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# Somatotype Characteristics and Nutritional Status of Santal Aboorigine Females in India

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## Abstract

**Introduction:** Santal arethe aborigine people in India most of whom live in villages with poor economic status. The aim of the present study was to review the Somatotype characteristics along with nutritional status of Santal women from a remote village where proverty is the part of daily life. **Methods:** Fortyfive Santal females were selected randomly and Anthropometric measurements were measured following the international standards standardized by International Society for the Advancement of Kinanthropometry (ISAK). Heath-Carter method (1967) was followed to calculate Somatotype. BMI was calculated from height and weight. **Results:** Average somatotype of 3.6 (±1.2)-2.9 (±1.0)-2.5(±1.4) was observed for the studied Santal women. 20.6 % women were with underweight category wheas 71.4 % were in normal category observed. When categorized, muscularity component was in Low category in 35.7% women and the rest were in moderate category at lower end. **Conclusion:** Poverty is very common in Santal population in India who lives in remote villages which was reflected in low muscularity which may be due to less intake of required protein along with balanced diet. Societies or related organizations should come forward to improve the poor health condition with less muscularity.

**Keywords:** Santal, Somatotype, Mesomorph, BMI, Economic status

# Características somatotípicas y estado nutricional de las mujeres aborígenes santal en la India

## Resumen

**Introducción:** Los santal son personas aborígenes de la India, la mayoría de las cuales viven en aldeas con un nivel económico pobre. El objetivo del presente estudio fue revisar las características del somatotipo junto con el estado nutricional de las mujeres santal de una aldea remota donde la pobreza es parte de la vida diaria. **Métodos:** Cuarenta y cinco mujeres santal fueron seleccionadas aleatoriamente y las medidas antropométricas se midieron siguiendo los estándares internacionales estandarizados por la Sociedad Internacional para el Avance de la Cineantropometría (ISAK).. El método de Heath-Carter (1967) se siguió para calcular el somatotipo. El IMC se calculó a partir de la altura y el peso. **Resultados:** Se observó un somatotipo promedio de 3.6 (±1.2)-2.9 (±1.0)-2.5 (±1.4) para las mujeres santal estudiadas. El 20.6% de las mujeres estaban en la categoría de bajo peso, mientras que el 71.4% estaban en la categoría normal. Cuando se categorizó, el componente de muscularidad estaba en la categoría baja en el 35.7% de las mujeres y el resto estaba en la categoría moderada en el extremo inferior. **Conclusión:** La pobreza es muy común entre la población santal de la India, que vive en aldeas remotas, lo que se refleja en una baja musculatura, posiblemente debido a una menor ingesta de proteínas, junto con una dieta equilibrada. Las sociedades u organizaciones relacionadas deberían actuar para mejorar la salud de la población con menor musculatura.

**Palabras Clave:** Santal, Somatotipo, Mesomorfo, IMC, Nivel económico

## Introduction

The Santal are the aborigine population of Indian subcontinent. Santals are the largest aborigine population of West Bengal province of India. Large number of Santals live in rural areas and most ot them are with poor socio-economic status (Cavallaro & Rahman, 2009; Dhargupta, et al., 2009; Dutta Chowdhury & Ghosh, 2010 ; Dash & Adhikari , 2017 ; Mukherjee & Malik, 2020).

Somatotype is the shape and size of human body which is very important for every population to know the present status of fattiness, muscularity and linearity for improvement of health and wellness (Carter & Heath, 1990). Similary Body Mass Index (BMI) is also very important preliminary tool for a population to know the health status (Fox et al., 1993). Thus knowing the body shape and size along with BMI is very important for evaluation and development of health status of Santal population in India which may lead to other health related research in future. Thus, the aim of the present study was to find out the somatotype characteristics along with health status of Santal population who live in rural area.

## Material and Methods

### Participants

45 Santal women from a village in Bankura District of West Bengal Province of India were selected randomly for the study. The village is in a remote area where modern facilities for good health and wellness are absent and villagers are with very poor Socio-economic status revealed from preliminary questionaries' following the Modified Kuppuswamy scale updated for the year 2025 ( Mandal & Hossain, 2025). Consent was taken from each participants before the measurements.

### Anthropometric Measurements

Anthropometric measurement were done following standard methods standardized by International Society for the Advancement of Kinanthropometry (ISAK). Height was measured with an Anthropometric Rod (Anthropometer, GPM, Switzerland) and Body mass was weighed with an electronic Weighing scale ( 50 g fraction). Skinfold Thicknesses were measured with Harpenden Skinfold Caliper (Baty International, UK) whereas Circumferences were measured with an Anthropometric Tape (Smartmet, USA). Epicondyle breadth of Humerus and Femur were measured with a Small Sliding caliper (CESCORF, Brazil). All measurements were taken on a participant on same day at a stretch.

