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# A STUDY ON AGE CHANGES AND SEX DIFFERENCES AMONG LODHAS OF DISTRICT MIDNAPORE, WEST BENGAL

*ABSTRACT — The present study is an attempt to understand the intricacy of the process of growth in a tribal group of district Midnapore, West Bengal. The Lodhas are now considered as a denotified community. They still carry the stigma of criminality and are regarded as social isolates.*

*The study is based on 425 Lodhas (209 males and 216 females) measured cross-sectionally for following nine body measures — body weight, stature, sitting height, trunk height, head and neck length, total upper extremity length, total lower extremity length, chest circumference and abdomen circumference — in the age range of 9 to 18 years for males and 6 to 16 years for females, following the standard measurement techniques.*

*The study reveals that both the sexes register an increase in size with increasing age in all the body measures. Male Lodhas invariably exhibit greater dimensions than females at all ages excepting 13 and 14 years where a few body measures exhibit female supremacy over males.*

*Head and neck length and total lower extremity length attain adolescent spurt between 13 and 14 years for males and during 12—13 years for females. The remaining measures attain adolescent spurt a year later for both the sexes.*

*Sex differences are highly pronounced at ages 15 and 16 while they are prominent at 9, 10 and 11 years. Stature, sitting height, total lower extremity length and abdomen circumference exhibit marked sex differences while head and neck length and trunk height show the least differences.*

*KEY WORDS: Lodhas — West Bengal — Sex Differences.*

It is generally observed that the humans grow up at different rates and at different times. As a result of differential growth rates the males show longer legs and arms relative to trunk when compared with females. Similarly, the difference in proportion of head and neck length, trunk and leg length relative to stature occur quite early during the pre-natal stage and continues in the post-natal stage up to 17 years (Scammon, 1953). These constituents of stature show a changing linear contribution during adolescence and as a result the spurt in these segments occur at different times (Meredith, 1939; Nath, 1971, 1972). During the period of adolescent spurt, the feet and hands speed up first, then calf and forearm, followed by the hips and chest and then the shoulders. The length of trunk accelerates last of all and, thus, there exists a years difference between the peaks for leg length and trunk lenght (Sinclair, 1985). Thus we find that the spurt in stature is more due to the increased rate of growth in trunk than in leg length (Tanner, 1962) or head and neck length (Nath, 1971, 1972).

To understand the intricacy of the progression of growth among an economically backward population, the present study is based on a tribal group the Lodhas.

Lodhas, a tribal community of the past, are considered as one of the denotified communities of West Bengal since the revocation of Criminal Tribes Act of 1952. They are settled in district Midnapore of West Bengal, district Mayurbhanj of Orissa and in Singhbum district of Bihar State. The total population of Lodhas, according to 1981 Census, is over 20.000 in these states. The Lodhas were famous for their criminal activities in the past but since 1952 they have adopted agriculture and

fishing for their subsistence. Economically the Lodhas are quite backward as compared to the other tribal groups around them, like the Mundas and the Santhals. Despite the attempts by the State government and other voluntary organisations to rehabilitate them, they still carry the stigma of criminality and are considered as social isolates. Their society is divided into different exogamous totemistic groups, and for the purpose of marriage they practice group exogamy.

The present study is a step towards understanding the patterns of physical growth of Lodhas through nine body measures. The study aims at assessing the effect of age and sex on different body measures.

## MATERIAL AND METHODS

Data for the present study comprise 425 Lodhas (209 males and 216 females), a tribal population of district Midnapore, West Bengal, measured cross-sectionally for the following nine body measures — body weight, stature, sitting height, trunk height, head and neck length, total upper extremity length (TUEL), total lower extremity length (TLEL), chest circumference and abdomen circumference — following the standard techniques recommended by Martin and Saller (1959) and IBP (Weiner and Lourie, 1969). The male Lodhas ranged in age between 9 and 18 years while the female Lodhas ranged between 6 and 16 years.

The actual date of birth for every subject was recorded from the school records and Village Panchayat office. Subjects with improper or faulty date of birth were excluded from the present study. All the subjects were grouped into mean age categories like 6.0, 7.0, 8.0 and so on up to 18.0 years. Age group 6.0 includes all girls who have attained 5 years and six months of age but are less than 6 years and six months (upto 6 years 5 months and 30 days) thereby providing us the mean age as 6.0 years. Age group 7.0, similarly, includes all girls who have reached the age of 6 years and 6 months but are less than 7 years and 6 months. Similarly, all subjects (males and females) were categorised into age groups upto 18.0 years.

