Vol.01,Issue03,March2013

INTERNATIONAL JOURNAL OF RESEARCH PEDAGOGY AND TECHNOLOGY IN EDUCATION AND MOVEMENT SCIENCES (IJEMS) ISSN: 2319-3050

SOMATOTYPES OF THE NON-ATHLETE MEITEI BOYS OF BARAK VALLEY ASSAM -INDIA

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ABSTRACT

Anthropometric Somatotypes of the non-athlete boys belonging to Meitei ethnic group of Barak Valley, the valley along the river Barak that covers the three southernmost districts of Assam state, India viz. Cachar, Karimganj and Hailakandi have been studied following Heath-Carter method in a cross sectional sample of 914 subjects ranging in age from 12 to 18 years. 460 of the boys belong to affluent families and 454 to non-affluent families. The affluent non-athlete boys showed higher ratings of endomorphy than their non-affluent counterparts, whereas the non-affluent non-athlete boys were more ectomorphs than the affluent non-athlete boys. Mesomorphic ratings have no notable difference between the two groups. All the three ratings do change with age during adolescence. But no regular trend has been seen and no distinctive change corresponding to adolescent growth spurt has also been observed. The mean somatotype for the affluent boys was calculated to be 2.6 – 3.3 – 4.0 and for the non- affluent boys 2.3 – 3.4 – 4.2. In the affluent group, somatotype changed from mesomorph-ectomorph (during 12 to 15 years) to mesomorphic ectomorph (during 16 to 18 years). The non-affluent boys belonged to mesomorph-ectomorph (during 12 to 16 years) and mesomorphic ectomorph (during 17 and 18 years).

Keywords: Mesomorphy, Endomorphy, Ectomorphy and Somatype.

INTRODUCTION:

Somatotype is used to assess body shape and composition independent of size, to describe populations, and to demonstrate similarities and differences in groups. Of particular interest is the relationship between success in sports and somatotype. Success in sports is a combination of genetic endowment, environmental conditions, psychological desire and condition, and specialized training. Somatotype is probably one of the factors which predisposes an individual to potential high achievement. In general, athletes (sportspersons) have been found to have

somatotypes which distinguish them from non-athletes, from each other according to sport, event and/or position played, and from each other based on achievement level. However, since the somatotype is viewed not as an invariant genotype, but as a present description of morphology which will respond to changes in health, nutrition, age and training, it must be remembered that these descriptions represent both the predisposition of physique on sport choice, and the influence of training for that particular sport on the somatotype (Carter 1970).

Somatotype is extensively studied in relation with performance and competitive levels of athletes and non-athletes (DeGaray et al. 1974; Carter et al. 1982; Carter 1984; Bloomfield et al. 1994; Pieter and Bercades 2009). If somatotype is to be used to help youngsters select a sport in which they have a reasonable chance for success, more needs to be known about the somatotypes of young athletes and non-athletes. An attempt has, therefore, been made to examine the pattern of somatotypes during adolescence of the affluent and non-affluent non-athlete boys belonging to the Meitei ethnic group of Barak Valley, the valley along the river Barak that covers the three southernmost districts of Assam state, India viz. Cachar, Karimganj and Hailakandi.

MATERIAL AND METHODS:

The sample of this cross-sectional study comprised of 914 apparently healthy non-athlete Meitei boys ranging their age from 12 to 18 years selected from nine Meitei dominated localities of the three southernmost districts of Assam state (India). A non-athlete was defined as an individual who had limited, sporadic recreational involvement in sports. Special care was taken to avoid anybody who had been practicing and competing regularly under the auspices of a coach or trainer prior to the present tests. 460 of the boys belong to affluent families and 454 to non-affluent families. The type of schools attended by the subjects provide a basic clue to socio-economic stratification (McMurray et al. 2002; Prista et al. 2003) .The parents who cannot afford to educate their children in expensive schools normally send their children to government schools which provide practically free education. Hence, it is reasonable to assume that the students of government schools are represented by those who come from lower socio-economic strata of the society. To verify this expectation, a questionnaire pro forma (Townsend et al. 1998)

was completed by the parents of the subjects to assess socio-economic status indicators: educational level, occupation and income of the parents, family size, other sources of family income and the quality of health care and access to medical services. All the boys belonging to non-affluent families were studied in the government schools whereas the boys in the affluent group studied in the mission schools and public schools. The parents of affluent boys consist of high ranking government officers of different statuses, doctors, advocates, engineers, college teachers, merchants, etc. The parents of non-affluent boys comprise cultivators, carpenters, blacksmiths, retail traders, small-scale hotelieries, unskilled labourers, low grade government employees, unemployed, etc. and the deceased. Peak adolescent growth spurts pertaining to height and weight were found during 14 and 15 years in both the boys groups.

