PRINT: ISSN 0972-0073 ONLINE: ISSN 2456-6802
Anthropologist, 11(1): 39-43 (2009)
DOI: 10.31901/24566802.2009/11.01.07

Nutritional Status of Baiga – A Primitive Tribe of Madhya Pradesh

T. Chakma, P.K. Meshram, P.V. Rao, S. B. Singh and A. Kavishwar

Regional Medical Research Centre for Tribals (ICMR), RMRC Complex, Nagpur Road, Post Garha, Jabalpur 482 003, Madhya Pradesh, India

KEYWORDS Baiga Tribe. Nutritional Assessment. Nutrient Intake. Tribal Children

ABSTRACT Baiga tribe of Baigachak area is declared as one of the primitive tribe of Madhya Pradesh, based on their pre-agricultural technology, low literacy and stagnant population. The present study was carried out to study the nutritional status of this tribe. A cross sectional study was carried out in the Baigachak area in 2002-2003 to study the nutrition profile of the Baiga Tribe. Eight villages were purposely selected from three blocks of Baigachak area. From eight villages 400 households were randomly selected for the study, and one thousand five hundred forty five individuals from four hundred households were covered for anthropometric measurements, and 80 households were covered for diet survey by 24hr recall method. The extent of malnutrition for preschool children was assessed by SD classification and the nutritional status of adults was assessed by BMI classification. About 61% of the pre-school children were under weight (<Median -2SD) out of them 24.3% children were severely under weight. Stunting and wasting were seen in 44.3% and 37% children respectively. Prevalence of chronic energy deficiency (BMI<18.5) was about 76% among adult population. Consumption of cereals was higher than recommended level (460gm), while the consumption of other foodstuff was lower than the RDA. The intake of all nutrients except calcium was significantly lower than recommended level. The present study revealed that malnutrition is widely prevalent among the Baiga tribe which is mainly due to inadequate dietary intake.

INTRODUCTION

India has a variety of tribal population reflecting its great ethnic diversity. They constitute about 8% of total population, though they are scattered all over the hilly and dense forest regions of the country. Madhya Pradesh has about 23% (119.87 lakhs) of tribal population of India. Baigas are one of the oldest aboriginal tribes and classified as one of the primitive tribe of Madhya Pradesh on the basis of pre-agricultural technology, low literacy and stagnant and diminishing population (Tewari 1984). They reside in the forest covered hilly tracks of Baigachak area in Dindori district. Shifting cultivation depicted as an important means of livelihood. The Baiga's economy is still highly depended on agricultural pursuits and collection of minor forest produces. Maize, Vargu and Rice is the staple grain and forms an important item of daily diet. Forest is the important source in the form of 'fauna and flora' to meet their domestic requirements (Elwin, 1986). The tribal diet is hackneyed and monotonous with little intra and inter-tribal variations. Various myths and faulty food habits are the important contributors for the wide prevalence of malnutrition among tribal population. Studies carried out among the Jenu Kurubas, a primitive tribe of Karnataka revealed low intake of various nutrients and high prevalence of nutritional anaemia.

Assessment of nutritional status is considered as a measure of health and it is necessary for planners to understand the food and nutrition situation among tribal population for upliftment of these vulnerable groups.

There is very little information available regarding the diet and nutritional status of Baigas. Hence to fill up some of this knowledge gap, the present study was carried out to assess the nutritional status of the Baigas. This information will be useful in the formulation of suitable development programmes like "food for work" or other development programmes for the nutritional upliftment of this tribe.

