

NUTRITIONAL STATUS OF THE TRIBAL PRESCHOOL CHILDREN IN THRISSUR DISTRICT

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ABSTRACT

Tribal population in different parts of our country experience various problems in their lifetime, in which malnutrition is prevalent. As the nutritional status of a preschool child provides a clear image of the child's health for lifetime, it is of utmost important to determine it. This can also picture out the nutritional status of the whole population in the future. In this concept, a study was conducted in Thrissur district among 75 tribal preschool children. Anthropometric measurements, one day food weighment survey, haemoglobin estimation and clinical examination were assessed and the results guarantee that malnutrition is as yet among the tribal preschool children. Anthropometric measurements such as height, weight, MUAC, chest circumference were all found below the standards. Clinical examination was conducted, by which we could locate that dental caries is pervasive. Food weighment survey revealed that the actual food intake and actual nutrient intake does not meet the RDA. The RDA of tribals was significantly different for all the food groups except roots and tubers and milk and milk products. Low intake of green leafy vegetables, fruits resulted in the low intake of nutrients such as iron, vitamin A and vitamin C. Haemoglobin estimation carried out showed prevalence of mild anaemia. The delayed growth could be due to low economic status and low food and nutrient intake. Hence an integrated approach is necessary to beat these problems. Nutrition education and short term appropriately planned nutritional intervention programmes may also be useful for enhancing their nutritional status.

KEYWORDS: Tribals, Preschool, Nutrition, anthropometric, Clinical

Tribal population constitutes about 8 per cent of the total population of India. They live in a unique physical, socio-economic and cultural environment, isolated from the general population and their food intake is influenced by vagaries of nature with large seasonal variation.

Preschool years are the most vulnerable period, since the foundation and sustenance of good health is laid during this period. A child, who has failed to grow during this crucial period, may not make up the loss in growth even with an excellent diet in later life. Malnutrition during this period will result in stunted growth which will affect the all round development of the child.

Tribal population is at a higher risk of under nutrition because of their dependence on primitive agricultural practices, irregularity of food supply, poverty, poor hygiene and unhealthy habits. Nutritional status plays a vital role in deciding the health status particularly in children. Nutritional deficiencies give rise to various morbidities, which in turn may lead to increased mortality. This gains more importance in tribal children, due to certain adverse realities like insufficient food intake, frequent infections, lack of access to health services, illiteracy, unhygienic personal habits, adverse cultural practices etc. Traditional life style of tribals and their lack of awareness also play a major role in their nutritional status.

In this context, the study was proposed to assess the nutritional status of the preschool children belonging to tribal families in Thrissur district through anthropometric measurements, one day food weighment survey and haemoglobin estimation.

MATERIALS AND METHODS

The study was conducted in Thrissur district of Kerala state. From the 24 panchayats having tribal population in the district, five panchayats was selected randomly for the study. Seventy five tribal families having preschool children (4-6 years) were selected purposively. Fifteen children (three children from each panchayat) were selected as the sub sample. Height, weight, head circumference, chest circumference and mid upper arm circumference of preschool children were measured as part of the anthropometric survey. Clinical examination, haemoglobin estimation and food weighment survey was conducted among the subsample of 15 preschool children. The data collected was then analysed using statistical methods in SPSS version 16.

RESULTS AND DISCUSSION

Anthropometric measurements such as height, weight, chest circumference and MUAC were recorded (Table 1). Height and weight of the children were compared with ICMR Standards (2010) and the results

revealed that boys were taller and heavier than girls. Mean height and weight was significantly lower than the ICMR (2010) standards. The boys are slightly taller and heavier than girls in the present study which is backed up by the findings of several studies in the tribal preschool children in India (Bisai *et al.*, 2014; Philip *et al.*, 2015).

Mean head circumference, chest circumference and MUAC were compared with NFI standards (Table 2) and were found below the standard level. The mean MUAC was lower than the NFI standards (1991) for both girls and boys. Studies showed that under conditions of reduced food intake, lower levels of subcutaneous fat and muscle mass in human arms tend to correspond to a decrease in the MUAC (WHO, 2009). The mean MUAC in the present study was 15 cm in boys and 14.8 cm in girls which is in line with mean values (14.6 to 14.9 cm respectively) determined by the NNMB report (2000). The mean MUAC of boys were higher than that of the girls in the present study which is in line with the results of a study conducted by Singh and Mukherjee (2015).

