

To Assess Correlation of Stature with Hand & Foot Length

Khwaja Moizuddin¹, Shaikh Siraj Ahmed Shaikh Hasham Saudagar², Sanket Dadarao Hiware³,
Faiza Banu Siddiqui⁴, Syed Rehan Hafiz Daimi⁵, Asim Mohsin Badaam⁶

¹Assistant Professor; Department of Anatomy, College of Medicine, Imam Abdulrahman Bin Faisal University,

²Assistant Professor, Department, ³Assistant professor, Department, ⁴Assistant Professor, Department, ⁵Assistant Professor, Department, ⁶Assistant Professor, Department

Abstract

Background: Human stature is an anatomical complex of linear dimensions, including skull, vertebral column, pelvis and lower extremities. The present study was conducted to assess correlation of stature with hand & foot length.

Materials and Method: The present study was conducted on 185 students (males- 81, females- 104) in the age group of 18-24 years. Stature, hand length and foot length was measured in all subjects with the help of digital verniercalipers.

Results: The mean height of males was 172.3 cm and females was 156.8 cm. The difference was significant ($P < 0.05$). The mean right hand length in males was 18.6 cm and in females was 16.5 cm, left hand length in males was 18.3 cm and in females was 16.2 cm. The difference was significant ($P < 0.05$). The mean right foot length in males was 28.7 cm and in females was 22.5 cm, left foot length in males was 28.3 cm and in females was 22.1 cm. The difference was significant ($P < 0.05$). A positive correlation of stature with hand and foot length was found.

Conclusion: Authors found a positive correlation of stature with length of hand and foot in subjects.

Keywords: Hand, Foot, Stature

Introduction

In forensic anthropology, determination of sex, age and stature is the foremost task for establishing the biological profile of an individual, which may consequently lead to a positive personal identification. In case of dismembered bodies, this task is more complicated so it is important to search for method that can be used for estimating the above mentioned basic individual characteristics.¹

Human stature is an anatomical complex of linear dimensions, including skull, vertebral column, pelvis and lower extremities, so that it is assumed that significant associations exist between the total stature and these individual body parts.²

Human beings are considered to be bilaterally symmetrical. However, there is an asymmetry in the length of the feet irrespective of sex or handedness. Hand has been used as a tool for estimating the area of burn injury.³ The area of palmar surface of one's hand has been estimated to be 1% of the body surface area. When hand length was compared with the body weight for both males and females there were a curvilinear relationship which was not far from being linear.⁴ The hand length has therefore been considered as an excellent predictor of body surface area and body mass. Change of foot length and width with age has been reported in a few

Corresponding Author:

Dr. Khwaja Moizuddin

Assistant Professor; Department of Anatomy, College of Medicine, Imam Abdulrahman Bin Faisal University
e-mail: kmoizuddin@iau.edu.sa

anthropometric studies in literature. The foot length and width were found to be increasing significantly on weight bearing between 3 and 18 years of age and in both genders.⁵The present study was conducted to assess correlation of stature with hand & foot length.

Materials and Method

The present study was conducted in the department of Anatomy in MGM Medical College, Aurangabad. It comprised of 185 students (males- 81, females- 104) in the age group of 18-24 years. All patients were informed regarding the study and written consent was obtained. Ethical approval was obtained from institutional ethical committee prior to the study.

General information such as name, age, sex etc. was recorded. A thorough physical examination was performed in all subjects.

Stature was measured as vertical distance from vertex (the highest point on the top of head) to the floor in midsagittal plane with subject standing barefooted, on an even floor and the head being oriented in the Frankfurt’s plane. Stature was measured with the help of Stadiometer (Anthropometer). Hand length was measured as the straight distance from mid-point of a line connecting the styloid processes of radius and ulna to the anterior-most projection of the skin of the middle finger. It was measured with the help of digital vernier calipers. Foot length was measured as the distance from the most posterior point of the heel to the most anterior point of the longest toe. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table I: Assessment of height of subjects

Height (cm)	Mean	DF	Mean square	F	Sign.
Male	172.3	1	8563.2	171.3	0.001
Female	156.8				

Table I shows that mean height of males was 172.3 cm and in females was 156.8 cm. The difference was significant (P< 0.05).

