

Age Related Variations in Endomorphic, Mesomorphic and Ectomorphic Components of Somatotype in Urban Women of Punjab

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ABSTRACT:

Somatotyping is an effective technique for study of anthropometric variations in any population. The present study was conducted on a sample of 300 healthy urban women of age 50-80 years, subdivided into six age groups. Somatotypes were computed according to the equation given by Carter (1980). The results show a dominance of endomorphic component over the other two somatotype components, having maximum endomorphic values for the women in the age group of 56-60 years (8.23). Minimum and maximum ectomorphic values were observed at the age group of 50-55 years (0.62) and 71-75 years (1.73) respectively. Minimum mesomorphic values are at the age group of 71-75 years i.e. 3.09. A maximum mesomorphic value is observed at the age group of 56-60 years (4.71). Maximum scattering of individual somatotype was found in 56-60 years of age group as indicated by maximum values of SDM and SAM.

Keywords: Somatotype, Anthropometry, Ageing, Endomorphy, Ectomorphy, Mesomorphy

INTRODUCTION:

Aging is associated with significant variations of body size, structure, proportion and composition (Arking, 1998). The biology of aging predicts loss of stature, decrease in weight, change in skin texture and loss of muscle tissue. It is attributed to the effects of age on

adipose tissue thicknesses which decrease in arms and legs (Young et al., 1963; Enzi et al., 1987) but increases on trunk region (Enzi et al., 1987; Borkan et al., 1985; Baumgartner et al., 1989). Therefore skinfolds and circumference measurements changes with age (Friedlander et al., 1977; Noppa et al., 1980). Variations in the human body physique have been always an important topic of interest in the human population studies. Visual appraisal has been often used to describe individuals as thin (ectomorphic), muscular (mesomorphic) and fatty (endomorph). To understand these variations, WHO (1995) formulated the universally applicable, non-invasive and inexpensive method “Anthropometry”. Somatotype has been often used to study morphometric variations as it describes the physical characteristics of the human body and allows a definition of body type through analyses of anthropometric characters. Number of studies has summarized the information related to somatotype changes and yielded much useful information about human physique (Singh and Sidhu, 1980; Singal and Sidhu, 1984; Singh, 2010). Regional differences show that Indians, like the Canadians, become more meso-endomorphic from their 20’s to their 40’s but less so thereafter and further highlights the largest age difference in somatotype between 20’s and 30’s in Indian population. The aim of this study is to describe age related variations of somatotype in a cross-sectional sample of 300 healthy urban women of Punjab.

MATERIAL AND METHOD:

The present cross-sectional study was conducted on 300 urban house wives ranging in age from 50 to 80 years, of Punjab state including Amritsar, Bathinda, Faridkot, Ferozepur, Ludhiana, Moga, Patiala and Sri Mukatsar Sahib Districts. Subjects were divided into six age groups (50-55 years; 56-60 years; 61-65 years; 66-70 years; 71-75 years; 76-80 years) and measured anthropometrically by following the methodology of Lohman et al. (1988). All the procedures and protocols were approved by Institutional clinical ethical committee (ICEC) of Punjabi university, Patiala. All the three primary components of physique (Endomorphy, Mesomorphy and Ectomorphy) were calculated using equations given by Carter (1980). Somatotype dispersion mean (SDM) and Somatotype attitudinal mean (SAM) for three somatotype components were also calculated.

RESULTS

Somatotype components i.e. endomorphy, mesomorphy and ectomorphy in urban women are displayed in Table 1, Figure 1. Somatotype ratings of different age groups are 6.75-4.41-0.62 (50-55 years), 8.23-4.71-0.88 (56-60 years), 6.16-4.12-0.91 (61-65 years), 6.414-4.06-0.82

(66-70 years), 5.28-3.09-1.37 (71-75 years) and 5.41-3.18-1.17 (76-80 years). Maximum value of endomorphy is observed in the age group of 56-60 years (8.23). Minimum mesomorphic values are at the age group of 71-75 years i.e. 3.09. A maximum mesomorphic value is observed at the age group of 56-60 years (4.71). Minimum ectomorphic value is observed at the age group of 50-55 years (0.62) and maximum at 71-75 years (1.37). Somatotype Distributions (Table 2) provide the information about the magnitude of dispersion or scatter of somatotypes about their mean values in two and three dimensions. The mean values of SDM for urban women are 6.54, 7.41, 5.71, 6.06, 4.77, 4.58 for all the age groups from 50-55 years till 76-80 years. 56-60 years of the age group possess maximum value for SDM among all the age groups. Somatotypes attitudinal mean values lie in the range of 1.92 to 3.32. However, maximum dispersion of somatotypes about their mean value has been observed in 56-60 years of the age group.

