

Estimation of Stature From Dimensions of Foot in Females of Nasik Population



Medical Science

KEYWORDS : Stature, Foot length, Foot breadth, Nasik Population.

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ABSTRACT

Introduction: Ascertaining sex and estimation stature from incomplete skeletal and decomposed bodies is the main theme in physical anthropology and forensic sciences.

Material and Methods: The present study was carried out for estimation of stature from the foot length and foot breadth of total 100 females subject in 18-25 years age group in dept of Forensic Medicine and Toxicology, SMBT Institute of Medical Sciences and Research Centre, Nasik, Maharashtra. Stature and foot length measurements of each one of them were taken using standard instruments.

Result : A good correlation of stature was observed with foot length and it was statistically significant.

Conclusion: The results of study practical use in medico- legal cases and in anthropometry.

INTRODUCTION:

Stature is natural height a person in an upright position¹. It is considered as one of the important parameters for personal identification and it is also important according to anthropometric point of view for physical identity of an individual. Measurement of stature is important in identification of commingled and mutilated skeletal elements in forensic examination¹. Identification of isolated extremities is important in investigation of identity of suspect/ victim of any crime, disaster or any assault¹.

Analysis of sole length can reveal very important clues, which can be used as forensic evidence in crime scene investigation^{2,3} and in cases where patient cannot stand erect so height cannot be estimated directly & height is based on certain parameters & in our study we take foot length as the parameter^{2,4,5,6,7}.

Growth is measured by the height of the individual which is the sum of the height of bones of the body. This relationship is really important according to medico-legal point of view, when only deceased are available⁸. Ascertaining sex and estimation stature from incomplete skeletal and decomposed bodies is the main theme in physical anthropology and forensic sciences^{2,9,10,11,12}. Anthropologists observe and compare the relation between within origins^{1,13}. Dimension of sole length is linked with sex, age, stature of an individual. We have to observe the variation and compare the relation between the body and segments to highlight variation between and within the groups.

Present study is to investigate the foot length and breadth in estimation of height and help us to find out which factor is more reliable either foot length or foot breadth in estimation of stature.

MATERIAL AND METHODS :

The present study will be conducted in the medical college of central India. 100 women were included in this study. Individual with any kind of upper and lower limb deformity either surgical or congenital, endocrinal disorders etc. which may affect the height of the individual are excluded from this study. All the individuals between 18-25 years of female are included in this study.

Aim and objective of the intended study will be properly explained to the subject and informed consent (Duly signed) will be taken along with the proforma sheet. Pencil and graph paper / chart sheet, measuring tape, measuring scale we are used for measuring of foot length and breadth.

Height of females will be measured in cms, using a measuring tape, subject standing in anatomical position (means subject will be in erect position, the eyes look straight to the front, the upper limbs hang by the side of the trunk with the palms direct-

ed forwards, and lower limbs are parallel with the toes pointing forwards). The height will be measured from the sole of the heel to the vertex of head as recommended by international biological programs^{14,15}.

Foot length measured by asks the subject to put her foot on the graph /chart sheet. Mark the heel (nearest point0 and tip of the great toe (farther point). Then join the two points with the help of scale and measure the distance.

Foot breadth was measured by using standard sliding calipers from base of 1st to 5th metatarsal.

Data analysis was done using the statistical package for social sciences (SPSS) for windows version 8.

RESULTS:

The study was done on 100 females subjects. The observations of this study are tabulated in the tables 1& 2.

TABLE NO : 1 STATURE AND DIMENSIONS (CM) OF FOOT IN FEMALES

Parameter	Mean ± Sd	Range
Stature	155 ± 7.06	145-169
Right foot Length	21.57±1.38	19-24
Left foot length	21.57±1.39	19.1-23.9
Right foot breadth	9.25 ± 1.05	6.7 -12
Left foot breadth	9.54 ± 0.90	6.4 -11.09

The above table shows that in female subject stature range from 145-169 cms. While mean value of 155 and standard deviation is 7.06 respectively. Right & left foot length range 19-24 & 19.1 -23.9 cms and mean and sd on right side 21.57±1.38 and left side 21.57±1.39. Foot breadth right and left side range from 6.7-12 on right side, 6.4 -11.09 on left side respectively. Mean of foot breadth right and left side 9.25 ± 1.05, 9.54 ± 0.90.

Parameter	Mean ± sd	Range	Intercept (a)	Regression coefficient (b)	Correlation Coefficient	P Value
Stature	155 ± 7.06	145-169	-	-		
Right foot Length	21.57±1.38	19-24	159.29	2.89	0.34	<0.001
Left foot length	21.57±1.39	19.1-23.9	158.37	2.92	0.35	<0.001
Right foot breadth	9.25 ± 1.05	6.7 -12	165	0.84	0.09	>0.05
Left foot breadth	9.54 ± 0.90	6.4 -11.09	156.84	1.43	0.17	>0.05

TABLE NO : 2 CORRELATION BETWEEN STATURE AND FOOT IN FEMALES

Above table shows that the correlation coefficient between stature and foot length of right and left side in female subject was statistically significant. Where as it was not significant for length ($p>0.05$).

DISCUSSION :

The present study was conducted in 100 females of Nasik population. Age between 18 -25 years for the estimation of stature from foot length and foot breadth. In this present study regression equation for estimation of stature from foot length and breadth. The correlation coefficient between stature and foot length was statistically significant in female population. This results are similar to previous studies.

Utsav Parekh et al studied on height and foot length of medical students was statistically significant but no statistically significant bilateral difference for foot length in both subjects¹⁶.

Rameswarapu Suman Babu et al¹⁷ carried out his study on 104 healthy individuals (54 males and 50 female) of Secunderabad Population. The correlation coefficient between height and foot length, indicate the foot length provides height reliability and accuracy in estimation stature of an unknown individuals.

The results of our study the regression equation for estimation of stature using foot breadth was statistically not significant in females. No such type study was carried out in Nasik population. Singh and Phookan¹⁸ examined thai male population of assam and suggested foot length to be better indicator to stature than foot breadth.

Rutihouser et al¹⁹ reported that predication of height from foot length fact can be used for the estimation of stature as no significant asymmetry was observed by him while working on the foot footprints of a South Indian population. Jitender Kumar Jakhar et al²⁰ result shows that stature and foot measurement was significant difference in male and female can be attribute to the fact the fusion of epiphyses of bone occurs earlier in girls in comparison to boys. The above reasons says that most of the females belong to Northern part of country. Gordon and Buikstra²¹ reported that height estimation from foot and shoe measurement showed a strong relationship between the calculation model with foot length and height.

From the above facts our study result revealed that foot length is more reliable indicator for stature estimation. No such type study was carried out in Nasik female population till date.

CONCLUSION :

The observation of above result of our study concluded that stature prediction is more accurate and reliable in Nasik female population. It is found that there exists linear relationship between the stature and foot length. This fact may be of practical use in medico- legal cases and in anthropometry.

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