

# Anthropometric characteristics and nutritional status of adult Oraon men of Gumla District, Jharkhand, India

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## Abstract

**Background.** According to the 2001 Census, India has a tribal population of over 84 million which constitutes 8.2 % of its total population. In general, the tribal populations of India are very undernourished.

**Objectives.** To determine the anthropometric characteristics and prevalence of undernutrition, based on body mass index (BMI), of adult male Oraons, a tribal population of Gumla District, Jharkhand, India.

**Methods.** A total of 205 adult (age=18 years and above) Oraon men of five villages, namely, Kubatoli, Rehetoli, Bhitari (inner) Serka, Bahir Serka, and Chera, in Gumla District, Jharkhand. These villages are located approximately 130 km from Ranchi, the provincial capital of Jharkhand. Anthropometric measurements included height, weight, circumferences and skinfolds. BMI was calculated by the standard equation. Chronic energy deficiency (CED) was evaluated according internationally accepted BMI cut-off points.

**Results.** The means (SD) for height, weight and BMI were 161.8 (6.3) cm, 47.3 (5.3) kg and 18.0 (1.6), respectively. The prevalence of CED (BMI < 18.5) was 63.9 %. The rates of CED III (BMI < 16.0), CED II (BMI = 16.0 to 16.9) and CED I (BMI = 17.0 to 18.4) were 7.3 %, 17.6 % and 39.0 %, respectively. According to the WHO criterion, the prevalence of undernutrition was very high and the situation was critical.

**Conclusions.** Adult Oraon men of Gumla, Jharkhand, are facing severe nutritional stress. The situation is critical, necessitating implementation of immediate nutritional intervention programs.

## INTRODUCTION

India has a tribal population of over 84 million which constitutes 8.2 % of its total population, according to the Census of India, 2001 (1). Several research studies on various tribal populations living in different parts of India have found them to be socially and economically disadvantaged (2). The Oraons are an agricultural tribe found mainly in Orissa, Bihar, Jharkhand and West Bengal. They are the second largest tribe of Jharkhand. They were originally the inhabitants of the Chhotanagpur region (Hazaribagh District of Jharkhand), which is south-west of the river Ganges (3). In Jharkhand, they speak Kurukh, which belongs to the sub-group of the Dravidian language family. The Oraons have several endogamous totemic clans and they use their clan names as surnames. Land is their main economic resource. They are mainly settled cultivators

but during lean season they depend on forest produce (3).

In developing countries like India, anthropometry, despite its inherent limitations, still remains the most practical tool for assessing the nutritional status in the community (4,5). The body mass index (BMI) is widely accepted as one of the best indicators of nutritional status in adults (6,7,8,9,10,11). BMI may be nutritionally rather than genetically related (12), despite wide variation in weight and height among human populations (13,14). Thus the use of BMI as an anthropometric indicator of nutritional status may be more appropriate in a country with diverse ethnic groups like India (15).

In general, data are scarce on the anthropometric and nutritional status of tribal populations of India (2,16). BMI has been validated as a measurement of the nutritional status

of other tribal populations in India (16). Recent studies suggest that there is an urgent need to evaluate the nutritional status of the tribes of India (16,17,18,19,20). Such studies can potentially be used to highlight the severity and uniqueness of nutritional problems among tribal and other underprivileged and underserved populations in India and other countries.

In view of this, the objective of the present study was to report the anthropometric characteristics and BMI-based nutritional status of adult Oraon men of Gumla, Jharkhand. To the best of our knowledge, this is the first report on the anthropometric and nutritional profiles of adult male Oraons of Jharkhand.

## MATERIALS AND METHODS

This survey was undertaken during January 2007, in five villages, namely, Kubatoli, Rehetoli, Bhitari (inner) Serka, Bahir (outer) Serka, and Chera. All the villages are located around Bishunpur, Gumla District in Jharkhand State. They are approximately 130 km from the state capital of Ranchi. A total number of 205 adult Oraon males from the above mentioned villages were randomly selected for the study. They were included on the basis of their availability in their village at the time of the visit of the field worker (RC). They were all apparently healthy individuals and able to do their day to day jobs as per their own satisfaction. All of them were cultivators and engaged in agricultural labour.

Ethical approval and prior permission was obtained from relevant authorities and local community leaders, respectively. Informed oral consent was also obtained from each participant. Information on ethnicity and age was obtained from all subjects with the help of a questionnaire.

The first author performed the anthropometric measurements following the standard techniques (21). Height and weight were recorded to the nearest 0.1 cm and 0.5 kg, respectively. Skinfolds and circumferences were measured to the nearest 0.2 mm and 0.1 cm, respectively. Technical errors of measurements were computed and found to be within acceptable limits (22). BMI was calculated by the standard formula:

$$\text{weight (kg)/height (m)}^2.$$

Nutritional status was evaluated according to internationally accepted BMI guidelines (23). Chronic energy deficiency (CED) grades III, II, and I were defined by BMI values of less than 16.0, 16.0 to 16.9, and 17.0 to 18.4, respectively.

