19] in Dhankuta town and Ineruwa town of Nepal. The reason for similar prevalence rate may be due to the economic as well as environmental similarities of all these places as all the above places where above mentioned studies were conducted have their major source of livelihood as agriculture, greater proportion of earning males than females, females having their role in society as a homemaker/ housewife only.

In present study, prevalence of malnutrition was significantly higher among government school children (67.33%) than private school children (32%). Nutrition Foundation of India (NFI) [20] in Delhi school children and Singh R *et al.* [9]. In school children of Jhansi city, also revealed that children from government schools were shorter and weighed less as compared to children from private schools and also as compared to CDC standards. The possible reason for this high prevalence of malnourished children in government schools may be that these children usually belonged to poor socio-economic classes and may have deficiency of balanced and nutritious food and having less knowledge about nutrition education.

7. Conclusion

This study revealed that around half of study population is affected from varying degree of malnutrition, and the malnutrition was found to exist more among government school children as compared to those in private schools, which calls for urgent and prompt actions at all levels.

8. Recommendations

Since malnutrition is the outcome of several factors, the problem can be solved only by taking actions simultaneously at various levels- family, school, community, national and international levels. It requires a coordinated approach of many disciplines- Nutrition, food technology, health administration, health education, marketing etc. It calls for a comprehensive programme of social development of entire country.

9. Declarations

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Conflict of interest: None declared

Ethical approval: The study was approved by ethical committee of Institution.

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