Result of the present study revealed that 92.86% of boys and 85.11% of girls were normal and 7.14%, 14.89% of boys and girls respectively were having moderate malnutrition. Girls were having higher malnutrition compared with boys. The rate of undernourishment based on MUAC was less prevalent in the present study. Majority of the boys (92.86%) and girls (85.11%) were having normal MUAC. In contrast to the present study, the rate of under nutrition by using MUAC was 58 per cent among the pre-school children from Central Orissa (Mishra and Mishra, 2007). The mean chest circumference and head circumference was also found to be lower than that of NFI (1991) standards. (Table 3).

The head and chest circumference ratio as suggested by Gopaldas (1987) was also calculated to assess malnutrition. The head size relates mainly to the size of the brain and chest in a normally nourished child grows faster than the head from the second year of life onwards. The chest circumference should overtake the head circumference by about one year of age. Low head and chest circumference ratio also is an indicator of protein energy malnutrition. The head and chest circumference ratio affirms that even though 71.4 per cent of boys and 63.8 per cent of girls were having normal ratio, 28.6 per cent of boys and 36.2 percent girls are malnourished. (Table 4)

The clinical manifestations observed among preschool children. The general appearance was good in 66.67 per cent tribes and 80 per cent non tribes. The important clinical manifestations such as pale tongue and dental caries were observed among the tribal preschool children. Dental caries was seen in 60 per cent of tribal. Pitting teeth was seen in 20 per cent of tribal children. The skin was found to be normal for 80 per cent of tribes. (Table 5)

The diets of tribes, rarely meet the RDA (NNMB, 2000). The diets of *Khawar* tribes of Uttar Pradesh (Mishra *et al.*, 2002), tribes of *Bastar* (Singh and Palta, 2004), *Bhils* (Qamra *et al.*, 2006), *Oraon* tribes of West Bengal (Mittal and Srivastava, 2006) are deficient in all the nutrients. There were adequate intake of protein, thiamine and niacin while there were deficiencies in the intake of fat, calcium, iron, carotene and vitamin C among preschool children of *Gond* and *Kawar* tribal communities (Mitra *et al.*, 2007). (Table 6)

Nutrient intake of tribes is significantly lower for all the nutrients except thiamine and niacin. Mean nutrient intake were more than 50 per cent in energy, protein, thiamine and riboflavin but the intake of calcium, iron, vitamin A and vitamin C were lower in tribals. The intake of nutrients was lower than the RDA in the tribal preschool children of Madhya Pradesh (Rao *et al.*, 1994). The diets of tribes, rarely meet the RDA (NNMB, 2000). The diets of *Khawar* tribes of Uttar Pradesh (Mishra *et al.*, 2002), tribes of *Bastar* (Singh and Palta, 2004), *Bhils* (Qamra *et al.*, 2006), *Oraon* tribes of West Bengal (Mittal and Srivastava, 2006) are deficient in all the nutrients. There were adequate intake of protein, thiamine and niacin while there were deficiencies in the intake of fat, calcium, iron, carotene and vitamin C among preschool children of *Gond* and *Kawar* tribal communities (Mitra *et al.*, 2007). (Table 7)

The percentage prevalence of anaemia among preschool children was determined on the basis of haemoglobin level of blood. The haemoglobin levels of 15 tribal preschool were estimated. The data was distributed according to the classification given by WHO (2001). The results revealed that the tribal children are anaemic. Prevalence of mild anaemia was found in 66.67 per cent of the tribal children. Only 33.3 per cent of the children had normal haemoglobin level of >11g/dl. (Table 8)

The result is in line with the findings of Behere *et al.* (2008) in his study among the *Paraja* tribes of Orissa. Vyas and Choudhary (2005) in their study to find the

prevalence of anaemia among preschool children of Rajasthan, found that majority of the children were having different grades of anaemia. Rao *et al.* (2005) also accede

with the present study that the anaemia prevalence rate among tribal preschool children is high.

