Nutrition Profile of the Orphans : A Case Study in the Dhammarajika Orphanage of Dhaka City

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Introduction

Children belonging to poor socio-economic status are observed to be malnourished in rural Bangladesh[1]. The nutritional status of the orphans and destitutes are perhaps still worse. Besides food, they are deprived from the warmth of parents' affection which is an important factor for overall development of the children. In recent years, destibutes have started drawing attention of the goverment as well as of the NGO's, as revealed by the proliferation of orphan-ages and pathakali trust etc. in our country. The orphanages attempt to bring the destitute orphans back to a better life and provide them with all possible facilities for their well upbringing. They are given better food, housing, medication, education and facilities for sports and games compared to their earlier situation. Thus they are to lead their life in an organised and controlled situation, everyone being exposed to more or less similar dietary and environmental situations. In the present context it is all the more improtant to assass the nutritional status of the orphans in order to study the impact of organised institutional feeding and better hygienic condition on the nutritional status of these orphans who were consistently reported to be initially malnourished before they were brought to the orphanage.

Methods

In order to study the nutrition profile of the orphans the investigation was carried in Dhammarajika orphanage of Dhaka city between june and August 1988. This orphanage provides shelter, education and other facilities to 550 orphans belonging specially to Buddhist community. The investigation has two components- (A) dietary and (B) anthropometry. Information on food intake was obtained by 24 hour food weighing method for seven consequitive days to take account of the food the orphanage authority served to the orphans. These intake were then averaged to find out the percapita per day consumption of different food-items by an orphan. These were then converted into nutrients using food values table prepared by the Institute of Nutrition and Food Science[2]. Each orphan present in every meal costituted one full consumption unit. Arithmatical adjustment has been made for any absent member or guest according to FAO criteria[3]. In order to assess the nutritional status of the orphans, anthropometric measurement of height and weight were obtained from a sub-sample again using a prescribed questionnaire. This subsample contituted 15 percent of the total orphans living in the orphanage and covered by the dietary part of the study. From among the list of 550 orphans 82 of them were thus

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statistically selected to from the samples of the anthropometric part of the study. Because of the time and resource constraint the anthropometric part of the study had to be confined to only 15 percent of the orphans residing in the orphanage. The details of the age distributions of the selected orphans along with their level of education are given in table 1. It is to be noted that only the male orphans constitute the subjects of the Dhammarajika orphanage and their age ranged between 5 and 15 years.

Till now, there has been no study focussing the nutrition profile of the orphan destitutes. The present findings were as such compared with those of the corresponding findings of 1981-82 nutrition survey and the subject belonged to similar age and sex groups. These orphans were collected from rural areas of Chittagong and Chittagong Hill Tract. Since the population under study are orphans, one would expect that their initial nutritional status would be worse than those of common rural population.

Results

A. Dietary

This section presents the finding on the dietary intake of the Dhammarajika orphans and provides information about the types of food consumed and sources of nutrients.

Foods were classified into eight groups. They were then converted into nutrients. The nutrients were shown under elven heads. Table 2 below presents the amount of food consumed per person per day by the orphans. Intake of 5-15 years old boys of 1981-82 Nutrition Survey are also shown for comparison[1]. It appears from the table that the average food intake of the orphans amounted to 1079gm per orphan per day as compared to 661gm of intake by our rural boys of comparable age and sex. Orphans intake is thus 41 percent higher than the rural boys. Except for leafy vegetables, milk, fish and food grouped under the title others, intake of almost all the food items were higher for the orphans compared to the intake of rural boys. Fish intake is equal for both the orphans and the rural boys. Fruits and leafy vegetables are absent in the diet of the orphans, while milk intake is very low. The virtual absence of these improtant food items made their diet nutritionally imbalanced[4]. As in the intake of rural boys, cereals dominated the diet of the orphans. Intake of meat (30 gm) by orphans is five times and that of egg is 22 times higher than the intake of rural boys. In terms of nutrition, the increased intake of these animal foods by the orphans has improved the quality of their diet in respsct of protein, minerals and vitamins. This has an important bearing on their nutritional status. Although oil intake is three times higher for the orphans than the rural boys, the intake should still be increased to ensure the ideal calorie supply from fat.

