Research Article Available online www.ijsrr.org ISSN: 2279–0543

International Journal of Scientific Research and Reviews

Study of Anthropometric Characteristics and Nutritional Status of Adult Bhumij of Jhargram District,West Bengal.

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ABSTRACT:

The tribal population in India, as per 2011 census is 104.3 million, constituting 8.6% of the total population. Presently malnutrition and undernutrition both are the comprehensible health issues for adult peoples of India. Above such condition also affects the children. The prevalence of such situation developed in India due to mainly socio-economic variation, especially in case of downgraded community like Scheduled Tribes (STs) and Scheduled Castes (SCs) than others. Presentstudy was carried out to assess the age trends in nutritional status and anthropometric characteristics among adult Bhumij Tribals.

It was a cross-sectional community-based study, carried out in tribal 3areas of Jhargram District, West Bengal, India. These were located approximately 50 km radius from Jhargram, 176 km from Kolkata, the state capital of West Bengal. A total 211 adult (male = 101 and female = 110) Bhumij tribals, agedover 20 years in those village areas were included in the study.

The mean values of height (HT), weight (WT), hipcircumferences (HC), biceps (BSF) and triceps skin fold (TSF), were significantly higher ($p < 0.001$) among males than females. Amongfemales, mean values of waist circumference (WC), supra iliac (SISF), mid-upper arm (MUAC) and BMI were significantly higher ($p < 0.001$).The overall sex-combined prevalence of undernutrition was 28.9 %. The prevalence ofundernutrition was significantly (chi square = 4.99, df = 2, $p < 0.05$) higher (29.8%) in males than females (28.2%). The prevalence of under nutrition increased with increasing.

Among tribal population under nutrition is a major health problem. Their nutritional status was not satisfactory.The nutritional stress was serious and this condition increased with the increasing age.

KEYWORDS: Age trends, Bhumij, Chronic Energy Deficiency, Body Mass Index

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INTRODUCTION:

The tribal population in India, as per 2011 census[1] is 104.3 million, constituting 8.6% of the total population Census of India, 2001overall, 89.97% of them live in rural areas. Nutrition has been a major health issue in India for centuries. Chronic hunger and under-nutrition are the worst difficultyof the poverty that still epidemics millions of tribal households in India.[1] India probably has the largest number of tribal communities in the world [2.] The vast majority of the tribal populations resides in rural areas of the country and is socially and economically underprivileged [3]. The Bhumij is one such tribe being the fourth largest (7.5% in 2001 census) tribal group in West Bengal state. The term 'Bhumij' means owner of the soil. They inhabit jagged forested terrains, speak an Austro-Asiatic language and are divided into several exogamiccircles. Settled agriculture is the predominant occupation supplemented with occasional hunting and trapping of birds and small wild animals. Many works as laborers in agriculture and other sectors. More than 95% of the Bhumij follow some traits of Hinduism along with their traditional religious practices[3].Undernutrition occurs when net nutrient intake is less than requirements. Under nutrition leads to a metabolic abnormality, physiological changes, reduce organ and tissue function and loss of body mass. Both under nutrition and over nutrition play a major role in morbidity and mortality, therefore assessment of nutritional status is an effort to improve the health ofindividual and population throughout the world. The body mass index (BMI) is the most established anthropometric indicator used forassessment of adult nutrition status [4,5,6,7]. There are very few data on the nutritional status of the various tribal populations of India[8,9,10,11,12,13,14,15,16,17,18]. High levels of undernutrition and low BMI(based on BMI) is a major public health problem especially among rural adults of developing countries[19.] Due to regional disparities and rural-urban dividing policy the situation in India is not only different but often very complex. Despite rapid footsteps in socio-economic development, health and education, the expanding economic, regional and gender disparities are challenges for the health sector[20]. There is direct relationship between health and development as per Sharma[20].

The Bhumij are one of the scheduled tribes in India who live mainly in Jharkhand, Chhattisgarh, Madhya Pradesh, Odisha and West Bengal. They were classed as one of the 'criminal tribes' under Criminal Tribes Act 1871during the British Raj and still suffer from social shame and rejected in modern times. Information on nutritional status of Bhumij, never the less, is extremely scanty.They lack educational opportunities and healthconsciousness.In view of this, the objective of the present study wasto report the anthropometric characteristics

and the nutritional status, based on BMI, of adult Bhumij of Jhargram District West Bengal.

