

# **Nutritional Health Status of Primary School Children**

## *A study in Bareilly District*

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### **ABSTRACT**

*The future of the society depends on the quality of life of the children. Nutritional needs change throughout life, depending on genetics, rate of growth, activity and many other factors. Nutritional status is the condition of health of the individual as influenced by the utilisation of nutrients. Nutritional needs also vary from individual to individual. The major objective of this research is “to assess the nutritional health status of primary school children of rural and urban areas”, by assessing their clinical health status and the quantity and quality of food intake by the children in both the areas of study. Four hundred children of 7-9 years of age were selected from the rural and urban areas of Bareilly district. They were assessed for nutritional health status by applying Clinical Nutrition Survey Chart; 24-hr recall method and Food Frequency Questionnaire. The nutritional deficiency signs and symptoms were observed more in rural children than the urban children. Nutrient intake and consumption frequency of all the 6 food groups was more among the urban children compared to their rural counterparts.*

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### **Introduction**

Since 1947, India has made substantial progress in human development. Still the manifestations of malnutrition are at

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unacceptable levels. Nineteen per cent of world's children live in India. India is a home to more than one billion people, of which 42 per cent are children. More broadly, malnutrition in India is in a state of silent emergency and thereby demands greater priority than ever before. The nutritional status of population is therefore critical to the development and well being of the nation (National Nutrition Policy, 1993 Government of India). The present status of malnutrition in India is that a devastating half of all the newborns are malnourished and 30 per cent are born underweight making them more vulnerable to further malnutrition and diseases. To evaluate nutritional status, assessors can use measure of body composition and development (anthropometric measurements) or measures of how well the body performs certain tasks (functional tests of nutrition status). Anthropometric measurements and functional tests useful in nutritional assessment indicate that each measurement depends on adequate nutrition. Poor growth in children indicates malnutrition. Malnutrition is an impairment of health resulting from deficiency of calories and/or more essential nutrients, and over nutrition, which is an excess of one or more nutrients and usually of calories.

Under nutrition is a major public health problem worldwide, particularly in developing countries (Onis et. al.). One third of the children under 5 years old worldwide are moderately or severely undernourished. Under nutrition impairs physical, mental and behavioural development of millions of children and is a major cause of child death (World Bank, 1993, Falkner, 1991).

Shrivastava, Rahul (2008) - according to 'National Sample Survey Organisation', twenty per cent people in rural India earn only ₹ 12 a day, of which each person spends just ₹ 7 on food. In Orissa and Chhattisgarh, 44 per cent people suffer from such a devastating situation. Ever wondered why people migrate from villages to cities? The survey says life is a shade better in urban India where 22 per cent people spend ₹ 19 daily. In urban Bihar, 56 per cent live on this amount.

"Nations where the human resource is undervalued and material resources are overvalued always remain poor." India stands 25th on the Global hunger Index with 46 per cent of underweight children below 5 years of age. (State of World Children, 2008).

This perhaps holds good especially for a State like Uttar Pradesh which, with a population of about 18 crore, is home to about one-sixth of country's population. Every sixth malnourished child in India lives in U. P. Fifty Seven per cent children born to malnourished mothers are underweight. In Uttar Pradesh the under- nutrition figure is as high as 72 per cent.

Therefore, the major objective of the present study is to assess the nutritional health status of the primary School Children in the rural and urban areas of Bareilly district.

### **Methodology**

The study was undertaken with the objective "to assess the nutritional health status of children in Bareilly district". Assessment of nutritional status is the first step in the formulation of any public health strategy to combat malnutrition. The children with in 7-9 years of age were selected randomly from the identified schools. Two hundred children from rural and urban areas each constituted the total sample of 400. Three tools were used in the study to assess the nutritional health status- Clinical Nutrition Survey Chart, 24-hr recall method, Food frequency questionnaire.

Clinical examination is commonly used in survey, since it is relatively simple and do not call for sophisticated equipment. It reveals the anatomical changes due to malnutrition that can be diagnosed by the naked eyes.

24-hr recall method is generally used by dietician to obtain a general picture of person's food intake. It is used to elicit an accurate picture of the diet history. In 24-hr recall method, the actual food and drink consumed in the immediate past 24 hours is recorded. Sometimes, a longer period may be used. The recorded food consumed in the last 24 hours is then converted to the nutrients available in each food item used in preparing it and then compared with the Recommended Dietary Allowances.

Food Frequency Questionnaire is either interviewer administered or self-completed. A detailed questionnaire includes the list of foods and the subject answers as to how often and in what quantity each food is eaten per day, per week and per month. The collected information of the food consumed is then checked with the Recommended Dietary Allowances (RDA by ICMR, 1990). It gives an estimate of the amount and frequency of the various nutrients consumed by the individual.

