



ANTHROPOMETRIC MEASUREMENTS OF HAND LENGTH AND BREADTH FOR ESTIMATION OF STATURE.

Anatomy

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ABSTRACT

Introduction: The estimation of stature is having a great clinical significance along with other characteristics (age, gender, race, etc.). The estimation of individual's stature helps in forensic examination and in medico legal cases because it is the main priority to determine the biological profile of suspect. It also helps in assessment of body's growth and nutritional level. **Aims And Objectives:** The present study aimed to estimate the length and breadth of adult hands and determine the clinical significance in estimation of body stature. **Methodology:** This observational study was conducted in the Department of Anatomy, Government Medical College, Jammu. A total of 200 adults were studied with the help of digital vernier calliper and stadiometer. **Results:** The mean age of the study subjects were 21.38 ± 3.29 years and the majority of the participants were females (52.5%). The female: male ratio was 1.1:1. The mean estimated stature / height of male and female subjects were 173.89 ± 8.74 cm and 162.54 ± 9.56 cm respectively and mean actual stature / height of male and female subjects were 173.01 ± 8.2 cm and 162.31 ± 9.5 cm respectively. It was observed that there was no statistical difference between mean values of estimated and actual length. **Conclusion:** It was concluded that the measurement of hand length and breadth is an appropriate measure of estimating the height of an individual as there is no significant difference in estimated and actual stature.

KEYWORDS

Stature, Hand length, Hand breadth and Height

INTRODUCTION

The stature or body height is one of the important anthropometric parameters which determines the physical identity. The estimation of individual's stature helps in forensic examination and in medico legal cases because it is the main priority to determine the biological profile of suspect.¹

The estimation of stature is having a great clinical significance along with other characteristics (age, gender, race, etc.).² The stature and other body parts are interlinked with each other and having a definite biological and genetic relation with each other. For the forensic purpose the stature is estimated by using anatomical and mathematical calculations.³

Various studies reported the significant relationship between stature and measurements of different body parts and to determine the stature of an individual to identify the victims in various medico-legal situations. The literature suggests that the stature can be estimated from bones (long bones) or hands.⁴

It was observed that the dismembered body parts are frequently found due to natural and manmade disaster and due to murder.⁵ The assessment of dismembered body parts helps in tracing and identifying the individuals. It also helps in assessment of body's growth and nutritional level.

Thus, the present study was undertaken to estimate the stature by measuring the length and breadth of hand.

Aims And Objectives

1. To study the estimated length and breadth of adult hands.
2. To determine its clinical significance in estimation of body stature.

MATERIAL AND METHODS

This observational study was conducted in the Department of Anatomy, Government Medical College, Jammu. A total of 200 adults were studied after obtaining the informed consent. The length and width was measured by using vernier calliper and stadiometer.

Inclusion Criteria:

1. The study subjects who were willing to participate.
2. Adult patients

Exclusion Criteria:

1. Fractured bones.
2. Pathological conditions

All the subjects were examined and all the readings were taken. The

measurement was done for three times to avoid error in readings. The data was recorded and analyzed through descriptive statistics. To measure hand length the subjects were asked to put their hand supine on a flat hard surface and reading was taken by using vernier calipers, the length was measured from distal transverse crease of Wrist to middle finger tip.



Figure 1. Measurement of Hand Length



Figure 2. Measuring actual height by stadiometer

For measuring the breadth of hand, subjects were asked to put their hands (with fingers together and the thumb out to the side) in prone position on a flat hard surface and breadth of hand was measured with sliding caliper at the level of knuckles. The hand breadth represents the distance between the radial side of 2nd metacarpophalangeal joint to the ulnar side of 5th metacarpophalangeal joint.

The actual stature height was measured with stadiometer by asking the subjects to stand barefoot on the base of a standard stadiometer in a standard standing position with slightly separated heels and to look directly forward and reading was taken.

The data was recorded in Microsoft excel sheet and analyzed by using SPSS version 20.0.

OBSERVATIONS AND RESULTS

In this study a total of 200 study subjects were studied and anthropometric measurements were taken. The mean age of the study subjects was 21.38±3.29 years and the majority of the participants were females (52.5%). The female:male ratio was 1.1:1.

