

Original article

## **Nutritional Deficiency Disorders Among Tribal School Children**

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### **Introduction**

Malnutrition is responsible for high morbidity and mortality in Indian children, pre-school as well as school children who constitute particular victims. Children constitute nation's human resource. Early detection and prompt management are essential to reduce their mortality percentage. Today measures for better nutrition in tribal communities in hilly areas of India figure as one of the focus of Prime Minister's 20 point programme (1). It is well recognized that main cause for the wide prevalence of malnutrition among these people and in many developing countries are poor economic condition, low education standard and inadequate availability of food. The dietary and nutritional surveys so far carried out in India have been largely confined to the urban school children and limited studies have so far being carried out in rural areas.

Nutritional status of children can be assessed with important tools like clinical examination, anthropometric measurement, biochemical laboratory test and of all these; clinical examination is the simplest, most practical and essential part of the nutritional surveys. The present study was undertaken with these limitations to assess the rural tribal primary school children on the clinical parameters. For this purpose isolated easily accessible pockets of tribal groups in hilly areas of Satpura mountain ranges of Dhule district of Maharashtra were taken as study material.

### **Materials and methods**

The present study was carried out in tribal primary schools which were randomly selected. A total of 404 primary schools children of both sexes between 6-14 yrs of age (245 male & 159 female) were examined. The information age in complete years was obtained from school record. The weights were taken by weighing balance up to nearest 0.1 kg. A thorough clinical examination of children was done including anthropometrical measurements and other related factors for the nutritional status of

children. The signs of nutrition deficiency were recorded in Pre-designed and pretested proforma . The clinical signs and their interpretations were carried out as recommended by Jelliffe (2). A defect has been defined as any deviation from the normal, denoting from minor ailment to gross symptoms as per classification of Indian Academy of Pediatrics (3) and Hardward reference standards (4) of weight for age were used in classifying the children into different grades of protein energy malnutrition (PEM). An oral assessment of income was done by interrogating parents at their homes. The children were grouped according to Prasad's social classification (per capita income) using updated social classification of Indian families (5). The goiter grading was undertaken as per criteria laid by UNICEF-WHO-ICCIDD (6). Hemoglobin estimation was carried out by cyanmethamoglobin method, using Drabkin's reagent prior to separation of plasma (7). The sickling test was performed by standard method a Dithionite tube test. (8).

### **Results**

A total of 404 primary school children in the age group of 6-14 years were drawn from three tribal villages namely Dhadgaon, Mundalwald and Talai of Dhule District. The majority of school children were from low socioeconomic strata as per criteria of Prasad . The commonest health appraisal was varying degree of malnutrition(81.0 %) followed by nutritiorial anemia, (56.9%)( Table-I). Vitamins and other minor nutritional deficiency status accounted for 56. 9%. Similar health problems have been reported in earlier studies (9,10). The average weight of girls were relatively higher than that of boys. In consistence all grades of malnutrition were slightly more in male (59.05%) than in females (48.9%). The observations are in consistence with reported studies of under privileged rural school children reported by Nagtilak (11) and Kapil (12). After anemia, vitamin 'A' deficiency was observed the second most nutritional deficiency (17.82%) found with similar incidence in males and female. The commonest sign of Vitamin 'A' deficiency, very important cause of blindness seen in most of the cases, were conjuvitival xerosis and Bitot's spot in 35.28% of total cases. However not a single case of Keratomalacia was seen in study area. Vitamin 'B' complex deficiency was seen in 48 (11.88%) cases and angular stomatitis in 45(11.12%) and glossitis in 24 cases ( 5.94 %) in study area. Higher incidence has been reported by other studies (13,14) whereas lower incidence have been observed by Gopaladas (15). Vitamin 'C' deficiency was observed in total 13 cases (3.21%). Similar results have been reported by Rao (10) and higher incidence has been reported by Sundaram. (14). The signs of Vitamin 'D' deficiency were seen in 7 cases (1.17%) out of which Rachitic rosary was seen in 5 cases (1.23%), pectus carinatum or excavatum seen in (0.74%) of the total cases. Iodine deficiency disorders (IDD)was present in endemic proportion (32.9%) (Table II). There is not a single frank case of hypothyroidism or any cretine seen in the studied school children. The

incidence of sickle cell anemia was present in 16.3% of the children. Among all deficiency disorders nutritional anemia was encountered most commonly in children to the extent of 34.7%. Thus the children of tribal rural schools are mostly affected by poor nutritional status due to the economic and social constraints.

