

Nutritional Status of Saharia – A Primitive Tribe of Rajasthan

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ABSTRACT The Saharia is reported to be one of the most backward tribes of Rajasthan. Recently media reported incidents of starvation deaths among Saharia tribal community in Kishanganj block of Baran district. Therefore, a rapid survey was carried out to assess the diet and nutritional status of Saharia tribal population. Eight villages, 4 each from Kishanganj and Shahbad blocks, where Saharia tribal population is concentrated were selected in consultation with the district officials. The study revealed that a majority of the households surveyed were nuclear families. About 81% of the male head of the households and 96% of their female counterparts were illiterate. The major occupation of the head of the household was either agricultural labour or other labour (82%). Only about 42% of the HHs surveyed possessed varying extent of land. In general at household level, the consumption of all the foods except cereals and millets were below the suggested levels. The intake of protein, calcium, iron, thiamin and niacin were comparable to the recommended allowances, while the intake of other nutrients such as total fat, energy, vitamin A, riboflavin, vitamin C and free folic acid were below the recommended levels. On clinical examination, the prevalence of Bitot spots among preschool children was found to be higher (8.3%) indicating that vitamin A deficiency is a major public health problem in the tribal population. The prevalence of undernutrition (weight for age <Median –2SD) among 1-5 years children were significantly higher (72%) than that reported for the State of Rajasthan (48%) (DWCD, 1998). Breast-feeding practices revealed that majority of the mothers initiated breast-feeding on the third day of the delivery. About 85% of the mothers discarded colostrum, mostly because of the traditional practice. The observations highlight the need for strengthening health and nutrition programmes in this area.

INTRODUCTION

About half of the World's total population of indigenous people, often referred as tribals, are living in India. The tribal population in Indian language known as "Adibasi", stands for original inhabitants, constitute 8.1% of the total population of India. A general feature of the tribal population of the country is their exclusive geographical habitat. But there are certain communities among them, who live in more or less total isolation in a life style, which shows only a little change from that of centuries ago. Most of them are small communities with relatively low growth rate compared to rest of the population. Government of India identified a total of 72 such tribal communities, as primitive tribes on the basis of low growth rate, pre-agricultural level of technology and extremely low level of literacy. The Saharia is one of those primitive tribes inhabiting 'Baran' district in the State of Rajasthan. The total population of Saharia is 79,312 with sex ratio of 951 females per 1000

males. A majority (93%) of the Saharia population is inhabiting of Kishanganj and Shahbad blocks of Baran district.

Nutritional status of the population largely depends on the consumption of food in relation to their needs, which in turn is influenced by the availability of food and purchasing power. The socio-economic conditions like agricultural pattern and occupation profile are different among different tribes and are determined by the eco-system they live in (Hanumantha Rao, 1996). Several studies have shown a close relationship between the tribal eco-system and their nutritional status. The tribal populations are 'at risk' of undernutrition because of their dependence on primitive agricultural practices, and uncertainty of food supply.

There is a broad understanding of the nutrition problems of population living in urban and rural areas, while such information on tribal population is meagre. Earlier studies indicated that the nutritional status of tribal people is very poor compared to their rural counterparts.

Recently, starvation deaths were reported among Saharia in Kishanganj block of Baran district by the media, due to prevailing severe drought conditions. Study carried out earlier in the State of Rajasthan revealed that recurrent droughts had adversely affected household food

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security in the severely affected areas, leading to undernutrition of the community (Mallikharjuna Rao et al., 2003). Therefore, a survey was carried out by the National Institute of Nutrition (NIN) during October – November 2004, with an objective to assess the diet and nutritional status of Saharia tribal population.

MATERIALS AND METHODS

Assuming a prevalence of 66% undernutrition among preschool children (Vijayaraghavan et al., 2003) with 95% confidence interval and 10% of relative precision, a sample size of 199 was arrived at. Hence, it was decided to cover 200 children of 0-5 years age group for nutrition assessment. Two blocks namely Kishanganj and Shahbad, where Saharia tribal population is concentrated were selected in consultation with district officials. Keeping in view that all the villages in a block are homogenous, four villages were randomly selected in each block, with an expected coverage of 25 children per village.

Within the village, the Saharia live in a separate colony, known as “Saharana” (Paliwal, SL, 2004). Starting from the North east corner of the Saharia colony in the selected village, the survey was carried out in the contiguous households till the targeted number of 25 children of below 5 years was covered for nutrition assessment. Household demographic and socio-economic information was collected from all the households contacted. Family diet survey was carried out in a sub-sample of 5 households having at least one preschool child, using 24 hour recall method. The information on infant and child feeding practices was also collected from all the households covered for the diet survey. In addition, particulars of mortality during previous six months were collected along with cause of death by verbal autopsy.