Table 1 Mean Hand length

Variable	Males (Mean±SD) CM	Females (Mean±SD) CM
Right Hand Length	18.99±1.89	17.34±0.36
Left Hand Length	18.82±1.09	17.21±0.48

Table1 depicted that the mean right hand length of males was 18.99±1.89 cm, mean right hand length of females was 17.34±0.36 cm, and the mean left hand length in males was 18.82±1.09 and mean left hand length in females was 17.21±0.48.

Table 2 Mean Hand Breadth

Variable	Males (Mean±SD) CM	Females (Mean±SD) CM
Right Hand Breadth	7.78±0.81	7.12±0.96
Left Hand Breadth	7.34±0.14	7.01±0.73

Table2 showed that the mean right hand breadth of males was 7.78±0.81 cm, mean right hand breadth of females was 7.12±0.96 cm, and the mean left hand breadth in males was 7.34±0.14 and mean left hand length in females was 7.01±0.73.

Table 3 Mean estimated stature / height vs actual stature / height Variable Males

Variable	Males (Mean±SD) CM	Females (Mean±SD) CM
Estimated	173.89±8.74	162.54±9.56
Actual	173.01±8.2	162.31±9.5
Difference	0.88±0.54	0.23±0.06

Table 3 represented the comparison of estimated and actual height / stature. It was observed that there was no statistical difference between mean values of estimated and actual length. The mean estimated stature / height of male and female subjects were 173.89±8.74 cm and 162.54±9.56 cm respectively and mean actual stature / height of male and female subjects were 173.01±8.2 cm and 162.31±9.5 cm respectively.

DISCUSSION

In this prospective study hand length and breadth was measured to estimate the height of study subjects. The measurements were done; data was analyzed and discussed with previous literature.

The present study showed that the mean age of the study participants was 21.38±3.29 years and the majority (52.5%) of the study subjects was females. The findings of our study are consistent to the study conducted by Rastogi P *et al.*, (2008) reported that the age of the study subjects ranged between 20 and 30 years and female: male ratio was 1.17:1.⁶

This study reported that the mean right hand length of males was 18.99±1.89 cm, mean right hand length of females was 17.34±0.36 cm and the mean left hand length in males was 18.82±1.09 cm and mean left hand length in females was 17.21±0.48. The results are correlated with the study conducted by Vanishri Pet *et al.*, (2019) found that the mean left hand length of male and female subjects was 19.88±1.15 cm and 18.43±0.95 cm respectively. The mean right hand length of male subjects and female subjects was 19.74±1.14 cm and 18.63±1.14 cm respectively.⁷ In similar study conducted by Kaur M *et al.*, (2013) found that the mean hand length of the male and female participants was 18.80±1.09 and 18.54±1.07 respectively.⁸

It was observed that the mean right hand breadth of males was 7.78±0.81 cm, mean right hand breadth of females was 7.12±0.96 cm

and the mean left hand breadth in males was 7.34±0.14 and mean left hand length in females was 7.01±0.73. The findings of our study are in contrast with the study conducted by Supare MS *et al.*, (2015) observed that the mean right hand breadth of male and female participants was 7.96 ± 0.55 cm and 7.44 ± 0.53 cm respectively. The mean left hand breadth of male and female participants was 7.94 ± 0.56 cm and 7.43 ± 0.52 cm.⁹ Similarly Asadujjaman Md *et al.*, (2010) reported that the mean right hand breadth of male and female participants was 8.29 ± 0.35 cm and 7.51 ± 0.39 cm respectively. The mean left hand breadth of male and female participants was 8.24 ± 0.39 cm and 7.48 ± 0.36 cm respectively.¹⁰

Further it was reported that the mean estimated stature / height of male and female subjects were 173.89±8.74 cm and 162.54±9.56 cm respectively and mean actual stature / height of male and female subjects were 173.01±8.2 cm and 162.31±9.5 cm respectively and there was no statistical difference between mean values of estimated and actual length. In similar study conducted by Vanishri Pet *et al.*, (2019) found that the mean estimated stature / height of male and female subjects were 169.98±9.96 cm and 156.07±10.46 cm respectively. Similarly Kaur M *et al.*, (2013) the mean estimated stature / height of male and female subjects were 160.91±5.75 cm and 175.98±6.76 cm respectively.

Various studies found that the measurement of hand length and breadth is a helpful tool in identifying the unknown causalities / bodies at the time of disaster.

CONCLUSION

The present study concluded that the measurement of hand length and breadth is an appropriate measure of estimating the height of an individual as there is no significant difference in estimated and actual stature.

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