

## Diet and Nutrition Status of Children in Four Tribal Blocks of Thane District of Maharashtra, India (Nutrition Status of Children)

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**Abstract:** India accounts for about 40% of undernourished children in the world, which contribute to high morbidity and mortality in the country. Recently reports on deaths due to malnutrition among Tribal communities of Thane district in the State of Maharashtra were widely published in the newspapers and also communicated via other media. A rapid survey was undertaken to investigate the extent of the problem in selected villages of Thane district where the malnutrition deaths were reported. Information was collected from a total of 118 households in 4 villages on nutritional status through clinical examination, anthropometry, dietary intake and general socio-economic status. The results revealed that majority of the population belonged to Scheduled tribe community (95.8%). Data on food and nutrient intake indicated that rice is consumed as the major dietary staple in the region followed by ragi (*Eleusine coracana*), wheat (*Triticum aestivum*) and bajra (*Pennisetum typhoideum*). The average calorie intake per Consumption Unit (CU) was observed to be 1857 kcal which was less than the RDA by 23% and protein 30% (42g) less than the RDA. The percent distribution of children from 0-6 years of age according to nutritional status indicated that the overall prevalence of underweight (<Median-2SD) among 0-6 year old children was 68.7% while that of severe underweight (<Median-3SD) was 28.6%. The overall prevalence of stunting (<Median-2SD) in the children of the 0-6 year age group was 60.4% while that of severe stunting (<Median-3SD) was 38.5%. The index of current nutritional status and measure of wasting as indicated by weight for height showed overall prevalence as 30.2% and severe wasting as 4.4%. The results of the rapid survey indicated that various factors including health status of mothers, dietary and socio-economic factors have been contributory to the malnutrition of the children and that malnutrition alone may not be the direct cause of the deaths that are reported in the media.

**Key words:** Nutritional status, tribal community, malnutrition

### Introduction

Many countries that are lower than India on GDP ladder have taken better care of their children. India accounts for about 40% of undernourished children in the world, which contribute to high morbidity and mortality in the country (James Levinson, 1998). Health and nutrition status of Indian women and children is in vast and systemic crisis. About 46% of children below the age of 3 years in India, i.e. about 45 million little boys and girls are underweight or malnourished in terms of the standard weight for age criterion (NFHS III Report, 2007). There are of course wide variations across states in both levels and trends in indicators of health and malnutrition. Punjab and Kerala report the lowest proportion of underweight children (27% and 28.8% respectively) while Jharkhand and Madhya Pradesh, more than 59% of children below the age of 3 were underweight. Child malnutrition has actually risen in seven states, most rapidly in Madhya Pradesh and Haryana. The National Plan of Action on Nutrition (National Nutrition Policy, 1993 and 1995) aims to bring down the prevalence of existing under nutrition among children by half and lower birth weight to less than 10%.

The State of Maharashtra is situated at a North latitude 18E42' to 20E20' and East longitude of 72E42' to 73E48' having a total population of 96,878,627 of which 9,881,656 belong to Scheduled Caste and 8,577,276 to Scheduled Tribe (Census of India, 2001). The State has a tribal population of 8.9% as against the National average 8%. However the tribal population in Thane district represents 1.96% of the population that is concentrated in some pockets of which Jawahar, Mokhada and Vikramghad blocks which consist of 90, 90.6, 52.67 and 90.35% respectively.

Scheduled tribe is a proxy of socio-economic backwardness in India and the recent malnutrition deaths reported in 4 regions of Thane district namely, Mokhada, Jawahar, Wada and Vikramghad blocks. The total population in these regions is 70,000 and a total of 718 deaths that were attributed to malnutrition were reported from these regions.

During 2004-2005 reports on malnutrition deaths in Tribal communities in Thane district in the State of Maharashtra occurred that were widely published in the newspapers (The Hindu 21.4.2006) and also communicated via other media. Regions in the district

Table 1: Coverage particulars of the study villages of Thane district

Taluk	Village	No. of HHS	Total population surveyed
Jawahar	Sarsun	31	163
Mokhada	Gomghar	31	233
Mokhada	Suryamal	28	177
Vikramgadh	Jambha	28	149
Total		118	722

Table 2: Average household consumption of foodstuffs (g/CU/day)

	n
Cereals and Millets (gm)	505±236.58
Roots and Tubers (gm)	73.2±37.74
Other vegetables (gm)	67.7±42.07
Milk and milk products (ml)	27.2±55.09
Flesh food (gm)	10.4±10.55