Table 1: Comparison of height and weight of tribal preschool children with ICMR standards (2010)

Height (cm)	Mean height ±SD		't' value		ICMR standards	
	Boys	Girls	Boys	Girls	Boys	Girls
	102.7±11.1	101.4±9.3	3.06*	5.01*	109.1	108.2
Weight (kg)	Mean weight ±SD		't' value		ICMR standards	
	Boys	Girls	Boys	Girls	Boys	Girls
	15.2±2.4	14.2±2.3	6.21*	11.63*	18	18

Significance - *1% level

Table 2: Comparison of head circumference, chest circumference and MUAC of tribal preschool children with NFI standards (1991)

	Mean value		't' value		NFI standards	
	Boys	Girls	Boys	Girls	Boys	Girls
Mean head circumference (cm)	49.2	47.74	1.82**	2***	50	49.1
Chest circumference (cm)	51.5	50.0	2.53*	4.31*	53.1	52.1
MUAC (cm)	15.0	14.8	4.26*	6.19*	16	16

Significance - *1% level, ** 5% level, *** 10% level

Table 3: Distribution of tribal preschool children according to MUAC (Gopaldas, 1987)

MUAC (cm)	Number of children	
	Boys (n = 28)	Girls (n = 47)
>13.5 (Normal)	92.86	85.11
12.5 – 13.5 (Moderate)	7.14	14.89
<12.5 (Severe)	0	0

Table 4: Distribution of tribal preschool children based on head and chest circumference ratio (Gopaldas, 1987)

Head / chest circumference	Number of children	
	Boys (n = 28)	Girls (n = 47)
<1 normal	71.43	63.83
≥ 1 malnourished	28.57	36.17

Table 5: Details of clinical symptom observed among preschool children

Sl. No.	Details	No of children (n = 15)
1	General appearance	
	Good	66.67
	Fair	33.33
2	Eyes	
	Normal appearance without xerosis	100
3	Mouth	
	Pale tongue	20
	Normal	80
4	Teeth	
	Pitting of teeth	20
	Dental caries	60
	Normal	20
5	Hair	
	Normal	100
6	Skin	
	Diminished elasticity	20
	Normal	80
7	Face	
	Normal without any paleness	100

Table 6: Mean food intake of tribal preschool children

Food item	RDA	Mean intake	't' value	Percentage of RDA
Cereals	120	100.7	17.82*	83.9
Pulses	30	17.6	38.66*	58.7
Roots and tubers	100	79.5	14.70*	79.5
Green leafy vegetables	50	17.3	61.46*	34.5
Other vegetables	100	75.9	40.29*	75.9
Fruits	100	19.3	69.31*	19.3
Milk and milk products	500	57	39.94*	11.4
Non vegetarian foods	50	17.6	23.79*	35.2
Fats and oils	25	13.8	31.59*	55.2
Sugar and jaggery	20	10.5	21.39*	52.5

*1% significance

Table 7: Mean food intake of tribal preschool children

Nutrients	RDA	Mean intake	't' value	Percentage of RDA
Energy (Kcal)	1350	1000	31.57*	74.07
Protein(g)	20.1	15.6	8.41*	71.1
Fat (g)	40	16.1	26.39*	34.3
Calcium (mg)	600	178.5	38.40*	24.3
Iron (mg)	13	4.1	35.06*	31.5
Carotene (µg)	3200	201.7	270.38*	5.6
Thiamine (mg)	0.7	0.47	7.67*	74.3
Riboflavin (mg)	0.8	0.57	4.64*	71.3
Niacin (mg)	11	4.42	42.04*	40.2
Vitamin C (mg)	40	9.3	203.4*	20.0

*1% significance

Table 8: Classification of preschool children based on the haemoglobin levels (WHO, 2001)

Category	Hb level (g/dl)	Number of children (n = 15)
Moderate anaemia	7 – 9.9	0
Mild anaemia	10 – 10.9	66.67
Normal	≥11	33.3

CONCLUSION

The results of the present study assure the fact that there malnutrition is still prevalent among the tribal preschool children. The delayed growth could be due to low economic status and low food and nutrient intake. Hence an integrated approach is necessary to overcome these problems. Nutrition education and short term appropriately planned nutritional intervention programmes may also be beneficial for improving the nutritional status.

