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## Nutritional status of adolescent boys of Oraon tribe of Chhattisgarh, India

**Manish Toppo and Reeta Venugopal**

### Abstract

The present study was conducted to assess the nutritional status of adolescent boys belonging to the Oraon tribal population of Jashpur district, Chhattisgarh, India. A total 220 participants (boys aged 10 – 14 years) was the sample of the study. Adolescence is a crucial era in which body composition changes occur and is period which encompasses the transition from childhood to adolescent. Study of changes in the body composition are important for planning and conducting physical activities for any population. In the present study anthropometric variables height and weight were measured, and BMI (Body Mass Index) was calculated (ICMR, 2010). Data was analysed by using descriptive statistics. The result showed that height and weight of the group showed increasing trend with increase in age. BMI indicates that 77.7% adolescent boys are in underweight category. Further studies needed to be conducted with other indicators like, life style, and fitness level of the adolescent which will help to plan inclusion of this population into sports.

**Keywords:** Oraon tribe, adolescent boys, BMI (Body mass index), nutritional status

### Introduction

Adivasis, vanvasi, aboriginals, primitives and animists are the different names given to the tribal people. After the Constitution of India registered them in a schedule, now they are generally referred to as the 'Scheduled Tribes'. India is multicultural and traditional country of various tribal communities. At present India was second largest tribal population in the world next to Africa. (According to census 2011) [2] the tribal population in India is 10.43 crore, constituting 8.6% of the total population. Chhattisgarh is a tribal dominated state of India. The schedule tribal population is 30.62% of the total population of the State. There are 42 schedule tribes in Chhattisgarh; Gond is the most populous tribe, constituting 54.94 percent of the total ST population. Four other ST in descending order are Kaware, Oraon, Halba and Bhatra etc. The Oraon is a tribe of about 3.6 million people residing in the states of West Bengal, Odisha, Chhattisgarh, Maharashtra, Madhya Pradesh, Bihar, and Jharkhand. The Oraon tribe is one of the five largest tribes of South Asia (Hahn and Crooks 1917) [7]. Oraon people call themselves Kurukh or Kurux. In some places they are called as Dhangars (labourer), Kisan (cultivator). They speak languages such as Kurukh, Sadri, and Hindi which belong to the Dravidian linguistic group (Turkey, 1989) [21]. Oraon tribes are divided into several Clans and Gotras, and they are named after the names of the birds, fish, animals, and plants, etc. Some important clans are Toppo (Woodpeckers), Lakra (tiger), Tirkey (mice), Minz (fish), Khess (paddy), etc. According to World Health Organization (WHO, 2016) [28]. Adolescence is described as the phase of maturation period of transition between childhood to adulthood. During this period various physiological, psychological and behavioural changes take place. This is a era of rapid growth, up to 45% of Skelton growth, and 15 to 25% of adult height is achieved during adolescence (Rees and Christine, 1989) [16]. During the growth spurt of adolescence, up to 37% of total bone mass is accumulated (Key and Key, 1994) [10]. One fifth of the total global population constitute of adolescents. In addition, this period is characterized by growth spurt & high level of physical activities. Nutrition is an important factor that influences growth and development throughout the life phase however, during the adolescence period the demand of nutritional need is at the highest (Lifshitz *et al.*, 1993) [12].

### The study area

Malnutrition has been found to be prevalent in adolescent, which adversely impact health and development. The growth and nutritional status of the children of various sections of India population have been assessed. Growth monitoring by anthropometric measurement during this period play an important health indicator and predictor of various morbidity in the community (WHO, 1995, 1999 and Singh *et al.*, 2011) [25, 26, 20].

In a country like India, with wide dissimilarity in the growth determinants, it is essential to develop the data region wise and monitor the same from time to time. Approximately 57 million children in India are underweight according to (UNICEF, 1997) [22]. Nutritional investigation—Public health investigation is the continuous, systematic collection, analysis and interpretation of health-related data needed for the planning, implementation, and evaluation of public health practices. There is a paucity of information on nutritional status of Oraon Adolescents. So, the present study is undertaken to assess the growth pattern and nutritional status of Oraon tribal adolescent of Jashpur, Chhattisgarh, India. Jashpur district formed in 25<sup>th</sup> May 1998 and its surrounded with Gumla, Raigarh and Ambikapur district and widely covered with the forests located between 22° 16'38 and 22 15' North latitudes and 83° 23'36" East longitudes in the north-western part of the Chhattisgarh state. Total area of the district is 6088 sq.km which is 4.5 percent of the total state area. As per the (census of India, 2011) [21] the district has a total population of 8,51,669, which is 3.33 percent of the total population of the state. The district predominantly has tribal population (62.37 percent of total population and of the total tribal population 86.9% is Oraon) (Gole, 2015) [6].

