

# Nutritional Status of Kamar Tribal Children in Chhattisgarh

Mitashree Mitra<sup>1</sup>, P.V. Kumar<sup>1</sup>, S. Chakrabarty<sup>2</sup> and P. Bharati<sup>2</sup>

<sup>1</sup>*School of Studies in Anthropology, Pt. Ravishankar Shukla University, Raipur, Chattisgarh, India.*

<sup>2</sup>*Biological Anthropology Unit, Indian Statistical Institute, Kolkata, India.*

[Received July 17, 2006; Accepted October 11, 2006]

---

## ABSTRACT

**Objective.** Assessment of the nutritional status among 309 Kamar children (161 boys and 148 girls) aged 4-12 years.

**Methods.** In this cross-sectional study, 24-hours dietary recall method was used to assess dietary intakes of children. Height and weight were recorded and children were classified by WHO criterion (Z-score) using nutritional indices i.e. weight for age, height for age and weight for height. NCHS data were used as reference. Mean energy and protein intake per day were measured and compared with Recommended Dietary Allowances (RDA) of Indian standards.

**Results.** More than 90 percent of children (both boys and girls) in the age group of 4-6 years suffered by underweight (<-2 SD weight for age), which was comparatively lower in 7-9 and 10-12 years age group children. 84.51 percent of boys suffered by stunting (<-2 SD height for age), which was much higher than girls (47.54%) in 4-6 years age group. Similarly, 80 percent of 4-6 years age group children were affected by wasting (<-2 SD weight for height). The consumption of energy and protein were also much lower among Kamar children than the RDA of India throughout the ages.

**Conclusion.** Undernutrition in the form of underweight, stunting and wasting and low consumption of dietary intake (energy and protein) was found to be widely prevalent among Kamar tribal children. Therefore, an urgent dietary intervention programme is necessary. Further studies are required to investigate into problem and to supplement the key nutrients which are required to ensure a good nutritional status in children. [Indian J Pediatr 2007; 74 (4) : 381-384]

E-mail: bharati@isical.ac.in, pbharati@gmail.com;

**Key words :** Kamar tribe; Children; Undernutrition; Nutritional indices; Dietary intake.

---

It is well established that nutritional status is a major determinant of the health and well-being among children and there is no doubt regarding the importance of the study of child nutritional status according to spatial and temporal dimension.<sup>1</sup> Developing countries like India, accounts for about 40 percent of undernourished children in the World<sup>2</sup> and it is largely due to the result of dietary inadequacy in relation to their needs.<sup>3</sup> In India, children living in the backward and drought-prone rural areas<sup>4</sup>, urban slums<sup>5</sup> and those belonging to the socially backward groups like scheduled castes<sup>6</sup> and tribal<sup>7</sup> communities are highly

susceptible to undernutrition. But condition is worst among the scheduled tribal communities. Most of the tribal people of India have their own geographically isolated life style. Inadequate food habits along with traditional socio-cultural and biological activities may lead to a high proportion of child undernutrition.<sup>8,9</sup>

In the high of the above, the assessment of nutritional status plays a vital role. To assess the nutritional status of an individual or population, anthropometry is widely recognised as one the useful techniques<sup>10</sup> because it is highly sensitive to detect undernutrition.<sup>11</sup> While much of the global childhood stunting and wasting are the result of deficiencies in energy and protein intake, known as protein-energy malnutrition,<sup>12</sup> mainly assessed by dietary intake in individual or household level.<sup>13</sup>

In Central India, a great majority of tribal communities show high prevalence of child undernutrition.<sup>14</sup> But there is hardly any study available

---

**Correspondence and Reprint requests :** Dr. Premananda Bharati, Associate Professor, Biological Anthropology Unit, Indian Statistical Institute, 203, B.T. Road, Kolkata- 700 108, India. Phone no. (+91) (033) 2575- 3210. Fax : (+91) (033) 2577-3049

among the Kamar tribal children of Central India. Keeping this in view, the purpose of the present study is to find out the nutritional status of the Kamar children, a primitive tribe of Chhattisgarh, on the basis of nutritional anthropometric indices and protein-energy dietary intake.

## THE TRIBE

Kamar is one of the five identified primitive tribes of Chhattisgarh in India. They live in the south-eastern region of Raipur and Dhamtary districts. They are isolated from the mainstream and modernization and depend almost entirely on natural resources for their subsistence. About 80 percent of the Kamar families are landless. They still practise shifting cultivation. They are mainly engaged in basketry. The population growth rate is almost stagnant in Kamar since 1944.

