

## NUTRITIONAL STATUS OF SCHOOL CHILDREN IN URBAN AREA OF VARANASI, UP, INDIA

Pragya Singh<sup>1</sup>, SC Mohapatra<sup>2</sup>, Hari Shankar<sup>3</sup>

### ABSTRACT

The school age population forms one fifth of the India' population, the future segment of the country. Malnutrition is still highly prevalent in developing countries. School children may also be at high nutritional risk, not only under-five children. However, their nutritional status is poorly documented, particularly in urban areas. The paucity of information hinders the development of relevant nutrition programs for schoolchildren. Therefore it is important to monitor and assess the nutritional and health status of this group and fortunately this group is easily accessible for nutrition monitoring and evaluation.

**Research Question:** - What is the mean nutritional status of school going children **Objective:** 1.To assesses the magnitude of malnutrition in primary school children using anthropometry 2.To determine adequacy of dietary intake of school children **Study design:** Cross-sectional survey. **Setting:** Government primary schools in urban area of Varanasi **Participants:** Primary school children. **Statistical Analysis:** Percentage and proportion. **Results:** Out of 100 surveyed children, more than half were girls and 46% were male. The study shows that 72 % children belonged to nuclear family and rest was joint family. Majority of the children mother's were educated up to 5<sup>th</sup> class level (36%). Study revealed that 13% children ate only one meal per day, while more than two third children ate more than one time, 17% children did not take milk at all. In our study more than 2/3<sup>rd</sup> children were found to be malnourished. Increasing trend of Mild and moderate malnutrition with increasing age was observed in both age groups, 6-7 year and 7-8 year respectively. While decreasing trend of severe grade malnutrition was found in my study. Over all severe malnutrition was found to be (19%). Severe stunting did not find in age group 6-7 year children. Protein consumption in all age group was less than RDA, although it was not remarkable increase with the increasing age from 6 years to 12 years. In the age group of 8-9 years it was just 50% of the RDA and after that comparatively decreases with age in relation to RDA. The trend shows slightly higher consumption of protein in female 20.36gm./d (mean) than male 18.87gm/d (mean). Fat intake was almost equal in all age groups Carbohydrates content in the diet of the school going children was less than the requirement in all age groups

**Key words:** Caste, religion, socio-economic status, education status, weight, height etc.

### INTRODUCTION:

Historically the science of nutrition developed in part from the study of disease entities brought about by inadequate diet. Nutritional status is the condition of health of an individual as influenced by the utilization of nutrients in the body.

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1. Research Scholar, 2. Professor, 3. Assistant Professor, Dept. of Community Medicine Institute of Medical Sciences, B.H.U., Varanasi

**Corresponding Author:** Pragya Singh, Research Scholar, Department of Community Medicine, Institute of Medical Sciences, BHU, Varanasi-221 005, Uttar Pradesh, E-mail: singhpragya333@gmail.com

Measurement of nutritional status indicates as individual over all nutritional status at a particular time and evaluates the adequacy of his recent nutrient intake (Shekin 1979). In developing countries like India various forms of malnutrition affect a large segment of population and both macro and micro nutrient deficiencies are of major concern. The percentage of underweight children in the country was 53.4% in 1992 it decreased to 45.8% in 1998 and rose again to 47% in 2006.<sup>(1)</sup> Based on the age and body weight and height, a number of indices such as height for age and weight for age have been suggested.<sup>(2)</sup> The children are classified using three categories 'Underweight' (low weight for age), 'stunting' (Low height for age) or 'wasting' (low weight for height). Low anthropometric values are those more than 2 SD away from the CDC 2000 (Center for Disease control and prevention) standards. Anthropometry is the single most universally applicable inexpensive and noninvasive method available to assess the size, proportion and composition of human body (WHO 1995). Several studies have been conducted and many continuing on the nutritional status and health because malnutrition is still a major public health problem in our country. An estimate (2005) from developing world; approximately 146 million children are underweight out of these 57 million children live in India. Poor nutrition contributes to weak undernourished bodies and poor mental and physical growth (Rohana Begum 1991). In order to take a rational decision on the need for nutritional support for an individual assessment of nutritional status is very necessary. There are various studies on the growth and nutrition monitoring of under five children but the studies on the children of school age group are not many. There are various types of health and nutrition programs running in our country time to time, but their progress and achievement found very slow and incomplete. These services are also very limited to few favored schools. If we want that these school age group to reach adulthood in a healthy state, it becomes very necessary to provide target services with political commitment so that their nutritional status is improved.<sup>(3)</sup> Nutritional status of an individual is often the result of many interrelated factors. It is influenced by the adequacy of food intake both in terms of quality and quantity and also by the physical health of the individual.<sup>(4,5)</sup> Lien, Jacobs and Kiepp (cited in before et al, 2006) report that adolescents from dietary habits affecting weight status that will persist into adulthood.