### Objectives

The specific objectives of this study are as follows:

1. To find out anthropometric characteristics (Height and Weight) of Oraon adolescent boys.
2. To assess the nutritional status of Oraon tribal adolescent boys by means of body composition BMI.
3. To compare the nutritional status of Oraon tribal adolescent boys with norms ie Indian council of Medical Research (ICMR) and National centre for health statistics (NCHS).

### Material & Methods

The present study is cross sectional a total of 220 adolescent tribal boys, between 10-14 years of age taken as the sample from Jashpur district, Chhattisgarh. In order to study the physical growth and nutritional status of Oraon tribal adolescent boys, anthropometric measurements height and weight were taken (Gibson, 1990) [5].

### Anthropometric measurements

Weighing machine was used for recording body weight. Anthropometer was used to measure the height.

### Body Mass Index (BMI)

(WHO, 1995; Ferro-Luzzi *et al.*, 1992) [25, 26]. It is the ratio of weight (Kg) to stature (m)<sup>2</sup>. It is an age independent nutritional index.

$$BMI = \frac{\text{Weight (kg)}}{\text{Stature (m)}^2}$$

### Absolute growth

Absolute growth of a character (difference of mean) is calculated by subtracting the mean value of the lower age group from that of the next higher age group.

$$\text{Absolute growth} = X_2 - X_1$$

Where: X<sub>1</sub>- Mean of lower age, X<sub>2</sub> - Mean of upper age

### Rate of growth

$$\text{Rate of growth} = (X_2 - X_1) * 100 / X_1$$

Where: X<sub>1</sub>- Mean of lower age, X<sub>2</sub> - Mean of upper age

### Statistical analysis

In the present study, cross-sectional approach is used to observe the growth pattern trend. For anthropometric measures the methodologies used were those of Weiner & Lourie (1969, 1981) [23, 24]. Standard methods and techniques were used to measure height and weight. BMI was calculated with height and weight. The analysis was done using Excel and JASP 0.17.3. Software. The age wise mean of body weight, height and BMI were calculated and the data were compared with the standard references data of NCHS 2005 [13], ICMR 2010 [9].

### Results

**Table 1:** Descriptive statistics of weight of oraon tribal adolescent boys

Age in (years)	N	Mean	SD	Absolute growth	Rate of growth
10	44	30.14	4.78	-	-
11	44	33.75	6.54	3.6	10.69
12	44	37.75	6.54	4	10.59
13	44	40.44	7.21	2.69	6.65
14	44	44.56	4.66	4.12	9.24

Table: -1 The result of present study shows increase in mean weight from 10-14 years. Mean body weight was 30.14 kg and standard deviation was 4.78 at 10 years and 44.56 kg and 4.66 at 14 years. Increasing trend in weight with age was observed. The maximum difference between two successive ages was 4.12 kg between at 13 to 14 years and minimum difference was 2.69 kg between 12 to 13 years.

**Table 2:** Descriptive statistics of height of oraon tribal adolescent boys

Age in (years)	N	Mean	SD	Absolute growth	Rate of growth
10	44	139.1	6.1	-	-
11	44	144.4	7.2	5.3	3.67
12	44	149.5	7.7	5.1	3.41
13	44	154.0	8.1	4.5	2.92
14	44	160.1	7.0	6.1	3.81

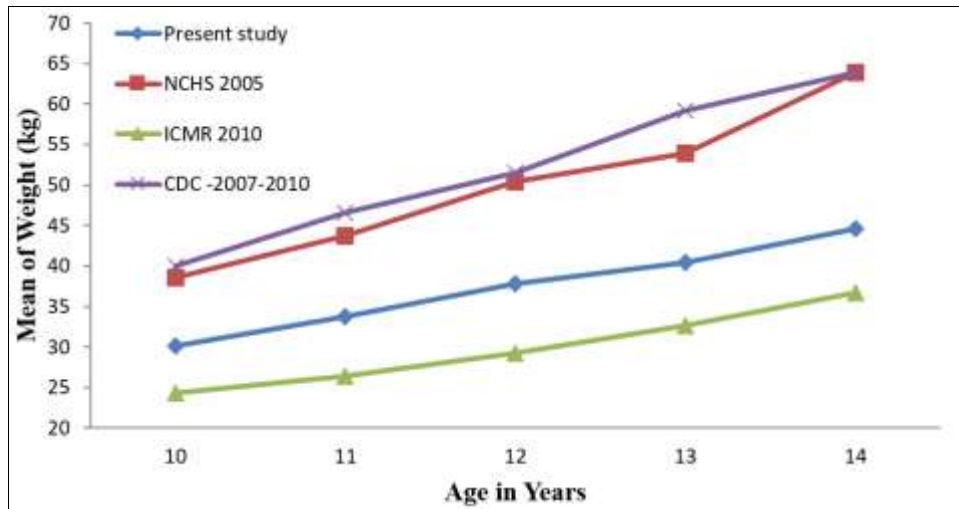
Table 2 indicates mean height value of boys at 10 years was 139.1 cm which increased gradually and was 160.1 cm at 14 years, standard deviation for both the groups were 6.1 and 7 respectively. Increasing trend in was noted in height with increasing age. The growth spurt was noted between 13+ to 14+ years that was (6.1 cm).