Table II: Assessment of hand length of subjects

Length (cm)	Right	Left	DF	Mean square	F	Sign.
Male	18.6	18.3	1	8564.7	172.6	0.001
Female	16.5	16.2				

Table II shows that mean right hand length in males was 18.6 cm and in females was 16.5 cm, left hand length in males was 18.3 cm and in females was 16.2 cm. The difference was significant (P< 0.05).

Table III: Assessment of foot length of subjects

Length (cm)	Right	Left	DF	Mean square	F	Sign.
Male	28.7	28.3	1	8572.5	175.1	0.001
Female	22.5	22.1				

Table III shows that mean right foot length in males was 28.7 cm and in females was 22.5 cm, left foot length in males was 28.3 cm and in females was 22.1 cm. The difference was significant (P< 0.05).

Table IV: Correlation of stature, hand and foot length of subjects

Pair	R	P
Stature & Hand length	0.71	0.01
Stature & foot length	0.65	0.01

Table IV shows positive correlation of stature with hand and foot length. The difference was significant (P< 0.05).

Discussion

Hand length and foot length has been studied extensively in relation to various body measurements but very few studies were available to predict the correlation between these two variables.⁶A number of studies have presented the relation between stature, foot length and foot breadth among different human populations utilizing linear and multiple regression equations. Foot measurements, such as foot navicular and malleoli height were used for the first time in Ozaslan et al⁷ to estimate stature and sex. Several studies have attempted to derive regression equations from measurements of footprints and foot outlines. Although upper extremities are not part of this complex, previous research has shown that the dimensions of upper extremities are also associated with stature to some degree. A number of studies on the relationship between hand measurements

and stature to calculate population-specific regression equations have been reported. It needs to be taken into the consideration that the equations derived from one population cannot be used for other populations as the body dimensions show ethnic variation due to here detained environmental conditions.⁸ The present study was conducted to assess correlation of stature with hand & foot length.

In present study mean height of males was 172.3 cm and in females was 156.8 cm. We found that mean right hand length in males was 18.6 cm and in females was 16.5 cm, left hand length in males was 18.3 cm and in females was 16.2 cm.

Uhrova et al⁹ assessed the stature, hand length, hand breadth, foot length and foot breadth of 250 young Slovak males and females, aged 18–24 years by standard anthropometric procedures. The results revealed significant sex differences in hand and foot dimensions as well as in stature ($p < 0.05$). There was a positive and statistically significant correlation between stature and all measurements in both sexes ($p < 0.01$). The highest correlation coefficient was found for foot length in males ($r = 0.71$) as well as in females ($r = 0.63$). The results of this study indicate that hand and foot dimensions can be used to estimate stature for a Slovak individual for the purpose of forensic investigation.

We found that mean right foot length in males was 28.7 cm and in females was 22.5 cm, left foot length in males was 28.3 cm and in females was 22.1 cm. We found a positive correlation of stature with hand and foot length. The difference was significant ($P < 0.05$). Fawzy et al¹⁰ included a total 400 healthy and normal adult medical students (200 male and 200 female) between age group 18-25 years with no obvious deformities or previous history of trauma to the hands or feet. The hand length and foot length of both the sides of individuals were measured with the help of sliding calipers and spreading calipers respectively and the data was analyzed statistically for correlation. **Results:** The correlation between hand lengths and foot lengths found to statistically highly significant on both sides in both sexes with p value < 0.0001 . Correlation coefficients between hand lengths and foot lengths were higher for females than males.

Conclusion

Authors found a positive correlation of stature with length of hand and foot in subjects.

Conflicts of Interest: The author declare that there is no conflict of interest regarding the publication of this paper.

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