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Anthropometric Profile and Nutritional Status of Selected Oraon Tribals in and Around Sambalpur Town, Orissa

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ABSTRACT The present study was carried out to determine anthropometric profile and nutritional status of selected Oraon tribal adults and children of Sambalpur town of Sambalpur district, Orissa. Oraon is one of the most primitive tribes of Eastern India. A total of 120 households comprising of 552 individuals (60 native and 60 migrant families) of Sambalpur District were selected purposively and interviewed through the help of a pre-tested structured scheduled for collecting the relevant information on socio-economic and demographic characteristics. Height and weight of all the members of the household were measured using standard protocol. Weight for age and height for age was calculated for assessing child nutritional status using NCHS standard of children and body mass index (BMI) was used to assess the nutritional status of adults. The study revealed that the overall socio-economic condition of migrants was good in comparison to the native counterparts. 70 % of native males, 66 % of native females, 91 % of migrant males and of 87 % migrant females were in low weight normal category. The extent of malnutrition among children was found to be high in both natives and migrants groups. In conclusion, the study provided evidence that the nutritional status of children and adult was not satisfactory. Immediate appropriate nutrition intervention programs are needed for improving their status.

INTRODUCTION

India has the second largest concentration of tribal population in the world next to Africa (67.8 million). It constitutes about 8 percent of the total population in India, with varying proportions in different states (Rao et al. 2006a). India's tribal people are among the poorest in the country. 1991 census data showed that 52.17 percent of them live below the poverty line. This dismal situation is reflected in the health and nutritional status of tribals. Geographical isolation, primitive agricultural practices, socio-cultural taboos, lack of formal education, poor infrastructure facilities, improper health seeking behaviour, poverty etc. has always lead to the development of various morbidities and under-nutrition. The dietary pattern and living condition of the tribals is different from the general population. Their food intake is influenced by vagaries of nature, with large seasonal variations, depending upon availability of agricultural and forest produce. Under-nutrition and malnutrition is widespread as access to forest products to supplement their diet and provide educational cash income is no longer possible, either because the forests have been destroyed or their rights of access are being denied. Several studies have documented a close relationship between the tribal ecosystem and their nutritional status (Rao et al. 1994a, 1994b).

The most vulnerable group regarding health and nutritional status were preschool children living in rural as well as in urban slum areas, within which the tribal preschool children were the main victims of under-nutrition (Mitra and Tiwari 1997; Mitra 2001; Agrahar-Murugkar 2005; Rao et al. 2006). In Central India, tribes like Gond, Bisonhorn Maria, Bhatra, Abujmaria and Kamar were found to have poor health and nutritional status among preschool children (Rao et al. 2005; Mitra et al. 2007). Malnutrition was a leading problem among tribal preschool children in India (Mahapatra et al. 2000).Several studies have documented that BMI of tribals is very poor (Bose et al. 2005, 2007; Mitra et al. 2007; Ghosh 2006; Mital et al. 2006; Kongsdier 2001; Sabat et al. 1991; Hanumantha Rao et al. 1993; Mahanty et al. 1991)

Orissa is a small and predominantly rural state of India which occupies an important place in the country having a high concentration of Scheduled Tribe and Scheduled Caste population. The Oraon are one of the major tribes in the country and are listed as a scheduled tribe in West Bengal, Orissa, Madhya Pradesh and Maharastra. Their population in India is 4,327,000 and in Orissa it is 350,000. They constitute 3.66

per cent of the state total tribal population. They are mainly concentrated in the districts of Sundargarh and Sambalpur, which adjoin Bihar, and Madhya Pradesh. Numerically the Oraon are the largest tribe in the District of Sundargarh, their main concentration being in Talsara, Sundargarh, Sadar, Lefripada, Bargaon, Raghunath Palli and Biramitra Police Station areas of the district. In undivided Sambalpur district, they are mostly found in villages around Sambalpur and Jharsuguda towns and in Deogarh Police Station area. In these areas they are found dispersed in many villages with purely Oraon inhabitants. According to Oraon tradition, their original homeland is said to have been in the Deccan. They have their language called Kurukh, which is classified as a Dravidian language. Those who inhabit the border areas of Bihar speak Sadri, which is mixture of Hindi and several tribal dialects of the Chotanagpur plateau.

