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Somatotypic Variations: An Analysis of Some Traditional Occupations

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ABSTRACT Somatotype variations among adult men of Punjab belonging to four different Occupational Groups, viz., Tailors, Farmers, Carpenters and Blacksmiths have been investigated. A cross-sectional sample of 800 subjects (200 of each group) ranging in age from 30-40 years, was measured from April, 2002 to January, 2004 from different areas of Punjab. The Heath-Carter Anthropometric Somatotype (1967) is 4.5-3.1-2.8 for Tailors, 4.0-3.4-2.8 for Carpenters and 4.5-3.3-2.9 for Blacksmiths thus pointing towards meso-endomorphic dominance of physique. Farmers represent central type of body physique with somatotype as 2.9-3.2-3.6. Musculo-skeletal development is more prominent in Carpenters whereas Tailors and Blacksmiths reflect relatively more amount of non essential fat. The Farmers physique is more diverse as reflected by the higher value of SDM which is 4.87±2.81. Inter-Group differences for endomorphy component are found to be relatively more than those for ectomorphy and mesomorphy component of somatotype.

INTRODUCTION

Somatotyping is a well established and excellent tool to explore the spatial temporal variations in human body form and to monitor the effects of physical exercise on human body physique (Singh and Malhotra, 1989; Carter and Heath, 1990; Carter, 1996 and Kaul et al., 1996). Moreover it combines an appraisal of relative adiposity, musculoskeletal robustness and linearity into a three number rating (Carter, 1997). Somatotype distribution in various ethnic groups are markedly more restricted and dominated by extreme somatotype than the nationality samples. Studies reveal that Eskimos (Alaska) are primarily endo-mesomophic, Manus (Papua New-Guinea) and Caingang (Brazil) presents conspicuously mesomorphic somatotypes with extremes towards mesomorphy (Heath et al., 1968; Heath, 1973, 1977; Carter and Heath, 1990). Strikingly ectomorphic somatotype is shown by Nilotes of the Nile valley in Africa (Roberts and Bainbridge, 1963) and many population groups living in hot environments of the tropics.

Apparent somatotypic differences that have been observed at the highest levels of sport studies are due to sex, level of competition, race-ethnicity and age of the competitors (Meszaros and Mohacsi, 1982; Stepnicka, 1986). Further it has been found that generalized descriptions of physique such as somatotype differentiate occupational groups are more clearly than separate dimensions and observed that the evidence favour selection and adaptation over occupational influences. Job requires specific patterns of physique and temperament for success, such patterns varying in strictness and in detail with the nature of job (Damon and Mcfarland, 1955). The present study has been conducted with a view to highlighting the somatotype variations in adult men of Punjab belonging to four different occupational groups i.e. Tailors, Farmers, Carpenters and Blacksmiths.

MATERIAL AND METHODS

The present cross-sectional investigation has been conducted on four traditional occupational groups of Punjab such as Tailors, Farmers, Carpenters and Blacksmiths. A total of 800 adult males (200 each group) ranging in age from 30 to 40 were measured anthropometrically from April, 2002 to January, 2004 from various urban and rural areas of Punjab.

Somatotypes have been determined by using the Heath-Carter anthropometric somatotype method (Heath and Carter, 1967 and Carter,

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Table 1: Somatotype components in traditional occupational groups

Components	*Tailors Mean±S.D.*	*Farmers Mean±S.D.*	*Carpenters Mean±S.D.*	*Blacksmiths Mean±S.D.*
Endomorphy	4.51±1.27	2.95±1.08	4.09±1.11	4.50±1.21
Mesomorphy	3.12±1.31	3.24±1.43	3.46±1.42	3.39±1.31
Ectomorphy	2.85±1.39	3.67±1.63	2.89±1.49	2.99±1.36
SDM	4.47±2.58	4.87±2.81	4.76±2.56	4.40±2.32
SAM	2.04±1.04	2.13±1.14	2.11±0.99	2.04±0.93

SDM-Somatotype Dispersion Mean, SAM-Somatotype Attitudinal Mean

1975). The anthropometric measurements for calculating somatotypes were taken following the techniques given by Lohman et al. (1988). Endomorphy is adjusted to height as suggested by Hebbelinck et al. (1973). Somatotype dispersion mean (SDM) and somatotype differences (t-values) between Tailors, Farmers, Carpenters and Blacksmiths, for three somatotype components are also calculated.