MATERIALS AND METHODS

The study was carried out in the Baigachak area of Dindori district in Madhya Pradesh in the year 2002. The Baigachak area is spread out in 39

Address for Correspondence:
Dr Tapas Chakma
Deputy Director (Medical)
Regional Medical Research Centre for Tribals,
RMRC Complex, Nagpur Road, Jabalpur 482 003,
Madhya Pradesh, India
Telephone: +91-761-6451539 (Direct),
2370800 ext-238 (O) *Fax:* +91-761-2672835
E-mail: tchakma@gmail.com

villages in three blocks. Total eight villages were selected purposely from all three blocks for this study considering its accessibility during survey. The total population of these eight villages was about 8000, and assuming 50% population to be covered with 95% confidence coefficient, and confidence interval of ± 5% a minimum of 385 households was required for the study (Calculated using Right Size software Package). Additional 15 household were covered for better coverage.

All the field investigators and research assistants were trained and standardized for data collection at the onset of the study. Age assessment of the children was done with matching local event calendar and rounded off to the nearest year. The collected data was scrutinized in the field for on the spot rectification. From these 400 households a total of 1545 individuals, of which 788 male, 757 female including 251 preschool children were covered for this study. Anthropometric measurements were taken using standard procedure (Jeliffee, 1966). Body weight was measured using lever actuated balance in Kg with accuracy of 100gm with minimum clothing. Height was measured by anthropometry rod (SECA, Yogul and Halke, Gmbh and Co. Humburg, Germany). Diet survey was carried out in every fifth household using 24 hours Dietary recall method (Thimmayama 1987).

The data analysis was carried out using statistical software package SPSS 11.5 version. Univariate analysis using t-test was applied to evaluate the statistical significance. Mean and Standard Deviation of the anthropometric data was calculated for each age group and compared with NCHS (National Center of Health statistics) standards (NCHS 1976)[1]. The extent of different types of undernutrition was assessed in preschool children using standard deviation (SD) classification based on weight for age (under weight), height for age (stunting) and weight for height (wasting) (WHO 1983). The nutritional status of the adults was assessed based on Body Mass Index (BMI), which is ratio of weight in Kilograms and square of height in meters and grouped into different nutritional grades using James' classification (James 1988). The nutrient intake was calculated using food tables for Indian foods (Gopalan et al. 1990) and food intakes were compared with the balanced diets recommended for Indians (ICMR 1981). The intake of nutrients was compared with the recommended Dietary allowances for Indians (ICMR 1990). The results were compared with the tribal data of National Nutrition Monitoring Bureau (NNMB 2000).

Table 1: Age and Sex distribution of Baigas

Age group (in Yrs.)	*Male*	*Female*	*Total*
< 1	3	4	7
1-5	133	111	244
6-10	76	70	146
11-14	69	63	132
15-19	82	74	156
20-24	78	83	161
25-29	109	113	222
30-34	83	90	173
35-39	56	50	106
40-44	48	39	87
45-50	36	33	69
51-60	18	14	32
60+	6	4	10
Total	797	748	1545

[1] NCHS data are of whole year.

RESULTS

A total of one thousand five hundred and forty five individuals' height and weight were recorded (Table 1). Preschool girls were slightly taller than the boys of same age group. However mean weight was comparable in both genders in the same age group. In the 7-10 years age group there was no difference in the mean height of boys and girls. However adolescent girls up to 15 years were taller by about 2-3 cm and heavier by 1-2 kg as compared to boys of the same age group. In contrast boys of 16 years age were taller by about 6-10 cm and heavier by 3-5 kg as compared to the girls of the same age group. Similar observation was made with respect to adults also. The tribals were shorter and lighter when compared with the NCHS standards (Table 2 A and B). Nutritional deficit of pre-school children using standard deviation classification of under weight (weight for age), stunting (Height for age) and wasting (Weight for Height) shown in table 3. The proportion of children with low body weight (<Median -2SD) was 61.1%, while the severe grade (<-3SD) underweight was 24.3%. The overall stunting was 44.3% and wasting was 37.2% and severely stunting and wasting was 21.2% and 9% respectively. Prevalence of chronic energy deficiency (BMI<18.5) through body mass index was about 75 per cent among

