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Adult Sexual Dimorphism Among the Tea Garden Labourers of Dibrugarh, Assam

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ABSTRACT The adult sexual dimorphism in respect of eleven somatometric characters among the tea garden labourers of Dibrugarh district from 20 to 45 years of age was studied along with an intention to look into their state of health and body build. Inspite both the sexes pursuing similar economic activities, the males are significantly larger and heavier than their female counterparts except the measure of skinfold at triceps and subscapular which is statistically insignificant. Both the sexes have a medium body build. The females enjoy a normal state of health but the males evince a state of mild undernutrition.

INTRODUCTION

The labourers of the various tea gardens of Assam are popularly connotated as *mazdoor* or *cha bonua*. Though basically coming from different tribes, castes and from different parts of the country at one time, now they form a single community of tea garden labours. The tea industry has exerted some common influences by exposing them to a similar type of economy, ecology and socio-cultural life. This seems to have resulted in common responses and thus diminishing the edges of their original identity. As per Kar (1975) they are more conscious of being a part of the total labour force rather than the comparatively small ethnic groups to which they belong.

In the present study therefore, the labourers have been taken as a single community. The study observes the adult sexual dimorphism in certain somatometric traits in relation to their general state of health and body build.

Collier (1993) has observed that dimorphism is complex. It can vary in different parts of body and it is the total set of activities of both males and females that contribute to the overall pattern. A number of authors have suggested that during times of environmental stress, sexual dimorphism decreases (Stini, 1975; Tobias, 1975; Wolanski and Kasprzak, 1976; Bielicki and Charzewski, 1977; Relethford and Lees, 1981). Such changes refer to traits where males are generally larger than the females. For traits where females are larger than males (*e.g.* fatness) and males are affected more than females, then sexual dimorphism would increase.

MATERIALS AND METHODS

The present study was conducted on adult labourers from two tea gardens in Dibrugarh district of upper Assam namely, Lepetkata tea estate and Barbaruah tea estate. Both the tea gardens are located about 20 km. south of Dibrugarh town. 53 adult males and 41 adult females from 20 years to 45 years of age were measured for eleven anthropometric traits during the period from October 1997 and January 1997. The measurements being stature, sitting height, lower extremity length, head circumference, girth of biceps, chest circumference, girth of calf, skinfold at biceps, skinfold at triceps, skinfold at subscapular and body weight. The measurements were taken as prescribed by Weiner and Lourie (1969) for which a house to house survey was made.

Standard statistical methods have been used for the computation of averages, standard deviation and correlation coefficients between the different anthropometric measures. The health status of the labourers was deduced with the help of three indices namely body build index (cf. Comas, 1960), Pellidisi index (Mason, 1931) and Korperfulle index (Comas, 1960).

RESULT AND DISCUSSION

The mean and standard deviation of the somatometric traits are presented in table 1 for both the sexes. The males have a greater mean value of all the body dimensions than the females except skinfold measurements at triceps and subscapular. This difference between the sexes

is at a significant level statistically. On average adult men are taller and heavier than women. Stature of women averages between 88% and 95% of the stature of men (Alexander et al., 1978).

Table 1: Anthropometric measurements of adult Tea-garden labourers

Somatometric measurements	*Males (N=53)*		*Females (N=41)*		*t-test*
	Mean	*S.D.*	*Mean*	*S.D.*	
Body weight (kg)	45.52	5.79	39.34	5.71	5.15*
Linear measures (cm)					
Stature	159.97	6.19	148.88	4.78	9.90*
Sitting height	81.24	2.95	75.67	2.57	9.77*
Lower extremity length	78.55	4.08	73.07	3.65	6.85*
Circumference (cm)					
Head	54.03	1.75	52.79	1.53	3.65*
Biceps	22.94	1.59	20.99	1.57	5.91*
Chest	83.26	4.90	80.29	5.50	2.72*
Calf	29.95	1.94	27.80	1.55	5.97*
Skinfolds (cm)					
Biceps	0.75	0.19	0.61	0.22	3.50*
Triceps	0.88	0.22	0.89	0.27	0.20
Subscapular	0.93	0.20	0.98	0.24	1.00

* Statistically significant differences in the two sexs at 5% level

The males are significantly bigger in linear measurements with greater trunk and leg length than the females. Similar to the linear measures in the circumferential dimensions also, dimorphism between the sexes is significantly evident. The males being larger in every girth measurements under consideration. The skinfold measurements are showing a different picture with the females having a greater value of triceps and subscapular skinfolds than the males which is statistically not significant.