In general, data are scanty on the anthropometric and nutritional status of various tribal populations of India (Yadav et al. 1999; Yadu et al. 2000; Khonngsdier et al. 2002; Gogoi et al. 2002; Bose and Chakraborty 2005). It has been recently suggested (Bose and Chakraborty 2005) that there is urgent need to evaluate the nutritional status of various tribes of India. With this backdrop the present survey has been carried out to record the anthropometric profile of the Oraon tribal adult and children and to assess the nutritional status on the basis of this.

Objectives

The specific objectives of this study are as follows:

1) To analyse the socio-economic condition of the selected Oraon tribal families.
2) To assess the nutritional status by indices of nutritional anthropometry.

MATERIALS AND METHODS

The data for the present study has been collected from 120 Oraon tribal households (60 native families of Charbhati and 60 migrant families living in and around Sambalpur town, Orissa). The research design followed for this study is exploratory cum descriptive in nature and the samples were selected purposively for collection of relevant data.

The study covers two aspects viz., socio-economic profile of the people, and assessment of anthropometric characteristics of the people. Broadly it covers general aspects, aspects of education, availability and access to various facilities, asset position, occupational structure, income generation food intake pattern, and health status. The interview schedule was prepared, pre-tested, revised and used for the collection of data. Personal interview method was employed to collect the data on the above aspects.

Health status of the people has been assessed pertaining to frequency of occurrence of various diseases and level of malnourishment through anthropometrical study. The study has sought to examine the incidence of various types of common ailments as well as chronic diseases viz., air borne diseases, water borne diseases and parasitic infections. The anthropometrical measurements of each member of the sample households (the weight and height) were analyzed and the indices such as Body Mass Index for persons above 16 years and weight for age (WFA) and height for age (HFA) for children less than 16 years were used to assess the nutritional status. Body Mass Index (BMI) has been computed as weight / (height in mt)2.

- <16.0 :Grade III malnutrition
- 16.0-17.0 :Grade II malnutrition
- 17.0-18.5 : Grade I malnutrition
- 18.5-20.0 :Low weight normal
- 20.0-25.0 :Normal

Weight for Age (WFA) has been calculated as (Actual weight / Standard weight (NCHS standard)) x 100. And The Gomez classification (Jackson et al. 1987) has been used to classify the weight status is as follows:

- < 60% weight for age: Grade III malnutrition
- 61-75 % weight for age: Grade II malnutrition
- 76-90% weight for age: Grade I malnutrition
- >90% weight for age : Normal

Height for Age (HFA) has been calculated and the Waterlow's classification (Jackson et al. 1987) has been used to classify the height status as per the details given below:

- < 85% expected height for age: Severe malnutrition
- 85-90% expected height for age: Moderate malnutrition
- 90-95% expected height for age: Marginal malnutrition
- >95% expected height for age: Normal

RESULTS AND DISSCUSSION

A. Demographic Characteristics

Various demographic factors like age, education, occupation of the head of the family mem-

bers and children have a positive influence in the nutritional status of the people. So an attempt was made for the analysis of the demographic characteristics of the sample (Table 1).

Table 1: Classification of the respondents (head of the family) on the basis of general information

Distribution and description	*Natives*		*Migrants*	
	No.	*%*	*No.*	*%*
Age				
30 years and below	9	15.0	-	-
31-years 60 years	45	75.0	56	93.3
Above 60 years	6	10.0	4	6.7
Total	60	100.0	60	100.0
Educational Status				
Illiterate	1.26	43.3	-	-
<Matriculate	22	36.7	7	11.7
Matriculate	10	16.7	10	16.7
Higher education	2	3.3	43	71.7
Total	60	100.0	60	100.0
Occupational Status				
Making *beedi*	14	23.4		
Shop	3	5		
Service	5	8.3		
Tailor/Driver	5	8.3		
Housewife/Retired	5	8.3		
Labour	28	46.7		
Total	60	100.0		
Occupational Status				
Officer			16	26.7
Clerk/Teacher/ Nurse			23	38.3
Peon/ Driver/Cable jointer			9	15.0
Housewife/Retired			10	16.7
Carpenter/Part time			2	3.3

In both natives and migrants tribal household, the head of the family is the senior male member of the family usually the father. Majority of the head of the family belonged to the age group of 31 to 60 years of age. The education level of the head of the family indicates that 43.3 percent of the natives were illiterate and there were no illiterates among migrants groups.

