

Height and weight of healthy Bengali (Brahmin) boys of Howrah district, West-Bengal

P. Bharati, S. Bharati*, R. Ghosh

Anthropology and Human Genetics Unit, Sociology Unit,
Indian Statistical Institute, Calcutta - India*

Summary

An assessment of the pattern of growth in height and weight was made among Bengali (Brahmin) school going boys aged 6-16yrs (n=550) living in the city of Howrah, West-Bengal. The results show that at 16 yrs. of age about 90% of the boys are between 156.8 and 175.0 cm tall and their corresponding weight ranges between 58.5 and 69.7 kg. The variation extent gradually widens as subjects get on in age from 6.0 to 16.0 yrs. The 50th percentile of the present study shows that it lies between the 50th percentile of ICMR [6] and NCHS [5]. The results of the study are expected to serve as regional standards for these two sensitive indicators of West-Bengal boys' physical growth.

Key words: Physical growth, Distance curve, Percentile

Introduction

The growth and development of an individual are invariably related to genetic constitution and environmental condition [15]. Therefore, the investigation of growth patterns in different socio-economic conditions, basically, to assess and understand the nutritional status, as well as to estimate the standard growth pattern of a community, population or nation is one of the major subjects of studies of human biology [8, 11]. The difference in growth between Indian children and those living in developed countries were ascribed, till recently, to possible environmental, genetic and socio-cultural factors. However, empirical studies indicate that the growth pattern can be explained in terms of genetic as well as of socio-economic or environmental variables and that the latter are responsible for one share of the variance among different populations [4, 10]. For example, studies carried out by the National Institute of Nutrition [9] on a large number of children attending public schools in different

parts of the country clearly indicate that the growth of these children is very much similar to that of American children up to the age of 14 yrs. in males. Follow-up studies of children from these groups indicate that the increment in height and weight over a 4 yr.-period is similar to that of Americans. The studies by Vijayaraghavan et al. [16] point out that the growth retardation observed among average Indian children might be more of nutritional than of ethnic or genetic origin. Jelliffe [7] observed that the environment, and especially nutrition, affects growth more than any other factor. Dugdale et al. [3] showed that genetic factors act on growth but become effective only when the nutritional and other factors reach an optimal level. The process of growth in different parts of the world is assessed in several ways in order to understand the nutritional status of a community, population or nation. Schutte [12] showed that before the adolescence period, the rate of growth is fairly high and therefore requires adequate nutrition to provide energy. Bharati and Basu [1] and Bharati et

al. [2] showed that the anthropometric measurements increase with the improvement of the economic condition among the different socio-economic subgroups of the Mahishya caste population of Howrah district. The Indian Council of Medical Research [6] has presented data on growth and development of infants and children on a national basis. But these data do not cover the children of West Bengal. The anthropometric studies among different communities of West Bengal indicate a lower average for height and other measurements than in other regional populations. This suggests variable growth standards for West Bengal population and emphasizes the need for such studies in different regional population. This paper is concerned with some aspects of growth in height and weight of adequately nourished Bengali (Brahmin) boys and presents local standards for their standing height and body weight as recorded in 6-16 yrs. boys taken in each year.

sent study considers those individuals whose birth records were available. Boys and girls aged six to sixteen, all belonging to a single caste group, "Brahmin families" were selected to study the growth pattern. Though the height and weight of boys and girls aged 6 to 16 years were measured, the present study only reports the data on 550 boys. The girl sample has not been analysed yet. The boys came of the upper middle class Brahmin Caste family. The study was cross sectional and the measurements were taken by a single individual (PB) during January 1992 - December 1992.

The measurements were taken following the I.B.P. recommendations of Weiner and Lourie [17]. The age of each subject was carefully ascertained on the basis of authentic and documented birth records. Subjects were measured on their respective birthdays, plus-minus 7-day interval.

The data on height and weight were separately analysed for each age group to reckon the yearly increment. Distance curves representing cross-sectional growth pattern were graphically represented. Seven percentile values (5, 10, 25, 50, 75, 90, 95) for height and weight of Bengali Brahmin Boys for each age were separately calculated according to the standard statistical procedure. The 50th percentile value of the present study has been considered for comparison with other available Indian studies (Figures 3, 4).

Materials and methods

The study was carried out in Howrah district, West Bengal, which is situated on the West bank of the river Hooghly, opposite to Calcutta City. A household survey was conducted in the central parts of Howrah town. The pre-

Results

The mean and standard deviation for height and weight are given in *Table 1*. The percentile values are presented in *Tables 2* and *3*.