Collier (1993) is of the view that dimorphism can vary in different parts of the body and the pattern of dimorphism among the adults reflects particular functional demands on various body parts of both sexes.

Frayer's model suggests that dimorphism is complex and does not follow uniform patterns across populations. He has indicated the fact that economic activity does not influence dimorphism in a simple unitary manner which supports the findings of Britzer (1985). The present study goes in confirmity maintaining the dimorphism between the sexes in all the linear and circumferential measure at a significant level inspite of the fact that the tea garden labours don't keep any difference in their work field, both sexes working equally for their livelihood. Both men and women work for equal hours, almost 8 hours a day. There is a similarity in their nature of work also. Rather it could be said that the women have to spend some time working in the kitchen also. But very negligible interest is given to the delicacy in their diet. Meat and fish does not finds any incitement which home made liquor (made out of cooked rice) creates. It has grown as a necessity for them.

Table 2 shows the correlation of body weight with linear, circumferential and skinfold measurements. In both the sexes, maximum correlation is with chest circumference indicating its maximum increase drop during adulthood contributing to the increase in body weight. Maximum correlation of body weight could also be found with skinfold at biceps among the females. Of all the measures under consideration. contribution of circumferential measures is most and skinfold measures have least during adulthood to the increase of body weight. All the measures have a significantly different correlation from zero with body weight except subscapular skinfold among the girls when it is statistically nonsignificant. Weight reflects the sum total of any changes occurring in any constituent parts of the body. Therefore, it has always been considered as a good indicator of any environmental stress faced by a community.

Table 2: Correlation coefficients of different variables with body weight among the sexes

Variable	*Body weight Males (N=53)*			*Body weight Females (N=41)*		
	r	±	*S.E.*	*r*	±	*S.E.*
Linear Measures (cm)						
Stature	0.67*	±	0.08	0.44*	±	0.13
Circumferences (cm)						
Biceps	0.50*	±	0.10	0.41*	±	0.13
Chest	0.70*	±	0.07	0.51*	±	0.12
Calf	0.49*	±	0.10	0.47*	±	0.12
Skinfolds (cm)						
Biceps	0.31*	±	0.12	0.51*	±	0.12
Triceps	0.53*	±	0.10	0.29	±	0.14
Subscapular	0.48*	±	0.11	0.24	±	0.15

* Significantly different from zero at the level of 5%

In the present study any sort of stress, if caused by the nutritional conditions was also

looked into (Table 3). Nutritional status being considered a good index of population well being because every socio environmental factor finally hinges on the state of nutrition.

Table 3: State of health and body build of the tea garden labourers

Indices	*Value*	*Class*
Males		
Body build index	21.64 ± 0.09	Medium
Pellidisi index	94.53 ± 0.48	State of mild under nutrition
Korperfulle index	1.11 ± 0.01	Low stateof malnutrition to verymild state of undernutrition
Females		
Body build index	22.80 ± 0.15	Medium
Pellidisi index	96.80 ± 0.81	Normal state of nutrition
Korperfulle index	1.21 ± 0.03	Normal or satisfactory state of nutrition

The labourers of both the sexes in the present study have a medium body build. But their state of health differs. Pellidisi and Korperfulle index has detected the males in a state of mild undernutrition. On the contrary, the females are in a normal or satisfactory state. So of the sexes, the males are the sufferers, Hall (1978) in study of sexual dimorphism has found the males to be more sensitive to environmental fluctuations.

Perhaps one of the most common uses of measures of sexual dimorphism is its use as an index of environmental stress. In the present study the health condition as detected by the two indices shows that the state of nutrition may be creating an environmental stress to which the health condition of the males have responded sensitively. The body build being maintained alike in both the sexes. If the nutritional status is creating a stress, it has not affected the dimorphism between the sexes in any way in the present population. In this context a more clear identification of the nutritional status along with a diet survey may be the requirement. The nutritional condition in the present population may be either creating an environmental stress but not to the extent of making any alteration in the dimorphism between the sexes. Whatever, it may be, at this instance it could be said that for a clear cut picture of the conditions prevailing needs a thorough nutritional study with a focus on the other environmental conditions, since, the selection pressures and environmental factors do not affect the two sexes identically.

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