The bulk of the orphan's deit consists of cereals. Average intake was found to be 546 gm. This constituted about one half of their diet. Cereals for the orphans consist of rice and wheat. Rice however is the main staple. It constituted about 82 percent of the

total cereal consumption and represented 42 percent of the daily food intake.

As is the case with rural boys cereal also constituted the principal sources of various nutrients in the diet of the orphans (Table 3). The table shows that the depedence on cereal for different nutrients is lower for the orphans than for the rural boys. This indicates that the orphanage authority has depended more on other varieties of foods for the supply of various nutrients to the orphans diet. This seems nutritionally sound.

Table 4 compares orphan's percapita nutrient intake with those of rural boys. Except for calcium and vitamin C, intake of all the nutrients are higher for orphans than for the rural boys. Inorder to compare the nutrient intakes with their requirements calorie requirement were calculated following FAO/WHO guidelines and the criteria followed by the nutrition survey of Rural Bangladesh 1981-82[5,1]. protein and other nutrient requirements for the orphans and the rural boys were obtained from the nutrition survey of rural Bangladesh 1975-76[6]. Among the nutrients saverage calorie, protein, iron thiamine and niacin intake of the orphans were well above the requirements, while that of calcium, vitamin A, riboflavin and vitamin C fell far below the set requirements. Average intake met only 54 percent of calcium requirement, 74 percent vitamin A, 56 percent riboflavin and 30 percent of vitamin C requirement (Table 4). Intake of calcium and riboflavin may be improved by including more green leafy vegetables and milk and milk products in the diet. Intake of vitamin A may be improved by including green leafy vegetables in diet. Similarly inclusion of more seasonal fruits (jack fruits, banana, mango and pineapple) in the diet will elevate the intake of vitamin C. It should be mentioned here that vitamin A, vitamin C, and riboflavin are the important as well as limiting nutrients in the orphans and traditional Bangladesh diet. But only a cereful planning of the diet is enough to remove the deficiency.

Table 5 shows the sources of different nutrients to the orphans diet. It is to be noted that the high contribution of animal food to the orphans diet has increased the consumption of some very improtant nutrients such as animal protein, vitamin A, riboflavin, iron, thiamine and niacin by the orphans. This has improtant bearing on the nutritional status of the Dhammarajika orphans.

B. Anthropometry

This section presents the findings on the nutritional status of the Dhammarajika orphans as assessed by anthropometry. Anthropometric measurments of height and weight of the orphans were recorded by using a wooden height scale and a weighing machine. The results have been tabulated in table 6 and table 7. Average for rural boys as well as western standrads of reference are also shown for comparison[1,7]. Both the tables (6,7) reveal that the average heights and weights of the orphans are higher than those of the average heights and weights of rural boys of comparable age. In most cases

their height and weights are also higher than the western standard. The improved nutritional status of the orphans might be attributed to adequate intake of macro nutrients alongwith above average intake of micronutrients, better health and sanitary conditions. These orphans, as stated earlier, live in a controlled situation in that they have adequate supply of pure drinking water, specific place for garbage disposal, presence of sanitary toilets and other medical care such as immunization, deworming etc. This along with improved food intake, must have cotributed to the better nutritional status of the orphans under investigation.

Inorder to determine the nutritional status of the orphans, the anthropometric data on height and weight were analysed in terms of three different criteria set for this purpose[8]. They are (a) weight for age, (b) height for age and (c) weight for height. Harvard values were used as standard for comparison of height data against age. For comparing weight two standards have been followed. Harvard values for children upto six years of age and IOWA standard[9] for children of the remaining age.

(a) weight for age : This criteria for determining the degree of malnutrition is popularly kniwn as Gomez classifica-tion[10,11]. Table 8 compares the nutrition profile of the orphans with those of the national children according to the Gomez grading. It appears from the table that the nutritional status of the orphans are far better than those of the rural boys of comparable age. It is to be noted that none of the orphans was found to have suffered from third degree severe malnutrition and only 14 percent of the orphans belonging to age group 5 and 16 percent each of the age groups 11 and 13 had suffered from the second degree moderate malnutrition. The better nutrition of the orphans are again attributed to factors mentioned before.