Table 3: Average household intake of nutrients (CU/day) as compared to RDA

Name of nutrient	Actual intake*	RDA**	% RDA (+/-) actual intake
Protein	42.0	60 gm	-30.0
Fat	8.0	20gm	-
Energy (Kcal)	1857.0	2425 Kcal	-23.0
Calcium	881.0	400mg	+55.0
Vitamin A (µg/day)	75.0	600 µg	-87.0
Thiamine	1.3	1.2 mg	+8.3
Riboflavin	0.7	1.4 mg	-50.0
Niacin	10.8	16 mg	-33.0
Vitamin C	27.2	40 mg	-32.0
Iron	14.6	28 mg	-48.0
Folic acid (µg/day)	34.4	100µg	-66.0

\*N = 25, \*\*% RDA±calculated based on RDA for sedentary worker. Source: Nutritive value of Indian Foods National Institute of Nutrition, Hyderabad, India

Table 4: Distribution (%) of 0-6 year children according to SD classification (<Median-2SD)

N	40
Under weight (weight for age)	68.7
Wasting (weight for height)	30.2
Stunted (Height for age)	60.4

reported to be affected were Jawahar, Mokhada, Wada and Vikramghad Blocks. In order to evaluate the extent of the problem and also identify the associated factors responsible for malnutrition deaths was the aim of the present study.

### Materials and Methods

A rapid survey was undertaken in Mokhada, Jawahar and Vikramgadh talukas in the villages where the deaths were reported. These villages were Gomghar (Mokhada taluk), Jamba (Vikramgadh taluk), Sarsun (Jawahar taluk) and Suryamal (Mokhada taluk). A house-to-house survey was carried out using a specially prepared questionnaire in all available households numbering 118. The coverage particulars are given in Table 1. Data was collected on demographic features and socio-economic status. Anthropometric measurements and clinical examination for nutrition deficiency signs was

performed for all the available children between 0-6 years of age and lactating mothers in all four villages. A total of 42 children below the age of 6 years (represented by 15.6%) and 40 lactating mothers were covered. Food and nutrient intake was carried out with the help of a food frequency questionnaire in 20% of the households. The nutrient intake was calculated using Nutritive value of Indian foods (Gopalan *et al.*, 2004; Expert Group ICMR, 1990).

### Results and Discussion

**Demographic and socio-economic profile:** About 96% of HHS belonged to Scheduled Tribe (ST) and 4.2% to Scheduled Caste (SC) community. Within the ST community 44.1% belonged to *Madhavakoli*, 25.4% *Worli* and 42% *K.Thakur* caste groups. Some of the following poverty indicators reveal the severity of the economic backwardness of the villages surveyed. About 42% lived in *Kutch* houses (mud/thatched wall and roof) while 33.9% lived in houses with tiled/asbestos roof and 22% had their houses made of brick/stonewall with thatched roof. A negligible percentage (0.8%) had concrete houses. Electricity was available in 33.9% of the HHS. The source of drinking water was mostly open wells (94%), which were situated at far distances from some villages. Firewood was the major source of fuel for cooking (95.8%).

Disguised Agriculture was the major occupation (46.6%) and major crops were *ragi* and *warai* (*Panicum miliaceum*). All the land was rain fed. The land used for agriculture was distributed by the State government, which gives 5 hectares per family as *patta*. About 19% were landless agricultural labourers. Migration was about 34% in the villages and was mostly in search of daily wages during the lean season by the families.

Even though illiteracy rate was very high (67.8%) about 11% only completed their schooling. About 67% comprised nuclear families and 30.5% joint families. Sanitation was observed to be very poor. Animals like cattle were also kept in the living area of the family. No latrine facilities were available in these villages.

**Food and nutrient intake:** Rice was the staple food in surveyed population followed by *ragi*, wheat and *bajra*. The government supplies 10 kg of rice and wheat to each of the family as monthly ration at a subsidized price. In addition the household procure rest of the rice and wheat under the food-for-work programme of the government.

The nutrient intake was observed to be below the RDA with respect to all nutrients except for calcium and thiamin (Table 2 and 3). Protein and vitamin A intake were observed to be 30-87% below the RDA (Table 2).

**Anthropometry:** Data on the percent distribution of pre school children according to NCHS standards for weight for age, height for age and weight for height are given in

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Table 5: Anthropometrical measurements (mean±SD) of lactating mothers, age at marriage number of children and prevalence of anemia

Weight (Kg)	Height (cm)	% Mothers with<20 BMI	Age at marriage (year)	Number of live children	Prevalence of anemia (%)
43.14±4.66	150.74±6.766	67.5%	17.27±1.372	2.97±1.233	35%
N=40	N=40	N=40	N=51	N=98	N=40



Fig. 1: A case of marasmus

Table 3. It was observed that the overall prevalence of underweight was about 69% that of stunting was 60% in the same age group. The weight for height, which gives the prevalence of wasting and used as index of current nutritional status was observed to be 60% in the 0-6 year age group (Table 4). A scrutiny of the records from one of the major hospitals in Jawahar indicated that 104 children (<6 yr) died during 2005 to 2006 due to various reasons like premature for death (24), premature for weight (27), infectious aseptica (8), septicemia (16), meningitis (3), pneumonia (16), TB (3), congenital heart disease (1). Out of 104, 5 were in malnutrition Grade III and 5 from Grade IV. In the same year 384 children were in Grade III and 266 in Grade IV malnutrition indicates severity of nutrition problem in the area. During the survey we found case of Marasmus (Fig. 1).