Sex differences among Lodhas were assessed for all the nine body measures using 't' test between 9 and 16 years age range only.

## RESULTS AND DISCUSSION

Table 1 depicts the mean values and standard deviation for male Lodhas in the age range of 9 to 18 years for the nine body measures. It is observed that all the measures exhibit an increase in size with increase in age from 9 to 18 years.

Table 2 presents the mean values and standard deviation for female Lodhas in the age range of 6 to 16 years for the nine body measures. The mean values of all the measures express an increasing trend with advancement in age.

The age-wise sex differences are highlighted in table 3, as assessed through 't' test, between 9 and 16 years, for all the nine body measures. Due to the non-availability of the male sample in 6, 7 and 8 year age groups and female sample in 17 and 18 year age groups the sex differences have been evaluated only between 9.0 and 16.0 years.

The measurement wise age and sex differences among Lodhas are as follows:

1. *Body weight:* The mean body weight varies between 23.3 kg at 9 years and 44.2 kg at 18 years for male Lodhas (*Table 1*) while for females (*Table 2*) it varies between 15.0 kg (at 6 years) and 38.9 kg (at 16 years).

The total increase in body weight amounts to 20.9 kg for males (between 9 and 18 years) and 23.9 kg for females (between 6 and 16 years). However the increase between the comparable age range, i.e. 9 to 16 years, is 18.7 kg for males and 19.5 kg for females.

The maximum annual increase, corresponding to the adolescent spurt in body weight, occurs between 14 and 15 years for males (Table 1) and from 13 to 14 years for females (*Table 2*). However, the mean body weight at 18 years for males and at 16 years for females is quite low which reflects an inadequacy in their nutritional intake.

Tables 1 and 2 reveal that the male Lodhas are heavier than the females at all ages between 9 and 16 years excepting at 14 years. The sex differences are significant at 9, 10, 15 and 16 years (*Table-3*).

2. *Stature:* The mean stature varies between 126.1 cm (at 9 years) and 160.6 cm (at 18 years) for male Lodhas (*Table-1*) while for females it varies from 109.7 cm at 6 years to 151.3 cm at 16 years (*Table-2*). The absolute increase in stature amounts to 34.5 cm for males and 41.6 cm for females. However, the net increase between 9 and 16 years is greater for males (30.8 cm) than for females (28.3 cm).

The maximum annual increase, corresponding to the adolescent spurt in stature, occurs between 14 and 15 years for males (*Table-1*) and between 13 and 14 years for females (*Table-2*). This period of maximum annual increase exactly corresponds to the period of maximum annual increase in body weight for both the sexes.

Tables 1 and 2 explain that the male Lodhas are taller than their female counterparts at all ages from 9 to 16 years and the sex differences are significant at all ages excepting at 14 years (*Table-3*).

3. *Sitting height:* The mean sitting height varies between 65.2 cm at 9 years and 81.6 cm at 18 years for male Lodhas (*Table-1*) while for females it varies between 57.5 cm at 6 years and 75.8 cm at 16 years (*Table-2*). The actual increase in sitting height amounts to 16.4 cm for males and 18.1 cm for females. However, the total increase between 9 and 16 years is greater for males (15.5 cm) than for females (13.1 cm). The proportion of sitting height to stature is greater for males in comparison to females at 9 and 16 years respectively.

The maximum annual increase, corresponding to the adolescent spurt, in sitting height occurs between 14 and 15 years (*Table-1*) for males and between 13 and 14 years for females (*Table-2*), which