**Table 3:** Mean weight of oraon boys in comparison with other references standard

Age	Present study	NCHS 2005	ICMR 2010	CDC 2007-2010
10	30.14	38.6	24.3	40.0
11	33.75	43.7	26.4	46.6
12	37.75	50.4	29.2	51.5
13	40.44	53.9	32.6	59.2
14	44.56	63.9	36.7	63.9

Table-3 shows comparison of body weight of Oraon tribal adolescent boys of the present study with others studies. It reveals that the mean body weight of the Oraon tribal adolescent boys in the present study was lower than National

Centre for Health Statistics (NCHS, 2005) [13], Centre for Disease Control and Prevention CDC (2007-2010) and higher as compared to reference of Indian Council of Medical Research (ICMR, 2010) [9].

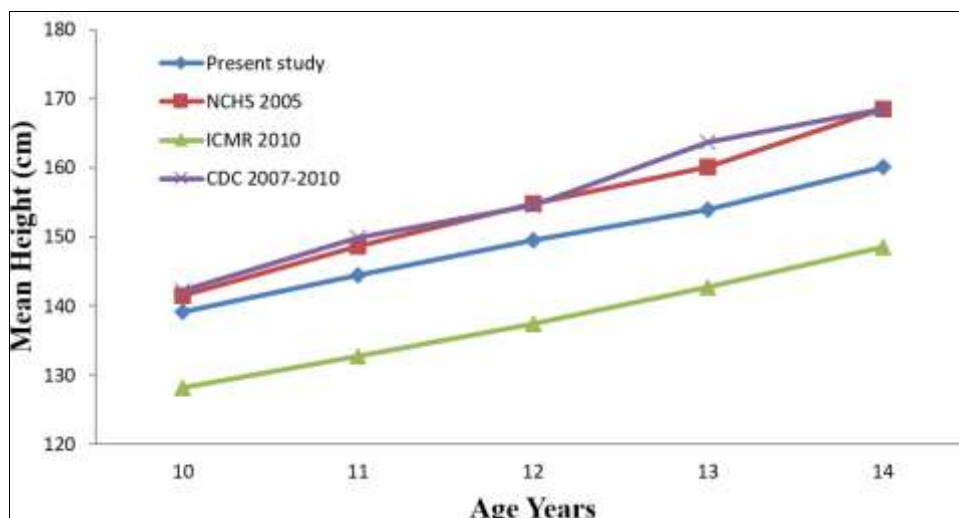


**Fig 2:** Comparison of mean weight of present study with others standard references

**Table 3:** Mean of height of oraon adolescent tribal boys as compared with other standard references

Age	Present study	NCHS 2005	ICMR 2010	CDC 2007-2010
10	139.1	141.5	128.2	142.3
11	144.4	148.7	132.7	149.9
12	149.5	154.8	137.4	154.6
13	154.0	160.1	142.7	163.7
14	160.1	168.5	148.5	168.5

Table-3 shows the mean height of the Oraon tribal adolescent boys of the present studies were lower than NCHS (2005) [13], CDC (2007-2010) and higher than ICMR (2010) [9].

