



A STUDY ON CORRELATION OF PERCUTANEOUS LENGTH OF ULNA WITH STATURE IN A SAMPLE OF KASHMIRI POPULATION

Anatomy

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ABSTRACT

Background: Estimation of stature from skeletal remains, amputated limbs and parts of limbs has definite medicolegal significance in situations like earthquakes, floods and accidents, where identification becomes difficult. The remains of long bones play an important role in anthropological practice for morphometric analysis¹. The ulna is long bone of the upper limb and is placed medially in the forearm. It is subcutaneous throughout.

Aims and objectives: To measure the length of ulna and height of the subjects in a sample of Kashmiri population and to correlate the height with the ulnar length.

Method: The present study was conducted in the department of nursing at government medical college Srinagar, India. A total of 70 (35 male & 35 female) nursing students within the age group of 19-25 years were included in the study. The height and the percutaneous ulnar length of subjects were recorded.

Results: The mean height for the male subjects was 167.67 ± 6.62 cm and the mean height for females was 163.45 ± 6.45 cm. The mean value for ulna length on the right side for male subjects was 27.64 ± 1.83 cm and on left side was 27.60 ± 1.82 cm. The mean value for the females in right ulna was 25.00 ± 2.45 cm and 25.00 ± 2.45 cm in left ulna. The correlation coefficient in male subjects was 0.71 for right ulna and 0.70 for left ulna. In case of females the value for correlation coefficient was 0.68.

Conclusion: A positive correlation was found between the stature and the ulna length. The data of this study could be useful to anatomist, clinicians, anthropologists and forensic experts.

KEYWORDS

Anthropometry, Forensic Experts, Mean height, Stature, Ulna

INTRODUCTION

The height is an important parameter for establishing the identity of an individual. A number of factors such as race, gender, nutritional status, and ethnicity affect the growth and development of an individual. Estimation of stature from skeletal remains, amputated limbs and parts of limbs has definite medicolegal significance in situations like earthquakes, floods and accidents, where identification becomes difficult. The remains of long bones play an important role in anthropological practice for morphometric analysis¹. In many situations only parts of human body are available for identification. There is a strong relationship between the dimensions of different parts in particular the bony lengths that form the basis for the estimation of stature². The stature of an individual can be estimated from different segments of the body such as foot, hand, length of forearm with hand, head length, the distance between the sternal notch and pubis symphysis³. The stature increases with age upto adulthood and tends to decrease with age due to the compression of cartilages and loss of elasticity of the intervertebral disc⁴. The ulna is long bone of the upper limb and is placed medially in the forearm. It is subcutaneous throughout. The surface landmarks of the bone such as olecranon process and styloid process are easily identifiable and can be conveniently used for measuring⁵. Ossification of ulna begins during 8th week of intrauterine life. The proximal epiphysis fuses with the shaft in 14th year in females and 16th year in males, the distal epiphysis unites with shaft in the 17th year in females and 18th year in males¹.

AIMS AND OBJECTIVES

1. To measure the length of ulna and height of the subjects in a sample of Kashmiri population.
2. To correlate the height with the ulnar length.

MATERIALS AND METHODS

The present study was conducted in the department of nursing at government medical college Srinagar, India. A total of 70 (35 male & 35 female) nursing students within the age group of 19-25 years were included in the study. The study subjects were of Kashmiri origin. Detail medical history and clinical examination was done to rule any disease or skeletal deformity that would have generally affected the body growth. Informed written consent was obtained from the subjects. The height and the percutaneous ulnar length of subjects were

recorded. For the estimation of the height the subjects were made to stand erect in anatomical position. The height (in cms) was measured by a stature metre fixed to the wall. The length of ulna (in cms) was measured from the proximal point of olecranon process to the distal point of styloid process of ulna with the elbow flexed and the palm spread over the opposite shoulder by using a measuring tape. The length of the right and left ulna was taken separately. Measurements were taken during a fixed period of the day and by the same observer with the instruments to avoid any technical errors. The data after collection was subjected to statistical analysis.

RESULTS

The study was conducted on 70 students (35 male and 35 female). The mean height for the male subjects was 167.67 ± 6.62 cm and the mean height for females was 163.45 ± 6.45 cm. The mean value for ulna length on the right side for male subjects was 27.64 ± 1.83 cm and on left side was 27.60 ± 1.82 cm. The mean value for the females in right ulna was 25.00 ± 2.45 cm and 25.00 ± 2.45 cm in the left ulna as shown in table 1.

Table 1: Mean $\pm$ SD of height of study population and ulnar length.