Tab. 1. Mean and standard deviation of height and weight at different ages of Bengali (Brahmin) boys of Howrah district

Age	Height (cm)				Weight (kg)		
	No.	\bar{x}	SD	Increment	\bar{x}	SD	Increment
6	50	111.12	6.28	—	17.00	2.66	—
7	50	120.02	7.13	8.90	20.73	4.72	3.73
8	50	124.24	5.28	4.22	21.54	4.33	0.81
9	50	129.74	5.54	5.50	25.39	4.33	3.85
10	50	134.30	5.76	4.56	28.66	6.31	3.27
11	50	139.29	7.23	4.99	30.11	7.79	1.45
12	50	142.87	8.04	3.58	34.12	9.25	4.01
13	50	152.37	7.67	9.50	37.71	7.41	3.59
14	50	157.71	8.68	5.34	41.82	8.70	4.11
15	50	162.86	6.30	5.15	46.60	8.68	4.78
16	50	165.30	4.77	2.44	49.65	9.11	3.05

Tab. 2. Percentile values for height of Bengali (Brahmin) boys within age group 6-16 yrs. of Howrah district

Age	5	10	25	50	75	90	95
6	98.70	100.80	104.95	111.30	115.05	118.50	120.40
7	107.80	109.60	114.75	119.40	125.35	127.90	130.95
8	114.25	117.40	120.35	123.50	128.35	130.10	132.55
9	118.70	122.10	125.40	128.80	132.85	136.10	138.95
10	124.10	126.10	128.70	135.00	138.20	140.30	143.15
11	126.55	129.60	133.20	137.90	143.80	148.30	152.05
12	127.25	130.70	136.80	143.50	148.25	154.30	155.60
13	137.30	142.50	145.90	151.90	157.00	161.70	164.65
14	139.25	144.90	150.70	158.00	164.00	167.20	170.75
15	150.55	154.10	158.75	162.60	166.90	170.20	174.05
16	156.85	158.60	161.80	164.90	169.85	171.30	175.10

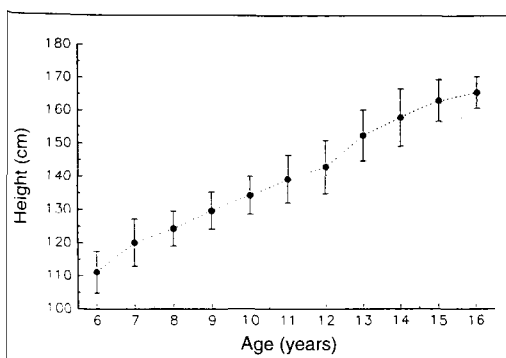
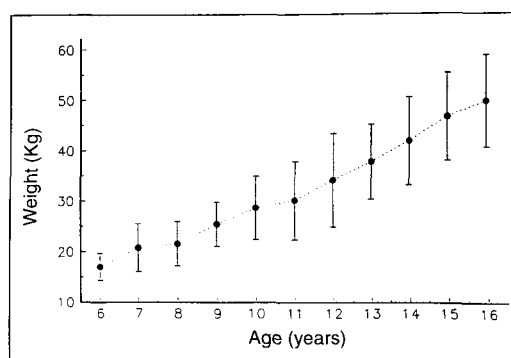
The growth patterns of these subjects are shown in *Figures 1* and *2* and percentile distributions in *Figures 3* and *4*.

Height - The distance curve for height in the present sample shows (*Figure 1*) a gradual increase from 6-16 yrs. The highest rate of increment (9.50 cm/yr.) is recorded at the age of 13 yrs. (*Table 1*).

Table 2 shows a steady increase of height percentile values from one age group to the next. The comparison of 5th through 95th percentiles indicates that about 90% of the 6 yr. old boys have attained a height between 98.70 cm and 120.40 cm. At 16 yrs. of age the height of about 90% of the boys ranges between 156.85 cm and 175.10 cm. The annual increment reaches the peak value of 9.50 cm

between 12 and 13 yrs. The 50th percentile value of the present sample is higher compared to ICMR (1972) [6]. In all ages while it is lower when compared with the 50th percentile of the NCHS (*Figure 1*) [5].

Weight - The comparison between the 5th and 95th percentile at 6.0 yrs. shows that about 90% of the boys weigh between 13.0 - 22.25 kg. The same percentage of 16 yrs. old boys range between 38.5 - 69.75 kg. It is evident, from the percentile extremes, that the increase in the 5th percentile between 6.0-16.0 yrs. is 25.5 kg, while during the same age period the increase in the 95th percentile is 47.50 kg. This reflects a gradual widening of the range of variations with the increasing of age from 6.0 - 16.0 yrs.