BMI values of 18.5 to 24.9 were considered normal.

We followed the World Health Organization (WHO) classification (23) of the public health problem of low BMI, based on adult populations worldwide. This classification categorizes the prevalence of undernutrition according to the percentage of the population with BMI under 18.5: low (5% to 9%), warning sign, monitoring required; medium (10% to 19%), poor situation; high (20% to 39%), serious situation; and very high (40% or more), critical situation.

## RESULTS AND DISCUSSION

The mean age of the subjects was 38.0 years (sd = 13.40). The mean and standard deviation (SD) of the anthropometric characteristics are presented in Table 1. The means (SD) for height, weight and BMI were 161.8 (6.3) cm, 47.3 (5.3) kg and 18.0 (1.6) kg/m<sup>2</sup>, respectively.

In the assessment of the nutritional status of individuals and communities, anthropometric measurements play an important role. The assessment is done by observing the departure of the anthropometric measures from the normal standards (14). The basic causes of undernutrition in developing countries are poverty, poor hygienic conditions, and little access to preventive and health care (24,25,26).

### Figure 1

Table 1: Characteristics of the Study Sample (n = 205).

Variable	Mean	Standard Deviation
Age (years)	38.0	13.4
Height (cm)	161.8	6.3
Weight (kg)	47.3	5.3
BMI (kg/m <sup>2</sup> )	18.0	1.6

Table 2 presents the nutritional status (based on BMI) of the subjects. The prevalence of CED (BMI < 18.5) was 63.9%. The rates of CED III, CED II and CED I were 7.3%, 17.6% and 39.0%, respectively. This prevalence of undernutrition (63.9%) was very high (40% or more) indicating a critical situation.

**Figure 2**

Table 2: Nutritional Status of the subjects based on BMI.

Nutritional Status	BMI reference values (kg/m <sup>2</sup> )	Frequency	%
CED Grade III	> 18.0	15	7.3
CED Grade II	16.0 – 16.9	36	17.6
CED Grade I	17.0 – 18.4	80	39.0
Normal	18.5 – 24.9	73	35.6
Overweight	≥ 25.0	1	0.5

Table 3 presents the height, weight and BMI of the adult male Oraons of Jharkhand along with those reported in earlier studies from northern West Bengal (2,27) and Central India (14). The anthropometric characteristics of the Oraons of the present study were very similar to those of Oraons of northern West Bengal.

**Figure 3**

Table 3: Mean anthropometric characteristics of adult Oraon men of different regions of India.

Study Area	Sample size	Reference Cited	Height (cm)	Weight (kg)	BMI (kg m <sup>2</sup> )
North Bengal	110*	27	160.1	46.7	18.2
	117**		162.1	47.4	18.0
North Bengal	200	2	158.0	47.0	18.8
Central India	99	14	163.2	52.2	19.6
<i>Jharkhand</i>	<i>205</i>	<i>Present Study</i>	<i>161.8</i>	<i>47.3</i>	<i>18.0</i>

\* high productivity tea pluckers  
 \*\* low productivity tea pluckers.

The CED rates of Oraons of northern West Bengal and Central India are presented in Table 4. This table clearly indicates that the rate of CED among adult Oraon men were high (20% to 39%) to very high (40% or more). This implied

that the nutrition situation among Oraons was serious or critical. It is noteworthy that Oraon men of the present study had the highest (63.9 %) rates of undernutrition.

**Figure 4**

Table 4: Prevalence of CED (%) among adult Oraon men of different regions of India.

Study Area	Reference Cited	CED III	CED II	CED I	Total CED
North Bengal	2	6.0	9.5	31.5	47.0
Central India	14	2.0	4.0	22.2	28.2
<i>Jharkhand</i>	<i>Present Study</i>	<i>7.3</i>	<i>17.6</i>	<i>39.0</i>	<i>63.9</i>

Efforts to reduce undernutrition depend on reducing poverty and raising people's living standards by improving the quality of homes and by increasing access to clean drinking water and adequate sanitation. Such interventions have positive impacts on health, and implementing these also goes some way towards fulfilling people's basic human rights (26). Unfortunately, these variables were not studied in the present investigation. However, the results clearly indicate that the Oraons of Gumla, Jharkhand are under severe nutritional stress. Therefore, it is imperative that immediate nutritional intervention programmes are initiated among this population. Such programmes would be beneficial in not only reducing the rates of CED, but also its associated maladies of morbidity and mortality (28).

Lastly, since there is vast ethnic heterogeneity in India (29), there is an urgent need for conducting studies that deal with the evaluation of nutritional status among the numerous tribal populations of the country. This would enable us to determine the prevalence of CED among Indian tribes. The Indian Government can take effective health promotion initiatives based on the findings of these investigations.

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