The Meiteis are predominantly Mongoloid but in no way homogenous. Caucasoid and Australoid racial elements are also found among them. The present day Meiteis are mostly Hindu by religion. Mass proselytation of the Meiteis into Hinduism during the early part of 18th century has contributed a good deal of share in the biological and cultural complexity of the present day Meiteis. Hinduised Meitei society is divisible into two main sections, such as the Brahmins and the Kshatriyas. There are, of course, sizeable numbers of revivalist who follow pre-Hindu beliefs and practices. Predominance of Caucasoid characters is observed among the Brahmins whereas the more populous Kshatriyas and others are predominantly Mongoloid. Social proscription of inter-marriage between the Brahmin and non-Brahmin is now on the wane. In the present study, the Brahmins were excluded from the sample so as to minimize racial influence in the data.

Height, weight, distal humerus and femur bone diameters, biceps and calf girths, skinfolds at triceps, subscapular, calf and supraspinal sites were obtained for each subject using standard instruments and following the techniques described by Carter (1982). All the measurements were taken in well-lit and well-ventilated rooms within the school premises during regular school hours by the author. Anthropometric somatotype method of Carter and Heath (1990) was used to estimate somatotype ratings. Somatotype Attitudinal Distance (SAD) and Somatotype Attitudinal Mean (SAM) were also calculated.

RESULTS AND DISCUSSION:

Table 1 demonstrates that somatotype ratings, viz., endomorphy, mesomorphy and ectomorphy do change with age during 12 to 18 years in both the affluent and non-affluent Meitei boys. The age-wise somatotypes plotted onto two-dimentional somatochart indicates that the somatotypes are scattered and do not follow regular pattern.

Peak adolescent growth spurts pertaining to height and weight were found during 14 and 15 years in both the socio-economic groups and no distinctive change in somatotype components corresponding to adolescent growth spurt has been observed. In case of the affluent boys, maximum value of endomorphic component has been seen at 16 years (2.7) and minimum (2.4) twice at 12 and 15 years. Among the non-affluent boys, maximum endomorph rating (2.5) has been observed at 16 years and minimum (2.2) at 12, 13 and 15 years.

In general, the affluent boys were more endomorphic than the non-affluent counterparts and t - values revealed statistically significant differences at all ages. Among the affluent boys maximum mean mesomorphic

Table 1: Mean and standard deviation of somatotype variables of the affluent and non-affluent Meitei boys by age group and 't' value for comparison

Age (in years)	N	Endomorphy	t-value	Mesomorphy	t-value	Ectomorphy	t-value	SAM	t-value
12	AF = 65 NA= 64	2.4 ± 0.54 2.2 ± 0.43	2.58*	3.1 ± 0.39 3.2 ± 0.36	1.57	3.5 ± 0.59 3.8 ± 0.36	3.73**	0.85 ± 0.37	1.65
13	AF = 64 NA= 65	2.5 ± 0.60 2.2 ± 0.52	4.71**	3.3 ± 0.38 3.4 ± 0.44	1.51	3.7 ± 0.41 3.9 ± 0.39	2.49*	0.71 ± 0.43	1.69
14	AF = 66 NA= 65	2.6 ± 0.55 2.3 ± 0.59	3.26**	3.3 ± 0.39 3.5 ± 0.42	2.74*	3.7 ± 0.42 3.9 ± 0.57	2.54*	1.18 ± 0.41	1.72
15	AF = 60 NA= 66	2.4 ± 0.47 2.2 ± 0.59	3.07*	3.3 ± 0.38 3.6 ± 0.58	3.83**	4.1 ± 0.57 4.1 ± 0.49	0.53	1.01 ± 0.43	1.73
16	AF = 69 NA= 65	2.7 ± 0.49 2.5 ± 0.59	2.58*	3.3 ± 0.65 3.5 ± 0.53	2.69*	4.0 ± 0.49 4.0 ± 0.51	0.61	1.42 ± 0.43	1.76
17	AF = 67 NA= 65	2.5 ± 0.54 2.3 ± 0.49	3.01**	3.4 ± 0.50 3.5 ± 0.59	1.61	4.2 ± 0.52 4.3 ± 0.58	1.48	1.18 ± 0.52	1.71
18	AF = 69 NA= 64	2.5 ± 0.48 2.3 ± 0.47	3.04**	3.3 ± 0.56 3.4 ± 0.51	1.49	4.1 ± 0.49 4.3 ± 0.48	2.79*	1.14 ± 0.88 0.98 ± 0.47 0.89 ± 0.53 0.80 ± 0.47 1.24 ± 0.60 1.03 ± 0.48 1.12 ± 0.53 1.13 ± 0.49	0.89
Total	AF = 460 NA= 454	2.6 ± 0.71 2.3 ± 0.56	9.81**	3.3 ± 0.57 3.4 ± 0.49	2.01	4.0 ± 0.59 4.2 ± 0.55	4.11**	1.11 ± 0.55 0.98 ± 0.49	4.23**