REFERENCES

- Behere T.R., Sahu A.N., Satapathy D.M., Sahani N.C. and Sahu T., 2008. Morbidity profile of 'Paraja Tribe' of Malkangiri district, Orissa. Health Popul. : Perspectives Issues, **31**(4):267 – 278.
- Bisai S., 2014. Prevalence of undernutrition among Santal tribal preschool children of Paschim Medinipur District, West Bengal. Int. J. Paediatr., **2**(4):347 – 354.

- Gopaldas T., 1987. Nutritional status of some selected tribes of western and central India. Soc. India. 33 proceedings. X Gopalan oration: pp.77 – 85.
- ICMR [Indian Council of Medical Research], 2010. Dietary Guidelines for Indians – A manual. Indian Council of Medical Research, Hyderabad, 127p.
- Mishra B. and Mishra S., 2007. Nutritional anthropometry and preschool child feeding practices in working mothers of Central Orissa. Stud . Home. Comm. Sci., **46**:497- 503.
- Mishra C.P., Singh N. and Chakravarty A., 2002. Dietary pattern of a tribal community of Naugarh block. Tribal Health Bulletin, **8**(1):6-11.
- Mitra M., Sahu P.K., Chakrabarty S., Bharati S. and Bharati P., 2007. Nutritional and health status of Gond and Kavar tribal preschool children of Chattisgarh, India. J. hum. Ecol., **21**(4):293 -299.
- Mittal P.C. and Srivastava S., 2006. Diet, Nutritional status and food related traditions of Oraon tribes of New Mal (West Bengal) India, Rural and Remote Health, **6**:385, (Online). Available at: <http://rrh.deakin.edu.au>.
- NFI [Nutrition Foundation of India], 1991. Growth performance of affluent Indian children (under five). Science Rept., **11**:67-69.
- NNMB [National Nutrition Monitoring Bureau], 2000. Diet and nutritional status of tribal population. Report on first repeat survey, National Institute of Nutrition, ICMR, Hyderabad, 147p.
- Philip R.R., Vijayakumar K., Indu P.S., Shrinivas B.M., Sreelal T.P. and Balaji J., 2015. Prevalence of undernutrition among tribal preschool children in Wayanad district of Kerala. Int. J. Advanced Med. Health Res., **2**(1):33 – 38.
- Qamra S.R., Roy J. and Mishra D.K., 2006. Food consumption pattern and associated habits of the Bhil Tribe of Dhar District of Madhya Pradesh. Proceeding of National Symposium on Tribal Health. Pp.211 – 218.
- Rao D.H., Rao K.M., Radhaiah G. and Rao N. D., 1994. Nutritional status of tribal preschool children in there ecological zones of Madhya Pradesh. Indian. Pediatr., **31**(1):635 – 640.
- Rao V.G., Yadav R., Dolla C.K., Kumar S., Bhondeley M.K. and Ukey M., 2005. Undernutrition and childhood morbidities among tribal preschool children. Indian J. Med. Res., **122**:43 – 47.
- Singh P.K. and Mukherjee B., 2015. Assessment of Nutritional Status by Mid Upper Arm Circumference (MUAC) among Rural Children of Katihar District in Kosi Region of Bihar. J. Evol. Med. Dental Sci., **4**(22):3823-3828.
- Singh R. and Palta A., 2004. Foods and beverages consumed by abujhmarias-A primitive tribe of Bastar in Chhattisgarh. Tribal Health Bulletin. **10**(1):33-40.
- Vyas S. and Choudhry M., 2005. Prevalence of anaemia in tribal school children. J. Hum. Ecol., **17**(4): 289 – 291.
- WHO [World Health Organisation], 2001. Iron deficiency anaemia: assessment, prevention and control, a guide for programme managers, World Health Organisation, Geneva. [Online]. Available: [http://www.who.int/nutrition/publications/micronutrients/anaemia-iron deficiency/ WHO_NHD_01.3/en/index.html](http://www.who.int/nutrition/publications/micronutrients/anaemia-iron%20deficiency/WHO_NHD_01.3/en/index.html) [26 July 2013].
- WHO [World Health Organisation], 2009. WHO Child Growth Standards and the Identification of Severe Acute Malnutrition in Infants and Children: A Joint Statement by the World Health Organization and the United Nations Children's Fund. Geneva: World health organization (WHO). 300p.