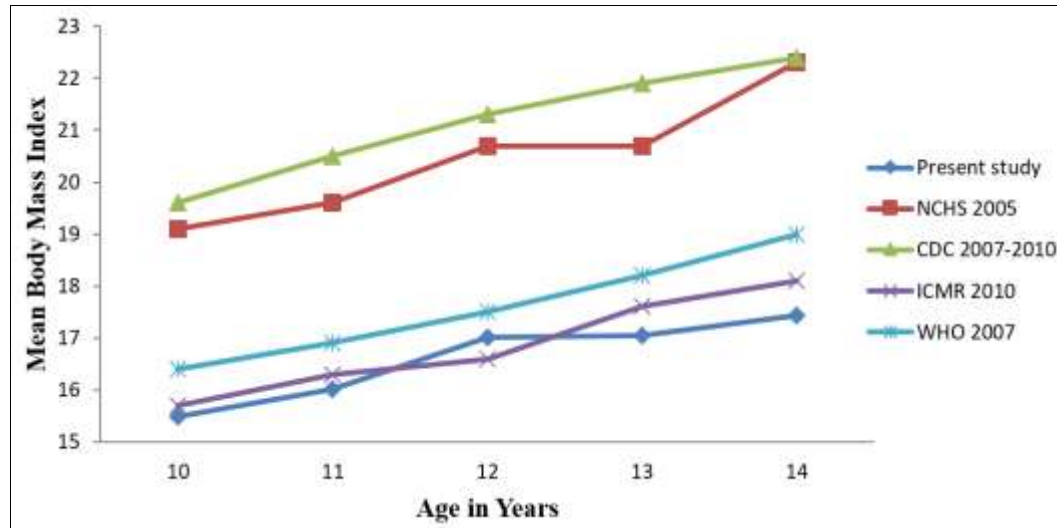


**Fig 2:** Comparison of mean height of present study with others standard references

**Table 4:** Comparison of BMI mean value with national and international standard reference data

Age	Present study	ICMR 2010	CDC 2007-2010	NCHS 2005	WHO 2007
10	15.48	15.7	19.6	19.1	16.4
11	16.02	16.3	20.5	19.6	16.9
12	17.01	16.6	21.3	20.7	17.5
13	17.04	17.6	21.9	20.7	18.2
14	17.43	18.1	22.4	22.3	19.0

Table -4 indicates that like height and weight the BMI of the present study also seems very close to ICMR reference where as it is much below as per NCHS (2005) [13] and CDC (2007-2010) standards.

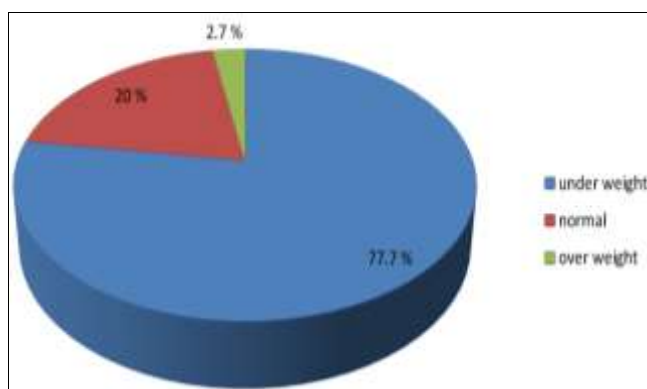


**Fig 3:** Comparison of mean BMI of Oraon adolescent boys with other standard reference

According to WHO (1995) [29], Body Mass Index (BMI) is the most appropriate variable for determining nutritional status among adolescents. Height and weight were taken according to standard techniques Body Mass Index (BMI) for adolescent was calculated by using formula  $BMI = \text{Weight (kg)} / \text{Height}^2 \text{ (m)}$  according to WHO (1995) [29]. Mean values were calculated and compared with ICMR, CDC, WHO and NCHS references standards.

**Table 5:** Nutritional status of Oraon adolescent tribal boys on the basis of BMI (ICMR, 2010) [9]

Age (yrs)	No	Under weight <18.00	Normal 18.00 to 23.00	Over weight 23.00 to 25.00
10	44	43 (97.7%)	1 (2.27%)	0 (0%)
11	44	39 (88.6%)	5 (11.3%)	0 (0%)
12	44	29 (65.9%)	11 (25%)	4 (9.09%)
13	44	30 (68.1%)	13 (29.5%)	1 (2.27%)
14	44	30 (68.1%)	14 (31.8%)	0 (0%)
Total	220	171(77.7%)	44 (20%)	5 (2.27%)



Body Mass Index values of Oraon Tribal Adolescent boys

Table-5 shows as per BMI mean value only 20% of adolescent lie in the normal range of BMI, whereas 77.7% lie in underweight category, 2.27% lie in over weight category.

**Conclusion**

The present study reveals increasing growth trajectory in height and weight among Oraon adolescent boys. with their height and weight steadily increasing. While their mean values are close to the ICMR (2010) [9] standard, a substantial number of Oraon adolescent boys in underweight category as per BMI values. The result of the study showup the need of intervention programs on nutrition for adolescents, parents and school personnel to understand the Specific dietary requirements and take appropriate measures. Optimal growth and nutritional status are paramount for adolescent boys to actively participate and excel in sports. Understanding of body composition, growth patterns and nutritional status are crucial in planning physical activities and training programs for any population. Right adolescent behaviours can be formed for emphasizing the importance of healthy food habits. Promoting regular physical activity and encouraging a balanced diet can effectively help this population to participate in competitive sports.

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