## Results and Discussion

The results of the present study conducted on the primary school children are discussed below:

**TABLE 1**  
**Clinical Nutritional Survey Chart of Rural and Urban Children**

Clinical Signs	Category	Rural	Urban
General Appearance	Good	6%	97%
	Fair	45%	3%
	Poor	45%	-
	Very Poor	4%	-
Hair	Normal	37.5%	99.5%
	Loss of Luster	51%	0.5%
	Discolored & Dry	13.5%	-
	Sparse & Brittle	21.5%	-
Eye Discharge	Absent	99%	100%
	Watery	1%	-
	Mucopurulent	-	-
Lips	Normal	6.5%	98%
	Angular Stomatitis, Mild	65%	2%
	Angular Stomatitis, Marked	17.5%	-
Gums	Normal	94.5%	98.5%
	Bleeding	4.5%	1.5%
	Pyorrhoea	-	-
	Retracted	1%	-
Teeth	Absent	21%	98%
	Chalky Teeth	44%	2%
	Pitting of Teeth	8.5%	-
	Discoloured	26.5%	-
Skin	Normal	46.5%	99.5%
	Loss of Luster	49.5%	-
	Dry & Rough	4%	0.5%
	Hyperkeratosis	-	-
Bones	Normal	100%	100%
	Rickets		

**Source:** FAO/ WHO Expert Committee on Medical Assessment of Nutritional Status, WHO Tech. Rep. Ser. 258.

## Interpretation

Table 1, shows the percentage distribution of the nutritional deficiency signs amongst rural and urban respondents. The description of the rural children is as follows- **General Appearance:** A majority of the rural respondents (90%) were classified as fair, (45%) and poor (45%). **Eyes:**

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99 per cent of rural respondents had normal eyes with no presence of discharge, only 1 per cent having watery eyes. **Lips:** 65 per cent of the children were observed to suffer mild Angular Stomatitis and close to 17.5 per cent had marked Angular Stomatitis. **Gums:** were observed normal in 94.5 per cent of the rural respondents, while 4.5 per cent of them had bleeding gums. **Teeth:** 44 per cent of the rural children had chalky teeth confirming the deficiency of Calcium, 26.5 per cent had discolored teeth which could be a result of poor dental care. **Hair:** 37.5 per cent of rural children had normal hair. However, 51 per cent had dull hair or hair without luster. 13.5 per cent of the respondents had discolored and dry hair and 21.5 per cent had sparse and brittle hair. A not so encouraging hair condition of the respondents indicates a significant deficiency of protein amongst the rural respondents. **Bones:** were found normal. None of the children had Rickets or any other visible orthopedic problem. **Skin appearance:** was normal in 46.5 per cent, dull in luster in 49.5 per cent. The balance 4 per cent of the respondents had dry and rough skin. Hyperkeratosis was not observed in any respondent.

Table 1, also exhibits the status of urban respondents on clinical signs and symptoms. **General Appearance:** 97 per cent of the respondents appeared good while 3 per cent were fair. **Eyes:** All the respondents had healthy eyes with no discharge. **Lips:** 98 per cent of the respondents exhibited normal condition of lips and only 2 per cent of them had mild angular stomatitis. **Gums:** 98.5 per cent of the urban respondents had normal gums while a minor fraction, 1.5 per cent, had bleeding gums indicating lack of dental care awareness. **Teeth:** Fluorosis was absent in all the children while only 2 per cent had discolored teeth. **Hair & Bones:** Almost all the respondents had normal hair and bones. **Skin Appearance:** The skin appearance of urban respondents was normal. Only 0.5 per cent of the respondents had dry and rough skin which could be a result of the stringent climatic consideration/s.

**TABLE 2**  
**Percentage distribution of children according to deficient nutrient intake within last 24 hours**

S.No.	Nutrient	RDA*	Rural		Urban	
			% Deficient	Average Intake (g/day)	% Deficient	Average Intake (g/day)
1.	Protein (g/day)	41	20.0%	27	6%	34
2.	Fat (g/day)	25	15.3%	18	-	-
3.	Carbohydrates (kcal/day)	390	96.0%	249	53.3%	296

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4.	Energy (kcal/day)	1,950	54.0%	1,418	11.3%	1,650
5.	Calcium (mg/day)	400	76.0%	229	1.3%	186
6.	Iron (mg/day)	26	42.0%	16	70%	16

\* Recommended Dietary Allowance/sby ICMR 1990.