*AF = Affluent Meitei boys; NA = Non-affluent Meitei boys; p < 0.05 * ; p < 0.01 ***

Rating, 3.4, has been found at 17 years, and minimum rating of 3.1 at 12 years. In the non-affluent boys, the maximum mesomorphic rating, 3.6, has been shown by 15 years and minimum, 3.2, by 12 years age class. Results of t - values showed significant differences in regard to mesomorphy between the two groups at the ages 14, 15, and 16 years. The affluent boys have shown ectomorphic values ranging from 3.5 to 4.2 represented by the age class 12 years (the minimum) and 17 years (the maximum) respectively. In this component, the non-affluent boys have displayed a maximum value of 4.3 at age classes 17 and 18 years and minimum value, 3.8 at age class 12 years. The non-affluent boys have larger ectomorphic values than the affluent counterparts at all ages except 15 and 16 years where equal ectomorphic rating of 4.1 and 4.0 respectively have been observed among the affluent and non-affluent boys groups. Statistical differences in this component were observed at four stages – during 12, 13, 14 and 18 years. Considering the mean of all the ages together, the ratings of endomorphy, mesomorphy, and ectomorphy among the affluent boys were found to be 2.6, 3.3, and 4.0 respectively while those of the non-affluent boys were 2.3, 3.4, and 4.2 in the same order. Virtually no differences were noted in mesomorphy between the two groups. Differences in endomorphy and ectomorphy were significant. The average somatotypes of both the affluent and non-affluent non-athlete Meitei boys were categorically mesomorphic ectomorph i.e., (2.6 – 3.3 – 4.0) and (2.3 – 3.4 – 4.2) respectively. In the affluent boys, somatotype has changed from mesomorph-ectomorph during 12 to 15 years, to mesomorphic ectomorph during 16 to 18 years. The non-affluent boys belonged to mesomorph-ectomorph (during 12 to 16 years) and mesomorphic ectomorph (during 17 and 18 years).

Single component analyses, however, fails to take into account component dominance. Three-dimensional analysis of somatopoints rectify this shortcoming. In three-dimensions, the distance between any two somatopoints is called the somatotype attitudinal distance (SAD), while the average distance of each point from the mean is known as the somatotype attitudinal mean (SAM). Two groups of the boys classed by age did not differ from each other with regard to the dispersion about their means (SAM). But when total samples were considered, the differences

between the SAMs were significant. Three levels of homogeneity were established by Carter et al. (1997): elevated distance, SAM ≥ 1.0; moderate distance, SAM = 0.80 – 0.99; and reduced distance, SAM ≤ 0.79. Among the affluent boys, 38.2% of cases were classified as elevated distance, 50.8% of cases as moderate distance, and 11.0% of cases as reduced distance, whereas among the non-affluent boys, 32.6% of the cases were classified as elevated distance, 46.3% as moderate distance, and 21.1% as reduced distance.

A difference of 0.5 unit in somatotype rating is considered to be of practical significance (Bailey et al. 1982). Using this criterion, the present non-affluent boys are less endomorphic than the affluent boys. However, these two groups are statistically different in endomorphy and ectomorphy components in most of the age classes. Comparatively, higher rate of consumption of protein and fat-rich foods coupled with less physical activities is the possible reason for heavier adipose tissue and consequently more endomorphic ratings of the affluent boys than non-affluent boys. Since endomorphy refers to relative fatness and ectomorphy is largely based on the height/weight relationship which would also be influenced by fat as a component of weight, low ratings for endomorphy and high ratings for ectomorphy would be expected in the non-affluent boys. The tendency towards higher ectomorphic ratings among the non-affluent boys could also be explained that they have experienced caloric inadequacy in their diets, thus, exhibiting greater linearity.

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