Correlation of Stature and Hand length in Adult Kashmiri Population

Sayma Samoon[1], Mohammad Saleem Itoo[2], Shaheen Shahdad[3], Neelofer Jan[1], Gousia Nisa[1], Showkat Ahmad[1]

ABSTRACT

Introduction: The human body is designed in such a way that there exists a correlation between different body segments for their proper function. Identification of an individual from human remains, mutilated bodies and fragmented body parts is an essential part of forensic investigation for identification of a person. Based on this principle in the present global situations like wars, suicide human bombing, natural disasters like earthquakes, fires, floods and tsunamis, where identification of human body is done from amputated, mutilated and disintegrated body parts. Study aims and objectives were to establish a correlation between hand length and stature in adult Kashmiri population.

Material and Methods: Total 156 healthy Kashmiri subjects in the age group of 20 - 45 years which included 78 males and 78 females were included in this study. The hand length and height of every subject was measured using standard methods.

Results: obtained were statistically significant and showed a positive correlation between height and hand length.

Conclusion: There exists a correlation between hand length and stature of an individual which may be used by forensic experts to establish identity of persons in situations where bodies are mutilated and body parts are fragmented.

Keywords: Hand Length, Height, Identification, Kashmiri Population, Nomogram, Stature, Regression Formula.

INTRODUCTION

Stature can be used for identification of a person even after mutilation and putrefaction by medico legal experts in jurisprudence when a complete dead body is found. Estimation of stature is possible by measuring length of long bones.[1-6] But determination of stature from fragmented body parts is not an easy job even for experts.[7] Estimation of stature from skeleton remains, fragmented body parts, amputated limbs or parts of limbs has definite medico legal significance in situations like natural disasters, accidents and major fires where identification becomes difficult. Human growth and development is affected by many factors like race, nutrition, ethnicity, so nomograms are population specific.[8] Till date most of the workers have described the relation of stature with anatomical structures like length of limb bones such as humerus, radius, tibia and fibula etc. Very little is known about the correlation of hand length with the stature in Kashmiri ethnic population. Since Kashmir being a conflict zone where identification at times may become difficult and is done from the body fragments. Hence the present study was undertaken to establish the correlation of hand length with the stature in adults of Kashmiri ethnicity. This study will help us in establishing a local nomogram which will prove helpful to forensic experts for establishing identity in cases where a human body is mutilated and split into fragments. Kashmir being a conflict zone where encounters are very common between militants and security forces and most of the time bodies are fragmented and identification becomes difficult. Hence this study was under taken to correlate hand length with stature with the hope that it may help in the identification.

Aims and objectives of the current research were to study the correlation between hand length and stature in Kashmiri population and to devise a method for identification of individuals from the remains of body parts like hand.

MATERIAL AND METHODS

The present study was carried out in Government Medical college Srinagar, 156 (78males; 78 females) right handed healthy individuals belonging to different departments of College between 20-45 years of age and of Kashmiri origin were included in this study. Detailed medical history and clinical examination of the subjects was done to rule out any disease or deformity that could have affected the general or bony growth. The height and hand length of these subjects was measured. The height was measured using standard Stadiometer in a standard standing position with head oriented in ear-eye plane from the standing surface to the highest point on the head. The hand length was measured using the Sliding Caliper from the proximal crease of the wrist to the tip of middle finger when the hand was held straight and stretched. To minimize subjective errors all the measurements were taken 2 times and then mean was taken.

STATISTICAL ANALYSIS

The data thus obtained was subjected to statistical calculations using SPSS computer programmer to derive linear regression equations.

RESULTS

In this study total 156 subjects were taken which included 78 males and 78 females. Hand lengths of right hand (n:156) and left hand (n:156) and height of individuals (n:156) was measured. Mean hand length of right hand (Rh) and left hand

[1]Post Graduate Scholar, [2]Associate Professor, [3]Professor and Head, Post Graduate, Department of Anatomy, Government Medical College, Karan Nagar, Srinagar

Corresponding author: Dr. Mohammad Saleem Itoo, Associate Professor of Anatomy, Government Medical College, Srinagar, Jammu & Kashmir India.

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Descriptive Statistics				
	N	Minimum	Maximum	Mean
Ht_RtRatio	156	8.055556	11.29252	9.088841
Ht_LtRatio	156	8.055556	11.06667	9.010566
Valid N (listwise)	156			

Table-1: Mean hand length of Right and Left hand

Correlations				
		ht	**rh**	**lh**
Ht	Pearson Correlation	1	0.787941	0.777245
	Sig. (2-tailed)		3E-34	8.48E-33
	N	156	156	156
Rh	Pearson Correlation	0.787941	1	0.985292
	Sig. (2-tailed)	3E-34		4.4E-120
	N	156	156	156
Lh	Pearson Correlation	0.777245	0.985292	1
	Sig. (2-tailed)	8.48E-33	4.4E-120	
	N	156	156	156
**. Correlation is significant at the 0.01 level (2-tailed).				

Table-2: Correlation of right hand and left hand length with height

(Lh) were calculated and correlated with the height as shown in the table below. A statistically significant correlation was found between hand length of right (0.787941) and left (0.777245) hand with the stature (Ht) of person as shown in the table 1 and 2.

DISCUSSION

In the past many workers[1-5] with variable success have tried to correlate length of long bones with the height of person. While conducting these studies they faced problems like making adequate number of bones available for required sample size, availability of trained manpower for cleaning of these bones. Selection of bones for the study was also a problem.

Thakur SD et al[7] estimated height from hand length of 250 Punjabi boys between 17-25 years by deriving regression equations within the error of 3-6 cm.[7] The regression equations were derived from hand length and correlated it with stature among Punjabi males.[8] An attempt was also made to derive regression formulae from hand length among 100 Nigerian adult male medical students of Jos Medical School, Nigeria and the results showed significant correlation between stature and hand length.[9] A study was conducted on 166 subjects and statistically analyzed the data indicating a close similarity of relationship between stature and hand measurements and also derived the regression equations.[10]

Sunil et al[11] in their study found, a significant correlation of height with hand length in both the sexes. Measurements of right side were found to be greater than the measurement of the left side, but the difference was marginal and statistically insignificant.

By applying their regression equations, the stature can be estimated within error of + 4.35 cm and + 4.26 cm for right and left side respectively in males while in females it is + 4.57cm and + 4.63 cm for right left side respectively.

The formulae devised for determination of stature from hand length would be beneficial for use in an unidentified fragmentary or mutilated part of upper limb especially hand within the standard error of estimate.

In our present study we correlated the mean hand lengths of right hand (Rh) and left hand (Lh) with the stature and found a statistically significant correlation. The observed correlation with mean length of right hand (Rh) and left hand (Lh) and stature was 0.787941 and 0.777245 respectively. These observations may be used to establish a nomogram for local Kashmiri population. Our methodology is easier than that used by earlier workers[1-5] with a limitation that it cannot be used long periods after death when soft tissues are destroyed. However the observations made in our present study are similar to those made by other workers[6-11] who correlated hand length with stature and obtained a population specific nomograms and or regression formulae.

CONCLUSION

The observation made in this study may be used to devise a nomogram which is applicable to adult Kashmiri population. It will prove useful for identification of persons from fragmented body parts.

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