Original Article

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Estimation of Stature among Tribal Males from the Measurements of Digit Length in Udaipur District of Rajasthan

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Abstract

Background: Estimation of stature has a very significant role to play in forensic anthropometry for personal identification. Present study is undertaken to derive regression equations for estimation of stature from digit length.

Material and methods: Present study was carried out on 481 males subjects among the tribal population of Udaipur district. The stature and digit length were calculated and the data was analyzed statistically and the regression equations were derived.

Result: The correlation between height and digit length in Tribals of Udaipur was found correlation coefficient (r) as 0.0519 for right digit and for left digit it was 0.0473 and for combined digit length 'r' was 0.0496 in males.

Conclusion: The present study revealed that the Digit length in males was highly significant of right and left sides ($p < 0.05$). There was a high correlation between right & left side digit length of males (0.999). There was a very low correlation between digit length of males of right (0.051) and left (0.047) sides with the stature.

Keywords: Stature; Digit Length; Male.

Introduction

Anthropometry is an important tool of physical anthropology for obtaining different measurements like stature on the living as well as dead (skeleton and skeletal remains) of man using scientific method. Estimation of stature has a very significant role to play in forensic anthropometry for personal identification. Even anatomists and anthropologists apart from forensic experts have shown keen interest in estimating the height of an individual by measuring different body parts like digit length & foot length, hand length. Important differences between various ethnic groups have been studied in detail by comparing relationship between segments of body and which has been shown to be related to life style and locomotion. Body segments prediction is of utility in many fields of modern science. The relationship among body segments and height is used in assessing growth in normal individuals as well as in people suffering from specific syndromes such as marfan,s syndrome. In the events of accidents, murders or natural disasters, stature estimation of a person from the remains of skeleton or mutilated or amputated limbs has a very important role in personal identification. In the absence of complete evidence the relationship between specific dimensions of body and proportions are used to solve crimes. And it has been showed that stature can be estimated from a shoe left at the scene of a criminal offense. Likewise, victim's stature can be estimated when a body part, such as hand or a long bone, is al that corpse [5]. The biological profile of an individual is an inherent traits such as sex, age, ethnicity and stature can be determined with the help of anthropometry [3]. Therefore this study was carried out to assess and correlate the digit length and the stature to predict the stature of an individual by digit length using regression analysis.

Materials & Methods

The study design of the current study is Cross-sectional descriptive type. In the present study samples were collected from the tribal community in Udaipur district. The study was conducted on a total number of 481 tribals males (including Bhil, Meena, Damors, Sahariyas, Gaduliya lohars, Garsias) of the Udaipur Region. Sliding vernier

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calipers was used for the measurements of digit length. Staturemeter was used for vertical height measurement.

Inclusion Criteria Tribal males of age group 18-32 years, and who were born & brought up in the tribal community of the Udaipur region.

Exclusion Criteria Males having physical deformity, injury, disease, fracture, amputation or record of any surgical procedures affecting stature and digit length were excluded from the study.

The data obtained was subjected to statistical analysis to derive the mean, standard deviation, correlation coefficient, regression coefficient. For testing the level of significance t test was applied. The following dimensions were measured based on the specific anatomical landmarks and the values were measured in millimeters.

Stature: It is the vertical distance between the highest point on vertex and the floor. The subject was made to stand barefoot on the foot place of the stature meter in an erect posture with the hands hanging down on the sides with the palm facing the thighs. Subject was asked to maintain upright posture and the movable piece was kept on the vertex and the height was recorded in millimeter.

Digit length (Middle finger): It was measured straight distance on the ventral surface of the hand from the midpoint of the proximal finger crease to the tip of the middle finger.

Ethical Clearence

- Ethical clearance obtained from the ethical committee.
- Ref: GU/UEC/EC/2013/312

Results

Table 1 Shows descriptive statistics for height and weight various parameters studied in males. The average stature of males was 1613.457 ± 72.096 mm and ranged between 1426 to 1800 mm.

Table 2 Shows Digit Length measured approximately 79 mm & ranged between approximately 60 to 98 mm in males.

