

Nutritional and health status of Jenukuruba tribal children in Mysore district

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Abstract

Introduction: Nutritional status is a sensitive indicator of community health and nutrition. It has an important role in determining health status especially in tribal children. **Objective:** This study was done to assess nutritional and health status among Jenukuruba tribal children in Mysore district. **Methods:** Community based cross sectional study done over a period of 2 years. 4207 children between the age group of 0-15 years of Jenukuruba tribal community were included. All data were recorded in a predesigned proforma. Anthropometric measurements were recorded. Weight for age, Height for age and BMI were calculated. Clinical examination was done to look for anemia, vitamin A deficiency and other morbidities. 24 hours dietary recall method used to assess dietary intake of calories and proteins. Mean energy and protein intake measured and compared with RDA of Indian standards. **Results:** 1393 (33.1 %) were stunted with height less than 3rd centile and 1588 (35.7 %) were underweight with weight below 3rd centile using WHO growth charts. 1175(27.9 %) of children were having BMI < 5th centile, 127(3.3 %) children were overweight with BMI between 85th and 95th centile and 9(0.2%) children were obese with BMI>95th centile. 53.4% were having varying degrees of protein energy malnutrition. 2083(49.5%) of study population had microcephaly. Mean RDA of energy is deficit in all age groups when compared to revised RDA recommended by ICMR in 2010 for Indians. **Conclusion:** Health and nutritional status of Jenukuruba tribal children is very poor. Immediate appropriate interventional programmes are needed for improving their health and nutritional status.

Key words: Children, Jenu kuruba, Mysore, Tribal, Nutritional and health status

Introduction

Nutritional status is a sensitive indicator of community health and nutrition and has an important role in determining health status especially in children [1]. This is more so in tribal children due to insufficient food intake, infections, lack of accessibility to health services, illiteracy, unhygienic personal habits, adverse cultural practices etc [1]. According to 2001 census [2] tribal population in India is 74.6 million (8.2% of total population), largest no seen in Madhya Pradesh, Orissa, Jharkhand. There are 573 scheduled tribes in our country and 270 tribal languages have been identified. There are 16 million tribal children (6-14years) among total 193 million children. Total population of tribal is 53 million in Karnataka which is 5.13% of Indian

population. 6.6% of total population are scheduled tribes. They are highest in Raichur, Bellary, Chitradurga. 50 scheduled tribes have been notified in Karnataka. Jenukuruba and koraga with 29,828 and 16,071 are the 2 primitive tribal groups. Jenukuruba tribes are mainly seen around Mysore, Kodagu, Bangalore. Koraga tribes mainly seen in Dakshina Kannada and Dharwad. In Mysore district 26, 41,027 tribal populations are there. Among them, 19,246 are Jenu kuruba which is the major tribal group inhabited in and around Nagarahole forest areas, around Hunsur, HD kote, Piriapatna and Nanjangud. Jenukuruba tribal children are suffering from anaemia and varying grades of PEM. Poverty, illiteracy, lack of safe drinking water and sanitary facilities, lack of health care facilities are the main reasons for health related problems and nutritional disorders among them. In the present study

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we have made an attempt to assess nutritional status, nutritional deficiency signs and other morbidities among school children of Jenukuruba tribal community in Mysore district, Karnataka, India.

Methodology

This study was a community based cross sectional study with study population of 4207 children between 0-15 years belonging to Jenu kuruba community in Mysore district. Children were selected by purposive sampling method. Predesigned proforma for data collection was used.

Preliminary site visit and enquiry of local officials, schools was done and all the Jenu kuruba households mainly in H.D. kote, Hunsur, Nanjangud, Periyapatna were listed. Explanation was done in simple language and consent forms were signed by parents for enrolment in the project. Institutional ethical committee clearance was obtained. Information regarding sociodemographic, living conditions was collected by interview method using proforma, dietary pattern by diet survey at

household level by 24 hour recall method for 2 days. Standardisation of cups and measures were done periodically and RDA was compared with revised RDA recommended by ICMR in 2010[3]. History suggestive of any chronic diseases or any acute illness in the past one month was recorded. Socioeconomic status classified using Kuppuswamy's classification modified in 2007 [4] and BG Prasad's classification [5].