(b) Height for age : Deficit in height for age is an indicator of past chronic undernutrition. Table 9 shows that nutrition status of the Dhammarajika orphans according to this criteria are better than those of the average Bangladesh rural boys of comparable age. The great majority of the orphans under study was found to be nutritionally normal. Only 14 percent of them belonging to age group 5 was found to have suffered from severe undernutrition. By contrast, the prevalence among rural boys is 42 percent in this age. Orphans of no other age was found to have suffered from severe undernutrition. None of the orphans are also found to suffer from moderate undernutrition while the incidence for rural boys ranged between 35 and 45 percent.

(c) weight for height : Using this classification, table 10 presents the nutritional status of the orphans. The table also lends support to the fact that nutritional status of the orphans are far better than those of the rural boys of the same age group. None of the orphans was found to be severely malnourished and only 8 percent of them belonging to age groups 9 was found to have suffered from moderate undernutrition. The picture with rural boys of the same age group is far alarming.

Table 1. *Distribution of Orphans by their Age and Education*

Age		Education		
Age in years	No. of orphans	Class	No. of orphans	Percent
5	7	I	9	11
6	12	II	10	12
7	7	III	8	9
8	7	IV	8	10
9	13	V	11	13
10	11	VI	11	13
11	6	VII	9	11
12	7	VIII	10	12
13	6	IX	4	5
14	6	S.S.C.	3	4
Average Age =	9.1	ALL	82	100

Table 2. *Food intake (gm/person/day) of the Dhammarajika Orphans as compared with the intakes of boys as per 1981-82 survey*

Food groups	Intake of orphans (5-15 yrs.old) in gm.		Intake of 1981-82 boys (age group 5-15yrs.)in gm	
	Intake	Percent	Intake	Percent
Cereal	546	51	397	60
Rice	449	42	379	57
Wheat	97	9	18	3
Roots & Tubers	192	18	50	8
Pulses & legumes	21	2	7	1
Vegetables	217	20	121	18
Leafy	0	0	19	3
Non leafy	217	20	102	15
Meat	30	3	6	1
Egg	22	2	1	-
Fish	23	2	17	3
Milk &Milk products	0.6	-	16	2
Fats & Oils	10	1	3	-
Others	17	1	43	7
ALL	1078.6	100	661	100

Note: - = Less than one percent.

Table 3. *Contribution of cereals to different nutrients in Dhammarajika Orphans diet as compared to 1981-82*

Nutrients	Intake of Orphans (5-15yrs.)		Intake of 1981-'82 boys (age group 5-15 yrs.old)	
	Contribution	% contribution of total nutrient	Contribution	%contribution of totalnutrient
Calorie (kcal)	1851.6	78	1385.5	86
Protein (gm)	39.1	58	33.7	83
Calcium (mg)	73.7	30	39.7	17
Iron (mg)	24.9	74	16.11	79
Thiamine (mg)	1.2	67	1.5	80
Riboflavin (mg)	0.4	53	0.48	81
Niacin (mg)	19.1	79	9.5	83

Table 4. *Percapita nutrient intake of Dhammarajika Orphans as compared to the intakes of boys (5-15 yrs. of age) as per 1981-82 survey*

Nutrients	Intake of orphans	Intake of rural boys	Requirement
Calorie (kcal)	2376.3	1614.0	2202.0
Protein (gm)	67.7	40.4	40.4
Calcium (mg)	244.8	234.3	464.0
Iron (mg)	33.7	20.5	8.3
Vitamin A (I.U)	1483.3	851.8	1525.0
Thiamine (mg)	1.8	1.9	0.88
Riboflavin (mg)	0.76	0.59	1.32
Niacin (mg)	24.2	11.36	14.5
Vitamin C (mg)	7.7	11.45	21.4

