NUTRITIONAL STATUS OF CHILDREN IN KERALA

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ABSTRACT

Nutritional status of children in two poor communities was studied using conventional anthropometric techniques. A total of 944 children, of which 246 boys and 242 girls in coastal area and 213 boys and 249 girls in the non-coastal area formed the study group. With measurements of height and weight, the prevalence of various forms of growth retardation was determined in two communities. Inspite of better food intake, the rural coastal children exhibited poorer nutritional status mainly because of environmental deprivation.

Keywords: *Anthropometry, Nutritional status, Rural children, Coastal children.*

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Received for publication: December 31, 1991; Accepted: February 24, 1994

Malnutrition is highly prevalent among the poor communities in our country. The extent and severity of malnutrition, however, differ in various states and communities. Kerala has done exceedingly well in reducing the infant and child mortality; the infant mortality is estimated to be 27 against the all India average of 95, while mortality in children 1-4 year old is only 8/1000, against the all India figure of 24/1000(1). However, the anthropometric parameters of the children are not different than other states in the country. In order to explore the possibility that childhood malnutrition could possibly exist in communities experiencing very low infant and child mortality, a study was undertaken in a population sample from two villages of Kerala.

Material and Methods

Two villages 20 km, South of Thiruvananthapuram were selected and study households were selected by cluster sampling. The villages were close to each other, being located on either side of a main road way. The occupation of the people differed, one village was exclusively a fishing village while in the other the predominant occupation was casual labour. Children under five years in the selected households were studied by measuring the height, weight, chest and mid arm circumferences, and skin-fold thickness. Weight measurements were taken in a portable platform weighing balance. The scale was adjusted to zero before each measurement. The subjects were having minimum clothing and were asked to stand on the platform of the scale without touching anything and looking straight ahead. Weight was recorded to the nearest 0.25 kg. Daily standardization was done with a known weight.

Height was measured using a measur-

ing tape fixed vertically on a smooth wall perpendicular to the ground, taking care to see that the floor area is even and not rough. Each subject was asked to remove the shoos, stand with the centre of his back touching the scale, with his feet parallel, heels, buttocks, shoulder and back of the head touching the wall. The head was held comfortably erect. The arms hung loosely by the side. A smooth thin ruler was held on top of the head in the centre, crushing the hair at right angle to the scale and the height read off from the lower edge of the ruler to the nearest 0.5 cm. Each reading was taken twice to ensure correctness of the measurement and to minimize intra-personal errors. For children below two years, a recumbent length was measured using infantometer. All these measurements were recorded by the same person, thus minimizing the interpersonal errors. Children were classified stunted and or wasted according to the Waterlow's quantitative classification(2,3). Children weighing less than 80% of the mean weight for their height were considered wasted and if the height was less than 90% of the mean height for their age, they were considered stunted.

Results

A total of 944 children were studied: 246 boys and 242 girls in coastal areas and 213 boys and 249 girls in the non-coastal area.

The measurement of growth of the children indicate that in both villages children suffer from growth retardation *(Tables I& II)*. The body weight and height were considerably lower than the standards(4). It was also observed that the anthropometric standards of the non-coastal children were higher than those of coastal children, though statistical significance was attained only at the higher ages. It was seen that wasting is fairly common in both coastal and non-coastal children, though

TABLE I–*Body weight in Coastal and Non-Coastal Villages*

Age (yr) (median)	Coastal village mean (SD) kg		Non-coastal village mean (SD) kg		Mean weight of (4) Indian children	
	Boys	Girls	Boys	Girls	Boys	Girls
0-1 (7 mo)	6.66 (0.96)	6.06 (1.02)	7.03 (0.48)	6.08 (0.72)	7.90	7.20
1-2 (21 mo)	8.36 (1.19)	8.21 (1.31)	8.60 (1.35)	8.01 (1.03)	11.20	10.10
2-3 (33 mo)	10.08 (1.70)	9.52 (1.58)	10.70 (1.35)	9.82 (1.22)	13.30	12.20
3-4 (45 mo)	10.87 (1.57)	10.69 (1.52)	12.40 (2.19)	11.71 (1.62)	14.70	14.0
4-5 (57 mo)	11.50 (1.79)	11.45 (1.97)	13.18 (1.70)	13.26 (1.70)	16.50	15.60

