Original Article

Study of Estimation of Height By Measuring Foot Length

Height Estimation by Measuring Foot Length

Muhammad Asif[1], Azhar Masud Bhatti[2], Tanveer Hussain[3], Zubia[4] and Sadaf Nadir[5]

ABSTRACT

Objective: To study of estimation of height by measuring foot length.
Study Design: Correlational and experimental study.
Place and Duration of Study: This study was conducted at the Department of Forensic Medicine, Sialkot Medical College, Sialkot from January 2018 to June 2018.
Materials and Methods: In this study samples size of 163 female were taken. Students were selected through non probability purposive sampling method from students of Sialkot medical college. Data collected was analysed by SPSS version 23. Regression equation helps to estimate height of an individual.
Results: Results indicated that there is strong positive correlation between foot length and height.
Conclusion: Regression equation can be used to estimate height when only foot is available as a result of man or nature caused disaster.

Key Words: Correlation, Height, Foot Length

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INTRODUCTION

Height is one of the criteria that helps in shortening the list for individuality. Its estimation is especially helpful in situation where an amputated body part is available. One can estimate the body height from the length of legs, pelvis, vertebral column and skull is summed up to give height of a person. Height varies in different communities as well as various individuals of same community[1]. Correlation of various measurements of different has long been studied and utilized in various fields of life especially arts and forensic scientists. Extensive studies have been made to study prediction of height by measuring length of foot, hand long bones, index finger etc. Ossification and maturation in the foot occurs earlier than the long bones and therefore, during adolescence age, height could be more accurately predicted from foot measurement as compared to that from long bones [2,6].

[1.] Department of Forensic Medicine, Sialkot Medical College, Sialkot.
[2.] Department of Forensic Medicine, Rahbar Medical and Dental, Lahore.
[3.] Department of Forensic Medicine Fatima Jinnah Medical College Lahore.
[4.] Department of Forensic Medicine LGH, Lahore
[5.] CMH Lahore.

Correspondence: Dr. Muhammad Asif, Assistant Professor of Forensic Medicine, Sialkot Medical College, Sialkot.
Contact No: 0331-6728473
Email: drasif_hameed@hotmail.com

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To individualize a disfigured, putrefied and skeletanized body has become an important need of now a days because natural and man caused disasters are being taken place at a greater rate than before[3,9].
Height of a person relies upon age, ethnicity, social and cultural factors [4]. Height is one of the most widely used body measurement .It not only helps in individuality but also gives information about health of an individual as well as community[5]. There are many advantages to use data of height. It is easily available especially when other criteria is not available for height measurement. Researchers have routinely used height as an indicator for both population health and early life conditions.[11] There are more chances for the availability of foot which is usually covered with shoes from a blast, disaster or air crash[6,7,8].

MATERIALS AND METHODS

It was a correlational study conducted at the department of Forensic Medicine, Sialkot Medical College, Sialkot from January 2018 to June 2018.
Sample Size: According to correlational sample size formula sample size is 62.Which was increased to 163.
Sampling Technique :Females were selected through nonprobability purposive sampling method from students of DPT and H& D and Third year MBBS Sialkot medical college Sialkot. **Samples Selection**: Inclusion criteria1)Females. 2)Students.
Exclusion criteria: Those having a foot, leg or spinal column defect were not included.
Data Collection: Only female students fulfilling the requirements and were asked to take part in the study. Details of study were explained and after their consent their height was measured from top of head to the heal

on standing position. Then each foot length from tip of the big toe to the back of heel was measured in centimeters with the help of measuring tape. All measurements were taken from 9 am to 1 pm.

RESULTS

The results of correlation and regression indicate that there is strong positive correlation between height and foot length. The value of correlation coefficient between height and right foot length is 0.785 and that between height and left foot length is 0.798. The p value in both cases is less than 0.001 which is far less than 0.05. Coefficient of determination between RFL and height is 0.616 and 0.637 between LFL and height. The descriptive statistics are given in table 1. Correlation between height and Right Foot Length describe in table 2 while correlation between height and Length Left Foot Length in given table 3.

