Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2016; 4(10A):3593-3596 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjams.2016.v04i10.010

Original Research Article

Study of Somatotypes in students of western Maharashtra Population by Anthropometric Method

Dr Manohar Namdeo Ughade[1], Dr Jaideo Manohar Ughade[2], Dr Poorwa Baburao Kardile[3]
[1]Professor and Head, Department of Anatomy, ACPM Medical College, Dhule, Maharashtra
[2]Associate Professor, Late Shri Lakhiram Agarwal Memorial Government Medical College, Raigarh, Chattisgarh
[3]Assistant Professor, Shri Vasantrao Naik Government Medical College, Yavatmal, Maharashtra

***Corresponding author**
Dr Manohar Namdeo Ughade
Email: drjaideoughade@gmail.com

Abstract: Somatotype though a method of describing various human forms in three numbers. It gives rough idea about the physique of the individual and variation in muscle and skeletal mass. The study was done to evaluate the student of western maharshtra region by this method. This study was comparable with the more such Indian studies. The numbers established by such studies was beyond comparable range. The range of numerical also had to be adjusted with Indian studies. The regression formulae were also derived from this study so that endomorphy, mesomorphy and ectomorphy components can be established from minimum measurements. The above study was first of its kind in establishing numbers of somatotype in western Maharashtra students. This study can be further useful in improving various sports skills and athletism.
Keywords: Somatotype, Endomorphy, Mesomorphy, Ectomorphy.

INTRODUCTION:

Somatotyping is the method of describing precisely the human form and its variations. Sheldon put forth the concept of somatotyping, stating that somatotype consist of three morphological components i.e. endomorphy, mesomorphy and ectomorphy in varying quantities which he expressed by giving three numericals [1]. Each numerical standing for each component. Example, 3, 2, 5, is the somatotype where numeral 3 stands for endomorphy which signifies relative massive digestive organ and soft roundedness of the body. Numeral 2 stands for Mesomorphy which means relative predominance of muscles, bones and connective tissues. Numeral 5 stands for ectomorphy which signifies the relative predominance of linearity of Somatotype. For each component Sheldon used the rating numerals between 1 to 7. His method required three viewed photograph of each individual. Many workers extended his work to different population but found difficulties.

Robert and Brainbridge found difficulty in rating Nelotics [2]. Tanner found difficulties in rating Mesomorphy in athletics of British. Tanner found difficulties in rating Mesomorphy in athletics of British [3]. In India, Berry and Deshmukh worked on Sheldon's method. They checked their ralities by Tanner and found the difference in Mesomorphy of 1 to $1^1/_2$ points [4]. Parnell worked on Sheldon's method and constructed M-4 chart to objectify ratings of each components [5]. Haronian and Sugarman objected M-4 chart for Mesomorphy [6].

Heath and Carter introduced the new method with modifications and adaptations of H-C chart in such a way that the ratings for each components were similar to that of Sheldon's method but extended to both ends i.e. less than 1 and more than 7 and not limited between 1 to 7 [7].

MATERIAL AND METHODS

65 male medical students between age group of 17 to 24 years were selected for present study from medical college. They were clinically normal. The following measurements were taken in each individual with the help of UNA caliper, sliding caliper, weighing machine (Lever type) and the measuring tape.

