Original Article

Correlation Between Hand Length And Stature

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Abstract

Objective: The main objective is to know the correlation between hand length and height so that a regression equation could be obtained to use for personal identification.

Method: It was a correlational study. Study center was at Sialkot medical college. Study duration was three months i.e., from April 2022 to June 2022. Only female students of Sialkot medical college were selected by non-probability purposive sampling technique. Sample size was 141. Those having any deformity of vertebral column and hand deformity were not selected. After taking informed consent measurements were taken. Stadiometer was used to measure the height and vernier caliber was used to measure hand length. The measurements were taken in inches. Descriptive data was calculated by using SPSS 25. Pearson correlation coefficient was found and regression equation was obtained. Regression curve was also obtained. Graphs and table were formed.

Results: Value of r between RHL and height was 0.780 and between LHL and height was 0.752. Conclusion: Hand length can be used to estimate height of the person helping to short list the persons to be identified.

Keywords: Linear regression, pearson correlation coefficient, regression curve, Height

Introduction

For the purpose of art of making pictures calculating measurements of various parts of the body has been used since hundreds of years before Christ. Later on in seventeenth century it was used in medical profession.[1] Different biological characteristics used to help get positive identification, like standing height and weight also help to get information about growing up of children related to their upbringing depending upon their balanced diet. It helps in assessing body surface area.[2] Short height has more chances of developing faster heart rate. A single regression equation cannot be used universally because sex and environment impacts the length

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and breadth of hand. These measurements can be used to predict the height of a person.[3]

Height also helps to assess normal physical growth of the children and young and effects of balanced diet on different biological characteristics of a person.[4,5] It is easy to measure standing height if a person is free from any deformity of vertebral column, disease or lose of limb. But in these conditions standing height cannot be obtained then other reliable way can be used to estimate standing height like by measuring hand length, foot dimensions, length of various bones and different dimensions of other parts of the body.[6] Various measurements of hand give a dependable source to estimate standing height and give a predicted value very close to actual height.[7,8] To construct standing height different body parts, play a pivotal part like spinal bones, lower limb, and head. They are different for people living in different geographical areas of the world[9]. There are two main methods utilized to estimate height i.e., anatomical and mathematical. The second method derives estimation of height either by regression equation or multiplication factor. In forensic medicine when only a part of body is available as a result of disaster.[10] regression equation

can be reliably used to estimate height. In a study carried out in India a very strong and statistically positive correlation was found between hand length and height.[11] In another study value of r was found to be 0.639 in males and 0.571 in females.[12] In India a study carried out in Karnatka concluded that there is very weak relationship between height and hand length with 0.25 value of r.[13]

Material and Methods

It was a correlational study. Study center was at Sialkot medical college. Study duration was three months i.e., from April 2022 to June. Only female students of Sialkot medical college were selected by non-probability purposive sampling technique. Sample size was calculated by using correlation formula. Sample size was 141. Those having any deformity of vertebral column and hand were not selected. After taking informed consent measurements were taken. One female student was trained to take the measurements. All measurements were taken in college hours. Every student was asked to put off her shoes and stand against the wall by keeping her feet adjacent to each other. Stadiometer was used to measure the standing height from top of head to the floor. Hand length was taken from tip of middle finger when hand was placed in adduction on the plane surface of the table, to the crease of the hand. Vernier calliper was used to measure hand length. The measurements were taken in inches. Descriptive data was calculated by using SPSS 25. Pearson correlation coefficient was calculated and regression equation was obtained. Regression curve was also obtained. P value was 0.05. Graphs and table were formed.

