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Physical Growth and Nutritional Status of Chakma Tribal Children of Tripura

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ABSTRACT The present cross-sectional data was collected on 710 Chakma tribal children (539 boys and 513 girls) aged 6 to 16 years from North District of Tripura. This study was conducted to determine the physical growth and the nutritional status of randomly selected school going Chakma children of Tripura. The nutritional status in terms of stunting (Height >3rd percentile), thinness (BMI> 5th percentile) and overweight (BMI< 85th percentile) were measured by the classification of World Health Organization, using the WHO growth reference data of 2007. Socio-economic status was measured using the updated Kuppusswami scale. The overall prevalence of stunting, thinness and overweight were found 38.31 percent, 10.56 percent and 2.68 percent respectively. It was also noticed that prevalence of undernutrition is slightly greater in boys than girls. This study indicated that both under nutrition and over nutrition coexisted among the Chakma tribal children of Tripura, although the number of overweight children is negligible.

INTRODUCTION

The physical growth of children provides an excellent measure of their health and nutrition while the average values of their heights and weights reflect the state of a nation's public health and the average nutritional status of its citizens (Tanner 1966). Assessment of nutritional status is not only effective for understanding the health condition of a community but it is also important for regional and national policy planning. In India, undernutrition is a serious public health problem among tribal community. For the assessment of physical growth and nutrition, anthropometry is the inexpensive and non-invasive applicable technique in the world (Hamieda and Billot 2002). Numerically, Chakma is the fourth largest tribal community of Tripura. Anthropologically these Tibeto-Burmese tribe belonged to the Mongolian race. Some studies have been reported on nutritional status of the endogamous tribal children of northeast India (Gaur 1995; Khongsdier 2003; Singh and Sengupta 2007; Bhasin et al. 2008; Sil et al. 2011; Singh and Mondol 2013: Mondol 2014). However, information on the Chakma children of Tripura is extremely scanty and there is no published literature on anthropometric characteristics and nutritional status. In this study, the growth pattern and nutritional status of 6-16 years old rural Chakma children of Tripura was assessed.

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MATERIAL AND METHODS

The present cross-sectional data was collected on 710 children (539 boys and 513 girls) aged 6 to 16 years from five village schools belonging to Chakma tribal community of North Tripura District by using cluster random sampling procedure. The age of every student was recorded from school registrar and their birth certificate. All the data were collected after getting the consent from their parents and school authorities. Decimal age calendar is used to determine the student's decimal age by subtracting the date of birth from the date of data collected. The subjects in various age groups were classified by following the same principle. Other general information regarding their socio-economic condition, parent's occupation and education, family income, size, structure and property etc., was also recorded. According to modified Kuppusswamy scale the socio-economic status of all the children were low (Mishra 2003).

Height and weight of each of the student were taken by using an anthropometer to the nearest of 0.1 cm and portable weighing machine to the nearest 0.5 kg respectively. According to the World Health Organization (WHO 1995) classification, each of the student were classified into three levels of malnutrition that is, stunting, thinness and overweight by applying WHO growth reference data for 5-19 years (WHO 2010).

RESULTS

Table 1 represents the age specific mean and standard deviation of height (cm), weight (kg) and BMI (kg/mt^2) of the Chakma tribal children of Tripura. It shows a positive linear increase of average height and weight with increasing age for both sexes. From 6 to 16 years, the overall average height was increased by 44.34 cm in boys and 41.27 cm in girls. The overall increase in weight was 29.59 kg for boys and 31 kg for girls. The peak height velocity for height and weight was found between 11-12 years for boys and 13-14 years for girls. The mean BMI also increased when the Chakma boys and girls approached higher ages except in the age of 7, 9 and 14 years among boys. The highest progressive increase of mean BMI was observed to be 1.29 kg/m^2 (aged 11 years-12 years) and 1.3 kg/m^2 (aged 13-14 years) among boys and girls respectively.

