

A Cross-sectional Growth Study of Adolescent Assamese and Bengali Kayastha Girls of Guwahati

Rumi Deb

Department of Anthropology, University of Delhi, Delhi 110 007, India

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ABSTRACT A cross sectional study of physical growth of 453 subjects comprising of 230 Assamese Kayastha girls and 223 Bengali Kayastha girls, aged 10 - 16 of Guwahati City was conducted in order to evaluate the body size of the girls and to examine the body dimensions in relation to the age. The study reveals a higher percentage of taller and heavier girls among the Assamese Kayasthas than among the Bengali Kayasthas.

INTRODUCTION

The growth of adolescent girls have been studied worldwide. It is seen to vary from one population to another as well as between different ethnic groups within the same region. The different stages of growth and development occupy a central place in the study of mechanisms of evolutionary changes and also in the study of individual difference in the structure and function within the same human species (Tanner, 1962). The reason attributed for this may be interaction between genetic component and environment, nutrition, socioeconomic status, etc. Searches for the patterns of changes in man's body structure and function, both external and internal, have been going for last two hundred years.

Very few studies have been done so far on the growth pattern of North East Indian population, despite the wide range of the socioeconomic, cultural ethnic and regional variations among the people of this region. Moreover, most of the studies on the growth of the North-East Indian population are from the rural areas. Das and Das (1969-71) did a cross-sectional study on the Assamese caste Hindu children from Guwahati city of ages ranging from 10-17 years. Das and Choudhury (1992) conducted a mixed longitudinal study of growth of urban Assamese children of ages 8-16 years from the Guwahati city, earlier these authors (1982) conducted a

study of growth of Assamese children of ages 1 - 7 years of Guwahati city. Presently a cross-sectional study is conducted among Assamese Kayastha and Bengali Kayastha girls (ranging from 10-16 years) respectively settled at Guwahati. The purpose of this study is to evaluate the body size of the girls and to examine the body dimensions in relation to the age.

MATERIAL AND METHOD

The cross-sectional data consists of 453 subjects comprising 230 Assamese Kayastha girls and 223 Bengali Kayastha girls, aged 10-16 years. The data was collected from different High and Higher Secondary Schools and one college in the Guwahati City. The date of birth of each subject was recorded from the admission registers maintained by the respective schools, was converted into decimal age following the decimal calendar given by Tanner (1978).

Almost all the subjects belonged to middle socioeconomic group. Care was taken to include only those subjects who were physically and mentally normal. Besides the basic background information, additional information such as food habit and living conditions was gathered from each subject. Twelve somatometric measurements (linear, cross-sectional, circumferential, fatfold) were taken on each subject to evaluate the physical growth of the two communities.

RESULTS AND DISCUSSIONS

Body Size of the Girls

In order to visualize the trend of physical growth, the mean of values of all the twelve somatometric parameters are calculated and are presented in table 1.

The average mean height of the Assamese girls is found to be more than that of the Bengali

Table 1: Mean for height, sitting height, total arm length, height iliospinale, biacromial diameter, bi-illio-cristale diameter, chest breadth, chest circumference, upper arm circumference, calf circumference, tricep skinfold and weight among the Assamese and the Bengali Girls

Age Group (Years)	Height (cm)	Sitting Height (cm)	Total Arm Length (cm)	Height Iliospi-nale (cm)	Bia-cromial diameter (cm)	Bi-illio-cristale diameter (cm)	Chest Breadth (cm)	Chest Circum-ference (cm)	Upper Arm Circum-ference (cm)	Calf Circum-ference (cm)	Tricep Skin-fold (mm)	Weight (kg)
Assamese												
10	135.61	70.94	59.82	75.81	27.25	20.85	21.36	62.08	17.16	24.14	3.81	25.84
11	142.13	74.81	62.95	80.99	29.00	22.73	22.18	65.63	17.94	25.98	4.08	32.47
12	145.37	75.32	63.45	82.56	28.72	23.15	21.87	39.12	18.83	27.21	5.68	33.89
13	149.97	79.41	65.33	86.14	30.06	24.30	22.49	75.52	19.81	28.27	5.74	38.64
14	153.46	79.64	68.08	86.12	32.00	26.88	24.35	79.01	21.93	30.42	8.87	45.16
15	154.23	80.22	68.31	85.79	32.61	28.12	24.12	82.13	22.87	31.13	9.19	46.62
16	154.85	82.51	68.62	87.71	31.64	27.64	24.87	85.93	23.62	31.96	8.55	49.46
Bengali												
10	134.13	69.78	59.01	76.88	28.08	25.08	20.11	62.21	17.16	24.9	9.91	26.77
11	139.77	72.25	61.45	81.49	29.04	22.89	20.48	64.81	17.39	24.66	9.31	30.09
12	145.33	75.38	66.02	84.12	30.35	24.63	24.63	71.85	18.32	26.82	10.97	34.27
13	150.2	78.76	67.69	85.96	31.74	26.39	22.91	77.55	20.35	29.42	13.97	39.01
14	151.37	78.67	67.87	85.86	31.99	26.16	23.2	79.54	21.23	30.63	13.78	42.45
15	150.97	79.06	67.33	85.78	32.83	27.72	24.14	81.19	21.71	30.02	15.8	45.31
16	151.14	80.94	65.67	86.16	32.55	26.75	23.39	77.98	20.17	29.04	12.24	41.77

