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Nutritional Status of Adivasi Santal Women of Urban Areas in West Bengal, India



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ABSTRACT

173 Santal women from the urban areas of Purba Medinipur, Purulia, and Bakura districts were measured for their nutritional status and calorie intake. The Santal women were from poor socioeconomic status where the family heads were involved in daily labor job where women were attached with domestic works as maid. The studied women group was with an average age of 27.5 ± 1.8 yr. An average height of 155.6 ± 3.01 cm was observed with an average weight of 43.0 ± 2.3 kg. Average BMI was 17.8 ± 0.72 kg/ht² with a range between 15.2 kg/ht² and 19.5 kg/ht². Total calorie intake per day for the Santal women of the present study was 1820 ± 23.7 Kcal, of which 86.9 % came from Carbohydrate, 9.3 % from Fat and rest from Protein. Sources of vitamin and minerals are less as rice was the main staple food with less vegetables and fruits intake. When nutritional status was considered for the present study, 89 % were in underweight category, whereas only 11% were in normal weight category. The Santal women were suffering from malnutrition which was observed from their underweight nutritional category. Inadequate food along with vitamin and minerals was the main reason for low nutritional status.

INTRODUCTION

India is country of diversity with a blend of distinct Tribal and Non-Tribal people who live in urban, semi-urban, rural areas. Adivasi is an umbrella term for a heterogeneous set of ethnic and tribal groups considered the aboriginal population of India (Lok Sabha 1995, Masani and Srinivasan.1985). Santal is an adivasi ethnic group who is the native of Indian subcontinent and lives in Jharkhand, West Bengal, Bihar, Odisha, Assam, Bangladesh and in Nepal. Santal is the largest Adivasi (indigenous) community in Indian subcontinent (Archer 1974, Govt. of India 2017, Dhargupta et al 2009). A total of 10 million Santals live in India, Bangladesh and Nepal but most them live in India. Tribal population of India is around 8.2 % of total population, of which 0.59 % are Santals (Hembrom 2000, Datta Banik et al 2007). Most of the Santals live in villages but some of them migrated to urban areas and settled there for survival. Though agriculture and hunting is the main occupation of the Santals, those who settled in urban areas changed their occupation and most of them are involved in daily labor activities. Most of the women are involved in domestic works either at home or out of home as maid (Chatterjee 1990, Kapoor and Dhali 2016).

In India, overnutrition and undernutrition, both are running parallel side by side. Obesity is now becoming epidemic in high income group people for overnutrition, whereas a large section of India especially the weak sections such as tribal communities are suffering from undernutrition. This is a asymmetric nutritional fact of overnutrition and undernutrition in India. Different studies on Indian tribes supported the existence of chronic energy deficiency reflected in poor nutritional status in term of underweight and malnutrition. Tribal women, who are more vulnerable section of the tribal society, are affected more in terms of chronic energy deficiency. Based on the poor nutritional background of Indian tribes (Basu 1985, Roy Burman 1988 , Chatterjee 1989, Basu 1993, Antony et al 2001, Bose et al 2006, Bose et al 2008, Das and Bose 2015), the present study was conducted on Santal women from different urban areas of three districts of West Bengal of India.

MATERIALS AND METHODS

Subjects: Santal women from different urban areas of West Bengal has been selected randomly. Santals those who has been migrated from rural areas to the urban areas of Medinipur, Purulia and Bankura Districts of West Bengal and changed their profession from cultivation to daily labor and other professions like agricultural labor etc. had been selected

for the present study. Adult women were selected. One hundred and seventy three Santal women were measured for their height, weight and questioned for their dietary survey and other information.

Anthropometrical measurements: Height and body weight was measured with an Anthropometric Rod (CESCORF, Brazil) and electronic weighing scale (OMRON, India). Measurement was done according to the standard method recommended by International Society for the Advancement of Kinanthropometry (ISAK 2011).

Dietary assessment: For Dietary assessment, a diet history questionnaire with defined questions on frequency and portion size was used. Food intake for consecutive seven days were noted by a standard questionnaire method and mean intake was recorded (Hebert et al 1998).

Body Mass Index: Body Mass Index (BMI) was calculated using the equation where $BMI = \text{Weight (kg)} / \text{Height(m)}^2$. Nutritional status was determined using WHO guideline based on BMI (WHO 2017).

Statistical analysis: Statistical package SPSS 10.0 was used for statistical analysis.

Socioeconomic Status: Socioeconomic status was assessed by Kuppusswamy scale (Kuppusswamy 1981, Khairnar et al 2017).