The study was undertaken with following objectives- To assess the nutritional status of primary school children using anthropometry and to determine the adequacy of dietary intake of school children.

## **METHODOLOGY**

A cross sectional study in which we explored nutritional status in primary school age children was conducted from January to April 2012 in urban schools of Varanasi district. Schools were selected randomly and one section out from one class was also selected randomly. All respondents of one section were interviewed. A predesigned and pretested questionnaire was used to interview the study participants to elicit information on family characteristics like residence, religion, type of family, education of parents were noted. Questionnaire was pretested and necessary modifications were made in the questionnaire before starting the study. Informed consent were taken from the principle of the schools as well as parents/guardian of the participants prior to inclusion into the study Dietary assessment was also calculated by -24hour Recall Method. Information on some

background characteristics like caste, religion, source of drinking water, environmental sanitation etc was noted. The anthropometric measurements like weight, height of study subjects was also taken.

**RESULTS**

The table-1 shows that out of hundred respondents the maximum 39% were moderately malnourished followed by 33% mildly malnourished. Overall only 9% were normal. In the age group of 10-12 years 1 child was normal, while 13 (43.33%) were moderately malnourished followed by 12 (40.00%) and 1 (3.33%) were severely and mildly malnourished respectively. In the age group of 8-9 year sixteen (45.61%) were mildly malnourished. In the age group of 6 to 7 years 5 (14.28%) were found to be normal.

**Table-1** : Nutritional status of study subjects according to Weight for age

Age group (yrs)	Normal children (90-110%)		Mild Malnutrition (75-89%)		Moderate Malnutrition (60-74%)		Severe Malnutrition (Under 60%)		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
6-7	5	14.28	13	36.11	12	34.28	5	14.28	35	35
8-9	3	8.56	16	45.61	14	40.00	2	5.61	35	35
10-12	1	3.33	4	13.33	13	43.33	12	40.00	30	30
Total	9	9.00	33	33.00	39	39.00	19	19.00	100	100

Gomez's classification

Table-2, shows that more than two third children were found to be stunted (79%). Our study indicated that over all prevalence of severely stunted children was 9.04%.Result shows that maximum prevalence of moderately and severely stunted children was found to be 12 (40.00%) and 2 (5.71%) respectively.

**Table-2** : Nutritional status of study subjects according to height for age (Gomez Classification)

Age group (yrs)	Normal children (>90%)		Mild Malnutrition (87.5-95.0%)		Moderate Malnutrition (80-87.5%)		Severe Malnutrition (<80%)		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
6-7	9	25.71	19	54.28	7	20.00	-	-	35	35
8-9	8	22.85	15	42.85	10	28.57	2	5.71	35	35
10-12	4	13.33	13	43.33	12	40.00	1	3.33	30	30
Total	9	9.00	33	33.00	39	39.00	19	19.00	100	100

The table-3, shows that maximum illiterate mothers belonged female children 18 (39.13%) followed by male 16 (29.62%). But if we see the highest educational level among mothers it was found that 5 (10.86%) females mother were educated up to 8<sup>th</sup> grade while males mother were 3 (5.55%). Although male children whose mothers educated up to 5<sup>th</sup> grade were found to be 35(64.81%) followed by female's mother were 23 (50.00%). If we see the educational levels of father's majority of fathers were like that of mothers up to 5<sup>th</sup> grade which was found to be 22 (40.74%) and 16 (34.78%) male and female respectively. If we see the total educational level of

fathers they were slightly more educated than mothers. Fathers were educated up to 12<sup>th</sup> grade which was 5 (9.25%) of male children's fathers and 7 (15.21%) were of female children's fathers.

