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Original Research Article

A Comparative Study Analysing the Hand Measurements and Stature Amongst Both Genders

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ABSTRACT

Background: The length of long bones can have a proportionate relationship to the overall stature of the individual. Reconstruction of stature from skeletal / dismembered remains is not new for Anthropologists / Forensic experts. The present study was conducted with the aim to determine the association between stature of individual and hand measurements.

Materials and Methods: The present prospective cross sectional study was conducted enrolling 300 subjects, out of which 150 were males and 150 were females. Subjects between 18-30 years of age were included in the study. The hand length, breadth and finger length was measured by a divider, measuring scale and sliding calliper. All the data was arranged in a tabulated form and analysed using SPSS software.

Results: The present study consisted of 300 subjects, out of which 150 were males and 150 were females. The mean age of the subjects was 28.89 +/- 4.33 years. The mean height amongst females was 160.9 +/- 6.9. Mean right hand and left hand width amongst females was 7.45+/- 0.41 and 17.12+/- 0.81 respectively. The mean height amongst males was 175.1 +/- 8.5. Mean right hand and left hand width amongst males was 8.46+/- 0.52 and 8.42+/- 0.51 respectively.

Conclusion: From the above study we can conclude that there is significant variation in the anthropometric measurements amongst both genders.

Keywords: Breath, Finger, Length, Stature.

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INTRODUCTION

Forensic anthropology is considered as study of remains of human skeletal. The length of long bones can have a proportionate relationship to the overall stature of the individual.[1] Whenever a fragmentised or mutilated remain of diseased is found, the gender of the individual is not obvious. In such cases the estimation of the sex plays a crucial role in medicolegal investigations.[2] Reconstruction of stature from skeletal / dismembered remains is not new for Anthropologists / Forensic experts. A number of mathematical factors and regression equations have been used to reconstruct stature from long bones throughout the world.[3] Habib SR et al tried to find out the correlation between stature and length of hand and phalanges amongst Egyptians. Stature estimation from extremities plays an important role in identification the deceased in forensic examinations. On analysis insignificant difference was found between individuals. Gender differences were significant for all measurements. Correlation coefficients were found to be positive, but little finger measurements of male and distal phalanges of female fingers were not correlated with stature.[4] The investigation of identity is of great significance amongst victims in case of mass disasters. In forensic investigations, the dimensions of the hand and foot have been used for estimation of sex, age and stature of an individual.[5] The present study was conducted with the aim to determine the association between stature of individual and hand measurements.

MATERIALS AND METHODS

The present prospective cross sectional study was conducted in Department of Forensic Medicine, Sakshi Medical College and Research Centre, Guna, Madhya Pradesh (India) enrolling 300 subjects, out of which 150 were males and 150 were females. The study was approved by the institutional ethical board and all the subjects were informed about the study and a written consent was obtained from all in their vernacular language. Subjects between 18-30 years of age were included in the study. Subjects with congenital anomaly or any amputation were excluded from the study. The stature was measured by a stadiometer. It was measured as vertical distance from the vertex to the foot. The hand length, breadth and finger length was measured by a divider, measuring scale and sliding caliper. It was measured as the straight distance from the metacarpo- phalangeal wrist crease to the most forwardly projecting point on the middle finger. Thumb

measurements were not taken in the present study for the reason of its variable flexibility as compared to other fingers. All the data was arranged in a tabulated form and analysed using SPSS software. Student t test was used to evaluate the differences amongst both the genders. Probability value of less than 0.05 was considered significant.

Table 1: Measurements amongst the females

Variable	Mean	Standard deviation
Height	160.9	6.7
Right hand length	15.9	0.7
Right hand width	7.45	0.41
Right index finger length	6.70	0.50
Right ring finger length	6.81	0.39
Left hand length	17.12	0.81
Left hand width	7.42	0.44

Table 2: Measurements amongst male subjects

Variable	Mean	Standard deviation
Height	175.1	8.5
Right hand length	18.8	.9
Right hand width	8.46	0.52
Right index finger length	7.56	0.42
Right ring finger length	8.30	0.51
Left hand length	18.72	1.72
Left hand width	8.42	0.51

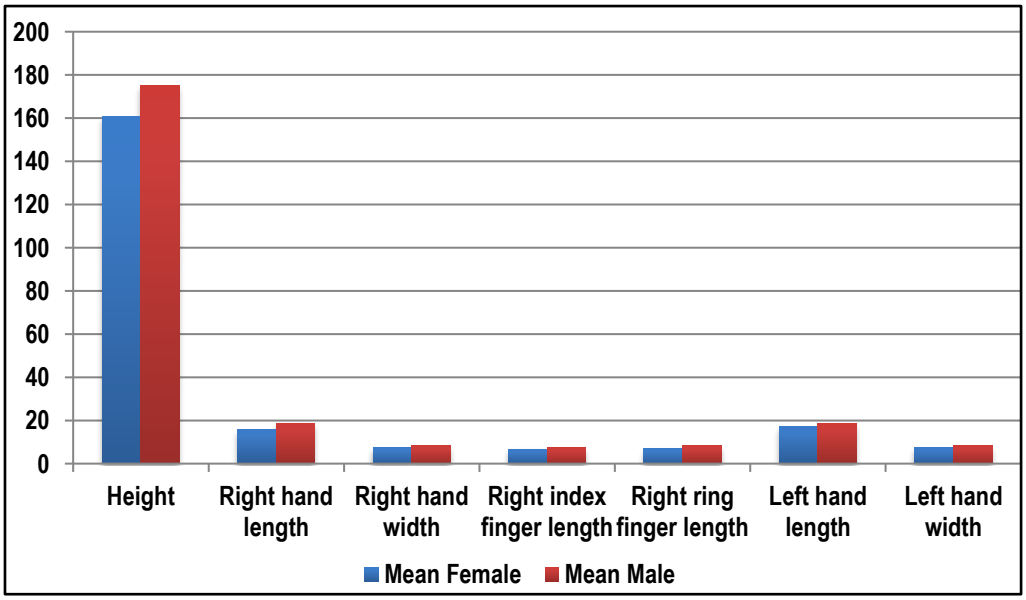
Table 3: Gender wise comparative analysis