RESULTS

Table 1: Average height, weight and BMI of Santal women

N=173	Age (yr)	Height (cm)	Weight (kg)	BMI (kg.m ⁻²)
Mean	27.5	155.6	43.0	17.8
Standard Deviation	1.8	3.01	2.3	0.72
Minium	21	149.2	37	15.2
Maximum	32	164.2	51	19.5

Table 2: Nutritional status of Santal women based on BMI

Category	BMI (kg.m ²) Cut-off points	Frequency	% of total 173 Santal women
Underweight	<18.50	154	89
Severe thinness	<16.00	3	1.7
Moderate thinness	16.00-16.99	9	5.2
Mild thinness	17.00-18.49	142	82.1
Normal range	18.50-24.99	19	11.0
Overweight	≥ 25.00	0	00

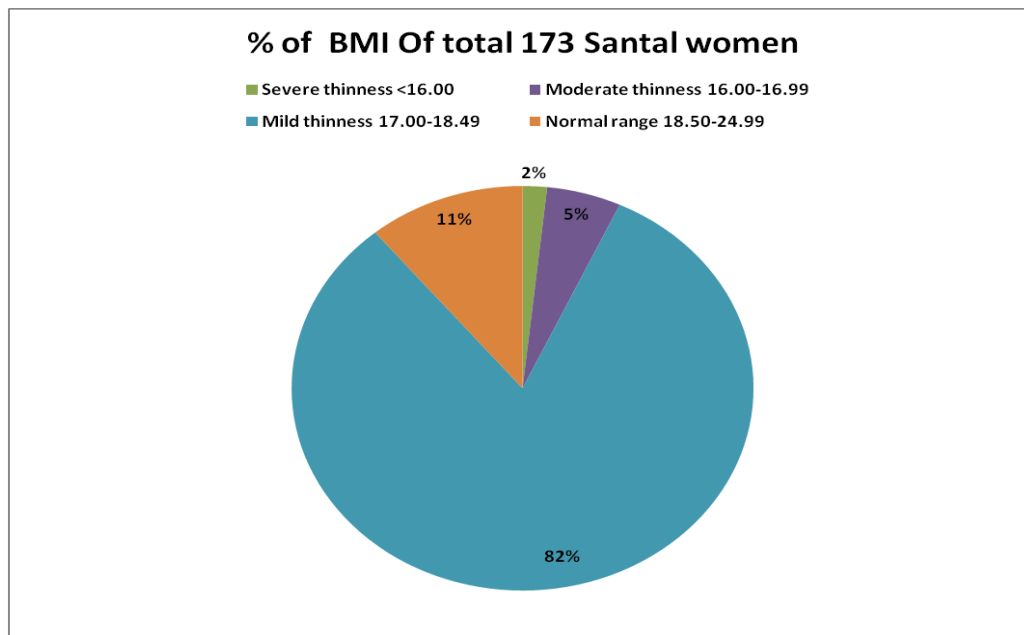


Fig 1: Nutritional status of Santal women based on BMI

Table 3: The International Classification of adult underweight, overweight and obesity according to BMI (Source: adapted from WHO, 1995, WHO 2000, and WHO 2004

Classification	BMI(kg/m ²)	
	Principal cut-off points	Additional cut-off points
Underweight	<18.50	<18.50
Severe thinness	<16.00	<16.00
Moderate thinness	16.00 - 16.99	16.00 - 16.99
Mild thinness	17.00 - 18.49	17.00 - 18.49
Normal range	18.50 - 24.99	18.50 - 22.99
		23.00 - 24.99
Overweight	≥25.00	≥25.00
Pre-obese	25.00 - 29.99	25.00 - 27.49
		27.50 - 29.99
Obese	≥30.00	≥30.00
Obese class I	30.00 - 34.99	30.00 - 32.49
		32.50 - 34.99
Obese class II	35.00 - 39.99	35.00 - 37.49
		37.50 - 39.99
Obese class III	≥40.00	≥40.00

Table 4: Daily average dietary intake of Santal women based on 7 days Diet survey

	Intake of per day (Mean ±SD)	% of total Energy intake
Carbohydrate	395 ±12.35 g / 24hr	86.9 % of total energy
Protein	16.3±2.4 g /24 hr	3.6 % of total energy
Fat	18.72±12.47 g/24 hr	9.3 % of total energy
Total Energy intake	1820 ± 23.7 Kcal (C)	