## Results

**Table 1.** Average Physical Characteristics and anthropometric parameters of studied women ( n= 45**)**

| | **Age (yr)** | **Height (cm)** | **Weight (kg)** | **BMI ($kg.m^{-2}$** | **Endomorphy component** | **Mesomorphy component** | **Ectomorphy component** |
|---|---|---|---|---|---|---|---|
| **Average** | 29.9 | 150.2 | 45.0 | 20.0 | 3.6 | 2.9 | 2.5 |
| **SD** | 8.5 | 3.9 | 5.9 | 2.6 | 1.2 | 1.0 | 1.4 |
| **Min** | 18 | 140.5 | 36.2 | 15.7 | 1.7 | 0.7 | 0.5 |
| **Max** | 48 | 158.9 | 57.7 | 24.6 | 5.6 | 4.0 | 5.4 |

*SD=Standard Deviation

**Table 2.** Health status based on BMI classification of studied female women (n=35**)**

| **BMI category** | **Percent of women fell in Category** |
|---|---|
| Under Weight | 28.6 |
| Normal | 71.4 |
| Over weight | 0 |
| Obese | 0 |

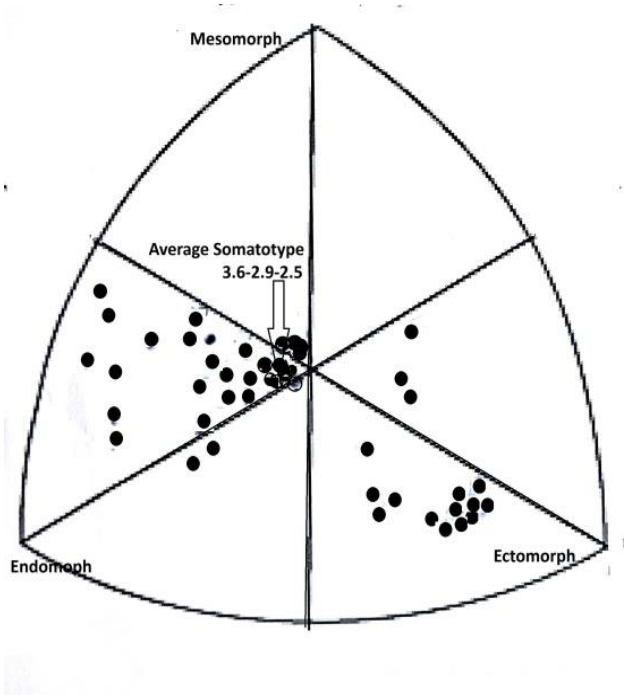


**Figure 1.** Somatochart of Santal women of Bankura distrct of West Bengal, India (n=45)

## Discussion

In the present study average age of the Santal women was 28.9 (£8.5) yr . Average Height was 150.2 (±3.9) cm with an average body weight of 45.0 (±5.9) kg. Average BMI was observed for these Santal females was 20(±206) $kg.m^{-2}$ Balanced Endomorph body type was observed in average with an an average Somatotype of 3.6 (±1.2)-2.9(±1.0)-2.3(±1.4) (Table 1).

The Santals of the present study were with very short stature which genetically a genotype character. Previous studies on Santals of also reported short height of Santals of other places in India (Ghosh & Malik, 2010 ; Ghosh & Malik,2013 ; Das & Roy, 2013; Dash & Adhikari,2017; Adhikari & Dash,2020).

28.6 % of Santal women of the present study were under weight category whereas the rest were in normal weight category indicating a large number of Santal women of the Bankura district suffer from inadequate intake of Food and nutrion (Table 2). Most of the Santal familes in rural India suffer from poverty as well as they did not have chance to hunt animals in forest due to deforestation . Thus families including women works in local agricultural fields as a daily labor with less earning. This is one of the reason where a large number of Santal women in underweight category and those who are in normal range were also very close to underweight scale with average BMI of 20 $kg.m^{-2}$ .

The poor Socio-economic status of the Santal women of the present study was also reflected in less muscularity. Santal women of the present study were with low muscularity which was reflected in low average Mesomorphy component of 2.9 with Standard Deviation of ±1.0 ( Table 1). 35.7 % women were with low category muscles wheras rest 64.3 % with moderate muscularity at lower end Though the average somatotype was Balanced Endomorph, but 32.1 % were Ectomorphic either Balanced, Endomorphic or Mesomorphic Ectomorph. Rest 32.1 % were Mesomorphic Endomorph, This was also reflected in Figure 1. Thus low or moderate at th lower level muscularity indicated poor intake of protein especially animal protein for these Santal group. As all are from Poor Scoicio-economic status, taking balance food is very hard for them to maintain proper health. Alternate way to intake protein must be advised to them by the Social workers or organizations.

## Conclusion

Very low muscularity was observed for the Santal Aborigine women of West Bengal, India. This might be due to poor Economic status of the Aborigine people of India especially those who live in Villages. This might be due to less intake of protein especially animal protein in diet. Poor economic condition did not allow them to have balance diet with sufficient protein. Moderate endomorphy or fattiness might be due to their daily physical activity as most of the Santal women worked hard for survival. Organizations should come forward to improve the

economic status of Aborigine people who live in villages for better Health and wellness. The Santal aborigine people of the present study possessed posseswho lives in a village with poor economic condition possess very low muscularity but moderate endomorphy component needs proper intake of food and nutrition for better health and wellness.

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## Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

## Informed Consent Statement

All the athletes included in the study provided written informed consent.

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