Regarding the occupational status there is great difference among the natives and migrants indicating that only 8.3 percent natives are engaged as peons and operators in government offices, rest 46.7 percent works as daily wage labourers, 23.4 percent are involved in making and selling *beedis*, others are tailor, driver, retired persons, housewives or work in medicine store, garage, cloth store as helper. But in case of migrants, majority of them are well- established, some are O.A.S officers, bank officers, nurses, teachers, drivers and clerks in government office and very few, 20 percent are housewives or retired government servants engaged in part time jobs like taking tuitions or making candles.

Most of the natives live in *kaccha* houses with *khupar* roof and moreover, many of these houses are made up of two rooms without kitchen (Table 2). The hygienic conditions are very poor in all of the households with no toilet facility. There is no water supply from the government, they collect drinking water from one family, who has bore well facility and they pay for it. They go to nearby river for bathing and washing clothes. All the native Oraons used wood as the fuel which is collected and/or purchased except few who use kerosene stoves and electric heaters. All of them have electric supply to their houses. No families have four wheelers, only one family has a three wheeler which carries goods and majority of them have no vehicles of their own, but 45 percent have at least one cycle. The daily dietary menu of native Oraons consists of rice with pulses or curry, non-vegetarian items are consumed once in a week or month and consumption of fruits like apple, bananas are almost negligible due to which they suffer from many deficiency diseases. They did not report on the prevalence of different diseases like blood pressure, diabetics, heart disease etc. This may be due to the fact that they were not aware of this and take their health problems lightly and did not go for any type of treatment.

The economic condition of Oraons is not very much sound. They cannot afford to have major means of communication such as television, radio etc. Because of this they were observed to be unaware and ignorant. This attitude is responsible for increasing the prevalence of illiteracy. The per capita income per month (PCI) is also very low, that is, 41.7 percent of native tribals have PCI between Rs.200-500/- per month and only 11.7 percent of families have PCI between Rs.900 to 500/- per month. As a result, they are not in a position to buy household materials, and some families do not even have a cot and other essentials. Very few families have bed, table, chair etc. The main source of income of these native Oraons comes from making and selling rice beer. Refrigerator, wardrobe, cooler and other luxury commodities were seen only in one household as their standard was better than rest. This particular family had a grocery shop and also sold alcohol.

The picture of the migrant tribal is totally different from the native tribal, as 93.3 percent of

Table 2: Distribution of the respondents on the basis of family information

Particulars	*Natives*		*Migrants*	
	No.	*%*	*No.*	*%*
Type of House				
Pucca	6	10.0	56	9.3
Mixed	47	78.3	4	6.7
Kaccha	7	11.7	-	-
Total	60	100.0	60	100.0
Source of Water				
Public PHd, tube well, or well	59	98.3	1	1.7
Own bore well or well without motor	1	1.7	8	13.3
Own water facility	-	-	51	85.0
Total	60	100.0	60	100.0
Sanitary				
No facility	60	100.0	-	-
Common toilet facility	-	-	2	3.3
Own toilet facility	-	-	13	21.7
Own toilet with proper facility	-	-	45	75.0
Total	60	100.0	60	100.0
Fuel				
Wood	47	78.8	-	—
Coal + wood or coal + kerosene	13	21.7	1	1.7
Kerosene heater	-	-	4	6.7
Gas, heater, etc.	-	-	55	91.6
Total	60	100.0	60	100.0
Vehicles Possessed				
No vehicles	28	46.7	1	1.7
Cycle	27	45.0	7	11.7
Scooter/Motorcycle	4	6.6	35	58.3
Four wheelers	1	1.7	17	28.3
Total	60	100.0	60	100.0
Food				
Rice, Pulses, Curry	39	65.0	-	-
Rice, Pulses, Curry	19	31.7	2	3.3
Rice, Pulses, Curry, Fruits, Milk, Non- Vegetarian	2	3.3	58	96.7
Total	60	100.0	60	100.0
Health				
Suffering from severe diseases	-	-	20	33.3
Suffering from common diseases	60	100.0	36	60.0
Suffering from major diseases	-	-	4	6.7
Total	60	100.0	60	100.0
Assets				
Below Rs. 5000	37	61.7	-	
Rs.5000-30,000	23	38.3	1	1.7
Rs.30,000-60,000	-	-	6	10
Rs.60,000-90,00	-	-	27	45
Above Rs. 40,000	-	-	26	43.3
Total	60	100.0	60	100.0
Per Capita Income				
200-500	25	41.7		
500-700	16	26.6		
700-900	12	20		
900-1500	7	11.7		
Total	60	100.0		

Table 2: Contd.....