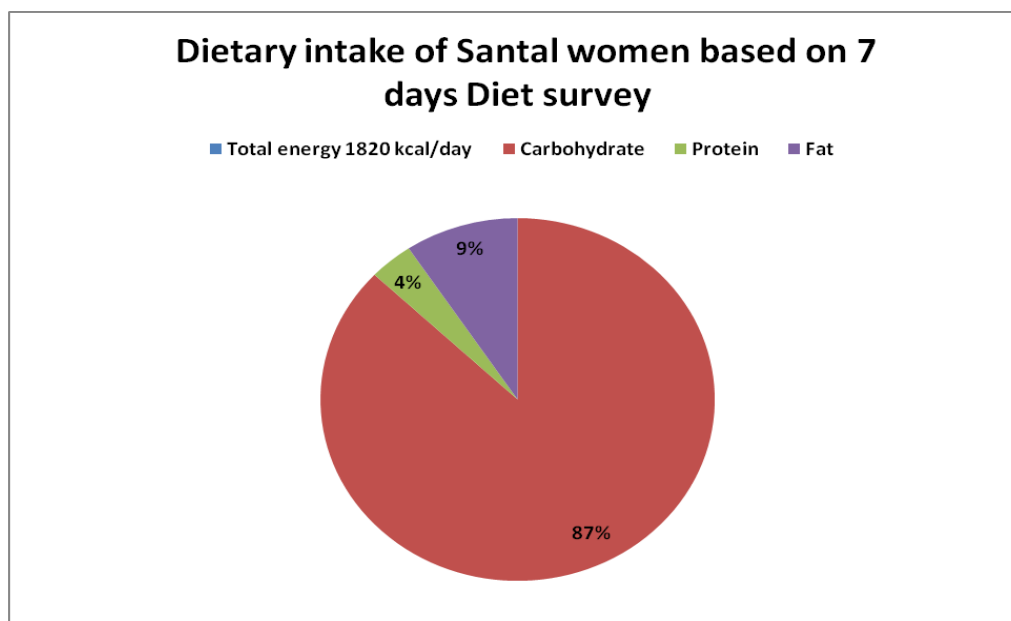


Fig 2: Graphical representation of daily average dietary intake of Santal women based on 7 day diet survey.

DISCUSSION

Wide range of nutrients are required to maintain a healthy and active life. The diet should have all nutrient in balance proportion according to daily life activities, especially the three major macro-nutrients like carbohydrate, protein and fat along with vitamin, minerals and water (ICMR 2000, Ganong 2008, WHO 2017). Change of required proportion of these three components hinder the normal growth and development in adolescent period which is reflected in adulthood by low height and weight. Though height is governed genetically stunted growth (low height for age) is a common feature in malnutrition (Ganong 2008, WHO 2017). Malnutrition refers to the deficiencies or imbalance in energy intake in the form of nutrients. This is a condition which results from low intake of nutrients resulting low calories, protein, carbohydrates, fat, vitamins and minerals and water (Ganong 2008, WHO 2017). Malnutrition is also called undernutrition when sufficient nutrients are not taken. Low body weight for height is a common feature of undernutrition. Undernutrition results low weight for height and low weight for age. The present study was focused on underweight criterion where low weight for height was considered. Low weight-for-height is known as wasting. This is caused by low food intake which may be either due to low socioeconomic status or due to infectious disease (Ganong 2008, WHO 2017). In India, low weight-for-height is due to low socioeconomic status of the tribal population (Roy Burman and

Chatterjee 1988, Chatterjee 1990, Bose et al 2006, Das and Bose 2015, Kappor and Dhali 2016). Hence, BMI is the best way to express nutritional status of an adult where weight for height is expressed.

Socioeconomic status (SES) is a measure of an individual's or family's economic and social position in relation to others (Kuppuswamy 1981, Chatterjee 1989, Chatterjee 1990). The socioeconomic status of a person has an immense impact on health and nutritional status (ICMR 2000). In the present study, 98 % of Santal women fell under the low socioeconomic class category. Only 2% were under lower-middle class. This low socioeconomic status was reflected in BMI. In the present study, the average BMI observed for the Santal women was $17.8 \pm 0.72 \text{ kg.m}^2$ with a range between 15.2 kg.m^2 and 19.5 kg.m^2 . Thus the average Santal women with a age range of 21-32 years were underweight with mild thinness. Only 11 % of the present study were in normal range, whereas rest were in underweight category. 82.1 % were in underweight with mild thinness whereas 5.2 % were underweight with moderate thinness, a small percentage of 1.7 % were in severe thinness. Thus average low BMI was due to poor socioeconomic status of the Santal women who lives in slums in urban settlement.