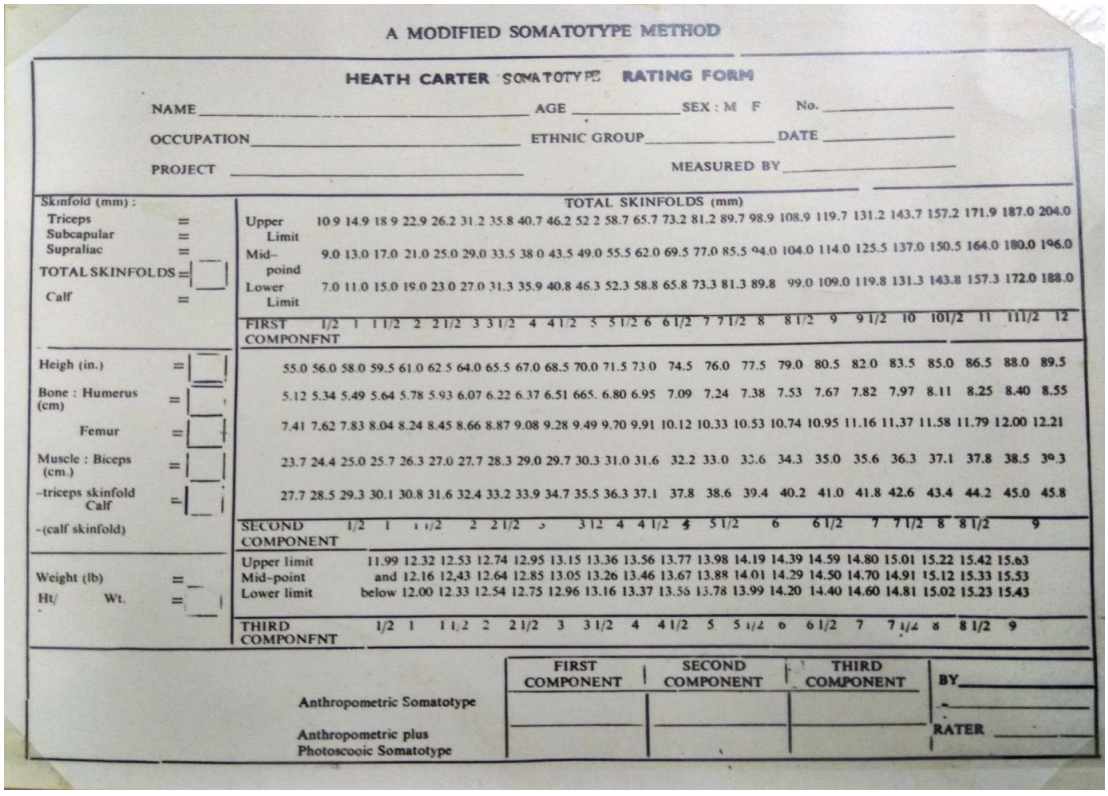
The following skinfold measurement in mm was taken with the help of UNA caliper by adjusting it for constant pressure of 10 gm/sq mm.

1. Triceps Skin fold: Taken between olecranon and acromion process, on the dorsum of left arm, on a skinfold running parallel to its long axis, in hanging position of the arm.
2. Subscapular skin fold: Taken on a skin fold running upward and medially from the inferior angle of the scapula, on left side.
3. Supra iliac skin fold: Taken on a skinfold running vertically, just above the tubercle of the ilac crest on left side.
4. Calf skin fold: Take on skinfold, in a line with medial mallelous on the maximum circumference of calf girth, on the left side.
5. Biepicondylar diameter of Humerus: It was recorded in centimetres by applying the sliding caliper to the epicondyles of left humerus.
6. Biepicondylar diameter of Femur: It was recorded in centimetres by applying the sliding caliper to the epicondyles of left femur.
7. Biceps girth: It was recorded in centimetres by applying the measuring tape to the maximum girth of left arm in flexed position.
8. Calf girth: It was recorded in centimetres by applying the measuring tape to the maximum girth of left calf in sitting position.
9. Height: It was recorded in inches and tenths, against the wall scale in standing position bare foot.
10. Weight: It was recorded in pounds and tenths on the weighing machine bare foot.

Procedure for obtaining anthropometric somatotype:

All the measurements of each individual were recorded in H-C rating form.

1. To obtain the first component ratings, the sum of the triceps, subscapular and supra iliac skin folds were done. The closest value of the sum was circled in F scale of the above chart. The rating value of the first component was found out below this column.
2. To obtain the second component ratings, first the height was marked in the height scale (first row); the nearest value of biepicondylar diameter of humerus was circled in the second row. Similarly the closest value of biepicondylar diameter of femur was circled in third row. Triceps skin fold was substracted from biceps girth and calf skin fold was substracted from calf girth. Corrected obtained values were circled in the fourth and fifth rows respectively. The average of the circled figure was marked by star shaped sign. Then the number columns were counted from the height whether the average deviates to the right or left from the four in the second component ratings and the rating value was circled for second component.
3. To obtain the third component ratings, Height divide by cube root of weight ratio was found out from normographs. It was recorded in H-C chart and the value for this was circled. This was the rating value for the third component.


A MODIFIED SOMATOTYPE METHOD

HEATH CARTER SOMATOTYPE RATING FORM

NAME _____ AGE _____ SEX : M F No. _____

OCCUPATION _____ ETHNIC GROUP _____ DATE _____

PROJECT _____ MEASURED BY _____

Skinfold (mm) :
Triceps =
Subcapular =
Supraliac =
TOTAL SKINFOLDS =
Calf =

TOTAL SKINFOLDS (mm)

Upper Limit 10.9 14.9 18.9 22.9 26.2 31.2 35.8 40.7 46.2 52.2 58.7 65.7 73.2 81.2 89.7 98.9 108.9 119.7 131.2 143.7 157.2 171.9 187.0 204.0
Mid-point 9.0 13.0 17.0 21.0 25.0 29.0 33.5 38.0 43.5 49.0 55.5 62.0 69.5 77.0 85.5 94.0 104.0 114.0 125.5 137.0 150.5 164.0 180.0 196.0
Lower Limit 7.0 11.0 15.0 19.0 23.0 27.0 31.3 35.9 40.8 46.3 52.3 58.8 65.8 73.3 81.3 89.8 99.0 109.0 119.8 131.3 143.8 157.3 172.0 188.0