METHODS AND MATERIALS:

Before commencement of the study Prior permission and ethical approval were obtained from local community leaders as well as relevant authorities. The district level and local administrative relevant authorities and the community leaders were informed about the objective of the field work. Verbal and written consent was obtained from each participant in their own language prior to each interview and measurement procedure. We have taken information on ethnicity; age, occupation, and educational status were obtained from all subjects with the help of a questionnaire. The present cross-sectional studies were conducted at villages Metial, Dhanghori, Ashanboni, Majhipara, under Lalgarh block of Jhargram district of West Bengal.These were located approximately 50 km radius from Jhargram, 176 km from Kolkata, the state capital of West Bengal. A total 211 adult (male = 101 and female = 110) Bhumij tribals, aged over 20 years in those village areas were included in the study. The vast majority of the subjects were illiterate and very low-waged manual laborers belonging to low socio-economic status. All anthropometric measurements were made by trained investigatorsusing the standard techniques of Lohman [4.] Height, circumferences, weight, andskinfolds were recorded to the nearest 0.1 cm, 0.5 kg, and 0.2 mm, respectively. Circumferencesand skinfolds were measured using measuring tape and Holtain skin fold calipers, respectively. Technical errors of measurements (TEM) were computed and were found to be within acceptable limits[22]. Body mass index (BMI) was computed using the following standard equation: BMI = weight (kg)/height (m2).

The CED (Chronic Energy Deficiency) status was defined as BMI < 18.5 kg/m^2. TheWHO classification (WHO, 1995) of the public health problem of low BMI, based on adultpopulations worldwide, was followed. This classification categorizes prevalence according topercentageofapopulation with BMI<18.5.

Table 1: LowBMI classification of WHO,1995

Prevalencecategory	Cutoffpercentage	Remarks
Lowprevalence	5-9%	Warningandmonitoringrequired
Mediumprevalence	10-19%	Poorsituation
Highprevalence	20-39%	Serioussituation
Very high prevalence	≥40 %	Criticalsituation

Means of all anthropometric variables and BMI were computed for each sex separately. The distribution of BMI in both sexes was not significantly different from normal according toCox's skewness test. Thus t-tests were performed to test for sex differences as well as differencesin mean BMI with other ethnic groups. The chi-square test (Fischer's exact test) was utilized tocompute sex differences in nutritional status. All statistical analyses were undertaken using the Statistical Package for Social Science (SPSS 16)program.

RESULTS:

Mean, standard deviation, tand significance(p)values of the following anthropometric measurements like height (HT), weight (WT), mid upper arm circumference (MUAC), waist circumference (WC), hip circumference (HC), biceps skin fold (BSF),triceps skin fold (TSF), supra iliac skin fold (SISK),body mass index (BMI) are presented in ***Table2***. The mean values of WT, HT, SISF, TSF were significantly higher ($p < 0.001$) among males. Among females the mean values of WC, MUAC, and BMI were significantly higher ($p < 0.001$). The age and sex specific nutritional status based on BMI presents in ***Table 3.***The overall sex-combined prevalence of under nutrition was28.9%. The prevalence of undernutrition wassignificantly (chi square = 4.99, $p<0.05$, df =2) higher males (29.8%)than in females (28.2%). The prevalence of undernutrition increased with increase in age (except 31 – 40 years). Similar trends were observed in both sexes. Thus, from these research investigations, it is clearly evident that the nutritional status of tribal populations of West Bengal was unsatisfactory. They were facing serious to critical nutritional stress.Thiscondition increasedwith theincreasein age.

DISCUSSION:

The "primitive" tribes resided in forests and hills for thousands of years, without having more than causalcontacts with the populations and the centers ofcivilization. There are several variations among these tribal groups in nutritional status and accessto utilization of nutrition and health services.