Presence of proper and balanced nutrients has a great impact on growth and development of human body. Sufficient amount of calorie intake are important for maintaining the daily activities. Similarly presence of required protein is also important for repairing and maintenance of muscles as well as muscle growth. According to ICMR, energy requirement for an Indian reference women involved in moderate activities is 2100 C (ICMR 2000). The reported energy requirement for adult Indian women with 45.0 kg body weight is 2090 C for 24 hr (ICMR 2000).

Minimum energy expenditure during rest can be expressed by Basal metabolic rate (BMR). The average BMR for 45 year old Indian women is 1100 C/24 hr whereas that of Indian reference women with 50 kg body weight is 1169 C/24 hr (ICMR 2000). Average BMR for the Santal women of the present study was $1073 \pm 32.2 \text{ C}$ which is very similar with 1100 C of ICMR report and 1169 C of reference Indian women (ICMR 2000).

Calorie value of the dietary intake must be approximately equal to the energy expended if body weight to be maintained. In addition to calories required for basal metabolic rate (BMR), extra calories are required to meet the energy demands of daily activities. In the

present study, an extra calories of average 747 C (1820 C-1073 C) was taken by the Santal women. The total calories intake of Santal women of the present study was 1820 C per 24 hour which was less than average Indian women intake of 2090 C for 45 years old women. Thus the observed underweight for the Santal women of the present study was due to less calorie intake than the requirement.

The distribution of the calories among carbohydrate, protein, and fat is determined partly by physiologic factors and partly by taste and economic considerations. A daily protein intake of 1 g/kg body weight to supply the eight nutritionally essential amino acids and other amino acids is desirable (Ganong 2008). Dietary protein provide amino acids for the synthesis of body protein and other biologically important nitrogenous compounds in the body. During growth adequate protein is required to build body mass and in adult when growth is completed, protein is required for maintenance and replacement of muscle fiber besides maintaining the Nitrogen balance. Thus average daily requirement of first class protein like animal protein for an Indian adult women is estimated to be 0.5 g/kg body weight which is less than international standard of 1 g per kg body weight (ICMR 2000, Ganong 2008). The required estimated protein for the Santal women of the present study with average body weight of 43.0 kg, should be 21.5 g per day. But the observed protein intake of the Santal women of the present study was 16.3 g in average which is lower than the requirement. Thus less protein intake also one of the factors responsible for less body weight.

Fat is the most compact form of food, since it supplies 9.3 C/ g. Fat not only the major source of energy, but it also required for absorption of beta-carotene and other fat soluble vitamins. The recommended minimum dietary requirement of fat for adult Indian is 12 g per day which may go to a higher level of 20 g per day depending on the requirement. In the present study, the average dietary intake of fat is 18.7 g per day which is more than recommended amount.

Carbohydrate is the main source of energy for daily activities. It is also the cheapest source of calories and provide 50 % or more calories in most diets (Ganong 2008). In the present study, carbohydrate is the main source of energy where 86.9 % of total energy came from carbohydrate. Rice is the staple food of the Santals which is the main source of energy. Only 9 % of energy came from fat and the rest from protein.

Inadequate carbohydrate, protein and fat intake was observed in the present study for the Santal women. This could be because of consumption of bulky food with low energy and

nutrient density. The protein and fat intake of the tribal women was low than daily requirement. Most of their protein intakes were from plant foods. Intake of 1st class protein like animal protein is less. For poor economic condition, these Santal families could not afford animal protein like fish, meat etc.

CONCLUSION

The present study showed poor nutritional status of the Santal women which supported all other previous studies. No matter where they live, whether in urban areas or villages, but the nutritional status of Santal women did not change. Inadequate intake of vitamin and minerals though different sources of food also barred the proper growth and resulted low body weight. Intake of protein and fat also were very low than required amount. Poor economic condition prevent the Santal women to have good nutritional foods. A good family earning throughout the year needed to improve the nutritional status of the Santal women in India.