Table 3: Paired Samples t-Test & Pearson Correlation showing statistical difference between Right and Left Digit Length in Males

Paired Samples	t	Df	Sig.(2-tailed)	Pearson Correlation
Male Right Digit Length-Male Left Digit Length	18.401	480	.000**	.999**

** Statistically Highly Significant at the Level (0.01 & 0.05)

To assess the statistical differences between the observations of right and left Digit Length in males, paired sample t test was performed and thus null hypothesis was rejected. The Digit length in males was highly significant of right and left sides. There is a high correlation between right & left side digit length of males as observed in Table 3.

Table 4: Correlation between the Stature and Right & Left Digit Length Parameters studied in Males

Parameters	Male Right Digit Length	Male Left Digit Length
Pearson Correlation	0.051	0.047
Sig.(2-tailed)	0.256	0.301

To assess the statistical differences between the observations of right and left digit length in males, Pearson Correlation was performed. There is a low correlation between digit length of males of right and left sides with the stature as observed in Table 4.

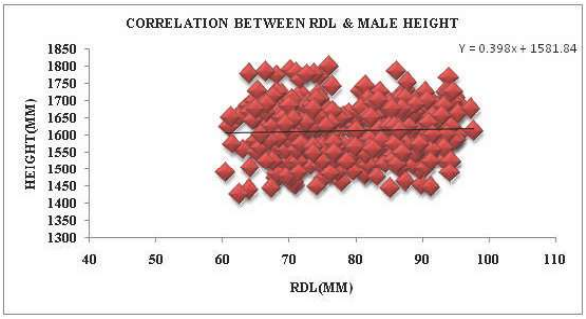

Fig. 1: Showing Correlation between Right Digit Length and Height in Males

Height = 1581.84+ 0.398 × Right Digit Length ± 72.074

Table 1: Descriptive Statistics of Height & Weight Studied in Males

Column	Size	Mean	Std. Dev	Std. Error	Range	Max	Min	Median
Height	481	1613.457	72.096	3.287	374	1800	1426	1621
Weight	481	56.89	11.495	0.524	46.07	88.13	42.06	53.29

Table 2: Descriptive Statistics of Right & Left Digit Length Studied in Males

Column	Size	Mean	Std. Dev	Std. Error	Range	Max	Min	Median
Male Rdl	481	79.3	9.382	0.428	37.18	97.68	60.5	79.84
Male Rdl	481	78.924	9.426	0.43	38.03	97.38	59.35	79.24

The figure 1 shows Regression Formula. Value of constant is 1581.84, Regression coefficient is 0.398 and standard error is 72.074.There was positive but very low correlation between height and Right Digit length in males (Fig. 1).

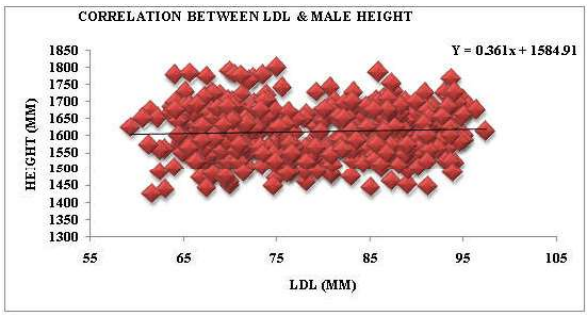

Fig. 2: Showing Correlation between Left Digit Length and Height in Males

Height = 1584.91+ 0.361 × Left Digit Length ± 72.091

The figure 2 shows Regression Formula. Value of constant is 1584.91, Regression coefficient is 0.361 and standard error is 72.091. There was positive but very low correlation between height and Left digit length in males (Fig 2).

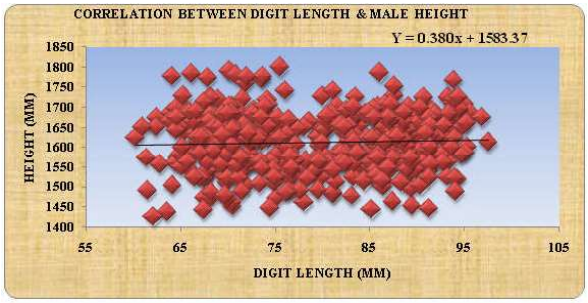

Fig. 3: Showing correlation between Digit Length and Height in Males

Height = 1583.37 + 0.380 × Digit Length ±72.083

Fig. 3 shows Regression Formula. Value of constant is 1583.37, Regression coefficient is 0.380 and standard error is 72.083. There was positive but very low correlation between height and digit length in males.

