

## **Nutritional Adequacy of Boys in Orphanages**

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The importance of proper nutrition in child health is well recognized. However, children in India are most neglected and fail to receive the desired nutrition. The situation is even worse in case of inmates of orphanages. We report the adequacy of diet being served to boys in orphanages of Udaipur city.

### **Subjects and Methods**

All the orphanages located within the municipal limits of Udaipur city were identified. After obtaining permission from the concerned authorities, information about the age and sex of all the inmates was obtained. From this, it was observed that 84.6% of all children were boys. Hence, all the 118 school age boys (6-12 yr) residing in these orphanages constituted the sample.

For the assessment of nutritional adequacy, information on dietary intake was gathered using the "24 hours

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*Received for publication: July 26, 1994;*

*Accepted: April 28, 1995*

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recall method" for three consecutive days. For relatively monotonous diets, this method is satisfactory and less time consuming. Diet consumed by each subject was measured with the help of a standardized set of cups and spoons. The amount of raw ingredients was calculated from the data obtained on the measures of cooked food and compared with balanced diet(1). The nutritional composition of the diet was calculated in terms of raw weight with the help of food composition tables (2) and the results obtained were compared with the recommended dietary allowances for Indians in corresponding age groups(2). Students' 't' and 'z' tests of significance were used for statistical analysis(3).

### **Results**

The subjects had inadequate intake of almost all the food stuffs (*Table I*). Average amount of cereals consumed by the boys of different age group was 76.2-91.5% of the requirements, whereas intake of pulses was only 30% of the suggested quantities. The leafy vegetables were rarely supplied to the children but intake of other vegetables, was more than the recommended.

The milk intake by children was insufficient not meeting even half the daily allowances. Intake of fats and oils was observed to be 30-45% less than what it is suggested. Much lower intake of sugar than recommended was also seen. *Table I* shows that as age advances, the requirements were relatively less met. Food items like fruits, meat, fish and eggs were never included in the diet provided in the orphanages.

Table II shows the nutrient intake in the children. The protein intake by the children of all the age groups was almost equal. However, in view of recommended quantities, only the younger group (4-6 yr) had adequate intake. Energy and calcium intakes were also significantly low in all children. Average phosphorus intake was quite satisfactory. In contrast, all the children received significantly less than the recommended intake of iron. The intake of P-carotene in

7-9 yr old boys did not provide even one fifth of the quantities recommended. The intake of thiamine and riboflavin was adequate. In case of niacin, only the younger group of children had adequate intake. The intake of vitamin C was also inadequate at less than 30% of the recommended.

### Discussion

Our findings indicate the inadequate intake of almost all nutrients by the school

TABLE I—Average Daily Food Intake (g)

Food groups	4-6 yr (n=5)		7-9 yr (n=50)		10-12 yr (n=63)	
	Intake	*B.D.	Intake	*B.D.	Intake	*B.D.
Cereals	183.3	200	196.0	250	244.0	320
Pulses	19.4	60	19.0	70	21.1	70
Green leafy vegetables	-	75	1.5	75	0.8	100
Other vegetables	47.8		57.0		57.0	
Roots & tubers	29.0	50 <sup>+</sup>	35.0	50 <sup>+</sup>	43.0	75 <sup>+</sup>
Milk & milk products	100.0	250	94.0	250	58.3	250
Fats & oils	18.0	25	18.5	30	19.2	35
Sugar	8.0	40	9.7	50	8.2	50

\* B.D. - Balanced diet(1)

<sup>+</sup> Values represent the recommended intake of vegetables including roots and tubers.

TABLE II—Mean Nutrient Intake of Children

Nutrients	4-6 yr (n=5)		7-9 yr (n=50)		10-12 yr (n=63)	
	Mean ± S.E.	*RDA	Mean ± S.E.	*RDA	Mean ± S.E.	*RDA
Protein (g)	32.7 ± 2.8	30	33.2 ± 0.82 **	41	33.8 ± 2.5 **	54
Energy (Cal)	1041 ± 61.4**	1690	1092 ± 39.4**	1950	1153 ± 73.9**	2190
Calcium (mg)	255 ± 33.4*	400	305 ± 34.8**	400	395 ± 33.2**	600
Phosphorus (mg)	873.4 ± 63.6	1000	913 ± 106	1000	1007 ± 127.2	1000
Iron (mg)	10.8 ± 1.07**	18	14.7 ± 1.03**	26	16.8 ± 0.55**	34
β-Carotene (mg)	289 ± 50.2**	1600	392 ± 59.8**	2400	212.0 ± 46.4**	2400
Thiamine (mg)	1.1 ± 0.08	0.9	1.2 ± 0.04**	1	1.1 ± 0.07	1.2
Riboflavin (mg)	0.7 ± 0.17	1	1.0 ± 0.09	1.2	1.0 ± 0.02**	1.5
Niacin (mg)	11.5 ± 2.1	11	10.0 ± 0.36**	13	11.6 ± 0.08**	16
Vitamin C (mg)	11.0 ± 3.1**	40	10.6 ± 0.35**	40	12.6 ± 0.83**	40

\* RDA as suggested by ICMR(2); \* P <0.05; \*\* P <0.01

age orphan boys. This is a result of insufficient inclusion of different food items like cereals, pulses, milk and milk products, leafy vegetable, fats and oils and sugar in their daily diet.

Similar findings of inadequate nutritional intake are reported from orphanages in Iran(4) and Poland(5). In terms of nutrients, deficient intake of energy(4,6), calcium(4,5), iron(4) and p-carotene(4,6) in similar groups of children is documented. Contrary to other studies we however found a lower intake of sugar, protein and ascorbic acid and normal intake of vegetables.

Within the limited budgetary provisions in orphanages, inclusion of seasonal green vegetables and other low cost nutritious food items may result in adequate nutritional intake of these children.

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