REFERENCES

1. Antony, G.M., Visweswara, R.K., Balakrishna, N. (2001). Human Development Index: It's Suitability for the Assessment of Health and Nutritional Status of Indian States. EP W, 36: 2976–2979.
2. Kapoor, A.K., and Dhall, M. (2016). Poverty, Malnutrition and Biological Dynamics among Tribes of India, Health Science Journal, 10(3:5): Available at www.imedpub.com
3. Archer, W. G. (1974). *The Hill of Flutes: Life, Love, and Poetry in Tribal India: A Portrait of the Santals*, University of Pittsburgh Press, Pittsburgh.
4. Basu, S.K. (1985). *Genetic- Environment studies among the tribal population of India: Consideration of Approaches for promotion of Health Care* (In) *population Genetics and Health Care: Issues and Future Strategies: NIHFW Technical Report*. 1985.
5. Basu, S.K. (1993) *Study on fertility and mortality trends among the tribal population of India -A review*. Monograph ICSSR, 26. 1993.
6. Bose K, Banerjee S, Bisai S, Mukhopadhyay A, Bhadra M. (2006). Anthropometric profile and chronic energy deficiency among adult Santal tribals of Jhargram, West Bengal, India: Comparison with other tribal populations of Eastern India. *Ecol Food Nutr*, 45(3): 1–11.
7. Bose, K., Bisai, S., Mondal, P.S., Ghosh, M. (2008). Body mass index and chronic energy deficiency among adult male Lodhas and Bhumijis: A comparison with other tribal populations of West Bengal, India. *J Pub Health*, 16(2): 117–121.
8. Chatterjee, M (1989). Socio-economic and socio-cultural influences on women's nutritional status. In: C Gopalan, Suminder Kaur (Eds.): *Women and Nutrition in India*. New Delhi: Nutrition Foundation of India, Spl. Pub. 5: 297-323.
9. Chatterjee M. (1990). *Indian women. Their Health and Economic productivity*. World Bank Discussion.
10. Datta Banik S., Bose, K., Bisai, S., Bhattacharya, M., Das, S., Jana A., Purkait, P. (2007). Chronic energy deficiency among adult Dhimals of Naxalbari, West Bengal: Comparison with other tribes of Eastern India. *Food Nutr Bull*, 28(3): 348–352.
11. Das, S, and Bose, K. (2015) Adult tribal malnutrition in India: an anthropometric and socio-demographic review, *Anthropological Review*, 78 (1): 47–65.

12. Dhargupta, A., Goswami, A., Sen, M. and Mazumder, D. (2009). Study on the Effect of Socio-economic Parameters on Health Status of the Toto, Santal, Sabar and Lodha Tribes of West Bengal, India, *Stud Tribes Tribals*, 7(1): 31-38.
13. Government of India (2017). Office of the Registrar General & Census Commissioner, Ministry of Home Affairs, Government of India, www.censusindia.gov.in.
14. Hebert, J.R., Gupta, P.C., Bhonsle, R.B. (1998). Development and testing of a quantitative food frequency questionnaire for use in Kerala, India. *Public Health Nutr.* 1:123-130.
15. Hembrom, T. (2000). *The Santals: Anthropological-Theological Reflections on Santali & Biblical Creation Traditions*, Punthi Pustak, Calcutta. p133.
16. Indian Council of Medical Research (ICMR) 2000. Nutrient requirements and recommended dietary allowances for Indians - A report of the expert group of the Indian Council of Medical Research, New Delhi, India.
17. ISAK manual (2011) : International Standards for Anthropometric Assessment, Arthur Stewart, Michael Marfell-Jones, Timothy Olds, Hans de Rider, published by International Society for the Advancement of Kinanthropometry, New Zealand.
18. Kuppaswamy, B. (1981). *Manual of socioeconomic status (urban)*. 1st ed. Delhi: Manasayan; 66-72.
19. Khairnar, M.R., and Wadgave, U., and P.V. (2017), Kuppaswamy's Socio-Economic Status Scale: A Revision of Occupation and Income Criteria for 2016, *Indian J Pediatr*, 84(1):3-6, DOI 10.1007/s12098-016-2223-y
20. Lok Sabha Secretariat, Parliament of India (1995). Lok Sabha Debates ser.10 Jun 41-42 1995 v.42 no.41-42, retrieved 2008-11-25, Adivasis are the aborigines of India.
20. Masani, M.R., and Srinivasan R. (1985). *Freedom and Dissent: Democratic Research Service*. Retrieved 2008; 11-25.
22. Roy Burman, B.K. (1988). Challenges of development and tribal women of India, in J.P. Singh, N.N. Vyas & R.S. Mann (Eds.). *tribal women and development*. Udaipur: MLV Tribal Research and Training Institute, Tribal Area Development Department, Rajasthan.
23. William F. Ganong ; *Review of Medical Physiology*, 22nd Ed, Tata Mcgraw-hill Publishing Company Ltd, page 311, 2008.
24. World Health Organization (WHO); *Malnutrition, Fact sheet*, May, 2017, available at <http://www.who.int/mediacentre/factsheets/malnutrition/en/>