DISCUSSION:

Results indicate that all the age groups in urban women dominate in endomorphy in comparison to its sister components (Table 1, Figure 1). Higher values of endomorphy indicate a predominance of body fat, which may be due to their sedentary life style. Kumar et al. (1997) also reported that sedentary activities generally have little higher endomorphic values than for the persons involved in heavy and hard physical labor. Habitual physical activity plays a significant role in restricting the endomorphic component to a certain extent. According to Bailey et al. (1982) at ages over and under 40 obese and diabetic females were significantly more endomorphic. The general conclusion that somatotype ratings change with the age and physical activity (Hunt & Barton, 1959; Barton & Hunt, 1962) is applicable to these Indian populations too. The present study shows that the somatotype ratings continue to change after 50 years of age. Bufa et al. (2005) somatyped healthy 146 women divided into 60–69 years; 70–79 years and 80–89 years of the age groups and found endo- and mesomorphic components to be dominant in the elderly subjects, with less development of ectomorphy than in younger individuals and depict strong development of endomorphy with lower ectomorphic component. Study also showed significant age-related variations. A comparative picture of the present study with other populations is given in Table 3, it indicates that urban women are less endomorphic than the Bania females except at the age group of 56-60 years where urban are more endomorphic (Singal and Sidhu, 1984).

Conclusion:

It has been concluded from the present study that urban women are taller and heaviest at the age group of 50-55 years. Urban women of all age groups dominate in endomorphy in comparison to its sister components. Endomorphy and mesomorphy components of somatotype decreases with age.

REFERENCES:

- Arking R (1998). *Biology of aging*. Sunderland, MA: *Sinauer Associates, Inc.*
- Bailey DA, Carter JEL and Mirwald R (1982). Somatotype of Canadian men and women. *Human Biology*; 54:813-828.
- Barton WH and Hunt EE (1962). Somatotype and adolescence in boys. *Hum. Biol*; 34: 254-270.
- Baumgartner RN, Heymsfield SB, Roche AF and Bernardino M (1989). Quantification of abdominal composition by computed tomography. *Am. J. Clin. Nutr* ; 50:221-6.
- Borkan GA, Hulth DE, Gerzof SG and Robbins AH (1985). Comparison of body composition in middle aged and elderly males using computed tomography. *Am. J. Phys. Anthropol*; 66:289-95.
- Buffa R, Succa V, Garau D, Marini E and Floris G (2005). Variations of Somatotype in elderly Sardinians. *Am. J. Hum. Biol*; 17:403-411.
- Carter JEL (1980). *The Heath-Carter Somatotype Method*. SDSU Syllabus Service, San Diego.
- Enzi G, Gasparo M, Biondetti PR, Fiore D, Semisa M and Zurlo F (1987). Subcutaneous and visceral fat distribution according to sex, age, and overweight, evaluated by computed tomography. *Am. J. Clin. Nutr*; 45:7-13.
- Friedlander JS, Costa PT, Bosse R, Ellis E, Rhoads JG and Stoudt HW (1977). Longitudinal Physique changes among health white veterans at Boston. *Hum. Biol*; 49:541-58.
- Hunt EE and Barton WH (1959). The inconstancy of physique in adolescence of boys and other limitations of somatotyping. *Amer. J. Phys. Anthropol*; 17: 27- 36.
- Kumar V, Kapoor AK and Tiwari SC (1997). Physical activity and somatotypic evaluation of Bengali Kaystha boys of Delhi. *Ind. J. Sport Sc. Phy. Ed*; 9(182): 41-51.
- Lohman TG, Roche AF and Marforell ER (1988). *Anthropometric Standardization Reference Manual*. *Human Kinetics: Campaign, IL*.
- Noppa H, Andersson M, Gengtsson C, Bengtsson C, Bruce A and Isaksson B (1980). Longitudinal studies of anthropometric data and body composition: the population of women in Goteborg, Sweden. *Am. J. Clin. Nutr*; 33:155-62.
- Singal P and Sidhu LS (1984). Age changes and comparison of somatotypes during 20 to 80 years in Jat-Sikh and Bania females of Punjab (India). *AnthropologiaAnzeiger*; 42:281.

Singh A (2010). *Morphometric analysis and Traditional occupations: Somatotype and Proportionality profiles of adult males of same traditional occupational groups of Punjab, India*. Lambert Academic Publishing.Gmbh and Co. KG. Printed by Schaltungsdienst Lange. O.H.G., Berlin, 1-52.

Singh SP and Sidhu LS (1980).Changes in somatotype during 4-20 years in Gaddi Rajput boys.*Zeitschrift Fur Morphologic and Anthropologic*; 71:285-293.

WHO (1995). *Physical Status: The Use and Interpretation of Anthropometry*. Report of an Expert Committee.WHO, Geneva.

Young CM, Blondin J, Tensuan R and Fryer JH (1963). Body composition studies of “older” women, thirty to seventy years of age. *Ann. NY Acad. Sci*; 110:598-607.

