

## Prevalence of Undernutrition in Santal Children of Puruliya District, West Bengal

SUTANU DUTTA CHOWDHURY, TARUN CHAKRABORTY AND TUSHARKANTI GHOSH

*From the Department of Human Physiology with Community Health, Vidyasagar University, Midnapur 721 102, West Bengal, India.*

*Correspondence to: Prof. Tushar K. Ghosh, Department of Human Physiology with Community Health, Vidyasagar University, Midnapur-721102, West Bengal, India. E-mail: [physiol\\_tushar@yahoo.co.in](mailto:physiol_tushar@yahoo.co.in)*

*Manuscript received: August 14, 2006; Initial review completed: February 15, 2007; Revision accepted: October 18, 2007.*

### ABSTRACT

*This study was carried out to determine the prevalence of undernutrition among the Santal children of Puruliya district of West Bengal. 442 Santal children (216 boys and 226 girls) aged 5-12 years were taken from randomly selected schools of Balarampur and Baghmundi areas of Puruliya. Nutritional status was analyzed by Z-score values according to the height-for-age, weight-for-age and weight-for-height reference data of National Center for Health Statistics (NCHS). The prevalence of undernutrition among Santal children was as follows: stunting (17.9%), underweight (33.7%) and wasting (29.4%). Severe (below -3 Z-score) stunting, underweight and wasting were found in 4.98%, 7.92% and 9.51% of Santal children, respectively. In girls, prevalence of stunting (21.7%) and wasting (35.8%) was higher in comparison to boys (13.8% stunting and 22.7% wasting).*

**Key words:** Bengal, Santal, Tribal, Undernutrition.

### INTRODUCTION

Santal, the third largest tribe in India, lives in many states including Bihar, Jharkhand, Orissa, Tripura etc. In West Bengal, Santals represent 54.27% of total tribal population and they are spread over in vast areas of Purba and Paschim Medinipur, Bankura and Purulia(1). This tribe lives in remote places and is characterized by poverty, illiteracy, and nutritional problems. The health status of this community remains unreported excepting few studies(2,3). The prevalence of undernutrition in children is an indicator of community health status. The nutritional status of Santal children has not been investigated recently in West Bengal. The present study was undertaken to assess the severity of undernutrition in Santal children of 5-12 years of age of Puruliya district of West Bengal.

### METHODS

The study was conducted on 442 Santal children (216 boys and 226 girls) aged 5-12 years from four

primary schools of Balarampur and Bagmundi area of Puruliya district of West Bengal. The socio-economic status of each subject was assessed by modified Kuppuswamy's scale(4). The study was carried out in accordance with the revised ethical guidelines for human experimentation of Helsinki Declaration of 2000(5). The anthropometric measurements including height and weight of each subject were measured using standard techniques(6) by trained investigators. The nutritional status of Santal children was evaluated using age specific values of height and weight from the National Center for Health Statistics (NCHS) reference data(7). The indices of undernutrition such as stunting, underweight and wasting were calculated by Z-score using the reference values of height-for-age, weight-for-age and weight-for-height of NCHS standards, respectively. The severity of undernutrition was assessed by Z-score according to the classification of World Health Organization(8). Children with Z-score below -2 of any indices were

considered to be undernourished and the children with Z-score below  $-3$  were considered to be severely undernourished. The statistical analyses were performed using Statistical Package for Social Science (SPSS software).

**RESULTS**

The height and weight of Santal children show increasing pattern with advancement of age. The mean height and weight of Santal boys are comparable to the Santal girls at all age groups. In comparison to the NCHS reference data, the mean height of Santal boys and girls remain above the 25th percentile at earlier ages (5-7 years), but with advancement of age, Santal boys are placed a little above 10th percentile (**Fig. 1a**) and that of Santal girls are placed around the 10th percentile (**Fig.1b**).

Mean weight of Santal boys (**Fig. 2a**) and girls (**Fig. 2b**) remain between 10th and 25th percentile at earlier ages (5-7 years) but at later ages (9-11 years) mean weight is placed below the 5th percentile of NCHS reference data.

