

Estimation of Stature from the Hand Length in Population of Rajasthan

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ABSTRACT

Background: Physical anthropology involves measurement of various physical parameters referred to as anthropometric parameters. Estimation of height from the skeletal remains like amputated limbs has obvious significance in medicolegal cases. Height (stature) and hand length are such anthropometric parameters which are helpful in process of identification.

Materials and Methods: The study was carried out on Medical students in Ajmer, Rajasthan. Study was carried on 300 students (150 males and 150 females) age group of 18-25 years. The hand length and total height was measured.

Conclusion: The study suggested that estimation of a living height could be made possible by using hand length. The regression formula has been calculated separately for males and females.

Keywords: Anthropology, Hand Length, Height, Bones.

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INTRODUCTION

In medicolegal cases, most often the personal identity of the deceased is a mystery. One of the key method of ascertaining the sex and stature is by using the human bones. Relationship that exist between different parts of body and height has been of great interest to anthropologist forensic and medical scientist for many years. Estimation of height from the skeletal remains like hands has obvious significance in medicolegal cases, accidents or natural disasters. In such cases hand length is measured and it has been observed and represents a certain relationship in form of proportion.

It has been observed that hand length is less affected than height by ageing process hence it provides a more accurate reflection of height while performing nutritional status. Estimating stature is one of the "big four" (identifying age, sex, stature and ancestry or race) of forensic anthropology.

The stature is directly proportional to different body parts and hence shows a definite biological and genetic relationship to each other. The stature is usually estimated using 'anatomical' and 'mathematical' techniques.

In 1899, Pearson, mathematician used this data to derive the regression equation, which he suggested were population specific. As the measurements are population specific; it becomes imperative to collect data from more population and make a comprehensive database.

MATERIALS AND METHODS

The study was performed on students of medical college of Ajmer. A total of 300 students of age group of 17-25 were undertaken including 150 males and 150 females. No skeletal or pathological changes were taken into considerations.

The particular age group was taken as the ratio between height and limbs will not change after the age.

The Parameters taken were:

1. Stature: Maximum distance from vertex to floor
2. Hand Length: Maximum distance between mid-point of line connecting styloid process and tip of 3rd digit. All measurements were performed with an mm sliding caliper.

RESULTS AND DISCUSSION

Estimation of stature is a major anthropological concern used for identification of unknown. The procedure was to estimate body height is to use its components. The present study takes this into consideration and uses similar measurements from living people.

The results are close similar to the study done by Mohanty et.al (2015) where they observed that males having a height of average between 170 to 175 cm the hand length measures 19.57 cm while that of females is 17.65 and the height ranges from 155 to 160. He also showed that as the height in both males and females increases the hand length also increases.

Table 1: Results of present study

Parameter	Males	Females
Age	21.3	20.7
Status (cm)	172	159.25
Hand Length (cm)	20.3	18.92
Hand Width (cm)	8.6	7.7
Wrist Width	5.8	5.2

In another previous study (Ozaslan et al 2006) showed difference of Truk and other Europeans and North Americans data about the parameters where the difference is significant due to different body proportions(showing racial differences also). The present study showed a similar result were as the height of male and female is proportionate to hand length. Males having 172 cm (20.3 cm hand length) and females is 159 cm (18.92 cm hand length). Santosh K et al Studies 300 (150 males and 150 females) medical students of SMS medical college, Jaipur (Rajasthan). Foot length, hand length and height of the individual were measured. Correlation coefficient between height & foot length were $r=0.92$ for male and $r= 0.899$ for female. Correlation coefficient between height & hand length were $r=0.961$ for male & $r= 0.94$ for female. Regression equations were derived to calculate height from foot length and hand length. They established definite correlation between stature and foot-length & hand length and also regression equations have been established. If either of the measurement (foot length, Hand length or total height) is known, the other can be calculated and this would be useful for Anthropologists and Forensic Medicine experts.

Similarly type of research has been done by other scientist like Khanpakar and Radke where he derived the regression equation for males as-

$$Y= 92.1 + (4.2) X \text{ and females}$$

$$Y= 84.9 + (4.3)X$$

In conclusion, estimation of body height from segments or dismembered parts has important considerations for identification of human remains recovered from mass disasters.

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