From Table 5 and Figure 1 it is clear that among males Bhumij from West Bengal (present study) have the highest mean value of BMI (22.7 kg/m2) followed by Santals of Birbhum [23]. West Bengal, Birhors of Purulia[25]. Mahalis of Bankura (19.9 kg/m2),[26]Santals of Purulia (19.5 kg/m2)[27], Kora Mudis of Bankura [28] and Bhumij of Paschim Medinipur (18.6 kg/m2)[18]. Similarly, among females Bhumij from West Bengal (present study) the mean value of BMI was highest followed by Birhors of Purulia (20.2 kg/m2)[25], Santals of Birbhum (19.5 kg/m2)[23], Kora Mudis of Bankura (18.3 kg/m2)[28], Santals of Purulia (18.1 kg/m2)[27]. The least mean BMI was observed

among Mahali females (17.9 kg/m2) of Bankura [26.]

In table 3 and table 4 it is clearly shown that under nutrition as well as over weight is the major concern in tribal population in West Bengal state and female have higher side than male in respect of overweight and undernutrition. Table 5 also shows the prevalence of CED among the various tribes in different areas of West Bengal in comparison with present study. The highest frequency of CED was found among Santals of Purulia (55.0%)[27], followed by Bhumij of Paschim Medinipur (52.3%)[18], Kora Mudis of Bankura (48.6%)[28], Mahalis of Bankura (42.2%) [26], Santals of Birbhum (30.5%)[23], Bhumij (29.8%) (present study). The lowest frequency of CED was found among Birhors (19.4%) of Purulia[25]. Among females, the highest frequency of CED was found in Mahalis of Bankura (63.6%)[26], followed by Kora Mudis of Bankura (56.4%)[28], Santals (52.5%) of Purulia[25], Santals of Birbhum (38.5%)[24,]Bhumij (28.2%) (present study). As with males, the lowest frequency of CED was found among Birhors of Purulia (19.4 %)[27.] Thus, from these research investigations, it is clearlyevident that the nutritional status of tribal populations of West Bengal was not satisfactory. They were experiencing 6serious to critical nutritional stress.

According to National Family Health Statistics-3Reporty the prevalence of under nutrition in India is 33.0% in males and 28.1% in females. Indian Government has been implementing several nutritional intervention and developmental programmes under tribal sub-plan approach for the betterment of health and nutritional status of tribal populations. However, as can be seen from the results of these anthropometric surveys, undernutrition is stillan important public health problem among various tribal populations of West Bengal.This maybe associated with low literacy, poor socio-economic conditions and other associated factors. Therefore, required appropriate intervention programmes to improve socio-economic conditions by income generating activities such as an employment guarantee scheme. To enhance the irnutritional status, food security in the form of food for work programmes along with increased dietary intake of calories and proteins are imperative.Other important efforts needed to improve this problem include improved education along with health promotion, better sanitation and provision of safe drinking water for prevention of diarrheal and other infections. One of the limitations of our study was that it did not investigate the role of socio-demographic and socio-economic concomitants of undernutrition. Taking into consideration, future studies on the prevalence of CED among tribal populations should investigate these variables in detail. Such studies are scanty not only from West Bengal but also from India. The manifestations of undernutrition are manifold with serious implications for morbidity and mortality.

CONCLUSION:

From our study it can be concluded that the nutritional status of Bhumij (ST populations) not satisfactory. The present study clearly showed that, the prevalence of undernutrition indicated a serious situation, according to the WHO classification of CED. Thus, to reduce the nutritional stress among this tribal group, appropriate nutritional interventionalprograms are needed to be initiated.

RECOMMENDATION:

Author suggests that similar studies should be undertaken to assess the prevalence of undernutrition among Bhumij of another region, as well as other ethnic groups, especially in rural areas. In India, there are many such nutritionally vulnerable tribal populations, those studies will help us to generate new data which can be used for compare with the prevalence of undernutrition in the local, national and global context.

ACKNOWLEDGEMENTS:

The authors are grateful to Centre for Life Science of Vidyasagar University for permit us to do this field survey and also thankful to block authorities' officers, members of the Bhumij association, along with all the participants of villagers for their co-operation for this study.

CONFLICT OF INTEREST:

The authors declare that there are no conflicts of interest regarding publication of this paper

Different tables and Figures:

Table 2: Anthropometric characteristics of the subjects.