TABLE 1. *Mean and Standard deviation for nine body measures of Male Lodhas*

| Age in years | N | Body Weight (kg) | | Stature (cm) | | Sitting Height (cm) | | Trunk Height (cm) | | Head & Neck Length (cm) | | TUEL (cm) | | TLEL (cm) | | Chest Circumference (cm) | | Abdomen Circum-ference (cm) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | S. D. | Mean | S. D. | Mean | S. D. | Mean | S. D. | Mean | S. D. | Mean | S. D. | Mean | S. D. | Mean | S. D. | Mean | S. D. |
| 9.0 | 22 | 23.3 | 3.01 | 126.1 | 4.81 | 65.2 | 2.71 | 43.9 | 3.31 | 21.2 | 2.13 | 57.0 | 3.14 | 72.8 | 4.01 | 57.6 | 2.60 | 53.5 | 3.63 |
| 10.0 | 20 | 24.5 | 2.87 | 128.7 | 4.39 | 66.3 | 2.27 | 45.0 | 1.83 | 21.7 | 1.69 | 58.2 | 3.26 | 74.8 | 3.89 | 58.1 | 3.45 | 54.8 | 2.97 |
| 11.0 | 21 | 25.6 | 3.12 | 131.8 | 5.12 | 67.9 | 3.04 | 46.8 | 2.51 | 21.9 | 1.03 | 59.5 | 4.16 | 75.9 | 4.58 | 59.3 | 3.38 | 56.3 | 3.51 |
| 12.0 | 23 | 26.9 | 3.44 | 134.0 | 6.27 | 68.6 | 3.59 | 47.9 | 3.15 | 22.2 | 1.25 | 61.0 | 4.68 | 78.1 | 4.83 | 60.5 | 3.54 | 58.0 | 2.84 |
| 13.0 | 20 | 29.0 | 3.55 | 138.6 | 4.49 | 71.0 | 2.08 | 48.7 | 2.18 | 22.4 | 1.59 | 62.8 | 3.74 | 79.7 | 5.15 | 61.9 | 3.73 | 60.2 | 3.58 |
| 14.0 | 21 | 33.5 | 3.35 | 144.2 | 2.58 | 73.2 | 2.33 | 50.4 | 2.46 | 23.5 | 1.43 | 65.0 | 2.45 | 86.3 | 2.42 | 64.0 | 3.02 | 61.1 | 2.35 |
| 15.0 | 20 | 40.3 | 4.03 | 153.6 | 4.07 | 79.6 | 2.95 | 55.5 | 2.61 | 23.8 | 1.49 | 71.4 | 4.86 | 88.6 | 5.26 | 70.5 | 4.46 | 65.4 | 2.24 |
| 16.0 | 22 | 42.0 | 3.65 | 156.9 | 2.06 | 80.7 | 2.56 | 56.8 | 2.14 | 24.0 | 1.64 | 73.0 | 2.52 | 91.4 | 4.51 | 72.7 | 3.65 | 66.0 | 3.40 |
| 17.0 | 20 | 43.5 | 4.52 | 158.9 | 2.74 | 81.3 | 2.63 | 57.3 | 2.06 | 24.3 | 2.15 | 73.8 | 2.04 | 93.0 | 3.04 | 73.8 | 2.04 | 66.4 | 3.06 |
| 18.0 | 20 | 44.2 | 3.65 | 160.6 | 3.13 | 81.6 | 2.54 | 57.7 | 2.23 | 24.3 | 2.60 | 74.3 | 2.73 | 93.2 | 2.49 | 74.7 | 1.38 | 66.7 | 3.74 |