## MATERIALS AND METHODS

**The sample :** The sample for the present cross-sectional study was collected from forty-four villages and four blocks (>15 % of Kamar villages) of the Raipur and Dhamtary districts of Chhattisgarh State, India. A sample of 309 Kamar children (161 boys and 148 girls), aged 4 to 12 years were selected for the present study considering 5 percent of total Kamar children from those two districts.

**Anthropometric measurements :** The anthropometric measurements of height and weight of Kamar boys and girls were taken as per the IBP recommendation.<sup>15</sup> The same investigator (PVK) collected all the measurements to avoid the interobserver error, and for maintaining uniformity and accuracy in techniques. Anthropometer rod was used to measure height of the children. The reading was taken to the nearest 0.1 cm. Portable weighing machine was used to measure weight of the children wearing minimum clothing and it was recorded to the nearest 0.5 kg.

**Dietary Survey :** Twenty four hours dietary recall method was used to assess dietary intake. The total cooked food volume of each of the preparations was recorded in terms of standard cups. The quantity of each preparation consumed by each individual was assessed in terms of cups and also recorded the quantity of left-over food.<sup>10</sup> The energy and protein content of diet was calculated using food composition table.<sup>16</sup> Structured schedule has been used for respondents and who prepared the cooked food, specifically mothers.

### Age estimation

The age of the children was ascertained from the school

registers and subsequently confirmed by teachers, and members of Kamar Development Agency, who are in that area since 1982 for the development of the Kamar tribe. Ages of most of the children were calculated and cross-checked with reference to the events such as some important festivals, storm, flood etc. The aged members of the households and villages, alongwith the ward member and the clan chief also confirmed the age of the children. The age of the child was recorded in complete years. For analysis of the data the age grouping was done according to the age at the last birthday.<sup>17</sup> All the children who had completed 6 years but less than 7 years were grouped as 6 years and likewise age group was calculated.

### Analyses

The nutritional anthropometric indices were calculated using reference median as recommended by NCHS<sup>18</sup> and classified according to standard deviation units (termed as Z- scores) based on WHO criterion.<sup>12</sup> Children who were more than two standard deviation below the reference median (<-2 SD) were considered as underweight (weight for age), stunted (height for age) and wasted (weight for height) respectively. Mean intake of energy and protein was calculated individually and grouped according to ages and finally compared with Recommended Dietary Allowances (RDA) of India.<sup>3</sup>

## RESULTS

Different nutritional anthropometric indices and nutrients consumption were examined to determine the nutritional status of Kamar children in the age group of 4-6, 7-9 and 10-12 years.

### Nutritional anthropometric indices

Table 1 shows distribution of children according to standard deviation (SD) classification based on WHO criterion to distinguish the level of nutritional status. The maximum percentage of underweight (<-2 SD weight for age) was found among boys (95.77%) in the age group of 4-6 years followed by 91.80 percent girls in the same age group. But the prevalence rate was found to be decreasing with the increasing age. The lowest prevalence was noticed among girls (15%) in 10-12 years of age group. The highest prevalence of stunting (<-2 SD height for age) was also found in 4-6 years boys (84.51%) but girls showed comparatively lower rate of (47.54%) stunting in the same age group. More than 50 percent of children (both boys and girls) suffered by stunting in the 7-9 and 10-12 years age groups. The results indicate that 4-6 year age group boys were found to have highly suffered by underweight and stunting, they were also found to be

## Nutritional Status of Kamar Tribal Children in Chhattisgarh

TABLE 1. Percentages of Malnutrition (Z-score) Among Kamar Children

Gradation of nutritional status	Percentages of children (Total= 309, Male = 161, Female = 148)					
	4-6 yrs		7-9 yrs		10-12 yrs	
	Boys (71)	Girls (61)	Boys (66)	Girls (67)	Boys (24)	Girls (20)
<b>Weight for age</b>						
<-2.00 (Below normal)(underweight)	95.77	91.8	54.55	56.72	33.33	15.00
-2.00 to + 2.00 (Normal)	4.23	8.2	45.45	43.28	66.67	85.00
> +2.00 (Above normal)	0.00	0.00	0.00	0.00	0.00	0.00
<b>Height for age</b>						
<-2.00 (Below normal) (stunting)	84.51	47.54	57.58	59.70	66.67	65.00
-2.00 to + 2.00 (Normal)	15.49	52.46	42.42	40.30	33.33	35.00
> +2.00 (Above normal)	0.00	0.00	0.00	0.00	0.00	0.00
<b>Weight for height</b>						
<-2.00 (Below normal) (wasting)	87.32	83.61	45.45	50.76	25.00	50.00
-2.00 to + 2.00 (Normal)	12.68	16.39	53.03	46.27	75.00	50.00
> +2.00 (Above normal)	0.00	0.00	1.52	2.97	0.00	0.00

