# **Research Article**

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# A descriptive cross-sectional study to assess prevalence of malnutrition in school children 6-14 years of age in rural and urban area of Bikaner, Rajasthan, India

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#### **ABSTRACT**

**Background:** Malnutrition affects the child's physical and cognitive growth and increases the susceptibility to infections consecutively having an adverse impact on economic growth of the country indirectly therefore with 39% of the world's malnourished living in India, we face a double jeopardy of malnutrition. The objective of this study was to determine the burden of malnutrition.

**Methods:** A descriptive cross-sectional study was carried out among 720 school children in the age group 6 to 14 years from urban and rural areas in Bikaner district of Rajasthan from July 2014-December 2014 with the objective to assess prevalence and types 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 and overweight (based on weight for age) was found to be 19.72% and 0.70% respectively. 9.86% of the study population was found to be stunted. Thinness and obesity (based on BMI-forage) was seen in 22.22% and 1.95% children. Hence overall prevalence of malnutrition was found to be 24.17%.

**Conclusion:** Around one fourth of study population is affected from malnutrition which calls for urgent and prompt action in term of Primordial and Primary prevention.

Key words: Malnutrition, School children, Rural-urban

## INTRODUCTION

Childhood is a period of rapid physical and mental growth and development. Children are building up new tissues constantly and replacing the old ones. Their nutritional requirements are higher per unit of body weight than those of adults. If children do not receive the nourishment they need, under nutrition and malnutrition of one type or other will inevitably result, the type and extent depending on the type and quality of nutrients lacking in diets.<sup>1</sup>

Malnutrition is basically cellular imbalance between the supply of nutrients and energy and the body's demand to

ensure growth, maintenance and specific body functions.<sup>2</sup> Thus, malnutrition is a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients. It comprises four forms- under nutrition, over nutrition, imbalance and the specific deficiency.<sup>3</sup> Malnutrition is not so silent emergency in India also. The global community has designated having the prevalence of underweight children by 2015 as a key indicator of progress towards the millennium development goal (MDG).<sup>4</sup>

Economic growth alone, though impressive will not reduce malnutrition sufficiently to meet nutrition target. End hunger, achieve food security and improved nutrition

and promote sustainable agriculture is one of the goals of sustainable development goal (SDG).<sup>5</sup>

Malnutrition is more common in India than in Sub-Saharan Africa. Every 3rd malnourished child in the world lives in India.<sup>6</sup> India ranks second only after Bangladesh with regards to the prevalence of underweight children in the world. India has 49% of underweight children which contributes to 39% of the world's underweight children.<sup>7</sup> Child malnutrition is responsible for 22% of India's burden of disease.

Given its health impact, education and productivity, persistent under nutrition is major obstacle to human development and economic growth in the country, especially among poor and the vulnerable, rural areas where the prevalence of malnutrition is highest. The children living in rural areas of India disproportionately suffer from under nutrition compared with their urban counterparts.<sup>8</sup>

The objective of the present study was to assess the nutritional status of schoolchildren attending schools covering both the urban and the rural areas of Bikaner, India.

This study is need because as written in the purview of above mentioned facts it is well obvious that under nutrition 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.

# **METHODS**

A descriptive cross-sectional study was carried out among 720 school children (360 each from urban and rural area) in the age group 6 to 14 years in Bikaner district of Rajasthan from July 2014-December 2014 with the objective to assess prevalence and types of malnutrition. The sampling method used was stratified random sampling. The study tool used was a pre-tested questionnaire.

In present study, the anthropometric measurements were taken following the standard techniques recommended by Jelliffe DB.<sup>3</sup> Nutritional status of children was assessed through standardized indices (height for age, BMI for age, weight for age).

## 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. Chi-square test was used to compare differences in categorical variables and

independent t-test and z test for continuous variables. P value <0.05 (at 95% confidence interval) was considered to indicate statistical significance.

#### **RESULTS**

Table 1: Distribution of study population according to socio-demographical profile (n=720).

Variable	Level of variable	Frequency	Percentage (%)
	6 years	36	5.00
	7 years	61	8.47
	8 years	61	8.47
	9 years	83	11.53
Age (years)	10 years	102	14.17
	11 years	81	11.25
	12 years	140	19.44
	13 years	92	12.78
	14 years	64	8.89
Condon	Male	380	52.78
Gender	Female	340	47.22
	Hindu	650	90.28
Religion	Muslim	64	8.89
	others	6	0.83
Residential	Urban	360	50.00
area	Rural	360	50.00
Socio- economic status class	I	48	6.67
	II	101	14.03
	III	216	30.00
	IV	337	46.81
	V	18	2.50
Type of	Joint	200	27.78
family	Nuclear	520	72.22

Table 1 show that maximum 19.44% children were in age group 12 years and minimum 5% children were in age group 6 years. Out of total 720 study population, 380 (52.78%) were male and rest 340 (47.22%) were female. Most of children (90.28%) were Hindu. The majority of the study population (72.22%) were from nuclear family and only 27.78% children were from joint family. Maximum (46.81%) 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 (2.50%) belonged to SES class V.

Table 2: Distribution of study population according to weight for age.

Weight for age	Frequency	Percentage (%)
Underweight (<-2SD)	142	19.72
Normal weight (-2SD to +2SD)	573	79.58
Overweight (>+2SD)	5	0.70
Total	720	100.00

In present study (based on weight-for-age criteria), majority of the study population (79.58%) were well nourished, 19.72% children were found underweight and 0.70% were overweight.

Table 3: Distribution of study population according to height for age.

Height for age	Frequency	Percentage (%)
Stunted (<-2SD)	71	9.86
Normal Height	649	90.14
Total	720	100.00

In present study, most of the study population (90.14%) was having normal height for age and 9.86% children were found to be stunted.

