Estimation Of Stature Using Measurements Of Inter Acromial Distance

Running Title - Inter acromial distance for stature estimation

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Abstract:

Aim:
The aim of this study is to establish the relationship between stature of different people and their inter acromial distance and to develop a regression equation formula from two variables in both males and females.

Introduction:
Stature provides numerous features of a population. It is a vital characteristic of an individual. It is used in forensic anthropology. Stature represents the distance between top of the head and bottom of the feet. Height is one of the steps for identification. There is a significant correlation between stature and different body measurement. Inter Acromial distance is the distance between the two bony landmarks,acromial processes of the scapula on both sides. Lateral point on the lateral border of the acromial process when a person stands in normal anatomical position with arms hanging by sides.

Materials and methods:
In this study, 60 (30 males and 30 females) samples were taken from dental students studying in saveetha dental college. The age group of the samples was 18-25 for the study. Measurements of inter acromial distance and height were taken.

Results:
The regression equation was calculated for males $y = 147.29 + 0.59x$ Where y is height in cm and x is inter acromial distance in cm. The correlation coefficient was found to be 0.282 hence weak correlation. For females $y = 178.43 - 0.508x$ Where y is height in cm and x is inter acromial distance in cm. The correlation coefficient was found to be -0.235 hence no correlation.

Conclusion:
From our study it was found in males stature having weak correlation with inter acromial distance and in females there is no correlation between stature and inter acromial distance.

Keywords: novel stature estimation, inter acromial distance, forensic anthropology, regression formula,

Introduction:
Stature provides numerous features of a population. It is a vital characteristic of an individual. It is used in forensic anthropology (1). Stature represents the distance between top of the head and bottom of the feet (2). Systematic study of measurements is known as Anthropometry. Height is one of the steps for identification (3). Identification determines the individuality of a person. There is a significant correlation between stature and different body measurement. Stature measurement is not the same in all populations; it differs from one population to another

population. Factors affecting are genetic variation and environmental factors etc (4)**.** Stature Estimation is an valuable criteria in terms of detecting identity (5).

Stature is important parameters for establishing identity, biological correlation of height with various parts of the body such as head, arms and spine (6). Most of the researchers for height estimation from subcutaneous bone length or skeletal remains, the regression analysis has been the most sorted method(7). Calculation of stature helps in identifying an individual person in mass disaster (8). In medico legal examination stature estimation is also given equal importance as age, sex etc (8,9). Inter Acromial distance is the distance between the two bony landmarks, acromial processes of the scapula on both sides. Lateral point on the lateral border of the acromial process when a person stands in normal anatomical position with arms hanging by sides (1). The extensive knowledge and experience of our research team has been translated into high quality publications (10–17),(18),(19),(20),(21,22),(23),(24),(25–29). The aim of this study is to establish the relationship between stature of different people and their inter acromial distance and to develop a regression equation formula from two variables in both males and females.

Materials and methods:

In this study, 60 (30 males and 30 females) samples were taken from dental students studying in saveetha dental college,velappanchavadi,chennai,Tamil Nadu 600077,India. The age group of the samples was 18-25 for the study. The study was approved by SRB Saveetha Dental College. Individual height was measured in cm standing on the vertical back ground surface in an erect position using Stadiometers . Inter acromial distance was measured in cm using measuring tape with the person standing in erect position. After taking measurement statistical analysis is carried out in SPSS 23 software and the regression formulae were derived.

Figure 1: Measurement of Inter acromial distance

Result:

Table 1- Regression equation values for estimation of stature (Y) from inter acromial distance (X) in males and females.

	MALE	FEMALE
n	30	30
Mean value of inter acromial distance (x in cms)	45.33	39.43
Mean value of height (y in cms)	174.16	158.4
Correlation coefficient(r)	0.282	-0.235
A	147.29	178.43
B	0.592	-0.508

Using data mentioned in table1 the regression equation was calculated to be

For males $y = 147.29 + 0.59x$

Where y is height in cm and x is inter acromial distance in cm. The correlation coefficient was found to be 0.282 hence weak correlation.

For females $y = 178.43 - 0.508x$

Where y is height in cm and x is inter acromial distance in cm. The correlation coefficient was found to be -0.235 hence no correlation.

Discussion:

Stature estimation was done in the south and north indian population using inter acromial length; there was significant correlation in females but not in males regression formulas are $y = 181.33-0.14x$ for males and $y = 122.9 + 1.15x$ for females. (1). There is other estimation done in western indian population. They concluded that inter acromial length is not a good parameter for estimation of stature (30). Patel et al found that inter (31) acromial length was highly significant when they combined both males and females inter acromial length. Stature of male is highly correlated to inter acromial distance the regression formula of male is $y = 5.45 + 0.239x$ and female also highly correlated regression formula is $y = 3.65 + 0.243x$ and combined regression formula is $y = 1.69 + 0.258x$ (9). There is significant correlation in both males and females, stature can be estimated by inter acromial length only if the upper trunk is available (32). (33) found a regression formula of inter acromial length for Male: $HT = 142.39 + 0.811 \times a\text{-}a$ and for Female: $HT = 121.74+ 1.10 \times a\text{-}a$ where a is inter acromial distance. Meanwhile in our study we

got a regression formula For males y = 147.29 + 0.59x and For females y = 178.43 - 0.508x The correlation coefficient for male is 0.282 hence weak correlation. The correlation coefficient for females is -0.235 hence no correlation.

Limitations:

The sample size taken for the study was considerably small and the results of the study can not be generalized.

Future scope:

To increase the sample size and also to include people with various age group and race,

Conclusion:

From our study it was found that stature in males has weak correlation with inter acromial distance and in females there is no correlation between stature and inter acromial distance. Hence we conclude that inter acromial distance may not be a valid parameter for stature estimation.

Author Contributions:

Bharath R: Study Design, Data collection, Data Analysis, manuscript writing

Yuvaraj Babu K: Study Concept, Data verification, Data Analysis, manuscript drafting and correction

Conflict of Interest:

The authors reported no conflict of interest while performing this study.

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