Table No 1: Descriptive Statistics

	N	Min.	Max.	Mean	Std. Deviation
Height	163	145.00	179.00	161.1448	7.39991
Right_foot_length	163	21.00	29.00	24.1988	1.45054
Left_foot_length	163	21.00	29.00	24.1933	1.45666
Valid N (listwise)	163				

Table No:2: **Correlation Between height and Right foot length (RFL)**

		Height	Right_foot_length
Height	Pearson Correlation	1	.785**
	Sig. (2-tailed)		.000
	N	163	163
Right_foot_length	Pearson Correlation	.785**	1
	Sig. (2-tailed)	.000	
	N	163	163
**. Correlation is significant at the 0.01 level (2-tailed).			

Table No. 3 :**Correlation Between height and Left foot length (LFL)**

		Height	Left_foot_length
Height	Pearson Correlation	1	.798**
	Sig. (2-tailed)		.000
	N	163	163
Left_foot_length	Pearson Correlation	.798**	1
	Sig. (2-tailed)	.000	
	N	163	163
**. Correlation is significant at the 0.01 level (2-tailed).			

Detail of F and T value of RFL and LFL are given 4. Correlation between foot length and height of different studies with our study given table 5.

Table No: 4. F and T values

	F value	T value
	258.64	
Constant		10.64
RFL		16.08
	282.70	
Constant		10.78
LFL		16.81

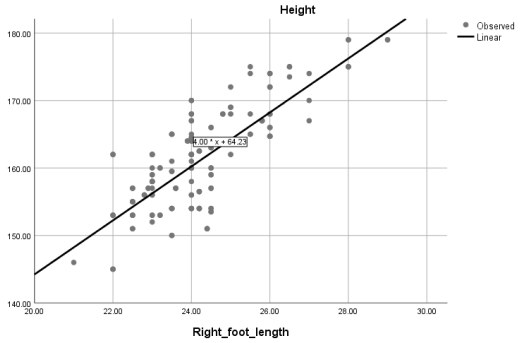

Figure No.1: Regression equation between height and RFL.

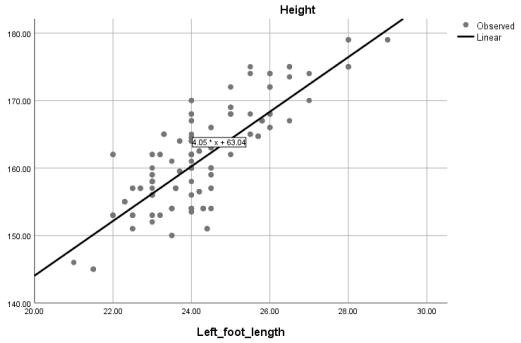

Figure No. 2: Regression equation between height and LFL.

Table No 5: various studies carried out for correlation between foot length and height.

Sr. #	Researcher	Value of r between RFL and height	Value of r between LFL and height
1	This study	0.785	0.798
2	Hemy et al 2013	0.70	0.70
3	Shah et al 15	0.709	-
4	Uhrova et al 15	0.71	0.71
5	Srivastava and Yadav 14	-	0.71
6	Agarwal et al 15	0.7025	0.7027
7	Parish et al 2013	0.696	0.708
8	Bharti et al 16	0.75	0.729

Figure 1 shows regression equation between height and RFL. Figure 2 shows regression equation between height and LFL.

T value of both coefficients also indicates that all values of coefficients are good for prediction purpose. Similarly F is equal to 258.64 and 282.70 indicating that overall models are good for prediction.

DISCUSSION

Many previous studies have such a strong positive correlation such as studies carried out by[12-17,21-24]. Various studies done in this respect are denoted in table 5 of result.

As there is difference between growth rate of males and females so that there is difference between average height so that an equation of regression for females cannot be used for prediction of male height[18]. Standard error of estimate is 4.59 and 4.47.The lowerer the SEE the more reliable results will be[9]. It also denotes more accuracy of equation[19,20]

CONCLUSION

The results of this study indicate that regression equation can be used to estimate height of a fragmented body found during disaster or bomb blast.

Author's Contribution:

Concept & Design of Study:	Muhammad Asif
Drafting:	Azhar Masud Bhatti, Tanveer Hussain
Data Analysis:	Zubia, Sadaf Nadir
Revisiting Critically:	Muhammad Asif, Azhar Masud Bhatti
Final Approval of version:	Muhammad Asif

Conflict of Interest: The study has no conflict of interest to declare by any author.

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