Table 2(A): Height (cm) and Weight (kg) according to age and sex

Age (in years)		Male		Female	
		Height	Weight	Height	Weight
1 +	Mean	76.1	6.4	78.0	6.9
	±SD	±0.0	±1.1	±0.0	±1.3
	Median	78.0	6.0	78.0	7.0
2 +	Mean	82.5	9.3	83.8	9.1
	±SD	±5.2	±1.8	±3.5	±1.6
	Median	83.5	9.0	84.0	9.0
3 +	Mean	87.8	10.8	88.6	10.6
	±SD	±6.2	±1.5	±7.2	±1.5
	Median	87.2	10.0	88.0	10.0
4 +	Mean	93.3	12.2	95.3	12.4
	±SD	±6.7	±2.4	±5.2	±1.8
	Median	93.0	11.0	95.0	12.0
5 +	Mean	102.6	14.5	103.5	14.3
	±SD	±7.1	±2.6	±7.1	±2.6
	Median	101.0	12.8	103.0	14.0
6 +	Mean	104.3	14.6	105.1	14.7
	±SD	±7.3	±2.1	±6.8	±2.1
	Median	104.0	14.8	106.0	15.0
7 +	Mean	112.3	16.1	113.9	16.8
	±SD	±5.7	±1.7	±7.8	±3.1
	Median	112.0	17.0	114.0	17.0
8 +	Mean	118.6	18.9	117.5	17.8
	±SD	±5.2	±2.3	±8.4	±2.8
	Median	118.0	18.8	118.0	18.0
9 +	Mean	122.5	20.5	122.3	20.2
	±SD	±5.4	±3.0	±5.4	±3.0
	Median	123.0	21.0	121.8	20.0
10 +	Mean	126.4	21.4	125.2	20.6
	±SD	±7.9	±2.6	±7.6	±3.8
	Median	124.8	21.0	126.0	20.0

Table 2(B): Height (cm) and Weight (kg) of according to age and sex

Age (in years)		Male		Female	
		Height	Weight	Height	Weight
11 +	Mean	130.9	23.5	129.7	24.1
	±SD	±7.2	±2.5	±7.3	±4.1
	Median	130.0	23.0	131.0	24.0
12 +	Mean	135.7	26.6	136.7	27.6
	±SD	±8.7	±4.7	±9.5	±5.1
	Median	135.0	27.0	136.0	26.0
13 +	Mean	141.5	29.9	145.7	31.4
	±SD	±9.6	±6.7	±6.2	±5.3
	Median	140.0	27.0	146.4	31.0
14 +	Mean	141.1	30.5	144.1	33.6
	±SD	±7.1	±4.6	±8.5	±5.3
	Median	140.0	30.0	145.1	34.5
15 +	Mean	149.8	35.6	151.9	37.4
	±SD	±8.1	±6.3	±6.3	±4.2
	Median	150.0	35.0	152.0	37.5
16 +	Mean	155.6	41.6	148.5	38.5
	±SD	±7.1	±6.6	±3.9	±4.0
	Median	156.0	41.0	148.0	37.5
17 +	Mean	158.1	44.7	147.8	38.7
	±SD	±7.8	±5.7	±5.6	±5.8
	Median	158.0	45.5	149.0	38.5
18 +	Mean	161.6	45.1	149.8	39.7
	±SD	±5.1	±8.3	±3.2	±3.1
	Median	162.1	45.0	150.0	39.3
19 +	Mean	163.3	46.7	150.8	41.2
	±SD	±6.4	±6.5	±6.0	±5.5
	Median	161.5	46.0	151.0	40.0

Table 3: Percent prevalence of malnutrition according to SD classification in pre-school children

Indicators	< -3SD	- 3SD to <-2SD	-2SD to <-1SD	-1SD to <Median	≥ Median
	Severe	Moderate	Normal		
Weight for Age(Underweight)	24.3	36.7	29.2	8.4	1.3
Height for Age(Stunting)	21.2	23.1	23.7	17.9	14.1
Weight for Height (Wasting)	9.0	28.2	28.2	22.4	12.2

adult population and adults females are slightly better nourished (26.4%) as compared to males (21.6%) (Table 4).