The prevalence of moderate stunting (Z-score between  $-2$  and  $-3$ ) was found to be higher in girls (15.9%) than boys (9.7%). But the percent values of severe stunting in both the sexes are similar (4.17%) in boys and 5.76% in girls). The prevalence of moderate and severe wasting was higher in girls (23.9% and 11.9%, respectively) than the boys (15.7% and 7.4%, respectively) (**Table I**). Stunting and wasting (below  $-2$  Z score) were found in 49 (21.7%) and 81 (35.8%) girls, respectively and these percent values were higher than that of boys (13.8%

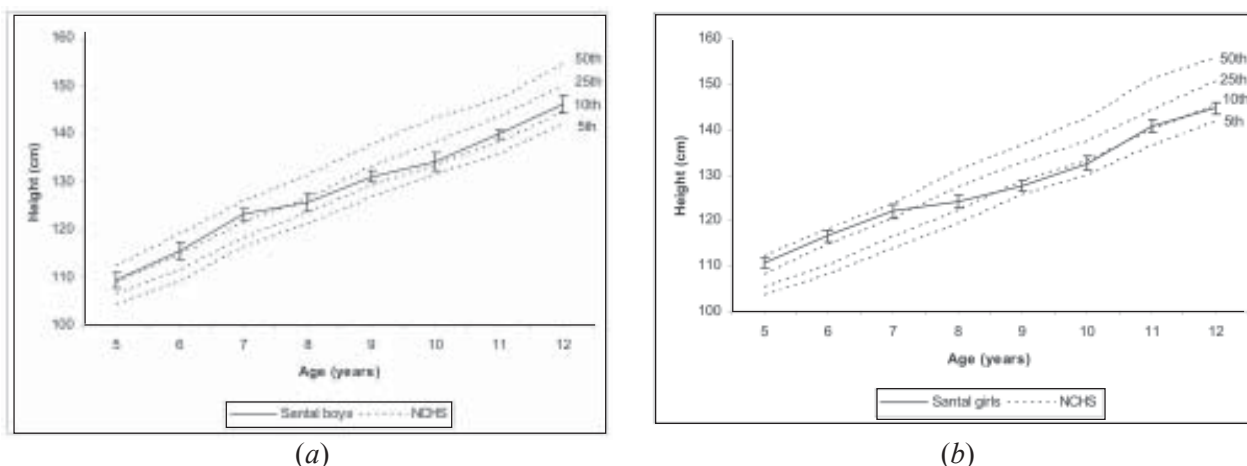


FIG. 1. Mean height (cm) of Santal boys (a) and girls (b) with NCHS reference data.

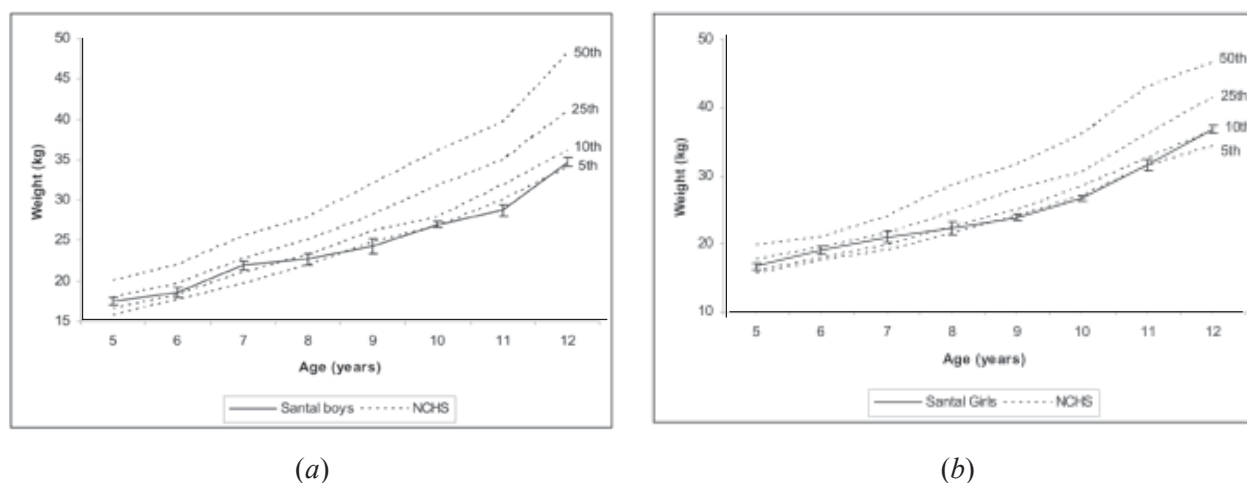


FIG. 2. Mean weight (kg) of Santal boys (a) and girls (b) with NCHS reference data.