Anthropometric measurements of lactating mothers as shown in Table 5 indicated the intake of protective foods such as green leafy vegetables and protein was grossly inadequate as compared to RDA. In the present survey we found that 67.5% of lactating mother had BMI less than 20. (which complicates by giving birth to low weight babies). Our report correlates with NNMB 2001 survey where the percentage of adult females with chronic

energy deficiency in rural Maharashtra was 45.1% and 5.6% adult females were obese (BMI>25).

The state of Maharashtra is progressive state with an average per capita income of Rs. 32,170 per annum (Economic Survey of Maharashtra, 2005-2006). The major occupation is farming. However, the surveyed Talukas in Thane District are tribal taluks constituting 90% tribal population having no match with State per capita income. Due to various reasons their nutritional status is very poor. These villages are located in the hills with no irrigation facility, only ragi and millet grows, no cash crop except warai, more than 4 children, marriage at early age. These are the probably contributory factors for malnutrition in the area. Unemployment in the area force people to migrate and take their children along. Height can be used as a basis for advising women about their level at risk and appropriate choice of place of delivery. Twenty percent of surveyed lactating women had height below 145 cms. As per NFHS-2 survey percent of married women with height below 145 cms in Maharashtra was 11.9%. Short stature may be associated with small pelvis, which can complicate delivery. Majority of the lactating mothers in the study had inadequate nutrients intake than RDA expect calcium, which could be the probable reason for very high rates of malnutrition in children.

Nutrition status is a major determinant of the health and well being of children. Inadequate diets and infections are associated with poor nutrition (NFHS II, 1999).

Children are the first call on agenda of development. Not only because young children are the most vulnerable but because the foundation for life long learning and human development is led in the crucial early years. It is now globally acknowledged that investment in human resources development is a pre-requisite for economic development of any nation. Early childhood (first 6 years) constitutes the most crucial period in life, when the foundations are led for cognitive, social and emotional language, physical/motor development and cumulative life long learning. By the end of the second year of life, most of the growth of the human brain is already complete and critical brain structure is in place. The young child under three years is more vulnerable to the vicious cycle of malnutrition, disease/infections and resultant disability, all of which constitute risks, development opportunities determine both the present of every child and family as well as the future human resource development of the nation.

The results of the rapid survey indicated that various factors including health status of mothers, dietary and

socio-economic factors have been contributory to the malnutrition status of the children and malnutrition alone may not be the direct cause of the deaths as reported in the media.

Limitations of the study: The survey was carried out during a period of 8 days where more number of households could not be covered due to time constraints. Added to this was the problem of high rate of migration during the survey period, which also limited our survey to only available households.

### **References**

- Census of India Report, 2001.
- Economic survey of Maharashtra, 2005-2006. [http://www.maharashtra.gov.in/english/ecosurvey/2005-06/eng/cha\\_2e.pdf](http://www.maharashtra.gov.in/english/ecosurvey/2005-06/eng/cha_2e.pdf)
- Gopalan, C., B.V. Rama Sastri and S.C. Balasubramanian, 2004. Nutritive value of Indian foods. National Institute of Nutrition, Indian Council of Medical Research, Hyderabad 500007.
- Expert Group of the Indian Council of Medical Research (ICMR), 1990. Nutrient requirements and Recommended Dietary allowances for Indians. Indian Council of Medical Research, New Delhi.
- James Levinson, F., 1998. India-Sector Review of Nutrition Programmes. A background paper prepared for the World Bank, New Delhi.
- NFHS III Report, 2007. [http://www.thesouthasian.org/archives/archives/2007/mp\\_malnut\\_data.pdf](http://www.thesouthasian.org/archives/archives/2007/mp_malnut_data.pdf).
- National Plan of Action on Nutrition, 1993. Food and Nutrition Board, Department of Women and child Development, Ministry of Human Recourses Development. Government of India, New Delhi.
- National Plan of Action on Nutrition, 1995. Food and Nutrition Board, Department of Women and child Development, Ministry of Human Recourses Development. Government of India, New Delhi.
- National Family Health Survey India 1998-99, NFHS-II, International institute of population studies, Mumbai, India, August, 2001.