

A CROSS-SECTIONAL STUDY OF ESTIMATION OF BODY STATURE USING PERCUTANEOUS TIBIAL LENGTH IN MEDICAL STUDENTS

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ABSTRACT

Body Stature is defined as height of the body in upright position and is an inherent character and is considered as one of the important parameters of personal identification. Generally body stature will be estimated by either anatomical method or mathematical way. To this rationale, we estimated the body stature using percutaneous tibial length using regression formula in medical college students of Telangana region. 100 medical college students belong to 1st year M.B.B.S of Medi Citi Institute of Medical Sciences, Medchal Mandal, Ranga Reddy District, during December 2007 to February 2008. All the medical students; height and length of right and left tibia were recorded separately. Measurements of the length of the right and left radius were taken separately for calculation. The data was analysed statistically SPSS software version-19 for calculation of Mean, SD, correlation coefficient, regression coefficient, the value of constant and 't' test for the correlation coefficient. Out of 100 students participated and out of which 70 were female, and 30 were male students. The average height of student was 166.21 ± 8.11 cm and the length of tibia was 36.91 ± 1.81 cm. This exercise may be useful in all medico-legal examinations and anthropometry procedures. However further studies are needed to validate this equation in large scale.

KEY WORDS: Body Stature, Percutaneous Tibial Length (PCTL), Regression equation.

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INTRODUCTION

Body Stature is defined as height of the body in upright position and is an inherent character and is considered as one of the important parameters of personal identification [1]. Identification of a human body from decomposed or mutilated due to natural disasters is an essential for all medico-legal scenarios and humanitarian grounds [2]. Generally body stature will be estimated by either anatomical method or mathematical way. To compute the living body height of a person by using an anatomical method, rectification

factors that recompense for soft tissue requires being added [3-5]. Patel MP et al. [6] has established the alliance between body stature and dimensions of various parts of the body. Karl Pearson [7] was the first man to estimate body stature through regression equation. Suman Babu.R [8-9] has also studied body stature using forearm bones ulnar and radius bones. To this rationale, we estimated the body stature using percutaneous tibial length using regression formula in medical college students of Telangana region.

MATERIALS AND METHODS

The present study comprised of a total 100 Medical college students belongs to 1st M.B.B.S of Medi Citi Institute of Medical Sciences, Medchal Mandal, Ranga Reddy District, during December 2007 to February 2008.

Their age ranged between 18 to 23 years. Institutional Ethics Committee approved the study protocol. The students with significant systemic diseases, history of previous bone fractures, orthopaedic malformation, and subjects with any obvious congenital deformity of spine or extremities were excluded from this study. All the medical students; height and length of right and left tibia were recorded separately.

The standing height of the subject was measured with the help of a Stadiometer. Then the tibial length of each subject was measured. The subject was asked to stand and keep his foot on a wooden stool. The angle between flexor surface of leg and thigh was maintained at 90°. The two points were marked using skin marking pencil on a tibia. The upper point was the medial most superficial point on the upper border of the medial condyle, and the lower point was the tip of the medial malleolus. The space between the two points was measured in centimetres using the spreading calliper. The tibial measurements were taken at a fixed time of a day at around 10 a.m to eliminate the diurnal variation.

Measurements of the length of the right and left radius were taken separately for calculation. The data was analysed statistically SPSS software version-19 for calculation of Mean, SD, correlation coefficient, Regression coefficient, the value of constant and 't' test for the correlation coefficient.

RESULTS

Table 1: Stature and length of tibia of medical students

Parameter	Height (cm)	Tibial (cm)
Females	156.98±7.67	33.93±1.86
Males	166.74±9.09	36.87±1.72
p-value	p<0.05	p<0.05

Table 2: Formulation of regression formula for calculating the stature from the length of tibia

Observations	Height
Independent variable (x)	Length of Tibia (x1)
Intercept (a)	29 to 39
Coefficient of determination (R2)	0.0058
Regression formula: $y = a + bx$	$Y = 0.018 * X + 34$

A total of 100 students participated and out of which 70 were female, and 30 were male students. The average height of student was 166.21±8.11 cm and the length of tibia was 36.91±1.81cm.

DISCUSSION

Indian subcontinent, the population was subdivided into various castes and tribes and resides in various states. The stature not only differs from state to state but also varies according to different castes. But there were limited studies about anthropometric-relationship between the length of tibia and body stature [10-11]. Establishment of stature requires special attention in cases where bodies are found in highly decomposed, and mutilated state, or only fragmentary skeletal remains are available. As per Bhavna S et al. [12-13] regression equations provide greater reliability in estimated stature, we conducted the present study on South Indian medical college students to correlate the percutaneous tibial length with body height in different stature groups. Pearson K [14] had calculated body stature mathematically in French cadavers from the right side tibial length, whereas the present study was carried out in Indian living subjects in which the tibial length of right and left side were considered. Allbrook David [15] has compared the estimated stature in British male population derived from the length of dried tibia and the estimated stature from the percutaneous tibial length and found no significant difference. Rani M et al. also found the considerable optimistic relationship of percutaneous tibial length (PCTL) with body height in males [16]. Our study results were also found similar to Prerna Gupta et al. [17] who has estimated in Stature in Living North Indian Males.

CONCLUSION

There is a positive correlation between stature

and length of the tibia. Simple linear regression equation so far derived can be used for estimation of height in Telangana area. This exercise may be useful in all medico-legal examinations and anthropometry procedures. However further studies are needed to validate this equation in large scale.

Conflicts of Interests: None

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