**TABLE I** DISTRIBUTION OF SANTAL CHILDREN ACCORDING TO Z-SCORE

Z-score	Boys			Girls		
	Height-for-age (%)	Weight-for-age (%)	Weight-for-height (%)	Height-for-age (%)	Weight-for-age (%)	Weight-for-height (%)
>0	55 (25.47)	19 (8.79)	26 (12.03)	49 (21.69)	29 (12.84)	24 (10.62)
0 to -1	74 (34.26)	47 (21.76)	62 (28.71)	77 (34.07)	52 (23.01)	57 (25.23)
-1 to -2	57 (26.39)	69 (31.95)	79 (36.58)	51 (22.57)	77 (34.07)	64 (28.32)
-2 to -3	21 (9.73)	64 (29.63)	34 (15.75)	36 (15.93)	50 (22.13)	54 (23.90)
<-3	9 (4.17)	17 (7.88)	15 (7.41)	13 (5.76)	18 (7.96)	27 (11.95)
Total	216 (100)	216 (100)	216 (100)	226 (100)	226 (100)	226 (100)

stunting and 22.7% wasting). The prevalence of moderate underweight was higher in boys (29.6%) than the girls (22.1%), but the prevalence of total underweight was found to be similar in both sexes (35.8% boys and 31.5% girls). Overall, 79 (17.88%), 149 (33.72%) and 130 (29.42%) of Santal children were stunted, underweight and wasted, respectively, according to the reference criteria (Z-score below -2) recommended by WHO. Severe (below -3 Z-score) stunting, underweight and wasting were found in 22 (4.98%), 35 (7.92%) and 42 (9.51%) of Santal children respectively.

## DISCUSSION

The prevalence of undernutrition among the tribal children in India has not been investigated sufficiently. Rao, *et al.*(9) reported widespread undernutrition (60% underweight) among the preschool children of Gond tribe of Madhya Pradesh. In West Bengal, 54% of children (6-12 years of age) of Oraon tribe are suffering from severe malnutrition(10). In the present study, undernutrition among Santal children of Puruliya district is not severe like Gond and Oraon tribes. Rao and Vijay(11) observed similar percent of severe underweight (6%) among the Santal children of Purnia district of Bihar. The stunting among Santal children in the present study is less than Gond tribe, which showed 30.1% of children as severely stunted compared to 4.98% of Santal children of Puruliya district.

Though there is no remarkable difference between boys and girls in severe stunting and

underweight, the total stunting appears to be higher in girls compared to boys. The gender difference is also prominent in total wasting of girls. Probably the results indicate that the prevalence of undernutrition is higher in Santal girls than boys.

The specific causes of undernutrition in these children can not be ascertained from this study. A lower socio-economic status of these children indicates that factors such as education, occupation and economic status of parents may be related to the undernutrition.

## ACKNOWLEDGMENTS

We would like to acknowledge the authorities of all Primary schools (Dalgiri Primary school, Patharbagan Primary School, Gidighati Primary School and Uludi Primary School) providing permission to carry out the work. We are greatly indebted to Mr. Abani Mohon Sandil for his help in the field work.

*Contributors:* SDC: data collection and analysis; TC: data collection; TG: data analysis. All authors were involved in manuscript preparation.

*Funding:* None.

*Competing interests:* None stated.

## REFERENCES

1. Bagchi T. Profile of some Indian tribes. 1st ed. Calcutta: Punthi Pustak; 1994. p. 152-192.
2. Bagchi T. Towards a better implementation of ongoing nutritional programme: A case study from a tribal area of W. Bengal. *Vanyajati* 1981; 39: 8-14.

**WHAT THIS STUDY ADDS?**

- The prevalence of stunting, underweight, and wasting among Santal children in Puruliya district is 17.9%, 33.7% and 29.4%, respectively

- Ghosh A, Chatterjee D, Bandhopadhaya AR, Das Chowdhury AB. Age and sex variation of body mass index and waist circumference among the Santal children of Jharkhand, India. *Anthropol Anz* 2006; 64: 83-89.
- Mishra D, Singh HP. Kuppaswami's socio-economic status scale – A revision. *Indian J Pediatr* 2003; 70: 273-274.
- Touitou Y, Portaluppi F, Smolensky MH, Rensing L. Ethical principles and standards for the conduct of human and animal biological rhythm research. *Chronobiol Internat* 2004; 21: 161-170.
- Lee RD, Nieman DC. *Nutritional assessment*. 3rd ed. New York; McGraw Hill; 2003. p. 163-215.
- World Health Organization. *Measuring changes in nutritional status*. Geneva: World Health Organization; 1983.
- WHO Working Group. Use and interpretation of anthropometric indicators of nutritional status. *Bull World Health Org* 1986; 64: 929-941.
- Rao VG, Yadav R, Dolla CK, Kumar S, Bhandeley MK, Ukey M. Undernutrition and childhood morbidities among tribal preschool children. *Indian J Med Res* 2005; 122: 43-47.
- Mittal PC, Srivastava S. Diet, nutritional status and food related traditions of Oraon tribes of New Mal (West Bengal), India. *Rural Remote Hlth* 2006; 6: 385.
- Rao TVRK, Vijay T. Malnutrition and anemia in tribal pediatric population of Purnia district (Bihar). *Indian Pediatr* 2006; 43: 181-182.