The average daily consumption of various foods and nutrients were computed per consumption unit (CU) at the household level using Food Composition Tables (Gopalan, 1996). The average daily intake of foods were compared with Recommended Dietary Intakes for Indians (ICMR, 1981), while that of nutrients were compared with the Recommended Dietary Allowances for Indians (ICMR, 1990).

The percent distribution of children according to weight for age, height for age and weight for height according to Standard Deviation (SD)

classification by using National Centre for Health Statistics (NCHS) standards (WHO, 1983) was carried out. The nutritional status of adult men and women was determined by computing Body Mass Index (Weight in kg/ height in metres²). Based on body mass index, the individuals were categorized into different nutritional grades using James et al classification (James, 1998).

The results of the present study were compared with that reported for the State of Rajasthan (DWCD, 1998) as well as figures reported for drought survey carried out in the severely affected areas of Rajasthan (Vijayaraghavan et al., 2003).

RESULTS

Coverage: A total of 314 households (HHs) from 8 villages were covered in the present study. A sub-sample of 40 HHs was covered for family diet survey. In addition, data on knowledge and practices of breast-feeding and complementary feeding was collected from 39 women. Nutritional anthropometry and clinical examination was carried out on 238 children of 0-5 years (116 boys and 122 girls) and 422 adults (Males: 195 and Females: 227). History of morbidity for the previous 15 days was also collected on all the individuals covered for anthropometry.

Household Demographic and Socio-economic Particulars: A majority of the HHs (70.3%) surveyed were nuclear families, followed by joint families (18.2%) and extended nuclear families (11.5%). The average family size was 5.6. About 81% of the male head of the households, and 96% of their female counterparts were illiterate (Table 1).

Forty two percent of the HHs possessed varying extent of land. Twenty six percent were marginal farmers (owning <2.5 acres), while 3% each were either small (2.5 – 5.0 acres) or large farmers (≥5 acres). The major occupation of the head of the households was either agricultural or other labour (82%), followed by cultivation (14.3%), service (1.6%) and business (1.3%). Bore wells formed the major source of drinking water in about 75% of the HHs, while the rest fetched the same from draw wells. Nearly half of the households surveyed were living at a distance of > 10 km from primary health center.

About 91% of the HHs surveyed were reportedly availing the State Government run

Table 1: Distribution of households by Socio-economic Characteristics (n=314)

Socio Economic Variable (n=314)		Percent
Type of Family	Nuclear	70.3
	Extended Nuclear	11.5
	Joint	18.2
Family Size	1-4	27.5
	5-7	56.5
	≥ 8	16.0
	Average Family Size (n):	5.6
Literacy Status of Adult Male (Standard)	Illiterate	81.2
	Read & Write	1.0
	1 st – 4 th	7.3
	5 th – 8 th	8.6
	9 th – 12 th	1.9
Literacy Status of Adult Female (Standard)	Illiterate	95.8
	Read & Write	0.3
	1 st – 4 th	2.9
	5 th – 8 th	1.0
Size of Land holdings (Acres)	Landless	58.2
	Marginal Farmers (< 2.5)	35.7
	Small Farmers (2.5 – 5.0)	3.2
	Large Farmers (≥ 5.0)	2.9
	Average Size of Land holdings	0.8
Occupation of the Head of the Household	Agriculture Labour	53.2
	Non Agriculture Labour	29.0
	Cultivator	14.3
	Tenant Cultivator	0.3
	Artisan	0.3
	Service	1.6
Source of Drinking Water	Business	1.3
	Draw Well	24.8
	Bore Well	75.2
	Distance of Village from PHC (km)	< 1
	1-5	14.6
	5-10	22.0
	≥ 10	12.7
		50.7

“Saharia Special Component Programme” under which, 35 kg of subsidized wheat per household per month @ Rs.2/- per kg was provided. The Government of Rajasthan announced programme of provision of employment for one person per household for a minimum period of 100 days in a year, under Food for Work Programme and grant of monthly pension of Rs.200/- per month per head to the aged, widows and physically handicapped. However, at the time of survey, only supply of subsidized wheat was in operation, while the remaining components were yet to be initiated by the State Government. In addition, the target beneficiaries from the HHs were also participating in supplementary feeding programme under ICDS (71%) and MDM (41%) programmes

Household Food and Nutrient Intake: The average consumption of various foods (g/CU/day) by the HHs compared with recommended dietary intakes (RDI) as well as the figures reported for the drought affected areas of the State of Rajasthan are provided in Table 2. The intake of all foods, except cereals & millets was lower than the RDI. The average consumption of cereals & millets (556 g) was higher than the recommended levels (460 g) as well as the figures reported by drought survey (357 g). However, the intake of income elastic and protective foods such as pulses, milk & milk products, oils & fats and sugar & jaggery was lower than the recommended levels as well as that reported during the drought survey for the State of Rajasthan.