girls in almost all the age groups, except at the age group 13 years at which the Bengali girls have slightly more height. In both the Assamese and the Bengali girls almost similar total gain (11.0 cm) in mean sitting height is observed from 10 to 16 years. Maximum increase in sitting height vertex is observed between 12 to 13 years of age in the Assamese as well as the Bengali girls. The mean arm length is found to increase rapidly from 10 and 11 years of age in both the groups of girls. From 11 to 12 years of age the Bengali girls show a sharp increase but not the Assamese girls. The Assamese girls reveal a slight increase in the mean total arm length from 14 to 16 years of age, but curiously a decrease is observed for Bengali girls during the same age group. The total arm length increases by 14.7% and 11.3% from 10 to 16 years of age among the Assamese and the Bengali girls respectively.

The mean iliospinale height increases between 10 and 13 years of age in the girls of both the groups. At 13 and 15 years of age group both the Assamese and the Bengali girls, the leg length does not seem to increase. From 15-16 years of age a sharp increase among the Assamese girls, but lesser increase among the Bengali girls in the mean iliospinale height is seen. The net increase for the measurement between 10-16 years of age is 15.7% in the Assamese girls and only about 12% in the Bengali girls.

The Bengali girls are observed to have a relatively greater mean biacromial diameter at all the ages except at age 11 and 14 years where both the Assamese and the Bengali girls show similar values for this measurement. The Assamese and the Bengali girls reveal approximately similar net increase (16%) in shoulder width from 10-16 years of age.

The greatest increase in hip width in the Assamese girls occurs from 13 to 14 years, while in the Bengali girls it occurs from 12 to 13 years of age. From 10-13 years the Bengali girls show greater mean bi-illio-cristale diameter as compared to the Assamese girls. But the trend is reversed between 14 to 16 years age groups. It is interesting to note that the Assamese girls reveal 32.6% net increase in hip width from 10-16 years of age, while the increase is only 6.65% in the Bengali girls.

The increase in mean chest breadth is almost similar between 10 and 11 years in both the groups of girls. From 11 to 12 years the Bengali girls show a sharp increase, while a reverse trend is seen in the Assamese girls. In both the Bengali and the Assamese girls almost similar total gain (16%) in the mean chest breadth is observed from 10-16 years of age.

The Bengali girls have relatively greater mean chest circumference at almost all the ages except at 11, 15 and 16 where the Assamese girls

show higher mean values. However, the Assamese girls reveal 38.42% net increase in chest circumference from 10 to 16 years of age, while the net increase is much less (25.25%) in the Bengali girls.

Both the Assamese and the Bengali girls show similar mean upper arm circumference at age 10 years. From 11 to 16 years of age the Assamese girls have a relatively greater mean value for this measurement except at 13 years where the Bengali girls possess slightly higher mean value. The net increase in upper arm circumference from 10-16 years of age is 37.69% in the Assamese girls, while it is only 17.54% in the Bengali girls.

The increase in calf circumference measurement for the Assamese girls is found to be uniform from 10 to 16 years of age, but in the Bengali girls the mean value of the calf circumference decreases from 10 to 11 years and then rises rapidly from 11 to 13 years of age. At 14 years of age both the groups show similar mean values. From 14-15 and 15-16 years there is a steady increase in the mean values amongst the Assamese girls, while the reverse is observed in their Bengali counterparts. The total gain in mean calf circumference in the Assamese girls is 32.29% against 16.63% in the Bengali girls.

The mean value of the tricep skinfold measurement at all the ages from 10-16 years is more amongst the Bengali girls than the Assamese girls. It is interesting to note that the net increase in this measurement from 10 to 16 years of age among the Assamese is at least five times more than that among the Bengali girls.