Particulars	*Natives*		*Migrants*	
	No.	*%*	*No.*	*%*
Per Capita Income				
500-100			7	11.3
1001-3000			21	35.0
3001-5000			20	33.3
5001-10,000			11	18.3
10,001-20,000			1	1.7
Total	60	100.0		

the migrant tribals lived in *pucca* house with proper toilet and water facility. They used L.P.G cylinders as main source of fuel, and kerosene and electric heater was also used by some. All had power supply and they maintained television, refrigerator, computer and other luxury gadgets for their convenience. It is observed that only one family did not have any vehicle as the head of the family was suffering from paralysis but rest 98.3 percent of migrant tribals had vehicles. Many had cycles and bikes. Some had four wheelers as well as bikes and cycles. They consumed rice, dhal and curry daily and non-vegetarian items two or three times a week. Fruits and milk are also taken by many migrants. 60 percent of migrant tribals suffered from malaria, jaundice etc. in last one year, 6.7 percent of migrant tribal suffered from diseases like headache, cold, cough, dysentery etc. and a good portion, that is, 33.3 percent of the migrant tribals suffered from lifestyle diseases like diabetics, asthma, blood pressure etc. Though the migrants have good food to eat, and possess all luxury commodities in comparison to the natives but their situation regarding health is poor in comparison to the natives. The PCI of each family is also good as they are employed in government and private sectors, 11.3 percent of migrant tribal have PCI between Rs.500 to 1000/- per month, 35 percent of migrant tribal have PCI between Rs.1001 to 3000/- per month, 33.3 percent of migrant tribal have PCI between Rs.3001 to 5000/- per month, 18.3 percent of migrant tribal have PCI between Rs.5001 to 10,000/-, per month.

B. Anthropometry

Anthropometric measurements are measurements of body size composition. This information is needed for assessing nutritional status and planning diets. Collecting measurements such as height, weight, mid arm, chest and head circumferences over a period of time is particu-

larly useful in assessing growth. The measures of growth and body size for instance height and weight have known to be affected by myriad of factors such as nutrition, socio-economic condition geography, hereditary etc. physical growth is a vital process which brings about irreversible changes in the body and its organs, in their size, form, body weights etc. Many studies of physical growth in tribal population have revealed that with the increase in age, there is a tendency for increase in all the physical traits.

All the children suffered from different grades of malnutrition on the basis of weight for age index (Table 3). In the age group 0-5 years the native boys were having higher prevalence of grade II (8 children) and grade I (6 children) malnutrition. The prevalence of grade I and grade II malnutrition among the migrant boys in this age group is observed to be very less. Among the total of 17 native girls in 0-5 years age group, 12 are normal and 3 suffered from grade III malnourishment. In the age group of 6-16 years also the native boys were suffering more from grade I (19 children) and grade II (13 children) malnutrition. Whereas 14 migrant boys were suffering from grade I malnutrition. The native girls in this age group have poor nutritional status compared to their migrant counterparts with a total of 11 children suffering from grade I and 9 children suffering from grade II malnutrition. 7 and 3 girls of migrant families were suffering from grade I and grade II malnutrition respectively.

Table 4 presents the nutritional status of children on the basis of height for age. Children in the age group of 0-5 years of age group of natives were suffering from malnutrition more than the children of migrants, 10 native boys and 4 native girls suffered from grade III malnutrition. In the age group of 6-16 years of age group, 25 the native boys are recorded to have higher prevalence of grade III malnutrition and 8 the native boys are recorded to have grade II malnutrition compared to only 6 and 3 of migrant boys suffering from grade III and grade II malnutrition respectively. 8 and 10 native girls were also recorded to be suffering from grade III and grade II respectively indicating higher prevalence of malnutrition. Whereas only 4 and 3 of migrant girls suffered from grade III and grade II respectively.

The distribution of BMI among adult Oraons (Table 5) shows that 70 % male migrants, 66 % female migrants, 91 % male natives and 87 % female natives were in low weight normal category and only 17 % male migrants, 13 % female migrants, 7 % male natives and 10 % female natives were normal and rest suffer from various degrees of malnutrition.