Table 2: Average Household Consumption (g/CU/Day) of Foodstuffs by the Saharia Tribe compared with Rural populations

Food Groups	Saharia Tribe	Rural		RDI
		Drought survey (2003)	State of Rajasthan (DWCD) 1998	
n	40	299	-	-
Cereals & Millets	556	357	504	460
Pulses & Legumes	15	5	27	40
Green Leafy Vegetables	15	0	23	40
Roots & Tubers	23	73	79	50
Other Vegetables	32	17	45	60
Milk & Milk Products	46	77	201	150
Fats & Edible Oils	11	14	21	20
Sugar & Jaggery	11	22	25	30

RDA: Recommended Dietary Intakes for Indians, ICMR, 1981

The intake of protein, calcium, iron, thiamin and niacin was comparable to the recommended levels, while that of other nutrients, such as total fat, energy, vitamin A, riboflavin, vitamin C and free folic acid were below the recommended levels (Table 3). The extent of deficit was maximum with respect to vitamin A (62%), followed by vitamin C (43%), total fat (35%), free folic acid (22%), riboflavin (14%) and energy (9%). In general, the nutrient intakes of Saharia were marginally better compared to the general population in drought affected areas. This may be because of availability of employment opportunities during the period of survey, which was harvesting season and also provision of wheat through PDS at subsidized rates. The intakes of various nutrients, except for protein, iron,

Table 3: Average household intake (CU/Day) of nutrients by Saharia Tribe compared to rural populations

Nutrients	Saharia Tribe	Rural		RDA
		Drou- ght sur- vey (2003)	State of Rajas- than (DWCD) 1998	
n	40	299	-	-
Protein (g)	76	61	78	60
Total Fat (g)	26	27	46	40
Energy (Kcal)	2211	1827	2439	2425
Calcium (mg)	407	441	735	400
Iron (mg)	33	24	32	28
Vitamin A (µg)	225	127	394	600
Thiamin (µg)	2.8	2.1	2.66	1.2
Riboflavin (mg)	1.2	1.0	1.27	1.4
Niacin (mg)	24	18	22	16
Vitamin C (mg)	23	14	45	40
Free Folic Acid (µg)	78	63	-	100

RDA: Recommended Dietary Allowances

thiamin and niacin, were however lower than the figures reported for the State of Rajasthan.

The frequency distribution of HHs according to consumption of various nutrients expressed as percent of RDA revealed that the proportion of HHs with the intakes below recommended levels was highest for vitamin A and free folic acid (90% each) followed by riboflavin (78%), vitamin C (75%) and energy (73%). At the time of the survey, none of the HHs were found to be consuming energy below the level of 50% of RDA, as against the figure of 5% reported for the drought affected areas of the State.

Nutritional Status

Prevalence of Nutritional Deficiency Signs:

About 4% of the infants were found to be emaciated, while an equal proportion had conjunctival xerosis (Table 4). Among 1-5 year children, about 1% had oedema and 5.7% were emaciated. The prevalence of Bitots spots, an objective sign of vitamin A deficiency was (8.3%) much higher than that reported during the survey in drought affected areas (1.3%) as well as for the State of Rajasthan (0.3%). Similarly, very high proportion (17.6%) of preschool children exhibited conjunctival xerosis. The prevalence of clinical signs of B-complex vitamin deficiencies such as angular stomatitis and glossitis was low (1.5% and 0.5% respectively). Among adults, the prevalence of clinical signs

Table 4: Prevalence (%) of nutritional deficiency signs among 0-5 year children

Clinical sign	1-5 years children			
	< 1 year	Present study	Drou- ght sur- vey (2003)	State of Rajas- than (DWCD) 1998
n	45	193	1035	-
Oedema	0.0	1.0	0.0	0.0
Emaciation	4.4	5.7	1.4	0.0
Marasmus	0.0	0.0	0.3	0.1
Night blindness	0.0	0.4	0.0	0.0
Conjunctival xerosis	4.4	17.6	1.3	0.3
Bitot spots	0.0	8.3	1.3	0.3
Cornial scar	0.0	1.0	0.0	0.0
Angular stomatitis	0.0	1.5	0.3	0.2
Glossitis	0.0	0.5	0.0	0.0

* Multiple responses

of nutritional deficiencies was observed to be negligible.

