Estimation of Height from the Length of Radius in Western Region of Maharashtra

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Research Article

Abstract: An attempt has been made to find out correlation and to drive a regression formula between the length of radius and height of an individual, in western region of Maharashtra. The material consisted of 200 undergraduate and post-graduate medical students of age group 20 to 30 years from western region of Maharashtra. The length of radius is measured by asking the subject to flex the elbow joint. Flexor surfaces of arm and forearm made an angle of 90 degree. Two points were marked with skin marking pencil, one on the upper edge of head of the radius and other on the tip of styloid process of radius and the distance between two points was measured by spreading caliper, both side radius length was taken. Height of the subject was measured with standard height measuring instrument in anatomical position. The results obtained were analyzed and attempt was made to derive a formula between length of radius and total height of an individual. The result shows that there is definite correlation between the two.

Keywords: Anthropometry, Spreading Caliper, Radius, Total height, Correlation.

Introduction

Anthropometry literally means "measurements of humans". It is systematized art of measuring and taking observations on man, his skeleton, his brain, or other organs, by the most reliable means and methods for scientific purposes. The regulations, divisions, indices, boundaries and classification it presents are all man-made and conventional, not natural. Racial and ethnic variations are reported to have an effect on the stature and length of long bones in an individual. There are no universally applicable formulae to express relationship between stature and long bones of an individual. Paul Topinard (1885)-he for the first time worked on sexual dimorphism. Worked on humerus, radius, femur and tibia. Rollet E (1888)- Worked on cadavers, Pan N (1924), Nat B.S (1931), Mendes Correa A.A (1932)- Living stature is 20mm shorter than the cadaveric stature. Telkka A (1950)- Expressed that each racial group will need a separate formulae. Paul Topinard (1885)-he for the first time worked on sexual dimorphism. Worked on humerus, radius, femur and tibia. Rollet E (1888)- Worked on cadavers, Pan N (1924), Nat B.S (1931), Mendes Correa A.A (1932)- Living stature is 20mm shorter than the cadaveric stature. Telkka A (1950)- Expressed that each racial group will need a separate formulae.

Aim and Objectives

Formulae derived for estimation of stature by the western workers are not suitable for Indian population as these formulae involve an error of 5-8%. So it was essential to evolve specific formulae for Indian population. In India, Maharashtra is a big state where climatic conditions and nutritional status vary in different regions, western Maharashtra, Vidharbha, and Marathwada. Therefore, we opted to work on western region of Maharashtra. The present study is aimed

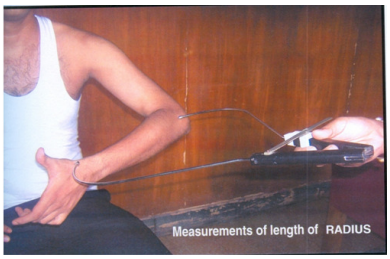
To derive stature from the length of radius. Sidewise comparison of length of radius in both male and females.

Material and Method

Equipments used are as follows

Anthropometer, Spreading caliper, Skin marking pencil

The subjects consisted of 200 undergraduate and post-graduate medical students. Age group between 20 to 30 years from western region of Maharashtra. Measurements were taken at a fixed time, to avoid diurnal variations. Any obvious deformity or limb defects were not included. Height of the subject was measured with standard height measuring instrument in anatomical position. Length of radius is measured by asking the subject to flex the elbow joint. Flexor surfaces of arm and forearm made an angle of 90 degree. Two points were marked with skin marking pencil, one on the upper edge of head of the radius and other on the tip of styloid process of radius and the distance between two point was measured by spreading caliper, both side radius length was taken.



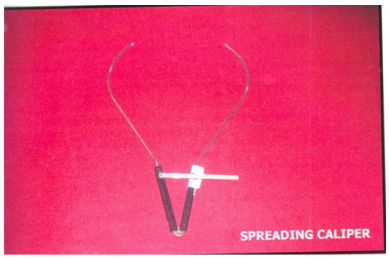


Table 1: Genderwise Comparison of Various Variables

Variable	Group				Unpaired t-test applied	
	Male		Female		t- value	p-value
	Mean	SD	Mean	SD		
Age	25.16	2.74	25.48	2.73	-0.826	0.410
Height (CMS)	173.8	8.80	157.6	7.98	13.611	3.30E-30
Radius (Right Side)	26.24	2.12	23.99	1.65	8.397	8.70E-15
Radius (Left Side)	26.13	2.15	23.89	1.67	8.233	2.40E-14

Difference in height between male and female works out to be statistically significant.

(**p = 3.30E-30).**Difference in length of right radius of male and that of female is statistically significant. (**p = 8.70E-15).** It is same with left side as well

Correlation - Coefficient

Parameters (Male)	**Correlation - Coefficient**
Age and height	-.226, P = 0.024
Radius (right side)	0.846, P = 1.70e-28
Radius (left side)	0.829, P = 1.60e-26

Parameters (female)	**Correlation - Coefficient**
Age and height	0.032, P = 0.750
Radius (right side)	0.675, P = 1.40e-14
Radius (left side)	0.642, P = 6.30 e-13

Age has no correlation with height while, height shows positive and significant correlation with radius on right and left sides. The correlation- coefficient **(r)** in males between height and length of right radius is **0.846**, while for the left side is **0.829**. Similarly in females correlation ---- coefficient (r) between height and length of right radius is **0.675**, while for the left side is **0.642.**

Regression Equation

For male: $\mathbf{Y = a + bx_1}$

Y = Height of individual

a = Intercept

b = Regression – coefficient

X_1 = Length of radius

For Female: $\mathbf{Y = a + bx_2}$

Estimated values of regression co-efficient are found to be satistically significant at 5 per cent level of significance for right as well as for left radius. For estimation of height from **length of radius of right and left sides can be attempted** by substituting values of right radius length and left radius length measured from the subjects.

Discussion

Formulae derived for estimation of stature by the western workers are not suitable for Indian population as these formulae involve an error of **5-8%**. So it was essential to evolve specific formulae for Indian population. No data, was available only on derivation of height from length of radius, and specially on western region of Maharashtra**.** From the above discussion it is now much clear that if either of the measurement (height of a person or total length of radius) is known than the other can be calculated and this can be use for medico-legal investigation and anthropometry.

References

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