the with highest (87.32%) prevalence of wasting (<-2 SD weight for height) in 4-6 years of age group followed by 83.61 percent of girls in the same age group. Apart from few exceptions, most of the results revealed that boys suffered more by undernutrition than girls specifically in 4-6 years age group.

### Nutrient consumption

Figs. 1 and 2 show the consumption of energy (kcal/d) and protein (gm/d) among Kamar children. Both boys and girls consumed lower amount of energy and protein than the RDA,<sup>3</sup> in all age groups, whereas Kamar boys consumed marginally higher energy than girls in all age groups. In case of protein consumption, girls consumed higher amount of protein (9.26gm/d) compared to boys (8.90gm/d) in 4-6 years age group but less in 7-9 years and 10-12 years age groups.

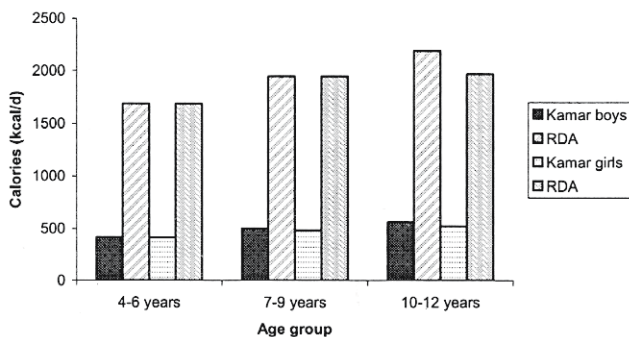


Fig. 1. Calories consumption of Kamar children

### DISCUSSION

It appears from the present study that undernutrition in the form of protein-energy malnutrition was found to be widely prevalent among children (both boys and girls) in different age groups of the Kamar tribe. Examination of children's nutritional status according

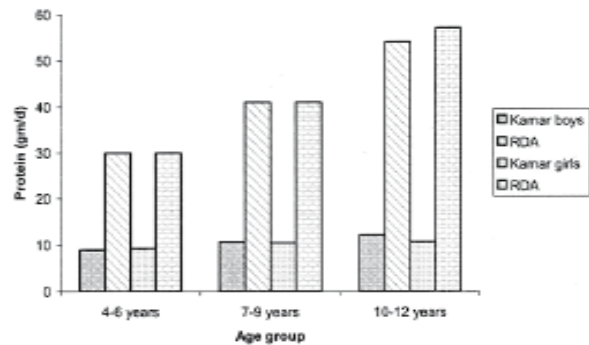


Fig. 2. Protein consumption of Kamar children  
RDA= Recommendatory Dietary allowances<sup>3</sup>

to standard deviation (SD) classification indicated that most of the children of both sexes were undernourished within which 4-6 years age group children were found to be mostly affected. Except low prevalence of stunted girls, more than 80 percent children suffered by underweight, stunting and wasting in 4-6 years age group. Therefore, an immediate dietary supplementation in this stage would be necessary to improve the nutritional status of these children. The Saharia primitive tribe of Rajasthan was also reported with high prevalence of underweight and stunting (60.40%) in 3-5 years of age group<sup>9</sup> but comparatively lower than the present study children. The National Family Health Survey (NFHS II) also reported high prevalence of undernutrition among the tribal children of Chhattisgarh.<sup>1</sup> The results also revealed that prevalence of undernutrition was comparatively lower in 7-9 and 10-12 years than 4-6 years age group. The may be due to the effect that these children may be able to get nutritious food by their own choice with their increasing age. Apart from these, boys suffered more by undernutrition than girls in early age group and to some extent also in higher age group. It may be due to early childhood diseases association among boys than