RESULTS AND DISCUSSION

Somatotype ratings of Tailors, Farmers, Carpenters and Blacksmiths are 4.5-3.1-2.8, 2.9-3.2-3.6, 4.1-3.4-2.8 and 4.5-3.3-2.9 respectively (Table 1). Out of all the four occupational groups, Farmers show diverse type of body physique such that more development towards linearity side. Tailors and Blacksmiths have mesomorphic endomorphs type of body physique (Fig.1). The value of endomorphy component is higher in both Tailors and Blacksmiths thus suggesting the greater development of non-essential fat in their body build. The mesomorphic component of the somatotype is found to be higher in Carpenters followed by Blacksmiths, which indicates the better musculo-skeletal development in them, which may be due to involvement in heavy habitual physical work. Mean somatoplot of the Farmers lie more towards the center of the triangle of somatochart. Similarly, Framers possess minimum value for endomorphy and Tailors for both mesomorphy and ectomorphy. Minimum fat mass is advantageous for farming like occupation as it helps to move properly in the fields to perform various agricultural activities. On the other hand better musculo-skeletal development in both Carpenters and Blacksmiths help in carrying out heavy loads. Physical activity seems to play a vital role in influencing the development of total body form. It has been observed that sedentary activities generally have a little higher endomorphic rating than that for the persons involved in heavy physical work. This may be due to physical activity playing a role in restricting the endomor-phic component to a certain extent. (Kumar et al., 1997).

Koeva et al. (2002) reported that mesomorphic endomorphs most frequently suffered from digestive system diseases, neurosis and rediculitis lumbosacralis whereas prevalence of arterial hypertension in mesomorphic endomor-phs, endomorphic mesomorphs and mesomorphic endomorphs is almost same.

The differences of first component of somatotype (Endomorphy) are found to be statistically significant among all groups except Tailors vs. Blacksmiths (Table 2) which shows that all the groups have different specific fat patterns.

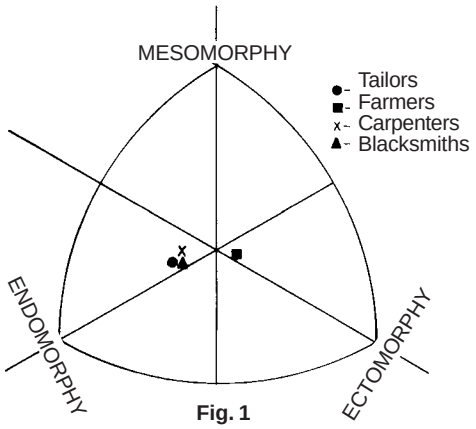

Fig. 1

Table 2: Statistical differences (t-values) between tailors, farmers, carpenters and blacksmiths

Occupational group	*Endo-morphy*	*Meso-morphy*	*Ecto-morphy*
Tailors/Farmers	13.68*	0.89	5.76*
Tailors/Carpenters	3.68*	2.52*	0.29
Tailors/Blacksmiths	0.08	2.12*	1.09
Farmers/Carpenters	11.51*	1.55	5.24*
Farmers/Blacksmiths	14.58*	1.11	4.78*
Blacksmiths/Carpenters	3.85*	0.52	0.74

* $p < 0.05$

In case of second component of somatotype (Mesomorphy), the differences are statistically significant between Tailors vs. Carpenters (t=2.52) and Tailors vs. Blacksmiths (t=2.12) only (Table 2). However, Third component (Ectomorphy) of somatotype shows statistically significant differences between Tailors vs. Farmers (t=5.76), Farmers vs. Carpenters (t=5.24) and Farmers vs. Blacksmiths (t=4.78). Somatotype Dispersion Mean (SDM) and Somatotype Attitudinal Mean (SAM) are useful in knowing about the distributions of somatotypes in a group from its mean somatotype in two and three dimensions. In the present study maximum and minimum mean values of SDM (Table 1) are observed in Farmers (4.87±2.81) thus indicating more dispersion in Farmers group as compared to its counterparts. However, mean values of SAM differ much in all the occupational groups and lies in the range of 2.04-2.11.

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