Anthropometry: height, weight, chest circumference, head circumference, were recorded by standard methods by senior research fellows and research assistants under supervision of co-investigators using standard techniques. Anthropometric indices like weight for age, height for age, weight for height, BMI were calculated. WHO growth charts and IAP classification of PEM [6] used to classify PEM. Calibration of weighing machines, stadiometers, and measuring tapes are done periodically. Detailed clinical examination was done. Appropriate statistical analysis was done.

Results

Among 4207 tribal children enrolled under project, 2130(50.6%) were boys and 2077(49.4%) were girls with almost equal sex distribution (TABLE I). 96.1% live in a nuclear family with a very low percentage of joint family system (3.8 %). Consanguinity rate was very high with 58.8 % having consanguineous marriages.

Table I: Age and sex distribution of study population

Age (in yrs)	Sex		Total
	Male	Female	
0 -1	170 (4.0)	173 (4.1)	343 (8.1)
2 – 3	239 (5.7)	258 (6.1)	497 (11.8)
4 – 6	461 (10.9)	453 (10.8)	914 (21.7)
7 – 9	495 (11.8)	437 (10.4)	932 (22.1)
10- 12	425 (10.1)	429 (10.2)	854 (20.3)
13 – 15	340 (8.1)	327 (7.8)	667 (15.8)
Total	2130 (50.6)	2077 (49.4)	4207 (100.0)

Figures in parenthesis indicate percentages.

Among 4207 tribal children enrolled under project, 2130(50.6%) are males and 2077(49.4%) are girls with almost equal sex distribution.

Drainage and sanitary facilities are very poor with 92.8 % practicing open air defecation and 24.9 % staying in an area with lack of drainage facilities. 95.7% are home deliveries and 9.4% are low birth weight babies with 89.3% not knowing the birth weight of baby.

99.2% of them belong to upper lower class according to modified BG Prasad's classification. 26.8 % of the mothers have habit of tobacco chewing, 88.7% of fathers are chronic smokers and 66.5% of the fathers of enrolled children are chronic alcoholics.

Exclusive breast feeding up to 5-6 months was practiced by 43.7%. Immunization coverage was good with 99.1% receiving primary immunization (TABLE II).

Table II: Data Related To Birth History, Infant Feeding Pattern And Primary Immunization Of Study Population

Maternal Age at first child birth (in yrs)	<15	16-20	21-30	>30	Total	
	330 (7.8)	2864 (68.0)	1008 (24.0)	5 (0.1)		4207 (100.0)
Place of Delivery	Home			Hospital		
	4027 (95.7)			180 (4.3)		4207 (100.0)
Birth Weight	<2kg	2-2.5kg	>2.5kg	Don` t Know		
	76 (1.8)	322 (7.6)	53 (1.2)	3756 (89.3)		4207 (100.0)
Exclusive Breast Feeding	Up to 4months	5-6months	7months-1year			
	1604 (38.1)	1839 (43.7)	764 (18.1)			4207 (100.0)
Age of Weaning Started	3-4months	5-6months	7months-1year	Not yet Started		
	1405 (33.4)	1760 (41.8)	975 (23.2)	67 (1.6)		4207 (100.0)
Primary Immunization	Yes	No				
		Forgotten	Negligence	No Facility	Total	
	4172 (99.1)	5 (0.1)	10 (0.2)	20 (0.4)	35 (0.8)	4207 (100.0)
Family Planning	No	Yes (Tubectomy)				
	733 (17.4)	3474 (82.5)				

(Figures in parenthesis denotes percentage)

1393 (33.1 %) Of children are stunted with height less than 3rd centile using WHO growth charts . 1588 (35.7 %) are underweight with weight below 3rd centile on WHO growth charts. 1175(27.9 %) of children were having BMI < 5th centile of WHO charts , 127(3.3 %)children are overweight wth BMI between 85th and 95th centile and 9(0.2%) children are obese with BMI>95th centile. 1,103(62.9%) of children less than 6 years were malnourished with 0.9% falling under grade IV PEM according to IAP classification of PEM.(TABLE III).

Table III: Classification according to IAP classification of PEM in children between 0-6 years.

