

GROWTH PATTERN OF URBAN TRIBAL BOYS OF TRIPURA

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ABSTRACT

Growth and development are intrinsic characteristics of childhood. Progress in growth and developmental milestones are age related, occurs in phases and has a normal pattern. There are different patterns of growth for particular age groups, from the prenatal period to adolescence. Tripura is inhabited by tribes who are basically Mongoloid in origin with short to medium stature and muscular body and have similar race, socio-economic status, culture, food habit and geographic, climatic condition. Thus, the tribal population of Tripura can be considered as a homogenous group (Dey SK and Debray P, 2003). The results obtained shows a significant difference ($P < 0.01$) in all anthropometric variables in between urban tribal boys. Compared to national boys, tribal boys of Tripura showed lower values in height and weight.

KEY WORDS: Growth, Tribal boys, Anthropometric

INTRODUCTION

Growth and development are intrinsic characteristics of childhood. Therefore appraisal of the progress of a country in the field of health can be made from time to time with the help of growth studies. According to De Onis and Blossner (2003) growth assessment is the single measurement that best defines the health and nutritional status of children, just as it provides an indirect measurement of the quality of life of an entire population.

Tripura is inhabited by two major racial elements, namely the Indo-Aryan represented by the Bengalee and the Indo-Mongoloid represented by various tribal communities, with short to medium stature and muscular body and have similar race, socio-economic status, culture, food habit and geographic, climatic condition. Thus, the tribal population of Tripura can be

considered as a homogenous group (Dey and Debray, 2003).

As there is a dearth of published data on the growth pattern of tribal boys of Tripura, we conducted a cross-sectional study. In present study, an attempt has been made to examine the trend of growth in height and weight among tribal boys and also to comparison of these parameters with national standards and those of other states of India to find out their physical status.

MATERIAL AND METHODS

A total of 150 tribal boys (10-16yr) were investigated in this cross-sectional study carried out from 2006-2010. All the subjects between ages 9 years 6 months to 10 years 5 months were included in age group 10 years, age 10 years 6 months to 11 years 5 months were included in

age group 11 years and so on up to 16 years. Data was collected only from the different higher secondary school situated in the Agartala Municipality Area, West Tripura by stratified random sampling technique. All the subjects came from almost similar socio-economic background. The age of the subjects was determined from their dates of birth recorded in the school register and it was rounded off to the nearest whole number. The anthropometric parameters of the boys including height (cm) and weight (kg) were recorded by following the standard procedures (Sodhi, 1991). Skinfold thickness was recorded by Harpenden skinfold caliper at the site of biceps, triceps, subscapular, suprailliac and calf (Eston *et al.*, 1995). Body density was calculated using the equation of Siri, 1956 and Body Fat % was calculated by the formula of Durnin and Womersley, 1974.

Statistical analysis:

Mean, standard deviation and paired t-test were performed to see whether any significant differences exist between the tribal and non-tribal boys in respect of anthropometry. The study was conducted at 0.05 level of significance.

RESULTS

Mean and Standard Deviation (SD) values of the physical characteristics of urban tribal boys is

shown in Table 1. It is apparent from this table that the mean values of all the anthropometric measurements are progressively accelerating with advancement of age except skinfolds and body fat % which declines toward puberty and again inclines after puberty among boys. The height and weight of these boys are also compared with the national boys in Table 2. The tribal boys are found lighter in weight and shorter in stature compared to them. In present study, the growth spurt for height and weight are noticed between age group 13 to 15 years.

DISCUSSION

Height and weight are the most important indicators of health and nutritional status. The height of tribal and non-tribal boys increased with age significantly. The mean height increased from 127.5cm±2.2 at 10 years to 159.0cm±4.1 at 16 years in tribal boys (average growth in height 5.25cm/year).

Peak height velocity (PHV) is a commonly used biological parameter in growth studies that allows subjects to be aligned at comparable biological rather than chronological ages (Baxter-Jones *et al.*, 2003). In present study tribal boys achieved a peak height velocity of 7.3cm/year which is similar to that rural Hyderabad (Satyanarayana *et al.*, 1980) boys (6.9cm/year) and more in comparison with well-off Chandigarh (Bhalla, 2011) boys (6.4cm/year)

Table -1. Comparison of the growth and physical development according to age on tribal boys of Tripura.