Morbidity: About 21% of the children reported morbidity during the previous fortnight. The common forms of illnesses reported were fever (12.6%), upper respiratory tract infections (6.7%), diarrhoea (1.7%) and measles (0.4%). Only about 5% of the adults reported sickness during the preceding fortnight.

Particulars of Mortality: A total of 27 deaths were reported during the previous six months among Saharia community surveyed. Of these, 7 were neonates, 2 were post neonates, 2 were preschoolers, 1 was of school age, 2 were adolescents and 13 were adults. The major cause of death among neonates was prematurity, while in the case of others, it was due to infectious diseases such as malaria, pulmonary tuberculosis or respiratory tract infections etc. None of the deaths could be attributed to starvation.

Anthropometry

Preschool Children: The distribution of infants and preschool children according to weight for age, height for age and weight for height by standard deviation (SD) classification are presented in Tables 5-7. The prevalence of undernutrition among 1-5 year children is compared with the figures reported during the drought survey and for the State of Rajasthan.

Weight for Age: About 72% of 1-5 year

children, in general, had underweight (weight for age <Median –2SD of NCHS) while the proportion of those with severe underweight (weight for age <Median –3SD) was about 24%.

The overall prevalence of underweight among Sahariaias was marginally higher (72%) compared to drought survey (66%), while it was significantly ($p<0.01$) higher than that reported

Table 5: Distribution (%) of 0-5 year children according to Weight for age by SD classification* compared with rural children

Weight for Age	Saharia Tribe			Pooled (1-5 Years)		
	< 1 Year	1-3 years	3-5 years	Saharia Tribe	Rural	
					Drought Survey (2003)	State of Rajasthan (DWCD-1998)
n	45	97	96	193	1035	6450
<Median - 3SD	11.1	36.0	12.6	24.4	22.8	16.4
Median -3 SD to Median -2 SD	33.3	47.5	47.8	47.7	43.3	31.7
≥ Median- 2 SD	55.6	16.5	39.6	27.9	33.9	51.9

*: By using NCHS Standrads

χ^2 test: Between age groups: $p<0.01$; Saharia Vs Drought: NS; Saharia Vs Rajasthan: $p<0.01$

Table 6: Distribution (%) of 0-5 year children according to Height for age by SD classification* compared with rural children

Height for Age	Saharia Tribe			Pooled (1-5 Years)		
	< 1 Year	1-3 years	3-5 years	Saharia Tribe	Rural	
					Drought Survey (2003)	State of Rajasthan (DWCD-1998)
n	45	97	96	193	1035	6450
<Median - 3SD	11.1	50.6	26.0	38.3	30.9	37.2
Median -3 SD to Median -2 SD	17.8	24.7	34.4	29.5	29.3	22.1
≥ Median- 2 SD	71.2	24.7	39.6	32.2	39.8	40.7

*: By using NCHS Standrads

χ^2 test: Between age groups: $p<0.01$; Saharia Vs Drought: NS; Saharia Vs Rajasthan: $p<0.05$

Table 7: Distribution (%) of 0-5 year children according to Weight for height by SD classification* compared with rural children

Weight for height	Saharia Tribe			Pooled (1-5 Years)		
	< 1 Year	1-3 years	3-5 years	Saharia Tribe	Rural	
					Drought survey (2003)	State of Rajasthan (DWCD-1998)
n	45	97	96	193	1035	6450
<Median - 3SD	4.7	1.0	1.0	1.0	1.6	3.9
Median -3 SD to Median -2 SD	7.0	11.4	13.5	12.4	13.8	11.3
≥ Median- 2 SD	88.3	87.6	85.5	86.6	84.6	84.8

*: By using NCHS Standrads

χ^2 test: Between age groups: NS; Saharia Vs Drought: NS; Saharia Vs Rajasthan: NS

for the State of Rajasthan (48%). The prevalence of severe underweight tended to increase significantly ($P < 0.01$) from 11% among infants to 36% among 1-3 year children and thereafter decreased to 12.6% among 3-5 year children.