Table 5. *Nutrient intake (person/day) of Dhammarajika orphans by their sources*

Nutrient	Cereal	Vegetable	Animal	Total
Calorie (kcal)	1851.6	393.4	131.3	2376.3
Protein (gm)	39.1	11.4	17.2	67.7
Vitamin A (I.U)	28.9	151.0	1303.4	1483.3
Riboflavin (mg)	0.4	0.27	0.09	0.76
Vitamin C (mg)	0.0	6.7	1.0	7.7
Iron (mg)	24.9	7.1	1.7	33.7
Thiamine (mg)	1.2	0.4	0.2	1.8
Niacin (mg)	19.1	3.3	1.8	24.2

Table 6. *Average height for age (cm) of Dhammarajika orphans as compared with the Bangladesh mean height and the Western standards*

Age in years	No. of orphans (male)	Mean Height of orphans	Bangladesh Mean (male)	Western standard (male)	Orphans Height = % of Bangladesh Mean	Orphans Height = % of Western standard
5	7	116.9	96	111	122	105
6	12	131.2	102	118	129	111
7	7	135.1	109	124	124	109
8	7	145.1	111	130	131	112
9	13	147.1	118	136	125	108
10	11	150.3	121	140	124	107
11	6	148.1	127	144	117	103
12	7	153.3	133	150	115	102
13	6	159.2	136	155	117	103
14	6	163.5	143	163	114	100

Table 7. *Average weight for age (kg) of Dhammarajika orphans as compared with the Bangladesh mean weight and the Western standard*

Age in years	No. of orphans (male)	Mean Weight of orphans	Bangladesh Mean (male)	Western standard (male)	Orphans Weight = % of Bangladesh Mean	Orphans Weight = % of Western standard
5	7	18.71	13.2	18.3	142	102
6	12	25.7	14.3	21.9	180	117
7	7	25.8	15.7	24.5	164	105
8	7	32.8	16.9	27.3	194	120
9	13	34.3	19.5	9.9	176	115
10	11	36.11	21.0	32.6	172	111
11	6	38.0	23.0	35.2	165	108
12	7	40.0	25.8	38.3	155	104
13	6	44.8	27.0	42.2	166	106
14	6	52.8	31.7	48.8	167	108

Table 8 . *Nutritional status of the orphans by gomez classification (in percent)*

Age group in years	Normal		1st degree		2nd degree		3rd degree	
	orphans	Rural boys	orphans	Rural boys	orphans	Rural boys	orphans	Rural boys
5	86	0	0	15.7	14	70.6	0	13.7
6	100	0	0	16.0	0	54.0	0	30.0
7	86	0	14	8.9	0	60.0	0	31.1
8	100	0	0	2.2	0	60.0	0	37.8
9	92	0	8	15.4	0	51.3	0	33.3
10	82	2.3	18	20.5	0	43.2	0	34.1
11	68	0	16	11.4	16	62.9	0	25.7
12	72	-	28	-	0	-	0	-
13	84		0		16		0	-
14	84	-	0	-	0	-	16	-

Table 9 *Nutritional status of the orphans by height for age (in percent)*

Age in years	Normal		mild		moderate		severe	
	orphans	Rural boys	orphans	Rural boys	orphans	Rural boys	orphans	Rural boys
5	86	7.8	0	13.7	0	35.3	14	43.1
6	92	8.0	8	26.0	0	34.0	0	32.0
7	100	4.4	0	17.8	0	46.7	0	31.1
8	100	0	0	15.6	0	33.3	0	51.1
9	92	51.1	8	28.2	0	38.5	0	28.2
10	100	9.1	0	20.5	0	38.6	0	31.8
11	84	8.6	16	25.7	0	40.0	0	25.7
12	72	-	28	-	0	-	0	-
13	100	-	0		0	-	0	-
14	84	-	16	-	0	-	16	-

Table 10 *Nutritional status of the orphans by height classification (in percent)*