TUEL Total upper extremity length
TLEL Total lower extremity length

TABLE 2. *Mean and Standard deviation for nine body measures of Female Lodhas*

| Age in years | N | Body Weight (kg) | | Stature (cm) | | Sitting Height (cm) | | Trunk Height (cm) | | Head & Neck Length (cm) | | TUEL (cm) | | TLEL (cm) | | Chest Circumference | | Abdomen Circumference | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | S. D. | Mean | S. D. | Mean | S. D. | Mean | S. D. | Mean | S. D. | Mean | S. D. | Mean | S D. | Mean | S. D. | Mean | S. D. |
| 6.0 | 20 | 15.0 | 1.52 | 109.7 | 2.67 | 57.7 | 2.48 | 38.0 | 1.85 | 19.2 | 1.80 | 46.1 | 3.25 | 60.2 | 2.58 | 51.4 | 1.78 | 48.4 | 2.02 |
| 7.0 | 22 | 16.5 | 1.50 | 113.3 | 1.44 | 59.0 | 2.72 | 40.7 | 2.76 | 19.5 | 1.38 | 48.2 | 3.94 | 63.1 | 1.82 | 52.4 | 1.42 | 50.6 | 2.48 |
| 8.0 | 21 | 17.9 | 1.60 | 117.3 | 2.02 | 61.7 | 1.75 | 41.3 | 1.84 | 20.3 | 1.21 | 50.9 | 2.71 | 66.8 | 2.33 | 53.9 | 1.79 | 51.0 | 1.85 |
| 9.0 | 20 | 19.4 | 1.34 | 122.0 | 1.58 | 62.7 | 1.21 | 42.7 | 1.78 | 20.5 | 1.88 | 53.1 | 2.59 | 69.6 | 3.46 | 55.0 | 2.24 | 52.1 | 2.17 |
| 10.0 | 20 | 22.0 | 2.89 | 124.5 | 3.09 | 65.9 | 2.86 | 44.3 | 2.89 | 20.8 | 1.57 | 56.8 | 3.15 | 72.0 | 2.63 | 56.2 | 1.51 | 53.0 | 2.16 |
| 11.0 | 21 | 24.6 | 1.63 | 127.5 | 4.02 | 65.9 | 1.69 | 46.1 | 1.65 | 20.9 | 0.88 | 58.6 | 2.34 | 73.6 | 1.43 | 57.8 | 2.59 | 54.1 | 2.10 |
| 12.0 | 20 | 25.3 | 1.38 | 131.1 | 2.92 | 67.2 | 2.58 | 49.2 | 1.92 | 22.1 | 1.95 | 59.9 | 3.48 | 75.0 | 2.86 | 58.9 | 2.41 | 55.7 | 1.67 |
| 13.0 | 21 | 28.7 | 2.80 | 135.2 | 1.49 | 69.4 | 2.04 | 52.8 | 1.80 | 22.5 | 1.42 | 62.4 | 1.98 | 82.5 | 2.62 | 60.4 | 1.72 | 56.6 | 3.05 |
| 14.0 | 20 | 34.7 | 2.41 | 143.5 | 1.48 | 74.5 | 2.66 | 53.2 | 2.16 | 22.5 | 1.85 | 66.9 | 2.61 | 85.4 | 2.14 | 64.9 | 2.89 | 60.6 | 2.89 |
| 15.0 | 16 | 37.9 | 2.95 | 148.6 | 1.66 | 75.6 | 2.65 | 53.2 | 2.48 | 22.7 | 1.26 | 67.9 | 2.03 | 87.9 | 1.75 | 65.6 | 2.16 | 61.8 | 3.10 |
| 16.0 | 15 | 38.9 | 2.19 | 151.3 | 1.76 | 75.8 | 2.65 | 53.3 | 2.48 | 22.8 | 1.78 | 68.0 | 2.44 | 88.7 | 2.06 | 65.8 | 3.05 | 62.3 | 3.39 |

TUEL Total upper extremity length
TLEL Total lower extremity length

corresponds to the period of adolescent spurt in body weight and stature for both the sexes.

Tables 1 and 2 express that the male Lodhas have greater sitting height than the females at all ages excepting at 14 years and the sex differences are significant at all ages except 12 and 14 years (*Table-3*).

4. *Trunk height:* The mean trunk height varies between 43.9 cm at 9 years and 57.7 cm at 18 years for male Lodhas, while it ranges from 38.0 cm to 53.3 cm between 6 and 16 years respectively for females (*Tables 1 and 2*).

The total increase in trunk height works out to be 13.8 cm for males between 9 and 18 years and 15.3 cm for females between 6 and 16 years. However the net increase between 9 and 16 years is greater for males (12.9 cm) than for females (10.6 cm).

The maximum annual increase, corresponding to the adolescent spurt, in trunk height occurs between 14 and 15 years for males (*Table-1*) and from 13 to 14 years for females (*Table-2*). This period corresponds to the period of spurt in body weight, stature and sitting height for both the sexes. However, the intensity of spurt is higher for males than for females.

The male Lodhas exhibit longer trunk than the females at all ages excepting at 13 and 14 years. However, despite the absolute differences in the mean trunk height, the sex differences are significant only at 14, 15 and 16 years (*Table-3*).