**TABLE-1**

**Magnitude, severity and PEM among tribal school children as per nutritional subcommittee of Indian Academy of Pediatrics IAP).**

S. No.	Nutritional Status	No. of Boys	%	No. of Girls	%	Total no. of Children	%
1.	81% of reference weight and above (Nutritionally Healthy)	32	13.1	45	28.3	77	19.0
2.	71% to 80%(Gr.II Malnutrition)	87	35.5	47	29.5	134	33.2
3.	61% to 70% (Gr. II Malnutrition)	104	42.5	55	34.6	159	39.4
4.	51% to 60% (Gr. III Malnutrition)	20	8.2	11	7.1	31	7.7
5.	Less than 50 % of reference weight (Gr.IV Malnutrition)	02	0.8	01	0.6	03	0.7
<b>Total Examined</b>		<b>245</b>	<b>60.6</b>	<b>159</b>	<b>39.4</b>	<b>404</b>	<b>100</b>

**TABLE -2**

**Prevalence of Vitamin & other nutritional deficiencies among tribal children**

S. No.	Deficiency sign/Symptom	No. of Boys	%	No. of Girls	%	Total No. of Children	%
1.	Vitamin A	43	17.6	29	18.23	72	17.82
	i) Conjunctival xerosis	43	17.6	29	18.23	72	17.82
	ii) Bitot's Spot	17	6.9	08	5.03	25	6.18
	ii) Corneal Opacity	01	0.4	01	0.62	02	0.49
2.	Vitamin B Complex	28	11.42	20	12.57	48	11.8
	i) Angular stomatitis	27	11.07	18	11.32	45	11.13
	ii) Glossitis	12	4.9	12	7.54	24	5.94
3.	Vitamin C	07	2.85	6	6.77	13	3.21
	i) Bleeding gums	07	2.85	6	3.77	13	3.21
	ii) Spongy gums	01	0.40	1	0.71	02	0.50
4.	Vitamin D	04	1.68	3	1.88	07	1.73
	i) Rachitic rosary	03	1.22	2	1.25	05	1.23
	ii) Pectus carinatum	02	0.81	1	0.62	03	0.74
	iii) Geneuavrous & valvus	02	0.81	1	0.62	03	0.74
5.	Anemia	141	51.7	81	61.8	222	50.9
6.	Iodine Deficiency disorders (IDD)	48	19.60	85	53.40	133	32.90

## **Discussion**

The study highlights the magnitude of nutritional status associated with morbidity pattern of Dhule district in Maharashtra. The study also reveals that the main problem of primary school children in tribal areas is of malnutrition. A total of 327 (81%) children were found clinically malnourished with 7.7 % suffering from Gr.III malnutrition. The girls were heavier than boys. It could be explained partly because of small sample size of girls compared to boys (245 males, 159 females). Secondly the girls involved in the study are in pubertal spurt (2). Major deficiency status seen in school children was anemia (56.9%), Iodine deficiency disorders (32.9%), Vitamin 'A' deficiency (17.8%), Vitamin 'B' complex deficiency (11.88%), Vitamin 'C' (3.21%), Vitamin 'D' deficiency and phrynoderma were also seen in few children. The tribal children are nutritionally neglected usually during their formative age (pre-school period) due to poor socio economic status or lack of awareness about balanced diet for proper nutrition. The fight against malnutrition is being envisaged by increasing awareness, rising standards of living by providing gainful employment, growth of social services and developments in agriculture and food technology.

## **Summary**

The present study was carried out in tribal school children belonging to Satpura mountain ranges North West Maharashtra to assess the nutritional status and associated disorders. There is paucity of literature of work done among tribal school children. The tribal primary schools were randomly selected, all together 404 school children (245 male and 159 female) of both sexes aged 6-14 years were examined. Malnutrition was graded as per classification of nutritional subcommittee of Indian Academy of Pediatrics. The varying grade of malnutrition accounted for 81% followed by nutritional anemia 56.9%. The vitamin deficiency mainly Vit. 'A' prevalent in 17.82%, while vit 'B' complex was only in 11.88%. The vit 'C' and 'D' were found deficient in very few children i.e. 3.21% and 1.75% respectively. Iodine deficiency disorders (IDD) was prevalent in endemic proportion (32.9%), whereas sickle cell anemia was observed in school children (16.3%). Malnutrition was observed more in male (60.6%) than in female (30.4%) school children. Malnutrition and other nutritional disorders make the children more susceptible to infection and thus not only contribute to increases mortality but also leads to retardation of physical and mental health which in turn, again contribute to increased morbidity. Thus a vicious cycle is setup for malnutrition leading on to less work capacity-leading to poor purchasing power leading on to further malnutrition. Under-nourishment imposed in the earlier age of development is more likely to have permanent effect. The results indicate that nutritional status is a proximate determinant of tribal children's nutritional status and should be considered in programme aiming at improving child health.

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