Four hundred and seventy five individuals were assessed for Dietary intake information. Maize and Rice formed the bulk of Baigas diet. The mean intake of cereals (478g/day) was higher than the recommended level ($P<0.05$). However the intake of foodstuffs, such as pulses, green leafy vegetables, root and tubers, oil and fat, sugar and jaggery was significantly lower than recommended level (Table 5) ($P<0.05$). The milk intake (5.6 g/day) was almost negligible in Baigas. The intake of all nutrients except calcium was significantly lower than recommended level (Table 6) ($P<0.05$).

DISCUSSION

The mean anthropometric measurements indicated that the growth spurt of boys is around 16 years at that age they overcome the girls of same age in both height and weight. Similar trend was reported by various other studies (Hanumanth Rao 1994). The magnitude of wasting in pre-school children was more (37.2%) as compared to NFHS (29.6%) and NNMB (23.7%) report for tribals of Madhya Pradesh and this proportion was observed significantly higher ($P<0.05$) (NFHS, 1998 and NNMB, 2000). The wide variation could be due to different sampling techniques used in different studies, similarly the prevalence of chronic energy deficiency was 75%

Table 4: Percent Distribution of Baiga Adult according to body mass index

BMI Grades	*Male*	*Female*	*Total*
CED III (≤16.0)	39.7 (199)	35.3 (166)	37.6 (365)
CED II (16.0-17.0)	15.3 (77)	14.7 (69)	15.0 (146)
CED I (17.0-18.5)	23.1(116)	23.6 (111)	23.4 (227)
Low Weight Normal (18.5-20.0)	14.9 (75)	16.4 (77)	15.6 (153)
Normal (20.0-25.0)	6.5 (33)	9.6 (45)	8.0 (78)
Over Weight (≥25.0)	0.2 (1)	0.4 (2)	0.3 (3)

Table 5: Average consumption of food stuffs in the Baigas (gm/cu/day)

	Cereals	*Pulses*	*Green leafy vegetables*	*Roots and Tubers*	*Other vegetables*	*Flesh food*	*Milk and milk products*	*Oil and fats*	*Sugar and jaggery*
Mean ± SD (n=475)	478.8* ±197.9	29.9* ±44.9	30.8* ±43.8	14.3* ±34.7	47.6* ±85.5	1.8* ±17.0	5.6* ±30.3	2.1* ±3.7	0.3* ± 4.1
RDA (ICMR1981)	460	40	40	50	60	40	150	40	30

* P<0.05

Table 6: Average Nutrient intake in the Baigas (cu/day)

	Energy (Kcal)	*Protein (g)*	*Fat (g)*	*Calcium (mg)*	*Iron (mg)*	*Carotene (µg)*	*Thiamine (mg)*	*Riboflavin (mg)*	*Vitamin C (mg)*
Mean ± SD(n=475)	1818.6* ±747.9	51.5 * ±22.2	12.3 * ±7.5	447.5 ±582.3	16.7 * ±13.4	379.2 * ±866.7	1.2 ±0.6	0.5 * ±0.4	18.8 * ±35.8
RDA(ICMR 1990)	2425	60	20	400	28	2400	1.2	1.4	40

* P<0.05

among adults, which was considerably high (P<0.05) than the reported figures of 48% among tribals of Madhya Pradesh (NNMB 2000). The high prevalence of malnutrition observed in the present study could be mainly due to inadequate Dietary intake. Other reasons could be poor socio-economic status, low purchasing power and faulty feeding habits etc. (Verma 1999).

In our study the intake of cereals was higher than the recommended level. Similar observations were also reported by other authors among tribes of Maharashtra and Bihar (Hanumantha Rao et al. 1992 and Chandrasekhar 1997). This is because most of the tribals diet is a cereal-based diet. Most of the nutrients (calories, protein, Iron etc.) except calcium mean intake was inadequate as compared to RDA. Hanumantha Rao et al. (1993) also reported lower intake of such nutrients in Jenu Kurubas, a primitive tribe of Karnataka.The low value of Carotene and Riboflavin could be due to low intake of green vegetable and negligible amount of milk in their diet. The high calcium value was mainly due to frequent consumption of fetid cassia leaves (Cassia-Tora) by this tribe.