Variables	Male(N= 101)			Female(N=110)			"t"value
	Mean	SD	SEM (±)	Mean	SD	SEM (±)	
HT(cm)	159.6	10.8	1.07	151.6	12.0	1.15	3.575***
WT(kg)	58.1	10.4	1.03	52.9	10.3	0.99	5.051***
MUAC(cm)	22.2	2.8	0.28	22.9	3.9	0.56	4.377***
CC(cm)	75.7	11.3	1.12	72.8	11.9	1.14	1.787#
WC(cm)	67.2	7.7	0.76	71.1	7.7	0.73	3.566***
HC(cm)	80.3	8.7	0.87	75.7	12.7	1.21	3.022***
BSF(mm)	26.7	5.9	0.59	23.3	5.1	0.49	4.480***
TSF(mm)	39.9	15.3	1.52	32.4	10.9	1.04	4.128***
SCSF(mm)	42.0	12.9	1.28	38.4	13.1	1.25	2.102#
SISF(mm)	40.1	11.2	1.11	45.3	21.9	2.09	2.183***
BMI(kg/m^2)	22.7	3.6	0.35	23.1	4.4	0.42	2.658***

All the data are expressed in terms of **Mean ± SEM**. Level of Significance: ***=p <0.001,

#: Not Significant

Table3: Nutritional status based on BMI.

NutritionalCategory	AgeGroup (Years)									Ageand sex Combined
	Male(N=101)					Female(N=110)				
	20-30 (N=29)	31-40(N=27)	41-50 (N=23)	>50 (N=22)	AgeCombined	18-30(N=22)	31-40 (N=22)	41-50(N=30)	>50 (N=36)	AgeCombined	
Under-nutrition	20.7%	18.5%	39.2%	45.5%	29.8%	18.2%	27.3%	33.3%	30.6%	28.2 %	28.9%
Normal	34.5%	66.7%	43.4%	31.8%	44.5%	36.4%	50.0%	36.6%	44.4%	40.9 %	42.6%
Over weight	44.8%	14.8%	17.4%	22.7%	25.7%	45.4%	22.7 %	30.1%	25.0%	30.9 %	28.5%
Chi-square	N. S					χ^2=93.83,p<0.05,df=5					χ^2=4.99,p<0.01 df=2

Sexdifference: chi-square=0.189, p <0.05,df = 1.

Table 4: Nutritional status analysis of adult ST population under Lalgarh block of Jhargram district of West Bengal based on BMI.

Sex	BMI Category	Age Group				Total	% Within sex
		20-30	31-40	41-50	51-60		
Male (101)	**Underweight**	6	5	9	10	30	29.8
	Normal	10	18	10	7	45	44.5
	Overweight	13	4	4	5	26	253.7
Female (101)	**Underweight**	4	6	10	11	31	28.2
	Normal	8	11	11	15	45	40.9
	Overweight	10	5	9	10	34	30.9
Total (211)	**Underweight**	10	11	19	21	61	7.1
	Normal	18	29	21	22	90	37.4
	Overweight	23	9	13	15	60	55.5

Table 5:Comparison of mean BMI kg/m2 and prevalence of CED among various tribal populations of West Bengal.

Community	Mean BMI (kg/m2)		CED Prevalence (%)		Study area (District)	Reference
	Male	Female	Male	Female		
Kora Mudi	18.6	18.3	48.6	56.4	Bankura	Bisai et al 2008
Santal	20.5	19.5	30.5	38.5	Birbhum	Mukhopadhyay 2009
Santal	19.5	18.1	55.0	52.5	Purulia	Das & Bose 2010
Birhor	20.5	20.1	19.4	33.3	Purulia	Das et al 2013
Bhumij	18.6	---	52.3	---	Paschim Midnapore	Ghosh & Bose 2015
Mahali	19.9	17.9	42.2	63.6	Bankura	Ghosh & Bose 2017
Bhumij	22.7	23.1	29.8	28.2	Jhargram	**Present study**

