HIGH PREVALENCE OF MALNUTRITION IN CHILDREN UNDER 5 YEARS FROM RURAL THANE DISTRICT, MAHARASHTRA

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Abstract

Malnutrition in children is a wide spread public health problem. Preschool children constitute the most vulnerable segment. Considering the increasing prevalence of malnutrition, the present study attempts to assess nutritional status of pre-school children in the age group 0-5 years in rural Thane district of Maharashtra. The objective of the study comprised to evaluate the prevalence of malnutrition in children, to assess the nutritional status of the children and to assess the prevalence of other nutritional deficiency disorders in the children. A cross sectional study was conducted in rural Thane district, India during November 2006 to February 2007.444 children (254 boys) aged 0 – 5 years Height and weight were measured and body mass index (BMI) was calculated. Height (HAZ), weight (WAZ) and BMI (BAZ) for age Z scores were calculated using World Health Organization growth charts. 24 hours dietary recall method was used to collect the dietary intake details of the children. Clinical examination was conducted by the paediatrician to assess the prevalence of other nutritional deficiency disorders. The results depivted that the height (83.8±12.2 cm) and weight (11.3±2.6 kg) was significantly higher in boys than that in girls [height (81.3±12.2 cm); weight (10.7±2.6)] ($p<0.05$). In boys, 67.7% had stunting (HAZ <-1) and 73.6% boys were underweight (WAZ <-1). In girls, 58.9% and 67.4% were stunted and underweight respectively. When BAZ was evaluated 22.4% boys and 13.7% girls had BAZ low (BAZ <-1). The mean energy 637 Kcal ($p<0.012$), carbohydrate 123.65 gms ($p< 0.023$), protein 13.1 gms ($p< 0.042$) and fat 10 gms ($p<0.001$) intake was significantly less than the recommended daily allowances (RDA). 16.9 % of children suffered from Vitamin A deficiency, 18.7 % from B Complex deficiency, 8.5 % from Vitamin C deficiency, 100 % from Iron deficiency and 55.3 % from Amoebiasis & Worm infestations.

Keywords: *Stunting, Underweight, Z-Score, India, Nutritional deficiencies.*

Malnutrition in children is a wide spread public health problem. The most neglected form of human deprivation is malnutrition, particularly among preschool children. Preschool children constitute the most vulnerable segment of any community because of their rapid growth rate. Their nutritional status is a sensitive indicator of community health and nutrition. Nutrition of preschool children is of considerable importance not only because they are in formative stage but also has persistent impact on their physical and mental development and on their health status as adults. [1]

The best global indicator of children's wellbeing is growth. Assessment of growth best defines the nutritional and health status of children.[2] Indicators like underweight, wasting, stunting are generally used in children for assessment of nutritional status.

Chronic under-nutrition is considered to be the primary cause of ill health and premature mortality among children in developing countries.[3] About 50% of the children less than 5 years in India are moderately or severely undernourished.[4] Under-nutrition among children is prevalent in almost all the states in India.[5] Child malnutrition has risen in recent years in India. Thus, considering the increasing prevalence of malnutrition, the present study attempts to assess nutritional status of pre-school children in the age group 0-5 years in rural Thane district of Maharashtra.

Methodology

A cross sectional study was conducted to analyse the prevalence of malnutrition in rural Thane district, India during November 2006 to February 2007 in children aged 0 – 5 years. Study subjects consisted of 444 (254 boys) children. Informed consent was obtained from parents. All measurements were recorded in morning between 8am to 11am.

Length was measured in children aged 0–1 years in a supine position using a flexible measuring tape from crown to heel. For children older than one year of age, standing height was measured using a flexible measuring tape which was fixed on the wall. Weight was measured on an electronic weighing scale to the accuracy of 100 g. For children less than 2 years of age, the mother was weighed with the child and then the weight for child was calculated by subtracting the weight of mother alone. Body mass index (BMI) was calculated by dividing weight (kg) by height (m^2). All the measurements were taken thrice and the average was taken.