Parameter	Male (n=35)	Female (n=35)
Height (cms)	167.67 ± 6.62	163.45 ± 6.45
Length of right ulna (cms)	27.64 ± 1.83	25.00 ± 2.45
Length of left ulna (cms)	27.60 ± 1.82	25.00 ± 2.45

The correlation coefficient between the height of an individual and the length of ulna was calculated in male and female subjects as shown in table 2. The correlation coefficient in male subjects was 0.71 for right ulna and 0.70 for left ulna. In case of females the value for correlation coefficient was 0.68. The values indicate a positive correlation between the height of the subjects and the ulna length.

Table 2: Correlation of height with length of ulna.

Sex		Correlation coefficient
Male	Length of right ulna	+0.71
	Length of left ulna	+0.70
Female	Length of right ulna	+0.68
	Length of left ulna	+0.68

DISCUSSION:

Identification of an unknown individual and the determination of

stature is one of the important aspects of anthropological and forensic studies. Anthropometry is based on the principle that after the age of 21 years the dimensions of the skeletal remains unchanged and also the ratio in the size of different parts to one another⁵. Height of an individual is measured for calculating the body mass index which is one of the most commonly used nutritional assessment variable. Its measurement is not always practical in old bed ridden or those individuals suffering from vertebral column deformities⁸. Trotter M⁹ et al observed that there is an increase in the height of the person after death by 2.5cms, so measuring height of ulna in living is considered as an advantage than the cadavers. Moreover ulna being a subcutaneous bone and is easily palpable making it convenient to take measurements even in compromised postures¹⁰. The height of subjects vary within an age group from country to country and even within different regions and populations of the same country this is because it depends on a number of factors including genetic, dietary habits, life style and physical stress.

In the present study the total subjects were 70(35male & 35 female).The mean height of the male subjects was 167.67±6.62 cm and the mean height for females was 163.45±6.45cm.The mean value for ulna length on the right side for male subjects was 27.64±1.83cm and on left side was 27.60±1.82cm.The mean value for the females in right ulna was 25.00±2.45cm and 25.00±2.45cm in the left ulna respectively. The correlation coefficient between the height of an individual and the length of ulna was calculated in male and female subjects.The correlation coefficient in male subjects was 0.71 for right ulna and 0.70 for left ulna. In case of females the value for correlation coefficient was 0.68.The values indicate a positive correlation between the height of the subjects and the ulna length.The values for males are higher than females and it could be due to the influence of estrogen on the closure of epiphysis with diaphysis earlier in females.A study done by Anjali prashad et al¹² found the mean height of male subjects as 172.93±6.52cm and female subjects as 166.53±3.57cm.The mean length of right ulna in males was 27.52±1.33cm and left ulna 27.26±1.35cm.The mean length of right ulna in females was 21.75±0.92cm and left ulna was 21.68±0.87cm and the correlation coefficient for males was 0.65 and 0.68 in females .Another study conducted by Chintala sukumar¹³ found the average height of males as 165.72±3.95cms and the average length of right ulna was 29.84±2.03 and left ulna as 29.78±2.04 respectively.The values for the mean height of females was 160.58±3.5cms and mean length of right ulna as 26.70±0.73cm and left ulna as 26.63±0.73cm with a coefficient value of 0.93 in males and 0.63(right ulna)and 0.61(left ulna) in females.Ashish Pandey¹⁴ et al in his study found the mean height for males as 169.46±6.53 and females as 164.07±7.96cms.The mean height for the right ulna in males was 27.52±1.63cm and left ulna was 27.62±1.69cm.The value for mean height of ulna in females was 164.07±7.9cm and the length of right ulna was 26.22 ±1.61cm and left ulna was 26.03±1.61cm.The correlation coefficient for males in right ulna was 0.45 and left ulna was 0.51.For females the value was 0.27 right ulna and 0.32 for left ulna.The values found in our study are comparable with the studies done by previous authors. various studies have shown that there is a positive correlation between the height of an individual and the length of ulna and is consistent with the findings of present study suggesting that if the length of ulna increases or decreases the height of the subject also increases or decreases. Variations are present in the people of different regions and races.It is important to conduct more studies among people of different regions and groups with larger number of subjects to obtain a simple and reliable method for stature estimation.

CONCLUSION

In the present study we made an attempt to assess the correlation between the height of an individual and the length of ulna in a sample of Kashmiri Population. A positive correlation was found between the stature and the ulna length. The data of this study could be useful to anatomist, clinicians, anthropologists and forensic experts.

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