### Interpretation

The 24-hr recall method was used to find out the amount of essential nutrients intake by the respondents. The percentage of the rural and urban children deficient in the six major nutrients is given in Table 2. The table illustrates that 20.0 per cent rural children were deficient in **Protein** intake than the recommended amount (41g/day). The average intake by the deficient respondents was 27g/day. 15.3 per cent of the respondents did not consume the recommended amount of **Fat** (25g/day). The average consumption of fat by these respondents was 18g/day. A majority of the respondents (96.0%) had deficient **Carbohydrate** consumption, average of 249 kcal/day compared to 390 kcal/day recommended. **Energy** deficiency was exhibited by 54.0 per cent of rural respondents. **Calcium** is an important nutrient for the children of this age as they are growing children and calcium is required for the building and growth of stature. However, 76.0 per cent of rural respondents exhibited calcium deficiency. The average intake of calcium was 229 mg/day in spite of the recommended amount of 400mg/day. Also, 42.0 per cent of the rural respondents did not consume the daily recommended **Iron** (26 mg/day). Their consumption was limited to 16mg/day.

Among the urban children 6 per cent of the respondents exhibited deficient consumption i.e. only 34 g/day of their daily requirement of **Protein** (41 g/day). All urban respondents were well fed with **Fats**. **Carbohydrate** was one nutrient on which both rural as well as urban respondents were found deficient with about 53.3 per cent urban respondents missing the recommended daily carbohydrate consumption of 390 kcal/day. The average consumption of carbohydrates was 296 kcal/day by them. 11.3 per cent of the urban respondents did not consume the recommended daily **Energy** requirement, as over half of the children were lacking carbohydrate intake. Proteins, fats and carbohydrates together make up for the daily requirement of energy. 1.3 per cent of the respondents were **Calcium** deficient and 70 per cent were not consuming the daily recommended amount of **Iron** (26mg/day). The average calcium and iron intake by the deficient urban respondents was 186mg/day and 16mg/day respectively.

The findings of the researcher in this particular study about the deficiency of nutrient intake amongst rural and urban children are well supported by a research article published in the **Mint, June 1, 2007**. The article states that the consumption of protein came down to 57.0 g/day in 2004-05 from 59.0 g/day during 1999-2000. There has always been a deficiency in the consumption of calories in rural and urban population since 1972. In urban India, protein consumption fell from 58.5 g/day to 57.0 g/day during the above stated period. Fat intake in rural areas fell from 36.0 g/day to 35.5 g/day and in urban areas it declined from 50.0 g/day to 47.5 g/day. A study conducted by Awasthi and Kumar in the year 1999 on 110 primary school children of Kumaon Hills, Uttaranchal reveals that the energy intake of more than half of the sample size was 50-75 per cent of the RDA standards.

**TABLE 3 (A)**  
**Percentage Distribution of Rural Children based on Frequency of Food groups' intake**

S.No.	Food Groups	Daily	Weekly	Twice a month	Monthly
1.	Pulses and Legumes	64%	22%	12%	2%
2.	Cereals	100%	-	-	-
3.	Milk & Milk products	44%	39%	-	-
4.	Green Leafy Vegetables	68%	26%	6%	0%
5.	Fats & Oils	56%	12%	-	-
6.	Meat, Fish & Poultry	19%	27%	5%	-

### Interpretation

Table 3 (a) details the frequency at which rural respondents consume various food groups constituents- 64 per cent of the rural respondents consume pulses and legumes daily, 22 per cent of the respondents consume it weekly, 12 per cent consume it twice a month and the balance 2 per cent of the respondents consumed pulses and legumes on a monthly basis. All the children consume cereals on a daily basis. These children may not be consuming all the cereals as a part of their daily diet, however, wheat and rice constitute staple food. Less than 50 per cent of the total rural respondents consume milk and milk products on a daily basis, about 44 per cent of them consume milk daily, 39 per cent consume it weekly, and the rest do not recall consuming milk and milk products. Though many of the respondents consume milk as a constituent of tea everyday, however, that is not considered as a source of rich lact-protein. Green leafy vegetables

are consumed by a fairly large number of rural respondents on a daily basis (68%), 26 per cent consume these weekly, and the balance 6 per cent consume them twice a month. Green leafy vegetables are grown and, therefore, readily available in rural destinations at economical prices than other vegetables and, therefore this could be one of the reasons of its higher consumption by rural respondents. 56 per cent rural children recalled consuming foods containing fat and oils like samosa, paratha, puri or any other fried food in their daily diet while 12 per cent consume it weekly. Fat is used for cooking food, however, the researcher wanted to know if respondents consume fat and oil from foods other than cooking oils as a part of their diet. 19 per cent of the rural respondents consumed non-vegetarian foods constituting either or a mix of meat, fish, poultry on a daily basis. 27 per cent of the respondents consume non-vegetarian foods weekly, while 5 per cent consume it only twice a month. All respondents didn't respond to this query, implying they could be vegetarians.