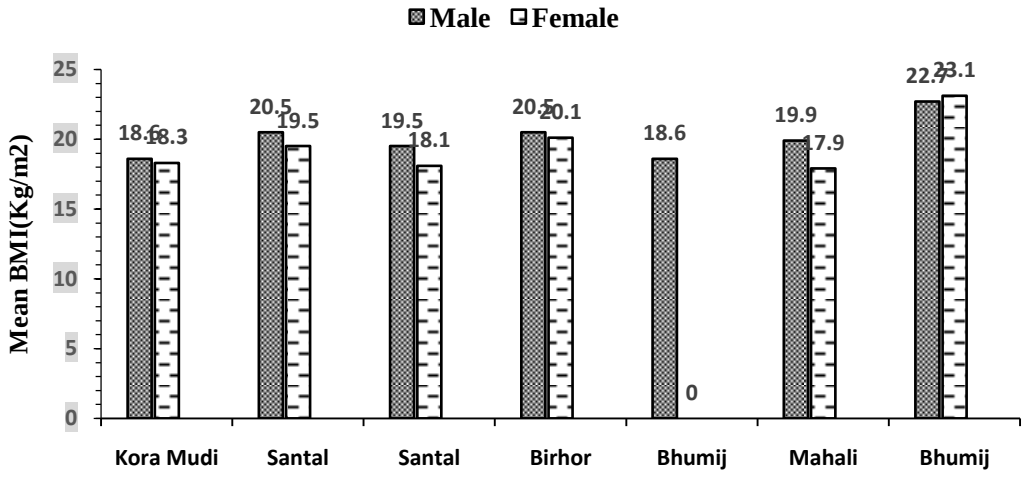

Fig 1: **Mean BMI: Community and sex wise**

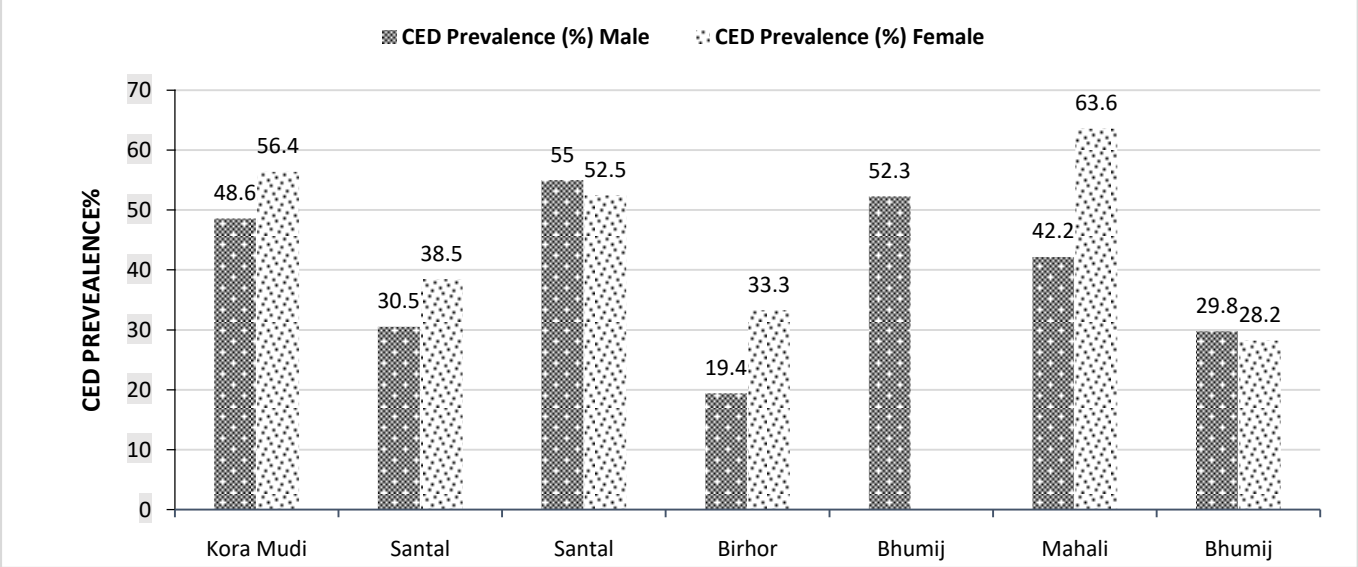

Fig 2: **Prevalence Of CED: Community and Sex**

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