Table 4: Distribution of study population according to BMI for age.

BMI for age	Frequency	Percentage (%)
Thinness (<-2SD)	160	22.22
Normal BMI (-2SD to +2SD)	546	75.83
Obese (>+2SD)	14	1.95
Total	720	100.00

Table 4 shows that based on BMI for age, thinness was present in 22.22% children and 1.95% children were obese. The overall prevalence of malnutrition (including thinness and obese) was found to be 24.17%.

Table 5: Association between residential area and weight for age.

Weight	Rural	Urban	Total
for age	area	area	
Underweight	74	68	142
	(20.56%)	(18.89%)	(19.72%)
Normal	282	291	573
	(78.33%)	(80.83%)	(79.58%)
Overweigh	4	1 (0.28%)	5
t	(1.11%)		(0.70%)
Total	360	360	720
	(100%)	(100%)	(100%)

 $\chi$ 2 = 2.195 at df=2, p=0.334.

The table shows that based on weight-for-age criteria, 19.72% children were found underweight and 0.70% was overweight. The prevalence of both underweight and overweight was found to be more in rural area as compared to urban area. No statistically significant difference was found in rural and urban areas regarding nutritional status of school children (p>0.05).

#### **DISCUSSION**

The present study is an attempt to find the prevalence of malnutrition among school going children of 6-14 years

age group in Bikaner district, Rajasthan. This descriptive study was carried out during July 2014 to December 2014 among 720 school going children of public and private schools in urban and rural areas of Bikaner.

In this study, equal proportion of the study population (50%) was taken from urban and rural area of Bikaner District, Rajasthan. 50% of study population was taken from public schools and rest 50% was taken from private schools of Bikaner district. Almost similar proportion of children among government and private schools was also observed in studies conducted by Singh R et al and Amruth M et al. 9,10

In present study, study population comprised of school children of 6 to 14 years of age. Maximum (19.44%) children were in age group 12 years and minimum (5%) children were in age group 6 years. Almost similar age profile of the study population was observed in other studies conducted by Bose K et al, Fazili A et al and Al-Mekhlafi MSH et al. 11-13

In present study, the proportion of boys (52.78%) was higher than girls (47.22%). Similar gender composition of the study population was also observed in study conducted by Singh R et al in Jhansi city (52.98% male and 47.02% females). 9

In present study, 19.72% school children were found to be underweight, 0.70% was overweight and rest 79.58% children were normal. Almost similar prevalence of underweight was obtained in studies conducted by Mukherjee R et al and Puthia R (16.1% girls and 13% boys). 14,15 Much higher prevalence of underweight was found in studies conducted by Saluja N et al (49.5%), World Bank. 16,17 The reason of such vast difference in prevalence of underweight may be that these studies were conducted in different geographical areas which are different in their age and sex composition of the population, literacy status of parents, socio-economic status, food habits and dietary practices etc. Another reason for low prevalence of underweight in present study may be that in other studies, where prevalence of underweight was quite higher, different classification systems were used, e.g. Gomez's classification, IAP classification, NCHS standards etc. and mild underweight children were also included in the overall prevalence. While, in this study, WHO-Z score was used to define underweight. Only moderate and severe undernourished children were included in underweight.

In present study among 720 school children, 9.86% children were found stunted and rest 90.14% children were found having normal height (based on height for age). Almost similar prevalence of stunting was found in studies conducted by Fazili A et al, (9.25%). Osei A et al found much higher prevalence of stunting (56.1%) than present study. Stunting reflects long-term malnutrition, and is influenced by parental attitudes and child care practices accumulating over a long period of

time. The reason of vast difference observed in prevalence of stunting may be that these studies were conducted in different geographical areas which are different in their age and sex composition of the population, literacy status of parents, socio-economic status, food habits and dietary practices etc.

In present study, 24.17% children were found malnourished. Thinness was found in 22.22% children and 1.95% children were found obese. This finding is similar to studies conducted by Patil SN et al (16.8%). Significantly higher prevalence of thinness as compared to present study was reported by Navaneethan P et al (Thinness – 83%, overweight 0.39% and obese 0.06%). The comparatively low prevalence of malnutrition in this present study may be due to difference in sociodemographic profile of the study population, ethnic variation, socio-economic status, geo-climatic condition, food habits of the children etc.

In present study, 24.44% and 23.89% children were found malnourished in rural and urban areas respectively. No significant difference was found in rural and urban area (p value>0.05). Bose K et al and Unnithan A et al found a significant effect of area (rural) on nutritional status of school children. Bharati DR et al in their study in Wardha city, Central India found that urban residence was an important correlate of overweight/ obesity.<sup>22</sup> The possible reason for the similar prevalence of malnutrition in rural and urban areas in present study may be that that the rural area included in this study is one of the affluent village in Bikaner district, Rajasthan where people have easy access to nutritious food, basic civic amenities like safe drinking water, proper communication and transport facilities, health services, schooling, sports etc. and majority of children parents are well educated which may have beneficial impact on the growth and nutritional status of the children.

#### CONCLUSION

This study shows that malnutrition is widely prevalent in school children in rural and urban areas and around one fourth of study population is affected from malnutrition which calls for urgent and prompt action in term of primordial and primary prevention.

Recommendations (a) for all the school children: encouraging children for balanced diet consumption. They should be encouraged to eat more nutritious homemade food and seasonal fruits and vegetables in place of unhealthy packaged food; (b) For the caregivers of school children: nutrition education should focus on the selection of right kind of local foods and in planning of nutritionally adequate diets within the limits of their purchasing power. It should address the family as a whole and not just the women; (c) for the school authorities: education regarding health, personal hygiene and nutrition should be made part of the school

curriculum. Better implementation of mid-day meal programme.

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