In the age group 0-5 years, the total number of migrant boys were 6, migrant girls were 3, native boys were 22 and native's girls were 17. In the age group of 6-16 years, the total number of migrant boys was 33, migrant girls were 21, native boys 42 and native girls were 27.

According to Gomez classification, on the basis of weight for age, Figure 1 shows that in the age group 0-5 years, 67 % migrant boys, 77 % native boys and 71 % native girls were normal whereas 33 % migrant boys, 100 % migrant girls, 28 % native boys and 29 % native girls were malnourished. Figure 2 shows that in the age group 6-16 years, 58 % migrant boys, 52 % migrant girls, 27 % native boys and 26 % native girls were normal whereas 42 % migrant boys, 48 % migrant girls, 73 % native boys and 74 % native girls were malnourished

According to Waterlow's classification on the

Table 3: Prevalence of malnutrition among the children (weight for age)

Level of malnutrtion	*Migrants*				*Natives*			
	Boys		*Girls*		*Boys*		*Girls*	
	No.	*Mean (sd)*	*No.*	*Mean (sd)*	*No.*	*Mean (sd)*	*No.*	*Mean (sd)*
0-5 years								
Grade-III	1	55.11	2	58.95(8.06)	3	63.3(5.7)	3	57.74(7.7)
Grade-II	1	67.20	-	-	8	65.0 (2.39)	1	67.00 (3.39)
Grade-I	-	-	1	89.90	6	88.33 (1.50)	1	86.00 (2.5)
Normal	4	105.96(17.35)	-	-	5	113.42 (6.47)	12	115.66 (3.84)
6-16 years								
Grade-III	-	-	-	-				
Grade-II	-	-	3	72.00 (1.60)	13	73.15 (7.72)	9	70.00 (7.29)
Grade-I	14	83.2 (4.65)	7	82.88 (5.36)	19	88.05 (8.73)	11	85.27 (6.51)
Normal	19	105.23 (16.66)	11	100.48 (9.88)	12	103.83 (11.43)	7	95.42 (8.12)

Table 4: Prevalence of malnutrition among the children (Height for age)

Level of malnutrtion	*Migrants*				*Natives*			
	Boys		*Girls*		*Boys*		*Girls*	
	No.	*Mean (sd)*	*No.*	*Mean (sd)*	*No.*	*Mean (sd)*	*No.*	*Mean (sd)*
0-5Years								
Grade-III	-	-	1	54.54	10	56.04 (15.10)	4	79.14 (10.73)
Grade-II	1	88.76	1	89.89	4	87.47 (9.73)	1	86.52
Grade-I	3	91.29 (14.93)	1	93.50	1	91.60	7	92.00 (20.56)
Normal	2	96.94 (2.49)	-	-	7	98.41 (10.35)	5	97.46 (15.40)
6-16 years								
Grade-III	6	78.06 (5.52)	4	77.61 (4.27)	25	77.65 (15.07)	8	71.16 (16.81)
Grade-II	3	88.01 (0.91)	3	86.55 (1.46)	8	87.23 (18.68)	10	89.39 (13.39)
Grade-I	12	91.94 (1.18)	3	92.27 (0.39)	10	91.31 (20.28)	7	94.43 (14.86)
Normal	12	99..34 (4.80)	11	101.87 (3.87)	4	105.49 (17.02)	2	109.86 (3.59)

Standard deviations are presented in parentheses.

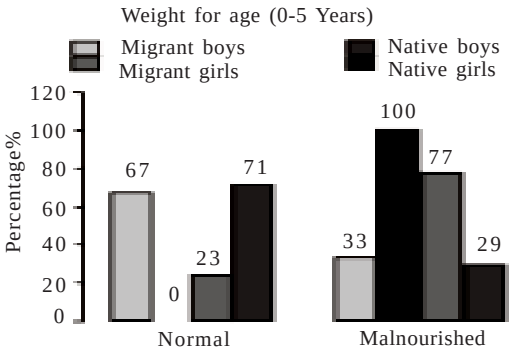

Fig 1.