5. *Head and neck length:* The head and neck length, which is obtained indirectly as a difference between sitting height and trunk height, varies between 21.2 cm at 9 years and 24.3 cm at 18 years for male Lodhas (*Table-1*) and between 19.2 cm at 6 years and 22.8 cm at 16 years among females (*Table-2*). The absolute increase comes out to be 3.1 cm for males between 9 and 18 years and 3.6 cm for females from 6 to 16 years. The net increase between 9 and 16 years is, however, greater for males (2.8 cm) than for females (2.3 cm).

The maximum annual increase, corresponding to the adolescent spurt, in head and neck length occurs between 13 and 14 years for males (*Table-1*) and between 12 and 13 years for females (*Table-2*). This period of occurrence of adolescent spurt does not correspond to that of body weight, stature, sitting height and trunk height for the two sexes as it is earlier by one year. The early occurrence of spurt in head and neck length is indicative of the fact that head and neck length does not contribute to the spurt in stature like trunk height. This observation confirms the contention that the spurt in stature is more due to the increased rate of growth in trunk than in legs (Tanner, 1962) or head and neck length (Nath, 1971, 1972).

The male Lodhas possess longer head and neck segment than the females at all ages between 9 and 16 years and the sex differences are significant only at 11 and 15 years (*Table-3*).

6. *Total upper extremity length (TUEL):* The mean total upper extremity length, among male Lodhas, increases from 57.0 cm at 9 years to 74.3 cm at 18 years, registering an overall increase of 17.3 cm in TUEL (*Table-1*). The female Lodhas, on the other hand, exhibit a total increase of 21.9 cm from 6 years (46.1 cm) to 16 years (68.0 cm) as witnessed from *Table-2*. However, the net increase between 9 and 16 years is greater for males (16.0 cm) as compared to the females (14.9 cm).

The maximum annual increase, corresponding to the adolescent spurt, in TUEL occurs between 14 and 15 years (*Table-1*) for males, while it occurs between 13 and 14 years for females (*Table-2*). The intensity of spurt is greater for males than for females and the period of its occurrence corresponds to that of body weight, stature, sitting height and trunk height for both the sexes.

The male Lodhas exhibit longer arms than females at all ages excepting 14 years, but despite the apparent differences in the mean TUEL values at almost all ages the differential trends exhibit significant sex differences only at 9, 14, 15 and 16 years (*Table-3*).

7. *Total lower extremity length (TLEL):* The mean total lower extremity length increases from 72.8 cm at 9 years to 93.2 cm at 18 years among male Lodhas, exhibiting an overall increase of 20.4 cm (*Table-1*). The females (*Table-2*), on the other hand, register an increase of 18.5 cm between 6 years (60.2 cm) and 16 years (88.7 cm). However, the increase in TLEL between 9 and 16 years is greater for females (19.1 cm) than males (18.6 cm).

The maximum annual increase, corresponding to the adolescent spurt, in TLEL occurs between 13 and 14 years for males (*Table-1*) and between 12 and 13 years for females (*Table-2*). The intensity of spurt is, however, greater for females than for males. The period of spurt in TLEL corresponds to that of the one observed in case of head and neck length for both the sexes, i.e. one year earlier than stature, sitting height and trunk height. The early occurrence of spurt in TLEL by one year than trunk height confirms the fact that the spurt in stature is more due to increased rate of growth in trunk than in leg length or head and neck length (Tanner, 1962; Nath, 1971, 1972; Sinclair, 1985) among both sexes of Lodhas. This fact is further established when we find that the rate of growth during 14—15 years and 13—14 years for males and females, the period of spurt in stature and trunk height, exhibit a sharp decline in comparison to the rate of growth observed during 13—14 years for males and 12—13 years period for females.