Height, weight and BMI for age Z scores were calculated using World Health Organization (WHO) growth charts.[6]

24 hours dietary recall method was used to collect the dietary intake details of the children. Clinical examination was conducted by the paediatrician to assess the prevalence of other nutritional deficiency disorders.

Analyses were performed using SPSS software for Windows (version 16.0, 2007, SPSS Inc, Chicago, IL). Data are presented as Mean ± SD. Independent sample T-test was used to analyse the difference in the anthropometric measurements between boys and girls.

Results :

Table 1 – Anthropometric Parameters in the study group

	Boys (n=254)	Girls (n=190)	P value
Age (years)	2.7±1.4	2.6±1.4	0.530
Height (cm)	83.8±12.2	81.3±12.2	0.024
Weight (kg)	11.3±2.6	10.7±2.6	0.011
Body mass index (kg/m2)	16.2±3.0	16.2±2.7	0.897
HAZ	-0.57±4.91	-0.22±5.42	0.486
WAZ	-1.70±1.67	-1.61±1.95	0.617
BAZ	0.88±3.02	1.52±3.66	0.052

Data presented as Mean±SD

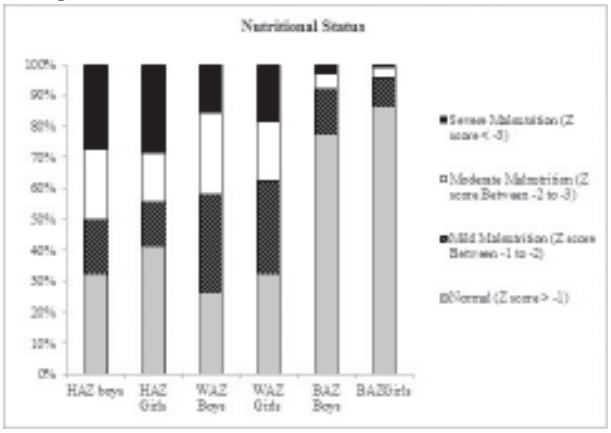

Figure 1: prevalence of malnutrition in boys and girls

Table 2: Major Nutrient levels of the study group

Nutrients	Mean Intakes	Std.Deviation	p values
Energy (Kcal)	637.0	206.19	0.012
RDA	1060.0	240.86	
CHO (gms)	123.65	40.62	0.023
RDA	187.6	53.5	
Protein (gms)	13.1	5.62	0.042
RDA	16.7	4.40	
Fat (gms)	10	2.50	0.001
RDA	27	5.30	

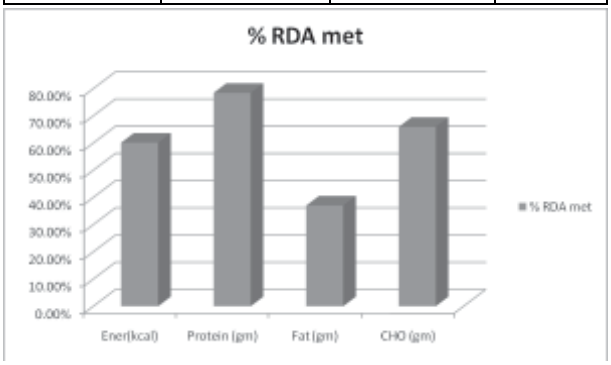

Figure 2 – Percentage of Recommended Daily Allowances met for Major Nutrients by the study group