Weight is a highly variable dimension of body. Being highly adaptive in nature weight continues to grow at different rates at each age group level. In both the samples considered in the present study weight shows a continuous increase with corresponding increase in age, the only exception being 15 to 16 years of age where the Bengali girls show decrease in their mean weight. From 10 to 16 years the mean weight increases by 90% among the Assamese girls, but only 56.1% among the Bengali girls.

Body Dimension in Relation to Age

The association of twelve body measurements in the two population groups has been

tested by the product moment correlation coefficient(r) for each age group.

At the age groups 10 and 11 years only tricep skinfold thickness reveals insignificant correlations with the other measurements among the Assamese as well as the Bengali girls. In both these age groups the tricep skinfold is associated with biacromial diameter in the Bengali girls. While in age group 10 years all the other measurements show statistically significant correlation with each other in both the population groups, excepting being leg length and upper arm circumference which are found to correlated only among the Bengali girls. In age group 11 years the upper arm circumference among the Assamese girls and the chest circumference among the Bengali girls are found to be least correlated with the other variables.

Of the twelve measurements, upper arm circumference and tricep skinfold thickness appear to emerge as the least correlated. On the whole (of 66 r -values) slightly greater number of statistically significant correlations between different body measurements are found among the Assamese girls than the Bengali counterparts.

In age group 13 years barring weight, tricep skinfold does not show significant relationship with any other measurement in the Assamese girls. On the other hand, statistically significant correlation are observed between tricep skinfold measurement and sitting height, arm length, biacromial diameter, chest circumference, upper arm circumference and leg length respectively in the Bengali girls.

A careful examination of r -values reveals a statistically insignificant correlation of upper arm with stature, sitting height vertex, arm length and leg length respectively in both the Assamese and the Bengali girls of 14 years of age. Chest circumference shows statistically significant correlation with stature, arm length and biacromial diameter respectively in the Assamese girls only.

In both the population groups in age group 15 years the linear measurement on one hand, and diameters and circumferential measurements respectively on the other, show statistically significant correlation. The only statistically significant negative correlation in this age group is found between arm length and chest breadth among the Bengali girls.

Table 2: Mean weight-for-height among the Assamese and the Bengali girls

Height (cm)	Assamese				Bengali			
	N	Mean Wt.	SD	CV	N	Mean Wt.	SD	CV
X—131.0	8	23.69	1.44	6.08	11	23.64	3.03	12.82
131.1—135.0	18	26.08	2.25	8.63	23	25.98	2.96	11.39
135.1—139.0	21	30.04	2.82	9.25	15	25.50	10.25	40.19
139.1—143.0	26	28.96	8.50	29.35	22	34.89	10.97	31.44
143.1—147.0	17	39.44	5.51	13.97	30	36.98	5.86	15.85
147.1—151.0	35	42.08	7.37	17.51	47	39.92	6.84	17.19
151.1—155.0	37	43.26	6.25	14.45	44	42.52	6.28	14.77
155.1—159.0	46	45.73	5.75	12.57	23	42.13	6.27	14.88
159.1—X	22	49.48	4.94	9.98	8	49.25	6.83	13.87

In the last age group it is observed that all the linear measurement of both the population are statistically significantly correlated with each other excepting sitting height which does not show any statistically significant correlation with arm length among the Bengali girls. On the other hand, stature which shows significant correlation with chest circumference, calf circumference and weight respectively among the Assamese girls, does not do so among the Bengali girls.

The weight of a child at a given height is known to be an important indicator of the present state of nutrition of the child. With a view to assess the nutritional status of girls of the present study the mean height for weight of the subjects in the two samples was divided into eight classes, and the weight of each subject falling in a particular class of height was noted before calculating the mean weight (see table 2). It is clear from this table that the mean weight of the Assamese and the Bengali girls is almost the same. Similarly, the tallest girls among the two samples possess similar mean weights. It is also noted that for a majority of the other given classes of height the Assamese girls show higher mean weight as compared to their Bengali counterparts. The Assamese girls belonging to 139.1 - 143.0 cm, height class are found to have lower mean weight than those belonging to the preceding class of height. However, the difference

is statistically not significant. Among the Bengali girls belonging to 131.1 - 135.0 cm class reveal almost similar mean values for body weight. The above observations of both Assamese and Bengali girls indicate some form of mal-nourishment among girls belonging to taller class of height as compared to girls belonging to the immediately shorter class of height. Another fact which emerged from the table is that an equal percentage of girls in both the samples are distributed in the first four classes of height, but a greater percentage (60.87%) of Assamese girls than that of the Bengali girls (54.71%) is distributed in the last four height classes.

On the whole, one finds a greater percentage of taller and heavier girls among the Assamese Kayasthas than among the Bengali Kayasthas.

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