TABLE 3. *Sex difference among Lodhas*

| Age in years | Value of 't' | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Body Weight | Stature | Sitting Height | Trunk Height | Head & Neck Length | T.U.E.L. | T.L.E.L. | Chest Circumference | Abdomen Circumference |
| 9.0 | 5.51* | 3.86* | 4,77* | 1,54 | 1,45 | 4.01* | 2,77* | 3.48* | 1.53 |
| 10.0 | 2.75* | 3.17* | 2.94* | 0.92 | 1.75 | 1.38 | 2.67* | 2.26* | 2.19* |
| 11.0 | 1.30 | 3.03* | 2.64* | 0.96 | 3.39* | 0.86 | 2.19* | 1.56 | 2,46* |
| 12.0 | 1.64 | 1.98* | 1,46 | 0.76 | 1.77 | 0.89 | 2.59* | 0.56 | 3.31* |
| 13.0 | 0.29 | 3.20* | 2.19* | 0.78 | 0.64 | 0.43 | 2.18* | 1.64 | 3,46 |
| 14.0 | 1.11 | 1.07 | 1.90 | 3.58* | 1.93 | 2.40* | 1.26 | 0.98 | 0.61 |
| 15.0 | 2.06* | 5.01* | 4.27* | 2.90* | 2.40* | 2.82* | 0.56 | 4.32* | 3.90* |
| 16.0 | 3.22* | 8.87* | 5.60* | 4.48 | 1.85 | 6.04* | 2.13* | 6.23* | 3.26* |

* Significant at 5 % level.



The male Lodhas possess longer legs than the females at all ages excepting at 13 years. The differential trends exhibit significant sex differences at all ages except 14 and 15 years (*Table-3*).

8. *Chest Circumference:* Mean chest circumference among Lodha males increases from 57.6 cm at age 9 to 74.7 cm at 18 years exhibiting an absolute increase of 17.1 cm in the chest circumference (*Table-1*). The female Lodhas (*Table -2*), on the other hand, register an overall increase of 14.4 cm in chest circumference from 6 years (51.4 cm) to 16 years (65.8 cm). However, the increase in chest circumference between 9 and 16 years is greater for males (15.1 cm) than females (10.8 cm).

The maximum annual increase, corresponding to the adolescent spurt, in chest circumference occurs between 14 and 15 years for males and during 13 and 14 years for females (*Tables 1 and 2*). The intensity of spurt is greater for males than for females. The period of occurrence of spurt in chest circumference corresponds to that of body weight, stature, sitting height, trunk height and TUEL for both the sexes.

The male Lodhas exhibit greater chest circumference than female at all ages excepting 14 years where females possess higher mean values. The differential trends, however, exhibit significant sex difference only at 9, 10, 15 and 16 years (*Table-3*).

9. *Abdomen Circumference:* The abdomen circumference varies between 53.5 cm at 9 years and 66.7 cm at 18 years among male Lodhas (*Table-1*) while among females it is 48.4 cm at 6.0 years and increases to 62.3 cm at 16 years. The male Lodhas exhibit an overall increase of 13.2 cm in abdomen circumference from 9 to 18 years while the females show an increase of 13.9 cm between 6 and 16 years. The net increase between 9 and 16 years is, however, greater for males (12.5 cm) than for the females (10.2 cm).

The maximum annual increase, corresponding to the adolescent spurt, in abdomen circumference occurs between 14 and 15 years for males (*Table-1*) while for females it is between 13 and 14 years (*Table-2*). The intensity of increase is greater for males than females and the period of its occurrence corresponds to that of stature, sitting height, trunk height, TUEL, body weight and chest circumference in both the sexes.

The male Lodhas exhibit greater abdomen circumference than females at all ages between 9 and 16 years. The differential trends exhibit significant sex difference at all ages except 9 and 14 years (*Table-3*).

To sum up, it may be stated that the male Lodhas exhibit greater dimensions for all the nine measures under study than the females between 9 and 16 years with a few exceptions where females outgrow males, like at 14 years the females exhibit greater dimensions than males for body weight, sitting height, trunk height, TUEL and chest circumference, while at age 13 only trunk height and TLEL show greater dimensions for females. In case of stature, head and neck length, and abdomen circumference males exhibit greater dimensions than females at all ages.

The maximum annual increase, which corresponds to the adolescent spurt, occurs between 14 and 15 years for males and during 13—14 years for females for all measures excepting head and neck length and TLEL which exhibit its occurrence a year earlier for both the sexes and confirms that the spurt in stature is due to the increased rate of growth in trunk than in leg length or head and neck length.

The sex differences are most prominent at ages 15 and 16 while at 9, 10 and 11 years they are quite marked. However, the sex differences are least at 12 and 14 years while at 13 years they are moderate. With regard to the body measures, the stature exhibits maximum variation between the sexes, followed by sitting height, TLEL and abdomen circumference. The head and neck length and trunk height, on the other hand, exhibit least variation between the sexes.

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