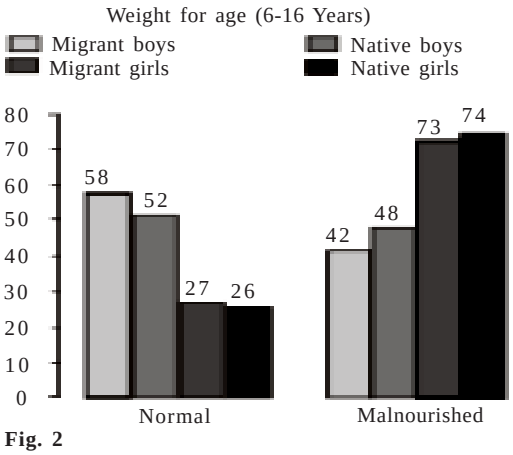

Fig. 2

Figs.1 and 2. Prevalence of malnutrition in 0-5 and 6-16 years (weight for age)

basis of height for age, Figure 3 presents the percentage of children malnourished in the age group of 0-5 years of age. It is seen that 33 % migrant boys, 32 % native boys and 29 % native girls were normal whereas 67 % migrant boys, 100 % migrant girls, 68 % native boys and 71 % native girls were malnourished. In the age group of 6-16 years Figure 4 shows that 58 % migrant boys, 52 % migrant girls, 27 % native boys and 26 % native girls were normal whereas 42 % migrant boys, 48 % migrant girls, 73 % native boys and 74 % native girls were malnourished.

The numbers of adult male migrants were 92, female migrants were 101, male natives 90 and female natives were 93. BMI is calculated to observe the prevalence of malnutrition among adults and presented in Figures 5 and 6. 17 % male migrants, 7 % female migrants, 7 % male natives and 10 % female natives were normal. 70 % male migrants, 91 % female migrants, 91 % male natives and 87 % female natives were in low weight normal category and rest 13 % male migrants, 2 % female migrants, 2 % male natives and 3 % female natives were malnourished.

DISCUSSION

Several studies have been done in different parts of India on health and nutritional status of preschool children (NNMB 1978; Mahapatra et al. 2000; Ghosh 2001; Urade et al. 2004; Kaur et al. 2005), protein energy deficiency (Sengupta

Table 5: Prevalence of malnutrition based on BMI among adults Oraons

	Migrants				*Natives*			
	Male		*Female*		*Male*		*Female*	
	No.	*Mean (sd)*	*No.*	*Mean (sd)*	*No.*	*Mean (sd)*	*No.*	*Mean (sd)*
Normal	16	23.4 (0.92)	13	22.00(1.75)	6	20.4 (1.552)	9	21.62(1.82)
Low weight normal	64	18.5 (1.79)	67	18.9 (1.95)	82	19.00(1.45)	81	18.6 (1.66)
Grade I malnutrition	10	17.3 (0.153)	16	17.6 (1.10)	2	17.0 (2.49)	3	17.7 (0.49)
Grade II malnutrition	2	16.10(1.08)	4	16.53(1.41)	-	-	-	-
Grade III malnutrition			1	15.90(1.6)	-	-	-	-

Standard deviations are presented in parentheses.

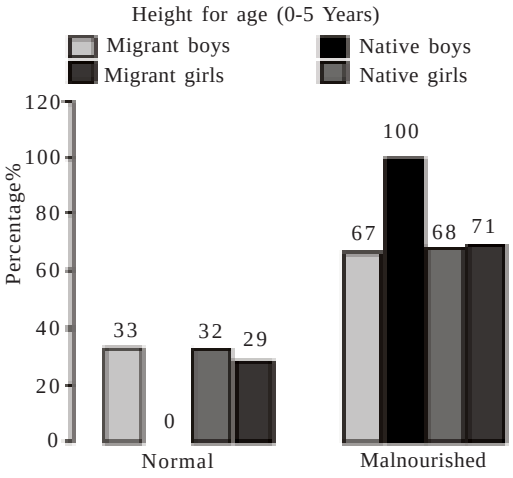

Fig. 3

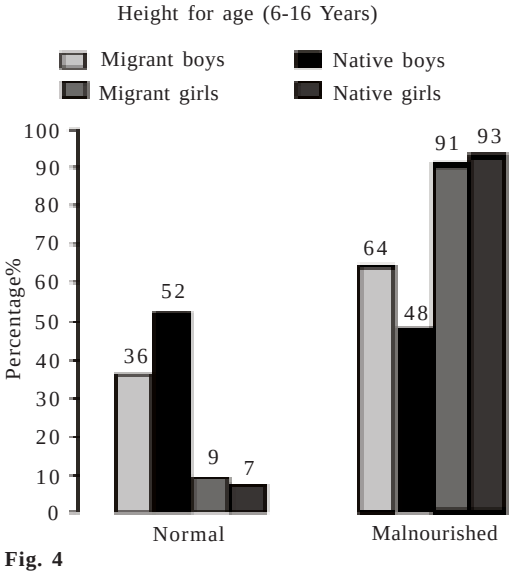

Fig. 4

Figs. 3 and 4. Prevalence of malnutrition in 0-5 and 6-16 years (Height for age)