Results

One hundred and forty-one female students were selected to take measurements. The least height was 59.40 inches, maximum height was 66.50 and mean height was 63.26 inches. As depicted in Table-1. Value of pearson correlation coefficient between height and right hand length and left hand length is depicted in table no 2. It is 0.780 and 0.752 respectively for RHL and LHL. Regression curve along with regression equation between height and right hand length has been depicted in the (Fig-1). Regression curve along with regression equation between height and left hand length has been depicted in the (Fig-2).
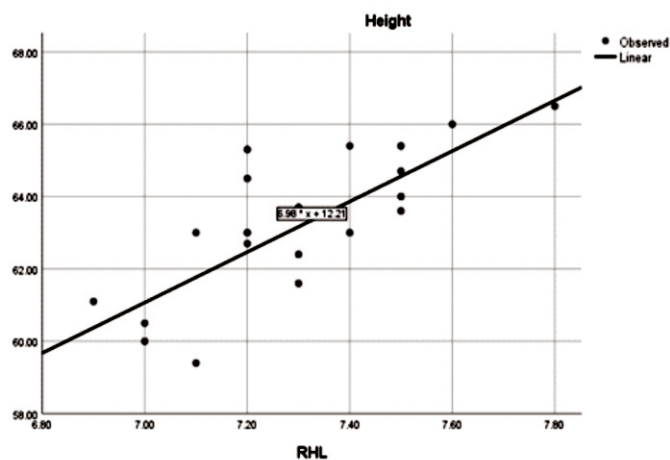
Fig-1: *Regression Curve and Equation Between Height and RHL.*
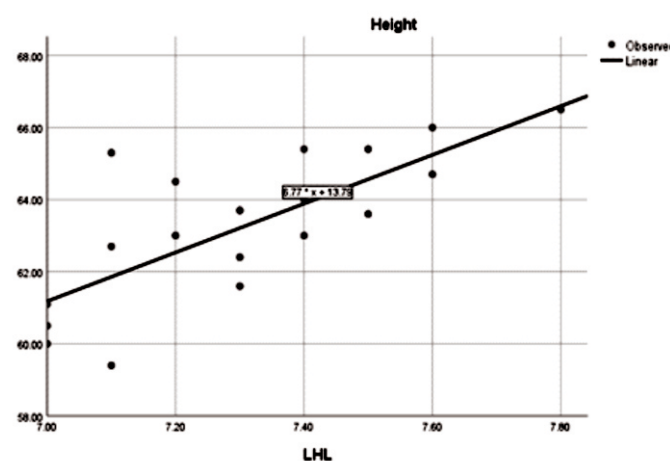
Fig-2: *Regression Curve and Equation between Height and LHL.*

Table 1: *Data describing minimum, maximum and mean values of all variables.*

	N	Minimum	Maximum	Mean	Std. Deviation
Height	141	59.40	66.50	63.2610	±1.86420
RHL	141	6.90	7.80	7.3085	±.20822
LHL	141	7.00	7.80	7.3064	±.20709

Table 2: *Value of r & F along with p value*

	Value of r	P value
Height and Right hand length	0.780	0.000
Height and Left hand length	0.752	**0.000**
	Value of F	**P value**
Height and Right hand length	216.2	0.000
Height and Left hand length	181.12	0.000

Table 3: *Value of t of regression coefficients has been depicted in*

	Value of t	P value
Height and Right hand length		
constant	3.516	.001
Right hand length	14.704	.000
Height and Left hand length		
constant	3.750	.000
Left hand length	13.458	.000

Discussion

This study indicates that value of pearson correlation coefficient is very strong indicating that hand length can be used to estimate height. Mean height of the students was 63.26 inches. Maximum height was 66.50 inches and minimum height was 59.40 inches. Mean RHL was 7.30 inches. Maximum RHL was 7.80 and minimum was 6.90 inches. Value of r was 0.780 and 0.752 between stature and right hand length as well as left hand length. In Maldives a study carried out resulted in a value of 0.7.[14] In India a study indicated a positive strong correlation with a 0.7 value of r.[15] In Bangladesh another study resulted in a very strong and statistically significant value of r i.e., 0.9.[16] A study carried out in Utter Pradesh on medical students value of r was found to be 0.644 & 0.598 for right and left hand length respectively.[17] Value of r was 0.78 & 0.77 between height and hand length (RHL&LHL). This study was carried out on Kashmiries.[18] Similarly in Malayshia 259 university students were studied. Value of r was found to be 0.7.[19] In Srilanka same value of r was seen in a study.[20] Value of F gives the information about the model whether it is statisticall significant or not.[21,22] In this study value of F was 216 & 181.12 indicating that both the model can be used to estimate height from hand length. Value of t is also indicative of reliability of each variable 23.

Conclusion

Hand length can be used to estimate standing height. The regression equation can help to estimate height for identity purpose as well as for clinical treatment of a bed ridden patient.

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Authors Contribution

MA: Conceptualization of Project

MA, AK: Data Collection

UB, SM: Literature Search

MA: Statistical Analysis

AAT, MA: Drafting, Revision

UA, AK: Writing of Manuscript