FIRST COMPONENT 1/2 1 1 1/2 2 2 1/2 3 3 1/2 4 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2 9 9 1/2 10 10 1/2 11 11 1/2 12

Heigh (in.) =
Bone : Humerus (cm) =
Femur =
Muscle : Biceps (cm.) =
-triceps skinfold =
Calf
-(calf skinfold)

55.0 56.0 58.0 59.5 61.0 62.5 64.0 65.5 67.0 68.5 70.0 71.5 73.0 74.5 76.0 77.5 79.0 80.5 82.0 83.5 85.0 86.5 88.0 89.5
5.12 5.34 5.49 5.64 5.78 5.93 6.07 6.22 6.37 6.51 665. 6.80 6.95 7.09 7.24 7.38 7.53 7.67 7.82 7.97 8.11 8.25 8.40 8.55
7.41 7.62 7.83 8.04 8.24 8.45 8.66 8.87 9.08 9.28 9.49 9.70 9.91 10.12 10.33 10.53 10.74 10.95 11.16 11.37 11.58 11.79 12.00 12.21
23.7 24.4 25.0 25.7 26.3 27.0 27.7 28.3 29.0 29.7 30.3 31.0 31.6 32.2 33.0 32.6 34.3 35.0 35.6 36.3 37.1 37.8 38.5 39.3
27.7 28.5 29.3 30.1 30.8 31.6 32.4 33.2 33.9 34.7 35.5 36.3 37.1 37.8 38.6 39.4 40.2 41.0 41.8 42.6 43.4 44.2 45.0 45.8

SECOND COMPONENT 1/2 1 1 1/2 2 2 1/2 3 3 1/2 4 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2 9

Weight (lb) =
Ht/ Wt. =

Upper limit 11.99 12.32 12.53 12.74 12.95 13.15 13.36 13.56 13.77 13.98 14.19 14.39 14.59 14.80 15.01 15.22 15.42 15.63
Mid-point and 12.16 12.43 12.64 12.85 13.05 13.26 13.46 13.67 13.88 14.01 14.29 14.50 14.70 14.91 15.12 15.33 15.53
Lower limit below 12.00 12.33 12.54 12.75 12.96 13.16 13.37 13.58 13.78 13.99 14.20 14.40 14.60 14.81 15.02 15.23 15.43

THIRD COMPONENT 1/2 1 1 1/2 2 2 1/2 3 3 1/2 4 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2 9

	FIRST COMPONENT	SECOND COMPONENT	THIRD COMPONENT
Anthropometric Somatotype			
Anthropometric plus Photoscopic Somatotype			

BY _____

RATER _____

Fig 1: Heath Carter Somatotype chart.

Thus three components for each somatotype were found out with H-C chart. In 12 students, where biceps girth was below the lowest value recorded in H-C chart, the importance was given to calf girth for derivation of second component and the regression equation was found out by using biceps girth.

OBSERVATIONS:

Somatotypes obtained in the present study by anthropometric method are given in table no 1.

Table 1: Somatotype of 65 subjects

1½, 1½, 6.	2, 2½, 5½.	2½, 2½, 5½.	2, 2, 5.	2½, 2½, 4½.
2½, 4, 2½.	3½, 3½, 2.	2½, 4½, 1.	1½, 1½, 6½.	2, 1½, 6.
2, 2½, 5.	3½, 2½, 4½.	2½, 2½, 5.	2½, 2½, 4.	2½, 3½, 3½.
3½, 2½, 2½.	3, 3½, 3½	3½, 3, 4	4, 7, ½	1½, 1½, 6
2, 5,5,	2, 3, 4½	2½, 4, 2½	2, 4, 3½	3½, 5, 4
3½, 3, 3½	2½, 2½, 5½	4, 4, 4½	2½, 3½, 4½	2, 3½, 4½
2½, 2½, 5	2½, 3, 4½	2½, 3, 4	1, 3½, 4	2½, 2, 5
2½, 3½, 4½	1½, 4, 3	3½, 5, 3	1½, 4½, 4	2½, 5, 2½
3½, 4½, 2	1, 2½, 5	2½, 3, 5½	2, 3, 4½	2½, 3½, 3½
3½, 4, 3½	3, 4½, 2½	2, 2, 5½	3, 3, 4	1½, 2½, 5
2½, 3½, 4½	3½, 2½, 2½	2½, 2½, 5	2, 2, 5	3, 2, 5
3, 4½, 2½	3, 3½, 4	2, 4, 3½	3, 3½, 3	3, 4½, 2½
3½, 4½, 2½	1½, 3, 4	2, 4, 4	3½, 3, 3½	3, 3½, 3

The mean values for each component are shown in Table no 2.