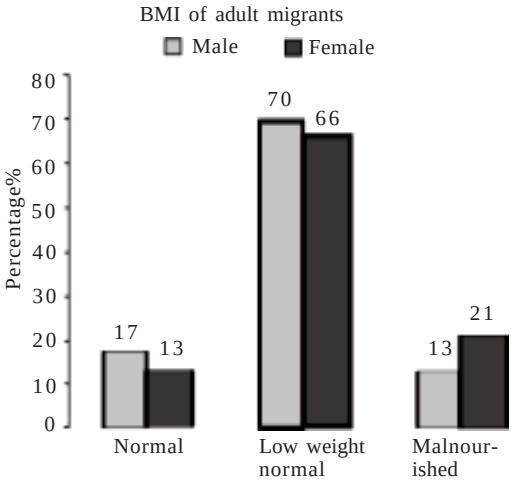

Fig. 5

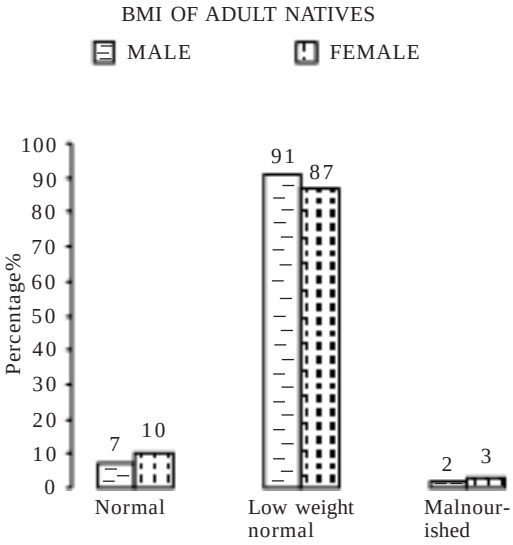

Fig. 6

Figs. 5 and 6. Prevalence of malnutrition among adults (BMI)

1980; Gopalan 1997), as well as nutritional status among different tribal children of Madhya Pradesh and Chhattisgarh states in India (Rao et al. 1994; Kumar et al. 1993; Mitra and Tiwari 1997; Mitra 2001; Rao et al. 2005).

Along with those studies, in the present study it was revealed through the reflection of various indices of nutritional anthropometry such as weight for age and height for age that high numbers of Oraon children were malnourished and regarding adults, maximum number of persons were of low weight which may be a cause of low intake of food and nutrient in comparison to RDI.

Similarly, high prevalence of under- nutrition was also reported in Oraon children and adults of New Mal (Mittal and Srivastava 2006). Higher prevalence of chronic and acute under-nutrition was also observed in other tribal and caste preschool children in India (NNMB 2000; Mahapatra et al. 2000; Mitra et al. 2004; Rao et al. 2005; Rao et al. 2006b; Laxmiah 2007; Chandraker et al. 2009) among adolescents (Laxmiah 2007; Rao et al. 2006a) and adults (Banik et al. 2007, Bose et al. 2005, 2006, 2007; Chandraker 2009; Varadaranjan 2009).

CONCLUSION

Tribal communities are relatively more vulnerable to food and nutrition insecurity compared to their rural counterparts. Studies carried out by National Nutrition Monitoring Bureau (NNMB) in different states revealed that even though there has been marked decrease in prevalence of severe under- nutrition over a period of three decades, the prevalence of overall under- nutrition continues to be still high. The prevalence of under- nutrition in the tribal communities was relatively high compared to the urban counterparts.

Inadequate health care facilities, low purchasing power, illiteracy, ignorance, anti-nutritional factors of the plant origin food due to lack of appropriate nutrition knowledge and socio-economic disadvantage among the tribal populations perpetuate the vicious cycle of under-nutrition. Therefore, there is an urgent need to evolve comprehensive programmes for the overall development of tribal populations.

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