Variable	T value	P Value
Height	11.41	<0.05
Right hand length	17.34	<0.05
Right hand width	17.82	<0.05
Right index finger length	11.56	<0.05
Right ring finger length	12.44	<0.05
Left hand length	9.25	<0.05
Left hand width	17.42	<0.05

RESULTS

The present study consisted of 300 subjects, out of which 150 were males and 150 were females. The mean age of the subjects was 28.89 +/- 4.33 years. Table 1 shows the mean measurements amongst females. The mean height amongst females was 160.9 +/- 6.9. Mean right hand and left hand width amongst females was 7.45+/- 0.41 and 17.12+/- 0.81 respectively. Mean right hand and left hand length amongst females was 15.9+/- 0.7 and 6.81+/- 0.39 respectively. The mean right index finger length amongst females was 6.70+/-0.50 and the mean ring finger length was 6.81+/-0.39. Table 2 shows the mean measurements amongst males. The mean height amongst males was 175.1 +/- 8.5. Mean right hand and left hand width amongst males was 8.46+/- 0.52 and 8.42+/- 0.51 respectively. Mean right hand and left hand length amongst males was 18.8+/- 0.9 and 18.72+/- 1.72 respectively. The mean right index finger length amongst males was 7.56+/-0.42 and the mean ring finger length was 8.30+/-0.51. Table 3 shows the comparative analysis between the males and females. On applying student t test there was a significant difference in all the variables i.e. height, hand length, width and finger measurement between males and females.

Graph 1: Measurements Mean amongst Male and Female



DISCUSSION

India is a multi-racial, multi-ethnic and multi-cultural country with vast population that have their own variations. The dimensions of the body are different in different parts of the country. The body dimensions shows inter racial and inter geographical variation and therefore there is variation in relation to stature also. Stature reconstruction from the fragmented remains like parts of limbs or other body parts is useful for the identification of the individual as these remains are common during accidents, murders, mass disasters etc. Human beings belong to a species known as homosapiens. None of the individuals in this world are exactly similar, even the monzygotic twins differ in some aspects from

each other. There are various changes that occur in these traits over a period of time as it is influenced by health and diseased state, from birth to death. Some quantitative expression should be given to these variations which are exhibited by these traits. Anthropometry resolves around that means, it is the technique of quantitatively expressing the form of the human body. In other words, anthropometry means the measurement of human beings, either living or dead or on skeletal material.[6] In cases of mass disasters the peripheral parts of the body like hands and feet are frequently found and in cases of assault the body is dismembered to hide the identity of the individual. The gender, age and stature of the individual are determined by the somatometry of the hand, osteological and radiological examination.[7] Karaman AG et al[8] studied therelationship of stature and hand measurements using anthropometric and radiological evaluation and develop equations that predict stature from the radiographic lengths and breadths of the second and third metacarpal bones. Sacngchaiyaet al[9] reported in their study that the variation in anthropometric dimensions existed between different populations of Thailand. In a study conducted by Lin YC et al[10] they compared anthropometric characteristics amongst four ethnic groups in East Asia i.e. Chinese, Japanese, Korean and Taiwanese and reported differences in ethnic groups. According to Dewangan et al[11] measured hand dimensions from the subjects of north eastern region in India, and compared these to the readings obtained in central, eastern, southern and western regions of the country and they reported that there were marked differences in the dimensions of hand between regions. Similar results were obtained in case of hand anthropometry of female subjects working as rural farm workers in Ibadan, Western Nigeria. This study was conducted by Okunribido OO.[12] Kar et al[13]also in their study reported significant difference in anthropometry and compared to subjects of other nationalities. Sanli et al[14] in their study reported that various factors i.e. heredity, economic development, socio demographic status, environment, labor structure and type of work are linked with differences in the dimensions of body and that attributes to ethnic differences. Various other factors like age, living conditions, environment, nutrition, and physical activity have also been reported by various authors.[15] Santosh Kumar, Rohin Garg et al, working on Population Of Rajasthan found correlation coefficient between height & head length were r=0.941 for Male & r= 0.85 for Female suggestive of strong positive correlation. They established definite correlation between stature and head length. If either of the measurement (total height or head length) is known, the other can be calculated. Santosh Kumar, Rohin Garg et al stated that it can help in medico-legal cases in establishing identity of an individual when only some remains of the body are found as in mass disasters, bomb explosions, accidents etc.[16]

CONCLUSION

From the above study we can conclude that there is significant variation in the anthropometric measurements amongst both genders. Length of fingers can be used in prediction of gender and hence may be used to estimate gender of the individuals when more firm means of gender estimation are not available during the medico-legal purposes.

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