Prevalence of stunting, thinness and overweight of Chakma children are depicted in Table 2. The overall prevalence of stunting, thinness and overweight was found to be 38.31 percent, 10.56 percent, and 2.68 percent, respectively. It also noticed that the stunting was more prevalent among girls (33.92%) than boys (18.18%) and the thinness was slightly higher prevalent among Chakma boys (7.42%) than girls (6.82%). In comparison of prevalence of overweight among the Chakma children, girls (2.14%) show

Table 1: Descriptive statistics of height, weight and BMI of Chakma boys and girls by age and sex

Age (yrs)	*No. of subjects*		*Weight (kg)*		*Height (cm)*		*BMI (kg/mt^2)*	
	Boys	*Girls*	*Boys Mean±SD*	*Girls Mean±SD*	*Boys Mean±SD*	*Girls Mean±SD*	*Boys Mean±SD*	*Girls Mean±SD*
6	54	58	18.55±1.43	17.8±2.34	115.79±3.54	113.86±5.97	13.84±1.26	13.7±1.32
7	51	53	20.02±2.80	20.5±2.47	120.58±6.32	119.20±5.64	13.77±1.34	14.4±1.54
8	56	58	22.51±3.34	22.4±3.01	123.36±7.58	123.80±6.50	14.79±2.21	14.6±1.21
9	52	48	23.04±2.90	24.1±4.73	126.72±5.43	127.60±6.62	14.35±1.63	14.8±1.08
10	51	53	25.7±4.03	27.4±5.37	130.74±7.15	131.40±7.18	15.04±2.41	15.9±1.62
11	51	52	28.44±5.77	31.6±5.35	134.21±9.05	135.81±6.82	15.79±1.75	17.1±1.48
12	48	38	34.38±6.89	34.4±4.88	141.87±7.85	140.75±6.54	17.08±1.16	17.3±1.25
13	53	52	37.71±5.59	37.7±6.30	146.46±6.76	146.01±8.30	17.58±2.24	17.6±1.30
14	35	28	40.26±5.74	42.8±5.64	152.80±5.44	151.43±5.88	17.24±1.55	18.9±1.52
15	40	37	44.55±4.70	46.7±4.96	156.24±5.17	153.62±5.14	18.25±1.09	19.8±1.35
16	48	37	48.14±4.11	48.8±3.15	160.13±4.87	155.13±4.61	18.77±1.51	20.3±1.40

Table 2: Nutritional status of the Chakma children of North Tripura

Age (yrs)	*Stunting (height <3rd percentile)*		*Thinness (BMI <5th percentile)*		*Overweight (BMI >85th percentile)*	
	Boys n (%)	*Girls n (%)*	*Boys n (%)*	*Girls n (%)*	*Boys n (%)*	*Girls n (%)*
6	7 (12.96)	10 (17.24)	3 (05.56)	1 (01.72)	2 (3.76)	1 (01.72)
7	11 (21.57)	13 (24.53)	5 (9.80)	3 (05.66)	0 (00.00)	0 (00.00)
8	8 (14.29)	16 (27.58)	2 (03.57)	1 (01.72)	0 (00.00)	0 (00.00)
9	9 (17.31)	12 (25.00)	3 (05.77)	4 (08.33)	0 (00.00)	2 (04.17)
10	12 (23.53)	20 (37.74)	6 (11.76)	8 (15.09)	0 (00.00)	3 (05.66)
11	7 (13.73)	17 (32.69)	3 (05.88)	2 (03.84)	0 (00.00)	1 (01.92)
12	13 (27.08)	14 (36.84)	4 (08.33)	5 (13.16)	2 (4.16)	0 (00.00)
13	8 (15.09)	27 (51.92)	5 (09.43)	4 (07.69)	0 (00.00)	2 (03.84)
14	6 (17.14)	16 (57.14)	4 (11.43)	2 (07.14)	2 (5.71)	0 (00.00)
15	10 (25.00)	15 (40.54)	2 (05.00)	2 (05.41)	1 (2.5)	2 (05.41)
16	7 (14.58)	14 (38.89)	3 (06.25)	3 (08.33)	1 (2.08)	0 (00.00)
All	98 (18.18)	174 (33.92)	40 (07.42)	35 (06.82)	8 (01.48)	11 (02.14)

higher prevalence than boys (1.48%). The maximum prevalence of stunting was observed among boys in the younger age groups at 7 (21.57 %), 10 (23.53 %) and 12 (27.08 %) years. On the other hand, the prevalence of stunting and thinness is more among the age group of 13, 14 years for boys and 9, 10 and 12 years for girls respectively.