However the present study revealed that Baigas are nutritionally poorer than other tribal population of Madhya Pradesh. Hence positive inputs like strengthening of supplementary feeding programmes, improvement of food security are needed to overcome the nutrient deficits.

ACKNOWLEDGEMENT

The authors wish to express their gratitude to Dr. Neeru Singh, Officer in Charge, RMRCT, Jabalpur for her valuable suggestions.

REFERENCES

Chandrasekhar U, Kowsalya S, Sinha S 1997. Nutritional status of selected Oraon tribes of Bihar. *Ind J Nutri Dietet*, 34: 264-269.

Elwin Verrier 1986. *The Baigas*. 1st Reprint in India, Delhi: Gian Publishing House.

Gopalan C, Ramasastri BV, Balasubramanyam SC, Narsinga Rao BS, Deosthale YG, Panth KC 1990. *Nutritive Values of Indian Foods*. Hyderabad: National Institute of Nutrition (ICMR).

Hanumantha Rao D, Mallikharjuna Rao K 1994. Levels of Malnutrition and Socio-Economic Conditions among Maria Gonds. *J Hum Ecol*, 5:185-190.

Hanumantha Rao D, Brahmam GNV, Mallikharjuna Rao K, Gal Reddy Ch, Prahlad Rao N 1992. Nutritional Status of Maria Gond – A primitive tribe of Maharashtra. *Ind Jr of Nutr Dietet*, 29: 61-66.

Hanumantha Rao D, Brahmam GNV, Mallikharjuna Rao K, Gal Reddy Ch, Pralhad Rao N 1993. Assessment

of Nutritional Status of Jenu Kurubas – A primitive tribe of Karnataka. *Ind Jr of Nutr Dietet,* 30: 66-71.

Indian Council of Medical Research (ICMR) 1981. *Recommended Dietary Intakes for Indians*. New Delhi: ICMR.

Indian Council of Medical Research (ICMR) 1990. *Recommended Dietary Allowances for Indians* – A Report of Expert Group of ICMR. New Delhi: ICMR.

Jelliffee DB 1966. *Assessment of the Nutritional Status of the Community.* WHO Monograph Series No. 53. Genava: WHO.

James WPT, Anna Ferro-luzzi, Waterlow JC 1988. Definition of Chronic Energy Deficiency in Adults. *Eur J Clin Nutr,* 42: 969-981.

National Center for Health Statistics 1976. *NCHS Growth Curves for Children 0-18 years*. United States, DHEW Publication, No.(PHS) Series 11 (165) 78-1650, Rockville, MD, 22-39.

National Nutrition Monitoring Bureau. 2000. *Diet and Nutritional Status of Tribal Population.* Report on first repeat survey. Hyderabad: National Institute of Nutrition.

National Family Health Survey-II India 1998. Mumbai: International Institute of Population Sciences.

Tewari DN 1984. *Primitive Tribes of Madhya Pradesh.* New Delhi: Ministry of Home Affairs, Govt. of India.

Thimmayama BVS 1987. *A Handbook of Guidelines in Socio-Economic and Diet Survey.* Hyderabad: National Institute of Nutrition.

Verma A 1999. A *Study of Socio-Cultural Determinants of Population Growth in A Primitive Tribe-The Baiga of Mandla District.* Ph.D. Thesis (Unpublished), Jabalpur: Rani Durgawati Vishwa Vidhyalaya.

World Health Organization 1983. *Measuring Changes in Nutritional Status. Guidelines for Assessing the Nutrtional Impact of Supplementary Feeding Programme for Vulnerable Groups*, Geneva: WHO.