TABLE II—*Body Height in Coastal and Non-Coastal Villages*

Age (yr) (median)	Coastal village mean (SD) cm		Non-coastal village mean (SD) cm		Mean height of (4) Indian children	
	Boys	Girls	Boys	Girls	Boys	Girls
0-1 (7 mo)	64.05 (3.26)	63.56 (4.09)	65.61 (3.64)	63.27 (3.26)	67.70	65.80
1-2 (21 mo)	74.69 (3.45)	74.38 (4.49)	76.17 (4.92)	74.88 (3.68)	81.90	79.90
2-3 (33 mo)	82.53 (5.21)	79.83 (5.89)	82.23 (4.42)	84.43 (5.64)	90.80	88.20
3-4 (45 mo)	86.28 (5.51)	85.43 (5.04)	93.46 (7.14)	90.88 (6.96)	96.90	96.30
4-5 (57 mo)	90.54 (5.53)	90.87 (7.34)	97.50 (5.67)	96.56 (5.96)	104.80	102.70

the difference becomes significant only at the highest age group. Unlike coastal children, wasting did not increase as age advances, among the non-coastal children. It was clear that as age advanced, the incidence of stunting increased among the coastal children while it declined in the non-coastal children. In the first year of life, only a very small proportion of children suffered from both wasting and stunting. However, the proportion rose abruptly during the second year, much more among the non-coastal children. There was a sharp decline in the proportion of severely malnourished children with advancing age.

The average energy and protein consumption worked out to be 922 kcals and 19 g in the coastal children, as against 678 kcals and 16 g in the non-coastal children. The density of population in the coastal village was over 6500 sq km, while it was only 800 sq km in the non-coastal village. The access to drinking water and hospitals were not much different for either group; but environmental conditions such as sanitary, housing, over crowding, access and utilisation of safe drinking water, *etc.* were much better for the non-coastal children. Stool examination of the children showed that 95% of the children in the coastal area suffered from the multiple worm infestation (round worm 98%, whip worm 92% and hook work 27%), while the intensity of multiple worm infestation was much less among the non-coastal children (89% round worm, 22% whip worm and 20% hook worm).

Discussion

Children from both these communities suffer extensive growth retardation. The deficit in the body weight ranged from 3 kg for non-coastal children to over 5 kg for the coastal children at the age of 5 years. The growth status in terms of stature also showed the same trend. One striking feature however, was that in the first two

years, there was practically no difference in the average height of the children of coastal and non-coastal villages which is not so as age advances. The non-coastal children are having significantly higher stature, though there is a shortage of nearly 6 cm in height when compared with the Indian standards(4,5). There is a perceptible difference in the growth profile beyond two years in these areas. One could perhaps think of food intake or propensity to infection as the possible causes. However, studies of food consumption by the 3 to 5 year old children in these two areas do not support this assumption. Non-coastal children have slightly better growth status with a lower food intake.

Conditions like sanitation, housing, over crowding, access and utilization of safe drinking water are all important determinants of infection and nutritional status. The difference in the worm infestation in both areas indicate the quality of environment. Our observation in the villages suggest that these factors have made a major contribution to the differences between the nutritional status of the two groups of children. It is clear that despite Comparable levels of stunting between .the two groups in the first two years, as age advances, the proportion of stunted children increases in the coastal area while it does not show the same pattern in the non-coastal children. However, there was no steady increase in wasting as age advances. The proportion of children wasted is far less than those stunted both for the coastal and non-coastal children. When stunted and wasted are together considered, the non-coastal children are worst affected in the second year and thereafter there is a significant improvement in their nutritional status. In contrast the situation remains more or less same for the coastal children throughout childhood.

A comparison of severity of malnutrition among boys and girls according to the Gomez criteria(6) reveal that in coastal area, where malnutrition is worst, there is a little difference in the degree and severity of malnutrition between boys and girls, while in the non-coastal area there is initially a slight but insignificant increase in the proportion of malnourished girls in the age group 1 to 2; the differences do not persist in the older children. However, when the proportion of children stunted and wasted are taken into consideration, there is a slight increase among girls below 3 years; but as the age advances, differences became insignificant. Our results do not corroborate the general assumption that malnutrition and mortality tend to be higher among the girls(7) consequent up on a conscious gender discrimination against girls especially in higher age groups.

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