Table 1:Trends in Somatotype Components of Urban Women.

| Age Group (Years) | | 50-55 | 56-60 | 61-65 | 66-70 | 71-75 | 76-80 |
|-------------------|------|-------|-------|-------|-------|-------|-------|
| Endomorphy | Mean | 6.75 | 8.23 | 6.16 | 6.14 | 5.28 | 5.41 |
| | SD | 1.26 | 1.64 | 1.43 | 1.44 | 1.25 | 0.99 |
| | SEM | 0.17 | 0.23 | 0.20 | 0.20 | 0.17 | 0.14 |
| Mesomorphy | Mean | 4.41 | 4.71 | 4.12 | 4.06 | 3.09 | 3.18 |
| | SD | 1.71 | 2.13 | 1.59 | 1.93 | 1.66 | 1.20 |
| | SEM | 0.24 | 0.30 | 0.22 | 0.27 | 0.23 | 0.17 |
| Ectomorphy | Mean | 0.62 | 0.88 | 0.91 | 0.82 | 1.37 | 1.17 |
| | SD | 0.73 | 1.01 | 1.30 | 1.15 | 1.27 | 0.95 |
| | SEM | 0.10 | 0.14 | 0.18 | 0.16 | 0.18 | 0.13 |

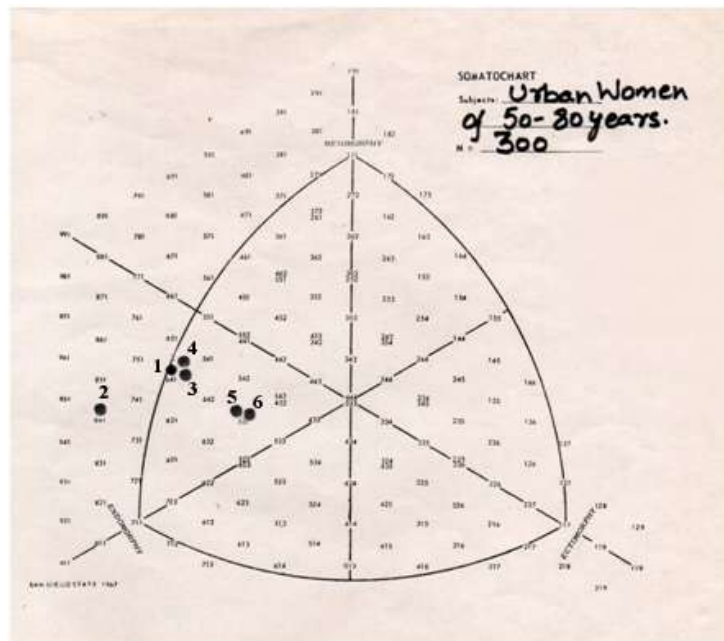
Table 2: Trends in Somatotype Distribution in Urban Women.

| Age Group (Years) | | 50-55 | 56-60 | 61-65 | 66-70 | 71-75 | 76-80 |
|-----------------------------|------|-------|-------|-------|-------|-------|-------|
| Somatotype Dispersion Mean | Mean | 6.54 | 7.41 | 5.71 | 6.06 | 4.77 | 4.58 |
| | SD | 3.63 | 4.26 | 3.26 | 3.51 | 2.67 | 2.61 |
| | SEM | 0.51 | 0.60 | 0.46 | 0.49 | 0.37 | 0.37 |
| Somatotype Attitudinal Mean | Mean | 2.81 | 3.32 | 2.44 | 2.59 | 2.02 | 1.92 |
| | SD | 1.56 | 1.92 | 1.38 | 1.50 | 1.13 | 1.09 |
| | SEM | 0.22 | 0.27 | 0.19 | 0.21 | 0.16 | 0.15 |

Table 3: Comparative analysis of somatotype components of Bania females of Singal and Sidhu (1984) with urban women of present study

| Singal and Sidhu (1984) | | | | Present Study | | | |
|-------------------------|---------------|------------|------------|------------------|-------------|------------|------------|
| Age groups (yrs) | Bania Females | | | Age groups (yrs) | Urban Women | | |
| | Endomorphy | Mesomorphy | Ectomorphy | | Endomorphy | Mesomorphy | Ectomorphy |
| 50-54 | 7.42 | 4.14 | 1.80 | 50-55 | 6.75 | 4.41 | 0.62 |
| 55-59 | 7.19 | 4.09 | 1.37 | 56-60 | 8.23 | 4.71 | 0.88 |
| 60-64 | 7.26 | 4.19 | 1.65 | 61-65 | 6.16 | 4.12 | 0.91 |
| 65-69 | 6.74 | 3.98 | 1.70 | 66-70 | 6.14 | 4.06 | 0.82 |
| 70+ | 5.72 | 3.74 | 1.96 | 71-75 | 5.28 | 3.09 | 1.37 |

Somatochart



(1 = 50-55 yrs; 2 = 56-60 yrs; 3 = 61-65 yrs; 4 = 66-70 yrs; 5 = 71-75 yrs; 6 = 76-80 yrs)

Figure 1: Mean Somatochart of 50 – 80 years of urban women