**TABLE 3 (B)**

**Percentage Distribution of Urban Children based on Frequency of Food groups' intake**

S.No.	Food Groups	Daily	Weekly	Twice a month	Monthly
1.	Pulses and Legumes	92%	8%	-	-
2.	Cereals	100%	-	-	-
3.	Milk & Milk products	96%	4%	-	-
4.	Green Leafy Vegetables	60%	3%	-	-
5.	Fats & Oils	92%	6%	2%	-
6.	Meat, Fish & Poultry	38%	16%	4%	-

**Interpretation**

Table 3(b) shows the percentage frequency of consuming various food groups for urban child respondents. The diet intake of the urban children was found to be good and better than their rural counterparts. Pulses and legumes were consumed by 92 per cent children on a daily basis while the rest consumed it weekly. Cereals were consumed by all the respondents on a daily basis, possibly in the form of chapatti/s. Milk was also consumed by a majority of respondents on a daily basis with only 4 per cent consuming it weekly. Green leafy vegetables were not found to be preferred by urban respondents as much as their rural counterparts. Only 63 per cent of the urban respondents recall consuming green leafy vegetables of which 60 per cent consumed it daily and 3 per cent consumed it weekly. Consumption of fats was high amongst urban respondents.

In addition to cooking oil/s they consume fats in the form of butter or ghee with chapatti, dal and also fried and junk food/s. 92 per cent of the respondents consumed visible fats daily. Only 58 per cent urban children recalled consuming non- vegetarian foods. 38 per cent consumed it daily (primarily eggs for breakfast), 16 per cent consumed these weekly and 4 per cent consumed these fortnightly. A research study is conducted.

### **Findings of the Study**

To meet the objective of the present study “To assess the Nutritional Health Status of Primary School Children in rural and urban areas” the nutritional health analysis tools were used and the status of nutritional health was assessed. On observing the rural children for any nutritional deficiency signs and symptoms, mild angular stomatitis, loss of luster of hair and skin indicates protein and energy deficiencies, chalky teeth shows calcium deficiency among them. They were also short of carbohydrates requirements. The urban children’s nutritional analysis shows a normal appearance; no prominent nutritional deficiency signs were seen. The urban children were also not meeting the RDA of carbohydrates and iron but the consumption was not poor enough to create deficiency in the body. The deficiency signs indicate the poor diet intake, inappropriate amount of food and non- nutritious food. They might tend to eat whatever is locally or cheaply available, a complete meal is lacking in their diet schedule. The urban children were lacking in iron, which indicates that the children might be reluctant in consuming iron rich food like green leafy vegetables, jaggery etc. whereas these are locally available and constitute the major proportion of the rural diet.

A research work is said to be successful if it can make a difference to the society or can bring a change in the ongoing practices. During the research the researcher realised that certain improvements by the Government of India, administrators and policy makers should be made in the ongoing welfare programme and new comprehensive programmes should be developed to improve the overall health of the children of India and elevate the position of India in the Human Development Index.

### **Implications**

The nutritional health analysis shows signs of deficiencies among the rural children. The frequency of essential food intake like milk and complex carbohydrates is also poor among the rural children

studied. Therefore, their energy requirement is not met by their daily diet. After doing this detailed study it is recommended that the supplementary meal provided by the Government under the mid-day meal scheme should be enough in portion and nutrition to support the daily Recommended Dietary Allowances given by ICMR, for the growing children of this age. The investigations indicate that the porridge, khichadi and rice puffs, generally given under the mid-day meal scheme do not suffice for the nutritional needs of the children, therefore the food with a mixture of highly nutritive or fortified by essential nutrients like Iron, Calcium and Carbohydrates should be distributed in schools or should be made readily available at subsidised rates.

It is not only the rural children but a nutritional gap is also seen among the urban children, hence imparting nutrition knowledge and follow-up of the running nutritional programme should be done. In the urban schools where children bring their own lunch boxes to schools, parents should be counseled about nutrition and a monthly diet plan should be advised to the parents according to the requirement of the child. This can keep a check as well as will help in modifying the diet of the child and the family as well. The government should have a budget to run a comprehensive nutrition education programme in all the schools.

The researcher recommends that the food provided to the children under Mid-day Meal programme should be a mixture of all the essential nutrients. It should be cooked by a trained cook in a separate cooking area, so that the students are not involved in cooking and the nutrients of the food are restored by applying appropriate cooking methods. The cooking utensils and the cooking area should be clean and well ventilated to maintain the hygiene.

Regular weight and height measurements should be taken in the school so that a regular check can be kept on the development of the children. Based on the need of the children of a particular school intervention programmes should be developed and implemented. The need of the date is to keep children free from all diseases and provide them a healthy and hygienic environment, so that the future of the country is secured.

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