Table 2: Showing the mean values for Endomorphy, Mesomorphy and Ectomorphy.

Subjects	No.	Endomorphy		Mesomorphy		Ectomorphy	
		Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Students	65	2.53	0.72	3.25	1.02	4.03	1.24

Regression Equation:

These were derived for each component, using the minimum measurements

Endomorphy – for this used total skin fold

(R=0.97) = 0.0182 P.E + 0.1133 (Total skin fold) – 0.4034

Mesomorphy – for this used Bicep girth

(R=0.8705) = 0.7657 P.E – 0.2047 P. Endo + 0.1191 Biceps girth + 895

Ectomorphy – for this used Height, Weight and Subscapular skin fold

(R=0.9035) = 0.3299 Ht – 0.0648 Wt P. Endo + 0.1191 Biceps girth + 895

DISSCUSSION

For the present study, 65 male students from medical college were selected and they were Somatotyped by the modified anthropometric method of Somatotyping described by Heath and Carter. This was the new method at the time when study was conducted. The results of the present study were compared with the study of Berry and Deshmukh [4].

Polar Somatotype: It was the somatotype, which has scored 7 rating in any one component. In the present study 4, 7, ½. Was the polar somatotype that had scored 7 ratings in mesomorphy while Berry had found 23 polar somatotypes in ectomorphy?

Sum of the components: It ranged from 8 to 12½ in present series while in Sheldon's study [1] it was strictly between 9 to 12, either less or more.

Mean Somatotype: The Table no 3. Shows the comparison of the mean somatotype of present study with various other studies.

Table-3: Comparison of the mean somatotype of present study with various other studies.

Sr No	Studies	Mean Somatotype
1	Berry [8]	2.83, 2.95, 4.49
2	Deshmukh [6]	2.85, 2.96, 4.56
3	Haronian *et al.;* [6]	3.47, 4.27, 3.34
4	Present study	2.42, 3.25, 4.03

The above two study and the present study was conducted in Indian population in various regions. The present study shows mean somatotype found to be lower in mean Endomorphy and mean Ectomorphy but higher in mesomorphy. The Haronian *et al.;* study conducted in population of Yale showed marked deviation from the other three Indian studies.

So from this study we derived somatotype of in western Maharashtra students. This study also showed that mean somatotype was 2.42, 3.25, and 4.03 which is lower in mean endomorphy and mean ectomorphy but higher in mean mesomorphy when compared with Nagpur and Chandigarh students. We also derived regression equations for each component using the minimum measurements.

In the present context this study is primitive but somatotype can be very useful in measure in epidemiological an study that highlight the overall health status of the people through anthropometric characteristics, but is more useful in physical evaluation of athletes [9].

CONCLUSION:

From the study we concluded that western Maharashtra student Somatotype was comparative similar other studies in India than foreign studies. We also concluded that mean endomorphy and mean ectomorphy but higher in mean mesomorphy than Nagpur and Chandigarh students. This study can be used as baseline study for further research.

REFERENCES:

1. Sheldon WH, Stevens SS, Tucker WB; The varieties of human physique: An introduction to constitutional psychology. Harper; 1940.
2. Robert DF, Brainbridge DR. Nilotic Physique. Am. J Phys Anthrop. 1963, 21, 341-370.
3. Tanner JM. Physique and choice of career. Equqenics Review, 1964, 149-157.
4. Berry JN, Deshfukh PY, Deshmukh PY; Somatotypes of male college students in Nagpur, India. Human biology. 1964 May 1; 36(2):157-76.
5. Parnell RW. Somatotyping by physical anthropometry. Am. J Phys Anthrop. 1954, 12, 209-239.
6. Haronian F, Arthur Sugerman A; A comparison of Sheldon's and Parnell's methods for quantifying morphological differences. American journal of physical anthropology. 1965 Jun 1; 23(2):135-41.
7. Heath BH, Carter JE; A comparison of somatotype methods. American journal of physical anthropology. 1966 Jan 1; 24(1):87-99.
8. Berry JN; Somatotype distribution in male college students in northern India. American journal of physical anthropology. 1972 Jan 1; 36(1):85-93.
9. Martínez PY, López JA, Meza EI, Millán EM, León RS, OCHOA M, *et al.;* Somatotype Profile and Body Composition of Players from the Mexican Professional Basketball League. Int. J. Morphol. 2014; 32(3):1032-5.