Variables	10years (n = 20)	11years (n = 24)	12years (n = 25)	13years (n = 21)	14years (n = 20)	15years (n = 20)	16years (n = 20)
Height (cm)	127.5±2.2	133.0±3.1	138.2±1.7	143.2±3.0	150.5±3.4	157.0±3.4	159.0±4.1
Weight (kg)	22.3±1.3	25.0±1.8	28.2±2.0	30.5±2.6	35.2±1.8	41.7±1.3	44.0±2.3
TST (mm)	26.5±3.1	27.0±2.3	25.2±2.0	25.0±1.7	24.8±2.3	28.0±2.5	29.0±3.0
Body fat %	11.20±1.58	11.62±1.13	11.40±1.02	11.07±0.98	10.60±1.35	12.05±1.67	13.20±1.32

Values are (mean±SD); TB, Tribal boys, NTB, Non-tribal boys; ** P < 0.01, *P < 0.05 ; TST, Total skinfold thickness i.e. (bicep + tricep + subscapular + suprailliac+calf)

and a total gain in height of 23 cm in tribal boys during the pubertal growth periods.

Table -2. Comparison of height and weight of Tripura tribal boys with national India boys.

Age (Years)	Well-to-do Indian boys ¹	ICMR ²	NCHS ³	Tripura tribal boys (present study)
Height (cm)				
10	138.45±6.82	137.5	141.5	127.5±2.2
11	143.35±7.22	140.0	148.2	133.0±3.1
12	148.91±8.45	147.0	154.6	138.2±1.7
13	154.94±8.67	153.0	159.0	143.2±3.0
14	161.70±8.43	160.0	161.2	150.5±3.4
15	165.33±6.92	166.0	162.1	157.0±3.4
16	168.40±6.36	171.0	-	159.0±4.1
Weight (Kg)				
10	32.39±5.94	31.4	34.7	22.3±1.3
11	35.26±6.68	32.2	39.2	25.0±1.8
12	38.78±7.67	37.0	43.8	28.2±2.0
13	42.88±8.13	40.9	48.3	30.5±2.6
14	48.26±8.66	47.0	52.1	35.2±1.8
15	52.15±8.13	52.6	55.0	41.7±2.3
16	55.54±8.17	58.0	-	44.0±2.3

Values are (mean±SD) ; ¹(Raghavan VK et al., 1971), ²(ICMR,1990), ³(NCHS,1977)

The body weight of tribal boys increased with age significantly average growth per year being 3.61 kg .In boys, peak weight velocity occurs at about the same time as peak height velocity and averages 9kg/year. The rate of weight gain decelerates in a manner similar to height velocity during the later stages of pubertal development. In present study tribal boys attain a peak weight velocity of 6.5kg/year. There was total gain in weight of 12.9 kg in tribal boys during pubertal growth periods.

In present study, the growth spurt for height and weight is noticed between age group 13 to 15 years boys.

Skinfolds measurements are used to assess thickness of subcutaneous tissues. Total skinfold thickness (TST) increased steadily till the age of 13 years and thereafter gradually decreased. This

decrease in the fat folds does not really represent lesser fat accumulation, but results from the enlargement of the underlying muscular tissue (Pathmanathan and Prakash, 1994). The mean Total skinfold thickness (TST) increased from 26.5mm±3.1 at 10years to 29.0mm±3.0 at 16 years in tribal boys (average growth in TST 0.41mm/year)

Body fat is assessed to measure the body composition. The mean body fat % increased from 11.20 per cent±1.58 at 10 years to 13.20 per cent±1.32 at 16 years in tribal boys (Average growth in body fat 0.33 per cent/year) At the age of 16 years maximum average value of body fat per cent (13.20 in tribal boys) is seen in the present study. Body fat per cent slowly decline during early childhood and slight increase in relative fatness in late pre-pubertal age, body fat per cent then slowly decline, reflecting the development of free fat mass at puberty.

Genetic (Graham *et al.*, 1979), nutritional and socio-economic factors (Dugdale *et al.*, 1970) and environmental factors (Balsuriya and Fernan-Do ,1986) plays an important role in determining the growth potential of a child . Indian boys as reported by ICMR (1990) and NCHS (1977) are taller and heavier than boys of the present study. From the study sample, it is revealed that the tribal boys are lighter in weight and shorter in stature compared to well-to-do Indians (Raghavan *et al.*, 1971). Comparison with Indian average standards, the lower value of height of present study may be due to the racial, genetic factors (Graham *et al.*, 1979) and different environmental conditions.

CONCLUSION

From the present observations it may be concluded that tribal boys are shorter and lighter. Growth spurts of height and weight are noticed in 13-15 years of age .In cross-sectional study, tribal boys achieved a peak height velocity of 7.3 cm/year and peak weight velocity of 6.5kg/year .Compared to national boys, tribal boys of Tripura showed lower values in height and weight. The finding of the study can be used as a reference material for urban Tripura tribal boys.

Further, the research conducted among Tripura tribal boys may help to suggest suitable programmes and strategies to improve the nutritional status and proper management of health.

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