**Table-3:** Distribution of children according to education of mother and father

Sex of Children	Illiterate		Up to 5 <sup>th</sup> Grade		Up to 8 <sup>th</sup> Grade		Up to 10 <sup>th</sup> Grade		Up to 12 <sup>th</sup> Grade		Total	
	No	%	No	%	No	%	No	%	No	%	No.	%
<b>Education of Mothers</b>												
Male	16	29.62	35	64.81	3	5.55	--	--	--	--	54	54
Female	18	39.13	23	50.00	5	10.86	--	--	--	--	46	46
Total	34	34.00	58	58.00	8	8.00	--	--	--	--	100	100
<b>Education of Fathers</b>												
Male	11	20.37	22	40.74	10	18.51	6	11.11	5	9.25	54	54
Female	08	17.39	16	34.78	06	13.04	9	19.56	7	15.21	46	46
Total	19	19.00	38	38.00	16	16.00	15	15.00	12	12.00	100	100

The table-4, that consumption of energy (kcal/d) among school going children consumed lower amount of energy than RDA in all age group. It appears from the above undertaken study that malnutrition was found to be widely prevalent among school going children in different age groups. Examination of nutritional status according to standard deviation (SD) indicated that consumption of energy was not showing increasing trend as it should be. In the age group of 8-9 years energy intake showing decreasing trend (588.3±178.91 kcal/d) than in the age group of 6-7 years (618.70±142.66 kcal/d) and there was slight increase in energy intake in the age group of 10-12 years (714.95±167.04 kcal)

**Table-4:** Distribution of children according intake of different nutrients (Mean ± S.D.)

Age Group	Frequency	Energy (Kcal.)	Protein (gm.)	Fat (gm.)	CHO. (gm.)
6-7	35	618.70±142.66	17.72±4.81	8.64±5.01	113.26±36.33
8-9	35	588.30±178.91	20.00±8.28	9.64±4.39	126.40±42.12
10-12	30	714.95±167.04	19.45±5.85	9.64±3.95	135.35±39.21

The protein intake of children shows that protein consumption in all age group was less than RDA there was no remarkable increase with the increasing age from 6 years to 12 years. In the age group of 8-9 years it was just 50% of the RDA and after that comparatively decreases with age in relation to RDA.

The trend shows slightly higher consumption of protein in female 20.36gm./d (mean) than male 18.87gm/d (mean). There was remarkable deviation seen in the age group of 8-9 years (20±8.28gm./d) followed by 10-12 years (19.45±5.85gm.) and 6-7 years (17.72±4.81gm./d). The result shows that maximum thirty four percent of respondents were consuming 5to20 gram of protein in which majority 11% were of eight years of age.

Thirty percent respondents were consuming 10 to 5 gram of protein per day. In the age group of 8-9 years and 10-12 years fat intake was same  $9.64 \pm 4.39 \text{ gm./d}$  and  $9.64 \pm 3.95 \text{ gm./d}$  respectively the only difference was Standard deviation which was slightly higher in the age group of 8-9 years. Standard deviation was highest in the age group of 6-7 ( $8.64 \pm 5.01 \text{ gm./d}$ ). The other important finding was that maximum amount of fat that was twenty to twenty five gram was only consumed by two age groups that was six years and eleven years. Carbohydrates content in the diet of the school going children was less than the requirement in all age groups. The observed mean value and Standard deviation was not showing any significant difference in all age groups. Standard deviation was highest in the age group of 8-9 years ( $126.4 \pm 42.12 \text{ gm./d}$ ) followed by 10-12 years ( $135.35 \pm 39.21 \text{ gm./d}$ ) and 6-7 years ( $113.26 \pm 36.30$ ). The data shows that majority forty five percent of the respondents were consuming between hundred to hundred fifty gram carbohydrates. Thirty four percent respondents were consuming between 50 to 100 gram carbohydrates per day.

