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Research Article

A Predictive Role of Foot Length in Estimation of Stature in Western Rajasthan Population

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Abstract: Estimation of body height from its segments or dismember parts has important considerations for identifications of living or dead human body or remains recovered from mass disaster or other. Stature is an important consideration in determining the identity. Our aim of the study was to investigate the relationship between foot length and body height and to derive a regression equation for stature estimation from foot length and to find out the correlation between body height and foot length. The present study was conducted on 500 subject's age above 15 years and below 72 years Bikaner Rajasthan India. Body height and foot length were measured in centimeter. All the measurements were taken by using standard measuring devices and standard anthropometric techniques. Correlation coefficients between stature and foot dimensions were found to be negative and statistically highly significant. Prediction of stature was found to be most accurate by regression analysis.
Keywords: Body Height, Stature, Foot length, Correlation, Regression Equation

INTRODUCTION

Anthropometry as adopted by medical scientist is described as a technique of expressing the form of human body quantitatively as it is the systematic collection and correlation of measurement of the human body [1]. Dimensional relationship between body segments and the whole body has been the focus of anatomists, scientists, and anthropologists for many years [2]. Body proportions and the dimensions of various body segments, including the long bones of their limbs and the bones of the foot and hand have been used to estimate stature [3]. Furthermore, the relationship between body segments has been used to compare and highlight variations between different ethnic groups and to relate them to loco motor patterns, energy expenditure, and lifestyle. Prediction of the dimensions of body segments is useful in many areas of modern science [4]. The long bones of the limbs, however, have been the most widely studied [5]. Determination of stature from incomplete skeletal and decomposing human remains is predominantly important in personal identification. Stature of a person can be said to be the sum of the length of certain bones and appendages of the body. Stature provides insight into various features of a population including nutrition, health and genetics. Various studies in past have been undertaken to study the relation between height of a person and various body parts but not much has been done to have it from the foot length. Therefore purpose of the present study is to study the anthropometric relationship between foot length and body height in normal young adults and its sexual dimorphism.

MATERIAL AND METHODS

Five hundred subjects (291 male and 209 female) of age group 18 to 72 years living in Rajasthan north India, were the subject for this study. Ethical clearance was obtained from the IERC [Institute Ethical Review Committee] before starting the study. Informed consent of participants was taken and socio-demographic indices like age and sex was noted. Each subject was studied for the measurements of stature and foot length. The measurements were taken by using standard anthropometric instruments. The height of the individual was measured between the vertex and floor, with the person standing erect, in anatomical position and the head in the Frankfort plane, using a standing height measuring instrument. The left foot was selected for measurement as per recommendation of the international agreement for paired measurements at Geneva (1912). Foot length was measured as a direct distance from the most prominent point of the back of the heel to the tip of the hallux or to the tip of second toe, when the second toe was larger then hallux by spreading caliper. Subjects having any disease, deformity, injury, fracture, amputation or record of any surgical procedures of either hand or foot were disqualified from the study. The measurements were

taken at a fixed time between 2.00 to 4.00pm to eliminate the possibility of diurnal variation and by only one observer in order to avoid inter-observer error. The data obtained were computed and analyzed using SPSS (Statistical Package for Social Sciences) computer and results drawn.

RESULTS

Total 500 subjects were included in this study. Out of this 291(58.2%) were males and 209 (41.2%)were females. The range of age for the study is >20 to 70 years .The mean stature of male was 166.72 with SD of10.10.In female the mean stature was 164.72 with SD 9.72.The difference in stature between two gender were found to be statistically significant(Table 1)

Table 1 also shows the mean foot length in male was larger than females. This is statistically significant. Table 2 and Table 3 show correlation values and regression equation for both sexes.

Table-1: Descriptive statistics for stature and measurements of feet in male and female

Parameter	Male(mean ±SD)	Female(mean ±SD)
Foot length	24.70±1.61	24.27±1.65
Stature	166.72±10.10	164.62±9.60

Table-2: stature v/s foot length correlation values for male and female

Stature v/s foot length	Male	Female
Correlation value	-0.015	0.106

Table-3: Derivation of regression equation for both sexes

male	Y=169.09+0.0944*FL
female	Y=149.61+0.168*FL

Y=stature FL=foot length

DISCUSSION

Estimation of stature from anthropometric measurements is an area of interest for Forensic Experts for the purpose of Identification. The data derived from entirely different population cannot be used for height assessment for all types of population hence the baseline data shall be derived from local population so that they can be used for the height assessment amongst them. In the present study, mean values of stature are greater for Males then Female with statistically significant difference. Mean values of foot length are greater for Males than Females with statistically significant difference. Charnalia[2], showed the significant correlation between height and foot length. Regarding the estimation of height from foot length, no data is available except Qamra et al [6], who derived a regression equation between foot length and height in North West India population. There correlation coefficient between foot length and height was, +0.69 in male and +0.70 in female. In our present study contest to above stature is positively correlated with foot length in females but not in males. Similarly Bhargve et al [7] while working on bhile of dhar district of Madhyapradesh pointed out that there is poor correlation between foot length and stature where as Anadi [8] also found there is no correlation between stature and foot length. It may be due to various factors like racial ethnic and nutritional factor and geographical variations, which play an important role in human development and growth.

CONCLUSION

In population similar to our subjects, stature and gender estimation can be done by using foot measurements and it will be helpful for Anatomists, Archeologists, Anthropologists and forensic experts to calculate stature based on foot length.

REFERENCES

1. Wilbur AK; The utility of hand and foot bones for the determination of sex and the estimation of stature in a prehistoric population from westcentral Illinois. International Journal of Osteoarchaeology, 1998; 8(3): 180–191.
2. Charnalia VM; Anthropological study of the foot and its relationship to stature in different castes and tribes of Pondicherry state. Journal of Anatomical Society of India, 1961; 10: 26-30.
3. Telkka A; On the prediction of human stature from the long bones. Acta Anat(Basel), 1950; 9: 103–317.
4. Athawale MC; Anthropological study of height from length of forearm bones: A study of one hundred Maharashtrian male adults of ages between twenty five and thirty years. American Journal of Physical Anthropology, 1963; 21: 105-112.
5. Sharma VK, Garg RK, Chattopadhyay PK; Calculation of stature from foot measurements: a study of Gaur Brahmins. Coll. Antropol, 1978; 2: 194–195.
6. Qamra S, Jit I, Deodhar SD; A model for reconstruction of height from foot measurements in a adult population of northwest India. Indian Journal of Medical Research, 1980; 71(jan): 77-83.
7. Bhargava I, Kher GA; An anthropometric study of Central India Bhils of Dhar district of Madhya Pradesh. J. Anat. Soc. India, 1960; 9(1): 14-19.
8. Pal A; Study of Onge Foot by Contour Method. Man India, 1971; 51(4): 290- 303.