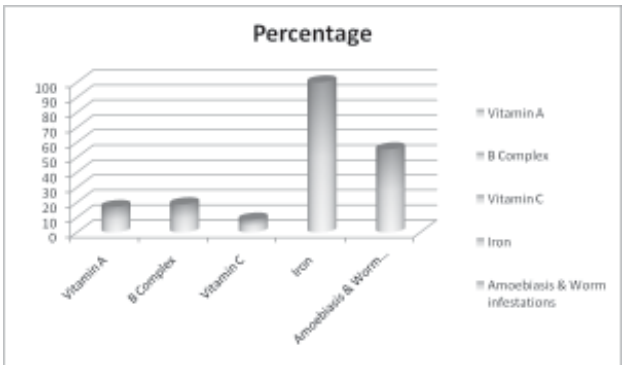

Figure 3 – Associated Nutritional Deficiency Diseases in the study group

Discussion

In the present study the mean age of the study group was 2.6±1.4 years. 61.5 percent of the children belonged to low income group and 38.5 percent belonged to middle income group. Table 1 presents the anthropometric parameters of the study group according to gender. There was no significant difference in age of the two groups ($p>0.1$). The height (83.8±12.2 cm) and weight (11.3±2.6 kg) was significantly higher in boys than that in girls [height (81.3±12.2 cm); weight (10.7±2.6)] ($p<0.05$). There was no significant difference in BMI between boys and girls ($p>0.1$). As seen in table 1, there were no significant differences in the mean height for age (HAZ), weight for age (WAZ) and BMI for age (BAZ) Z score between boys and girls ($p>0.1$).

In comparison to the WHO Standards, of the 444 children, 64% had stunting whereas 70.9% (HAZ <-1) children were underweight (WAZ <-1). Overall, 19.7% children had BAZ less than -1. Figure 1 describes the gender wise percentage prevalence of malnutrition in comparison to the WHO Standards. As seen in **Figure 1**, 67.7% boys had stunting (HAZ <-1) whereas 73.6% boys were underweight (WAZ <-1). In girls, 58.9% and 67.4% were stunted and underweight respectively. When BAZ was evaluated 22.4% boys and 13.7% girls had BAZ low (BAZ <-1). A very high prevalence of stunting (64%) and underweight (70.9%) was observed in the subjects in the study.

Chronic stunting and underweight is a pandemic affecting children across the world. Stunting is found in 28.6 – 44.2% children whereas 11.4 – 26.7% are found to be underweight in the Sub-Saharan Africa.[7] The prevalence of stunting has been reported to be between 14 – 54% and that of underweight between 19 – 48% in the South Asian Region.[8] In India, 48-78% children under 5 years in India are stunted and 40-43 % are underweight.[9,10] Similar results were seen in the current study.

As per Table 2 the mean intakes of the energy 637 Kcal ($p<0.012$), carbohydrate 123.65 gms ($p< 0.023$), protein 13.1 gms ($p< 0.042$) and fat 10 gms ($p<0.001$) intake was significantly less than the recommended daily allowances (RDA). This observation highlights that basically the dietary intake of the nutrients is not able to meet the normal requirements of the children, which further complicates because of the rapid growth period in this pediatric age group.

Figure 2 describes the percentage of Recommended Daily Allowances met for Major Nutrients i.e. total energy, carbohydrate, protein intake by the children which are lower than the standards. The reason for protein intake which is better than the other nutrients though less than the standards may be because the study group was staying in the coastal areas and the intake of sea food available locally was consumed.

Under-nutrition predisposes the children to multiple nutrient deficiencies leading to various nutritional deficiency disorders. the gut functioning is also affected in this condition. Figure 3, describes the percentage (%) prevalence of other nutritional deficiency diseases observed in the children on clinical examination**.** 16.9 % of children suffered from Vitamin A deficiency, 18.7 % of children from B Complex deficiency, 8.5 % of children from Vitamin C deficiency, 100 % of children from Iron deficiency and 55.3 % of children suffered from Amoebiasis & Worm infestations.

Conclusion

A variety of factors like poverty, low literacy rates, poor infrastructure, inadequate health and sanitary conditions could be a reason for the high prevalence of malnutrition in the current study. A further study, comparing the nutritional intake, paternal education and income can is required to determine the causes of malnutrition in Indian rural children.

In conclusion, a high prevalence of malnutrition and nutritional deficiencies is prevalent in children under the age of 5 years in rural Thane district, India and steps need to be taken to combat high levels of malnutrition. There is a strong felt need to implement effective nutrition intervention programmes to improve the nutritional status of the children in rural areas with poor economic status.

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