Age in (Yrs)	>81		71 – 80 GRADE I PEM		61 – 70 GRADE II PEM		51 – 60 GRADE III PEM		<51 GRADE IV PEM		NC	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
0-3	207	168	118	158	63	80	14	17	3	4	4	4
4-6	113	163	168	152	146	127	26	10	7	1	1	-
Total	320 (18.2)	331 (18.9)	286 (16.3)	310 (17.7)	209 (11.9)	207 (11.8)	40 (2.3)	27 (1.5)	10 (0.6)	5 (0.3)	5 (0.3)	4 (0.2)

(Figures in parenthesis denotes percentage)

1,103(62.9%) of children less than 6 years were malnourished with 0.9% falling under grade IV PEM. 474(82.6%) of children were anemic. (17.2%) of them had varying grades of Vitamin A Deficiency (TABLE V). 2083(49.5%) of study population had microcephaly.

Table IV: Mean and \pm SD values of height, weight and BMI

Age (in yrs)	Height		Weight		BMI	
	Mean \pm SD	Mean \pm SD	Mean \pm SD	Mean \pm SD	Mean \pm SD	Mean \pm SD
	Boys	Girls	Boys	Girls	Boys	Girls
0-1	67.70 \pm 16.19	63.85 \pm 13.72	7.56 \pm 3.94	6.58 \pm 2.52	16.08 \pm 12.58	15.08 \pm 3.50
2-3	84.23 \pm 8.04	83.50 \pm 6.51	10.06 \pm 1.58	9.87 \pm 1.43	14.05 \pm 1.73	14.20 \pm 1.85
4-6	98.05 \pm 8.79	98.34 \pm 6.76	13.36 \pm 2.52	13.16 \pm 1.97	13.77 \pm 1.61	13.59 \pm 1.41
7-9	115.71 \pm 7.22	114.08 \pm 7.64	18.83 \pm 3.24	18.09 \pm 3.42	14.00 \pm 1.53	13.85 \pm 1.86
10-12	131.09 \pm 7.64	129.56 \pm 8.80	26.65 \pm 5.41	25.75 \pm 5.24	15.40 \pm 2.25	15.26 \pm 2.31
13-15	144.48 \pm 8.58	141.70 \pm 10.38	35.65 \pm 6.81	33.38 \pm 6.63	16.97 \pm 2.21	16.50 \pm 2.29

Table V: Health status on clinical examination of study population

General Physical Examination				
	Yes	No	No cooperation	Total
Anemia	3474 (82.57)	724 (17.20)	9 (0.21)	4207 (100.0)
Generalized Lymphadenopathy	663 (15.75)	3535 (84.02)	9 (0.21)	4207 (100.0)
Icterus	91 (2.16)	4107 (97.6)	9 (0.21)	4207 (100.0)
Edema	45 (1.06)	4153 (98.7)	9 (0.21)	4207 (100.0)
HAIR				
Lusterless	2796 (66.4)	1402 (33.3)	9 (0.21)	4207 (100.0)
Sparseness	277 (6.5)	3921 (93.20)	9 (0.21)	4207 (100.0)
Discoloured	2620 (62.27)	1578 (37.50)	9 (0.21)	4207 (100.0)
Easy pluckability	63 (1.49)	4135 (98.2)	9 (0.21)	4207 (100.0)
SKIN				
Pigmentation	2994 (71.16)	1204 (28.61)	9 (0.21)	4207 (100.0)
Scabies	834 (19.82)	3364 (79.96)	9 (0.21)	4207 (100.0)
Pyoderma	1424 (33.84)	2774 (65.93)	9 (0.21)	4207 (100.0)
Dry	3010 (71.54)	1188 (28.23)	9 (0.21)	4207 (100.0)
ORAL CAVITY				
Lips angular stomatitis	635 (15.09)	3563 (84.69)	9 (0.21)	4207 (100.0)
Cheilosis	1737 (41.28)	2461 (58.49)	9 (0.21)	4207 (100.0)
Teeth mottled enamel	1455 (34.58)	2743 (65.20)	9 (0.21)	4207 (100.0)
Caries	2881 (68.48)	1317 (31.30)	9 (0.21)	4207 (100.0)
Bald tongue	2698 (64.13)	1500 (35.65)	9 (0.21)	4207 (100.0)
Glossitis	540 (12.83)	3658 (86.95)	9 (0.21)	4207 (100.0)
Gums hypertrophy	240 (5.70)	3958 (94.08)	9 (0.21)	4207 (100.0)
Bleeding	39 (0.92)	4159 (98.85)	9 (0.21)	4207 (100.0)
NAILS				
Koilonychia	244 (5.79)	3954 (93.98)	9 (0.21)	4207 (100.0)
Platynachia	1871 (44.47)	2327 (55.31)	9 (0.21)	4207 (100.0)
Clubbing	5 (0.11)	4193 (99.66)	9 (0.21)	4207 (100.0)
Others	9 (0.21)	4189 (99.57)	9 (0.21)	4207 (100.0)
EYES				
Bitot's spot	694 (16.49)	3504 (83.28)	9 (0.21)	4207 (100.0)
Corneal xerosis	15 (0.35)	4183 (99.42)	9 (0.21)	4207 (100.0)
Night blindness	16 (0.38)	4182 (99.40)	9 (0.21)	4207 (100.0)
Visible Goiter	118 (2.80)	4080 (96.98)	9 (0.21)	4207 (100.0)