Height for Age: The overall prevalence of stunting (height for age $<$ Median -2 SD), an indicator of long duration undernutrition was to the extent of 68%, though higher but not significant compared to that reported during drought survey (60%). However, the prevalence of stunting was significantly higher compared to the State of Rajasthan (59%). The extent of severe stunting (height for age $<$ Median -3 SD) was about 38%.

Weight for Height: The prevalence of overall wasting (weight for height $<$ Median -2 SD), an indicator of short duration undernutrition, was about 13%, the prevalence was marginally lower than those reported during the drought (15.4%) as well as for the State of Rajasthan (15.2%) and was comparable between age groups.

Adults: About 60% of males and 53% of females had varying degrees of chronic energy deficiency (BMI < 18.5) (Fig.1). No significant gender differences was observed in the prevalence of CED. The overall prevalence of CED among adults was significantly ($p < 0.01$) higher (56%) than the figures reported during drought (40%) as well as for the state of Rajasthan (45%). Over weight or obesity was observed in only 1% of adults as against 8% reported during drought survey.

Breast Feeding and Complementary Feeding Practices: Majority of mothers (85%) reportedly initiated breast-feeding only on the third day of delivery. The new borns were fed with jaggery water (80%) or goat milk (20%) during the first two days. Eighty five percent of

mothers stated that they discarded colostrum, the proportion of whom was much higher than that reported for the State of Rajasthan (53%). The common reasons attributed for the practice were (i) belief that it was not good for the health of new born (36.4%) (ii) as a traditional practice (33.3%) or (iii) on elder's advice (30.3%). Among those who were receiving supplements, only 26% of the infants started getting the same at the age of 7-12 months of age, while in a majority (68%), the complementary feeding was initiated between 13-18 months of age. The type of complementary foods commonly given to the children included roti (82%), bread/biscuits (15%) or *dalia* (3%).

DISCUSSION

Tribals are particularly vulnerable to malnutrition because of their geographical isolation, uncertainty of food supply, lack of adequate health care facilities and due to certain traditional belief systems and cultural practices. Studies carried out earlier by National Institute of Nutrition among primitive tribal groups in different areas of the country revealed that socio-economic conditions and nutritional status of these tribes were influenced by the eco-system they live in (Haumantha Rao et al., 1993, 1994).

In general, dietary intakes of the Saharia community, barring cereals, was poor compared to the suggested levels of balanced diets. This was reflected in higher prevalence of undernutrition both among children as well as adults. The extent of deficit in the intake of nutrients was relatively higher with respect to micronutrients such as vitamin A, riboflavin and free folic acid. About 73% of the HHs were not meeting the energy requirements. High prevalence of clinical deficiency signs such as conjunctival xerosis and Bitot spots indicate that vitamin A deficiency is a major public health problem among this tribe.

The fact that the prevalence of underweight and stunting among preschool children and chronic energy deficiency among adults of Saharia tribe was significantly higher compared to their rural counterparts or those studied in drought affected areas indicates that the tribe is nutritionally highly vulnerable. Practices such as delayed initiation of breast feeding, discarding of colostrum and faulty feeding habits seem to have significantly contributed to higher

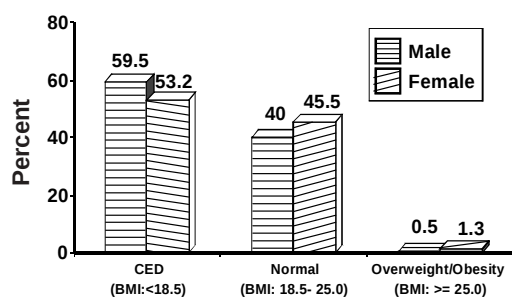


Fig. 1. Distribution of adult men and women according to Body Mass Index

prevalence of growth retardation among infants and children of younger age group. Particulars of mortality revealed that the major cause of death among neonates was prematurity, while in case of others it was mainly due to infectious diseases. None of the deaths could be attributed to starvation.

About 90% of the HHs surveyed were availing the benefits of the “Saharia Special Component Programme”. In addition, majority of the households were participating in supplementary feeding programmes such as ICDS and MDM. These, to certain extent could have averted more severe forms of undernutrition. Nevertheless, the observations highlight the need for further strengthening of health and nutrition programmes, especially RCH programme in this area. A high prevalence of vitamin A deficiency, which is of public health significance, warrants strengthening of implementation of vitamin A prophylaxis programme and ensuring 100% coverage of beneficiaries. In addition, health and nutrition education should be provided on a war footing to this community in order to ‘bring-in’ behavioural change among the women to ensure better infant and child feeding practices, environmental sanitation and personal hygiene to achieve better health and nutritional status.

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