Discussion

Comparative Analysis of Various Studies Conducted on Estimation of Stature from Digit Length:

Digit Length (Middle finger)

In 2013 Shivakumar A.H. [1], studied correlation between height and right digit length in males of Karnataka and found correlation coefficient(r) as 0.35 for right digit length. The correlation coefficient between stature and right middle finger were found to be positive and statistically highly significant ($p<0.01$).

In 2014 Gayathri [2] studied correlation between height and digit length in individuals of Andhra Pradesh and found correlation coefficient (r) as 0.46 for right digit and r for left side was 0.489 in males where as in females it was 0.564 for right side and 0.6 for left side in females.

In 2014 Suseelamma D. [3], studied correlation between height and digit length in individuals of Andhra Pradesh and found correlation coefficient (r) as 0.359 for right digit and r for left side was 0.360 in females. There was significant difference ($p<0.001$) between stature of male and female subjects. Similarly significant difference ($p<0.001$) existed between male and female finger length.

S. No.	Population	Sex	Area	Author	Yr	Regression Equation	See	Value of R
1	Medical Students	M	South India	Shivakumar [1] A.H.	2013	H= 52.02+1.47(Right middle Finger Length)		
2	Individuals	M	A.P.	M. Gayathri [2] et al.	2014	H=107.08 + 6.80 × Right Third Digit Length	6.82	0.46
	Individuals	M	A.P.	M. Gayathri [2] et al.	2014	H=114.76+ 7.07 × Left Third Digit Blength	6.71	0.489
3	Individuals	F	A.P.	M. Gayathri [2] et al.	2014	H=97.77 + 7.97 × Right Third Digit Length	6.53	0.564
	Individuals	F	A.P.	Gayathri [2] et al.	2014	H=93.51 + 8.49 × Left Third Digit BlengtH	6.32	0.6
4	Medical Student	M	A.P.	Suseelamma. D [3]	2014	H= 80.762+7.994 × Right middle Finger Length H= 84.902+7.646 × Left middle Finger Length		
5	Medical Student	F	A.P.	Suseelamma. D [3]	2014	H= 122.023+3.54× Right middle Finger Length H= 84.902+3.15 × Left middle Finger Length		0.359 0.36
6	Tribals	M	Udaipur	Present Study	2016	H= 1581.84+0.399×RDL H= 1584.914+0.362×LDL H= 1583.37+0.380×DL	72.074 72.091 72.083	0.051 0.047 0.0496

A significant correlation was observed between finger length and stature. Pearson correlation between finger length and stature was higher among males than females.

In the present study we have noted the correlation between height and digit length in Tribals of Udaipur and found correlation coefficient (r) as 0.0519 for right hand and for left hand it was 0.0473 and for combined digit length 'r' was 0.0496 in males.

Conclusion

In the present study, following conclusions were derived these were:

1. The mean (mm) and S.D. of Digit Length measured of right side was 79.3 ± 9.382 and left side was 78.924 ± 9.426 in males.
2. The Digit length in males was highly significant of right and left sides ($p < 0.05$).
3. There was a high correlation between right & left side digit length of males (0.999).
4. There was a very low correlation between digit length of males of right (0.051) and left (0.047) sides with the stature.

Conflicts of Interests: None

References

5. Shivkumar AH, Raju GM, Vijaynath V. Prediction of stature by right middle finger length of males among south Indian population. Journal of Pharmaceutical and Scientific Innovation. 2013;2(1):31-3.
6. Matheswaran Gayathri, Vallabhajosyula Ranganath. Digit length displays a significant fraction in stature estimation: A study from coastal region of south India. International Journal of Anatomy and Research. 2014;2(2):336-39.
7. Suseelamma D, Gayathri P, Deepthi S, Chandra MM, Uday Kumar M, Amarnath. Study of Correlation between Stature and Length of Fingers. Scholars Journal of Applied Medical Sciences. 2014; 2(2D):773-84.