However, in Table 3, a significant difference was seen at the age of 6, 7, 11, 15 and 16 years ($t=2.48$, $P<0.05$; $t=4.24$, $P<0.05$; $t=2.23$, $P<0.05$; $t=5.54$, $P<0.05$; and $t=8.44$, $P<0.05$, resp.). In case of weight, the boys were heavier than girls at the age group of 6,7,8, and 16 years, and a significant difference was found at the age of 6,7,9,11,13 and 16 years ($t=3.11$, $P<0.05$; $t=2.80$, $P<0.05$; $t=3.19$, $P<0.05$; $t=2.86$, $P<0.05$; $t=3.98$, $P<0.05$; $t=2.64$, $P<0.05$ resp.). However, there was no significant difference noticed between both sexes for the prevalence of overweight.

Figures 1 and 2 represent the comparison of the average height and weight between Chakma boys and girls aged 6-16 years with the Naga tribal children of Nagaland (Longkumer 2013). The findings revealed that the Chakma boys and girls show superior growth performance at all the ages except 15 years for boys and 13 years for girls.

Table 3: Age-wise comparison (t value) of mean height and weight between boys and girls

Age	*Height*	*Weight*
6	2.48*	3.11*
7	4.24*	2.80*
8	1.17	0.91
9	0.97	3.19*
10	1.05	1.72
11	2.23*	2.86*
12	0.53	0.21
13	1.16	3.98*
14	0.52	0.26
15	5.54*	0.87
16	8.44*	2.64*

*Significance at 5% level

DISCUSSION

Present cross-sectional design showed that the prevalence of undernutrition in terms of stunting is more in girls than in boys. Prevalence of thinness and overweight are slightly higher in girls than in boys. From earlier papers it is established and widely accepted that in India a majority of children and adolescent of tribal community in India suffer from malnutrition (Khongsdier 2003; Chakraborty et al. 2008; Thomas et al. 2013; Basu et al. 2014; Mondol 2014; Sukhdas et al. 2014). The recent investigation showed that, the nutritional status of Chakma children is slightly worse or week than the Tripuri

Fig. 1. Mean height at all age groups between Chakma boys and girls and their comparison with Naga children of Assam

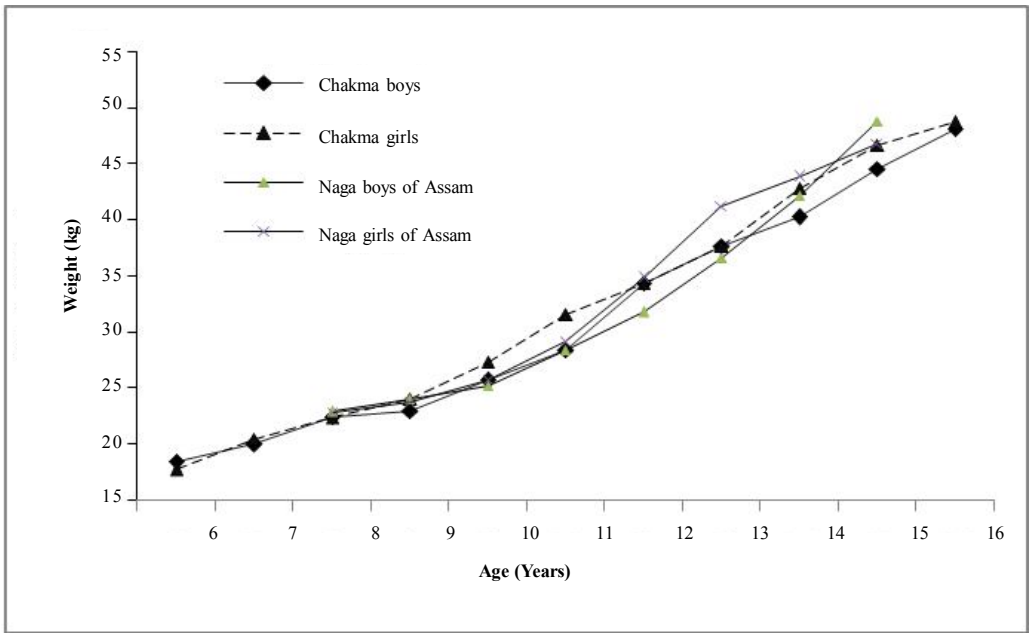

Fig. 2. Mean weight at all age groups between Chakma boys and girls and their comparison with Naga children of Assam

and Sonowal Kachari children of Tripura (Sil 2011) and Assam (Singh and Mondal 2013) respectively but is better than that of other tribal children of northeast India (Gaur 1995; Khongsdier 2003; Singh and Sengupta 2007; Mondol 2014; Sukhdas et al. 2014). In comparison with the Indian Council of Medical Research (ICMR) standards (ICMR 1972) and WHO (WHO 2010), it was found that the growth pattern of Chakma children are similar but below the ICMR and WHO growth reference data. The probable causes of undernutrition in the Chakma tribal children of Tripura may be their low socio-economic condition, low family income, inadequate diet, large family and ignorance about the nutritive value of food.