**Fig. 1.** Distance curve for height of the present study of Bengali (Brahmin) boys**Fig. 2.** Distance curve for weight of the present study of Bengali (Brahmin) boys

Tab. 3. Percentile values for weight of Bengali (Brahmin) boys within age group 6-16 yrs. of Howrah district

Age	5	10	25	50	75	90	95
6	13.00	13.50	15.00	16.50	17.75	21.00	22.25
7	14.00	14.50	17.00	19.50	23.00	27.00	29.50
8	14.50	17.00	18.50	21.50	24.50	28.50	30.25
9	18.25	19.50	22.00	25.00	27.50	32.00	33.25
10	19.00	20.50	23.00	27.50	33.50	37.00	38.75
11	19.25	21.50	24.00	28.50	34.50	42.00	46.25
12	21.50	23.50	26.00	31.50	38.75	48.00	50.00
13	25.75	27.00	32.00	37.00	41.00	48.50	49.50
14	28.50	31.00	35.25	40.00	45.25	55.00	57.50
15	33.50	36.50	40.00	43.50	49.50	61.00	63.00
16	38.50	39.00	42.25	48.00	52.25	61.50	69.75

Discussion

In the context of national standards for height and weight (ICMR 1972) [6], the 50th percentile of Bengali (Brahmin) boys is higher than the value obtained for Indian boys in general. (Figure 3). In fact Indian boys are about 4 to 5 cm shorter and also about 2 to 4 kg lighter than their Bengali (Brahmin) counterparts. The 50th percentile (height) of the Bengali (Brahmin) boys is also observed to compare closest with the 75th percentile of the respective characters of the Indian boys in general and as for weight it is closest to the 90th percentile of the Indian boys.

The 50th percentile of the Bengali (Brahmin)

boys is almost uniformly about 4 to 5 cm shorter and 6 to 7 kg lighter than the well-off Indian boys of Hyderabad, Vijayaraghavan et al. [16]. It may be noted that as for height, it is the 75th percentile of Bengali (Brahmin) boys which tallies closely with the 50th percentile of the well-off Indian boys, whereas concerning weight, the 50th percentile of the well off boys falls between 75th and 90th percentile of the Bengalis. It is important to note that the well-off school boys studied by Vijayaraghavan et al. [16] belonged to elite families of affluent classes. Conversely, the Bengali (Brahmin) boys came of upper middle or middle class families with different educational levels. The basic difference in

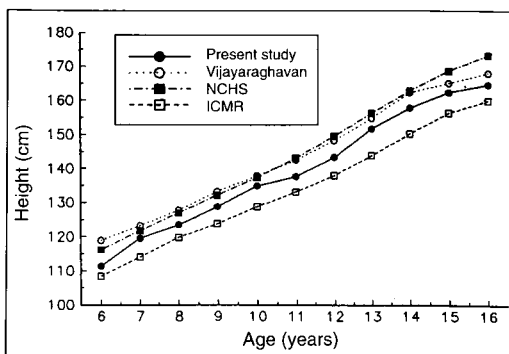


Fig. 3. 50th percentile of height of the Bengali (Brahmin) boys compared with some other studies

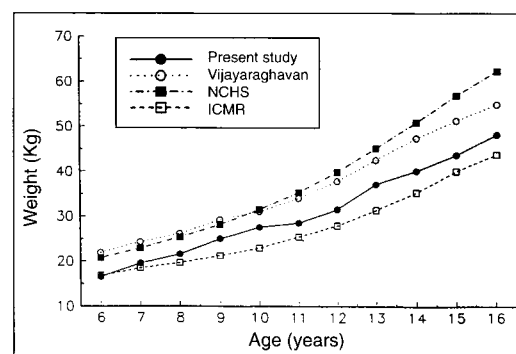


Fig. 4. 50th percentile of weight of the Bengali (Brahmin) boys compared with some other studies

their socio-economic condition may explain the observed differences in the overall growth patterns for weight and height between the Bengali (Brahmin) and well-off Indian boys.

Conclusions

The centile values of height and weight as recorded in the present study may prove useful as cross-sectional age standards. In assessing any single measurement (or in doing that for the first time) of a growing male child of the Bengali (Brahmin) parentage these percentiles will be of great value, especially when community standards or any frame of reference [7] for the Bengalis are hardly available. These centiles for the Bengalis do not, of course, represent the most suitable or optimal standards, but relate to what is currently held true for them. The standards worked out in the USA and UK or in other developed countries cannot apply to the local situation in Howrah as the local environment and socio-cultural situation are quite different from the Western World. So local standards should be introduced to assess the physical growth status of children. Moreover, to heed the most common concern of the Bengali (Brahmin) that is whether the growth in size of their male child is within normal limits for his age, the standards of size attained at each age of distance standards as studied by Tanner et al. 1966a, [13, 14] serve to meet some practical problems of growth assessment.

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Dr. P. Bharati, Anthropometry and Human Genetics Unit, Indian Statistical Institute, 203 Barrackpore Trunk Road, Calcutta 700035 - India