(Figures in parenthesis denotes percentage)

3474(82.6%) of children were anemic, 17.2% of them had varying grades of Vitamin A Deficiency.

In the age group of 2-3 years, mean RDA of energy was deficit by 177.2 kcal, in 4-6 years, mean RDA was deficit by 155.2kcal, between 7-9 years, it was 237.5kcal deficit, between 10-12 years, it was 561.1 calorie deficit and 13-15 years deficit was 638.4 k cal when compared to revised RDA recommended by ICMR in 2010 for Indians . Mean intake of protein is more than RDA recommended by ICMR except in the age group of 13-15 years where deficit was by 6.4 gms.

Discussion

India has the second largest concentration of tribal population in the world next to Africa with varying proportions in different states. Undernutrition is an important contributing factor to high mortality in children with mild to moderate malnutrition having relative risk of 2.2 and severe malnutrition having relative risk of 6.8 for death [1]. Undernutrition along with poor environmental sanitation predisposes children to infections.

In this study, Jenu kuruba tribal children in Mysore district are suffering from varying grades of PEM similar to several other studies done in different parts of India [1,7-16]. Clinically overt forms of PEM like marasmus and kwashiorkor were not seen in contrast to other studies where it was 0.6% to 1% [1,7]. The food

and nutrient consumption was low in all the age groups. High prevalence of anemia was observed in concordance with other study [1]. Prevalence of vitamin A deficiency was very high compared to other study [1,7]. Most of the studies have usually focused on children aged 6 to 72 months, which is the young population most at risk unlike in our study which has included children up to 15 years of age. The finding of a high prevalence of vitamin A deficiency in older children in our study is of concern and warrants further studies. In some older children, Bitot spots can persist after the vitamin A deficiency has been corrected, so it may not be indicative of current vitamin A deficiency. Few studies done in India have shown high prevalence of vitamin A deficiency in older children [17,18]. .2.8% of the children had visible goiter.



Fig 1: Bitot spot in a tribal child



Fig 2: Cheilitis and angular stomatitis suggestive of vitamin B complex deficiency in tribal children

68.5% had dental caries. Skin infections were highly prevalent with 19.8% had scabies and 33.8% of them had pyodermal lesions.

Prevalence of microcephaly was very high which could be part of PEM or constitutional which is not documented in any other study. 2083(49.5%) of study population had microcephaly. Microcephaly could be a part of malnutrition or genetically predetermined. Head circumference was recorded by pediatric postgraduates and recording was done twice to confirm. Further studies are necessary to determine the cause of high prevalence of microcephaly noticed in our study.

Poverty, illiteracy, lack of safe drinking water and sanitary facilities, lack of health care facilities are the main reasons for health related problems and nutritional disorders among them. Lack of Drainage and sanitary facilities with 92.8 % practicing open air defecation reflects the poor living conditions and thereby its impact on health status of tribal population similar to other study [1].

95.7% are home deliveries and 9.4% are low birth weight babies with 89.3% not knowing the birth weight of baby reflects the poor health care facility availability, accessibility and maternal and child health awareness among tribal population.

Conclusion

Health and nutritional status of Jenukuruba tribal children is very poor. Immediate appropriate interventional programmes are needed for improving their health and nutritional status.

There is an urgent need to improve the socioeconomic conditions and provision of health care facilities in tribal regions. Health oriented research studies on tribal population help in formulating effective need based health care strategies among various tribal groups in India.

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Conflict of Interest: The authors declare no conflict of interest

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