Out of 100 respondents 13 were taking one meal a day out of which 5 (9.25%) was boys and 8 (17.39) were girl. Maximum no. of respondents 41% were taking two meals a day in which 27 (50%) were boys and 14 (30.43%) were girls. 30% of children answered for taking three meals per day. 16% of children take more than three meals in a day. Data reveals that in all age group of school going children male children were compromised than female in taking meals.

**Table-5:** Sex-wise distribution of children according to meal per day

No. of meal per day	Boys		Girls	
	No.	%	No.	%
One	5	9.25	8	17.39
Two	27	50.00	14	30.43
Three	15	27.77	15	32.60
More	7	12.96	9	19.56
Total	54	99.98	46	99.98

## DISCUSSION

The study was carried out to check the nutritional parameters for the assessment of nutritional status of school children (age group of 6-12 years) of Lala Lajpatray Junior High School, BHU. For this, a group of 100 children were selected by random sampling method. The children were divided into 7 different groups based on their age; 6 year, 7 years, 8 years, 9 years, 10 years, 11 years, 12 years. The physical growth may occur in similar patterns but the rate may not necessary follow a strict chronological correlation. The genetic endowment role to fashion the pattern of growth in an individual which makes him/her distinct from each other. However environment has an equally important influence which expresses itself as individual differences.

The present study showed a growth lag in the basic parameters of height and weight as compared to the reference standards laid down by WHO amongst school age children. Assessment of nutritional status using WHO recommended anthropometric indicators revealed prevalence of malnutrition among all age groups of school going children which was also found in the study of Medhi et. al. (2006).<sup>2</sup> Our study shows 79% children were stunted and 91% were undernourished which was quite higher than the study conducted by Mukherjee et. al. (2008) 13.81% stunted and 9.87% was undernourished.<sup>3</sup> This difference may be due to small sample size and socioeconomic group of the children who were from lower socioeconomic group of the society.

Recent report by “Hungama” (Hunger & Malnutrition Organization) found illiterate mothers have 45% underweight and 63% stunted children.<sup>4</sup> Mother’s educational level was a reason for Nutritional status of children because no mother was educated more than grade 8<sup>th</sup> this kind of relation was also found in other studies like Mukherjee et. Al (2008).<sup>3</sup> The study of Handa et al (2008) shows significant relation for the height and weight in all age groups.<sup>5</sup> A list of different foods and frequency of consumption per day, week and fortnight or month etc. Along with likes and dislikes is useful in qualitative assessment of nutrient (Wadhwa A, Sharma S, 2003). Dietary intake was progressively lowering with increasing age as compared to Recommended Dietary Allowances in respect to all nutrient Protein, Energy, Carbohydrates and fat more or less. 13% children taking only one meal a day in our study which shows skipping of meals in these children may be another cause of under nutrition and short stature problem. According to the study (Franko 2008) greater meal frequency is associated with a lower risk of increase in body mass index.

## CONCLUSION

The study reveals a high prevalence of malnutrition among school going children in urban area of Varanasi. . Education of father and mother play a major role on age dependent anthropometric measure but the nutrient intakes of children are affected by education of the mother. The weight and height of boys were higher than the girls till the age of 10. Afterwards girls show increased weight to height ratio because of growth spurt earlier in them. The nutrient intake of boys and girls was lower than the recommended dietary allowance of ICMR 1991 in all the age groups with the difference being small during 6-7 years. For implementing a well designed programme for proper nutrition and health there is a need of comprehensive study of dietary intake, Clinical signs, and Biochemical data as well anthropometric measures. We can say there is urgent need to educate mothers as well as children for healthy living and healthy eating practices.

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