CONCLUSION

The present study has highlighted the growth pattern and prevalence of undernutrition in terms of stunting and thinness among Chakma tribal children Tripura, North East India. In respect to the different nutritional indicators the tribal children of Tripura shows a significant difference for age and sex in the prevalence of undernutrition. The result of present investigation of this state will be helpful for policy makers to formulate various developmental and health care programs. Nutritional intervention is also necessary in Tripura to ameliorate the nutritional status among the Chakma tribal children by supplementary balanced diet and micronutrient rich or protective foods.

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REFERENCES

Basu D, Islam G, Gogoi R, Dey S, Deori J 2014. Child's growth and nutritional status in two communities - Mishing tribe and Kaibarta caste of Assam, India. *International Journal of Sociology and Anthropology,* 6(2): 59-69.

Bhasin MK, Shil AP, Sharma MB 2008. Comparative evaluation of growth patterns among different caste

and tribal groups of Sikkim. *J Hum Ecol,* 24(4): 231-278.

Chakraborty U, Dutta Chowdhury S, Dutta G, Ghosh T 2008. A comparative study of physical growth and nutritional status in Santal Children of Ghatsila and Bolpur. *Tribes and Tribals*, 2: 79-86.

Gaur R, Singh NY 1995. Growth profile of rural Meitei children of Manipur state of India. *Int J Anthropol,* 10: 189-197.

Hamieda J, Billot L 2002. Nutritional status of Libyan children in 2000 compared with 1979. *East Mediterr Health J,* 8: 1-10.

Indian Council of Medical Research (ICMR) 1972. Growth and Development of Indian Infants and Children. *Technical Report Series* No. 18. New Delhi.

Khongsdier R, Mukherjee N 2003. Growth and nutritional status of Khasi boys in Northeast India relating to exogamous marriages and socio-economic classes. *Am J Phys Anthropology*, 122: 162-170.

Longkumer T 2013. Physical growth and nutritional status among Ao Naga children of Nagaland, Northeast India. *Journal of Anthropology*, 13: 1-6.

Mishra D, Singh HP 2003. Kuppusswamy's socio-economic status scale – A revision. *Ind J Pediatr*, 70: 273–274.

Mondol N 2014. Thinness as major underlying problem among adolescents of northeast India. *Journal of Nepal Paediatric Society*, 34(1): 39-47.

Sil SK, Sarkar S, Saha S, Roy S 2011. Assessment of nutritional status of rural tribal children in Tripura. *Indian Paediatrics,* 48: 489-490.

Singh J, Mondal N 2013. Assessment of nutritional status: A case of tribal children in Assam, Northeast India. *Journal of Nepal Paediatric Society,* 33(1): 1-7.

Singh J, Sengupta S 2007. Nutritional status of Sonowal kachari children of Dibrugarh district, Assam. *Anthropologist,* 9: 233-235.

Sukhdas G, Challa S, Bhatia P, Rao AR, Koteswara R 2014. Nutritional status of tribal children in Andhra Pradesh. *International Journal of Medical Research & Health Sciences,* 3(1): 76-79.

Tanner JM 1966. Growth and physique in different populations of mankind. In: PT Baker, JS Weiner (Eds.): *The Biology of Human Adaptability*. Oxford: Clarendon Press, pp. 45-66.

Thomas R, Srinivasan R, Sudarshan H 2013. Nutritional status of tribal children and adolescents in rural South India: The effect of an NGO delivered nutritional programme. *The Indian Journal of Pediatrics*, 80(10): 821-826.

WHO Physical Status 1995. The Use and Interpretation of Anthropometry. *Report of a WHO Expert Committee.* World Health Organization, Technical Report Series No. 854. Geneva, pp. 1-452.

World Health Organization 2010. Growth Reference Data for 5-19 Years. From< http://www.who.int/growthref/ who2007/en/index.html> (Retrieved on 10 November 2010).

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