Age in years	Normal		Mild		Moderate		Severe	
	orphans	Rural boys	orphans	Rural boys	orphans	Rural boys	orphans	Rural boys
5	72	52.9	28	41.2	0	5.9	0	0.0
6	100	42.0	0	42.0	0	10.0	0	6.0
7	100	26.7	0	55.6	0	15.6	0	2.2
8	100	37.8	0	48.9	0	13.3	0	0.0
9	92	38.5	0	51.3	8	10.3	0	0.0
10	100	45.5	0	45.5	0	6.8	0	2.3
11	100	51.4	0	45.7	0	2.9	0	0.0
12	86	-	14	-	0		0	-
13	100	-	0	-	0		0	-
14	100	-	0	-	0	-	0	

Discussion

The finding of the present investigation is quite encouraging. Average intake of the orphans are far higher than the national intake. Though the presence of cereal, animal food and pulses were found to be on the high side, there was virtual absence of leafy vegetables, fruits mlik and milk products in their diets. As a consequence their diet was found to be deficient in some essential micronutri-ents such as riboflavin, vitamin A, vitamin C and sufficient in the fulfilment of the macronutrients such as calorie and protein requirements. The finding thus suggest that the management of the orphanage be exposed to nutrition education. This might help them to incorporate right kind of food items to the diets for nutritional betterment of the orphans. The nutritional status of the orphans was also found to be better than the national average by any nutritional status criteria[1]. This might be attributed to a great extent to better health and sanitary condition, and improved health care system prevailing in the orphanage apart from provision of high calorie and protein rich food.

This suggests that the nutritional status of the orphans, who are cosidered to be nutritionally disadvantageous, can be improved through organised feeding and exposure to better hygienic condition.

Summary

Nutritional status of the orphans was determined in an orphanage in Dhaka city. The study covered both deitary and anthropometric measurements of the male orphans aged between 5 and 15. The average food intake of the orphans is higher than the average intake of boys of the same age groups covered by 1981-82 National Nutrition Survey. cereals dominate in the diet of the orphans. Consumption of meat by the orphans is five times and that of egg is twenty two times higher than the intake of boys covered by 1981-82 survey. Fruits and leafy vegetable intakes are surprisingly low in the diet of the orphans, while milk intake is very negligible. Among nutrients, average calorie, protein, iron, thiamine and niacin intakes of the orphans are well above the requirements, while that of calcium, vitamin A, riboflavin and vitamin C fall far below the set requirment. Average heights and weights of the study orphans are higher than those of the average heights and weights of Bangladeshi children of comparable ages. Their heights and weights are also higher than the Western Standard. Most of the orphans under the study were found to be nutritionally normal by any nutrational status criteria. Only very few of them was found to have suffered from mild or moderate under nutrition. This implies that organised feeding and better hygienic condition can improve the nutritional status of the orphans who are otherwise believed to be malnourished.

Reference

1. Institute of Nutrition and Food Science, University of Dhaka. Nutrition Survey of Rural Bangladesh 1981-82, 1983.

2. Institute of Nutrition and Food Science, University of Dhaka, Nutritive values of local food staff, Dhaka 1980.

3. FAC. Manual on House hold food consum-ption surveys, FAO Nutritionalstudies No. 18. FAO, Rome, 1967.

4. National Institute of Nutrition, Indian Council of Medical Research, Nutritive value of Indian Foods; Hyderabad, India D. 1978.

5. FAO/WHO Adhoc Expert Committee. Energy and Protein Requirements; WHO Technical Report series No. 522. World Health Organization, Geneva, 1973.

6. Ahmad et al. (eds). Nutrition Survey of Rural Bangladesh 1975-76, Institute of Nutrition and Food Science, University of Dhaka, 1977.

7. Jelliffe, D B. The Assessment of Nutritional status of the Community; World Health Organization, 1966.

8. American Health Care Association. Growth Monitoring: Primary Health Care Issues, 1981.

9. Nelson, W.E. Vaughan, V and Makay, R.J. Text Book of Pediatrics W.B. Saunders Company, 1969.

10. Gomez, F. et al. Malnutrition in infancy and childhood with special reference to Kwashiorkor. In Levine, S. (ed): Advanced in Pediatries, New York. Year Book Publishers. vol. 7, p-131, 1975.

11. Waterlow, J.C. Classification and Definition of Protein Calorie Malnutrition; British Medical Journal, vol. III, No 566 1972.