girls. The consumption of energy and protein were also very low among Kamar children than RDA of India. Similarly, children of Udaipur district of Rajasthan were shown to be receiving highly (73.00%) inadequate energy and protein intake than RDA.<sup>19</sup> While Khasi girls of Meghalaya were also shown to have lower energy (1183.70 kcal in 4-6 years, 1268.32 kcal in 7-12 years and 1606.23 kcal in 10-12 years age groups) and protein (33.48 gm in 7-9 years and 43.98 gm in 10-12 years age groups) intake than RDA but comparatively higher than the present study children.<sup>20</sup> Though the consumption of energy and protein were slightly higher in boys than girls, both of them have highly inadequate intake of energy and protein as per RDA which may be reflected in high prevalence of protein-energy malnutrition among children. Beside these, there are other factors that may contribute to the occurrence of undernutrition among Kamar children.

### CONCLUSION

This study highlights that both boys and girls of Kamar tribe suffer from undernutrition in the form of underweight, stunting and wasting. This is largely due to dietary inadequacy of energy and protein intake. An urgent intervention by supplementation of key nutrients is required to ensure nutritional status in these children.

### REFERENCES

1. National Family Health Survey (NFHS 2). Chhattisgarh (1998-1999). Mumbai; International Institute of Population Sciences, 2002.
2. James LF. *India-Sector Review of Nutrition Programmes. A background paper prepared for the World Bank*. New Delhi, 1998.
3. National Institute of Nutrition. *Dietary Guidelines for Indians-A manual*. Hyderabad; National Institute of Nutrition, 2003.
4. Vijayaraghavan K, Brahmam GNV, Venkaiah K et al. *Diet and Nutrition Situation in Drought Affected Areas of Rajasthan*. Hyderabad; National Institute of Nutrition, 2003.
5. Ghosh S, Shah D. Nutritional problem in urban slum children. *Indian Pediatr* 2004; 41: 682- 696.
6. Uppal M, Kumari K, Sidhu S. Clinical assessment of health and nutritional status of scheduled caste preschool children of Amritsar. *Anthropologist* 2005; 7: 169-171.
7. National Nutrition Monitoring Bureau. *Diet and Nutritional Status of Tribal Population Repeat Survey*. Hyderabad; National Institute of Nutrition, 2000.
8. Balgir RS, Kerketta AS, Murmu B et al. Clinical assessment of health and nutritional status of Gond children in Kalahandi district of Orissa. *Indian J Nutri Dietet* 2002; 39: 31-37.
9. Rao MK, Kumar RH, Venkaiah K et al. Nutritional status of Saharia- A primitive tribe of Rajasthan. *J Hum Ecol* 2006; 19: 117- 123.
10. National Institute of Nutrition. *Pre-conference workshop on epidemiological tools in assessment of nutritional status*. Hyderabad; National Institute of Nutrition, 2005: 1-18.
11. Martorell R, Ho TJ. Malnutrition, morbidity and mortality. *Popul Dev Rev* 1984; 10 (Suppl.): 49- 68.
12. World Health Organization *Physical Status. The Use and Interpretation of Anthropometry*. WHO technical report No. 854, Geneva; WHO, 1995.
13. Patterson RE, Pietinen P. Assessment of nutritional status in individuals and populations. In Gibney MJ, Margetts BM, Keaeney JM et al, ed. *Public Health Nutrition*. Oxford; Blackwell Publishing Company, 2005; 66-82.
14. Dolla CK, Meshram P, Shrivastava P et al. Nutritional status of Kodaku preschool children in Central India. *J Hum Ecol* 2005; 17: 229-231.
15. Weiner JS, Lourie A. *Practical Human Biology*. London; Academic Press, 1981.
16. Gopalan C, Rama Sastri BV, Balasubramniam SC. *Nutritive value of Indian Foods*: Hyderabad; National Institute of Nutrition; 1989.
17. Rao BR, Klontz CE, Benjamin V et al. Nutrition and health status survey of school children 1. Rural school children in Kaniyambadi vally, North Arcot District. *Indian J Pediatr* 1961; 28 : 39-50.
18. Frisancho AR. *Anthropometric Standards for Assessment of Growth and Nutritional Status*. Michigan; The University of Michigan Press, 1990.
19. Sankhala A, Sankhla AK, Bhatnagar B et al. Dietary status of children of Udaipur district. *Anthropologist* 2004; 6: 257-259.
20. Agrahar- Murugkar D. Nutritional status of Khasi schoolgirls in Meghalaya, *Nutrition* 2005; 21 : 425-431.