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PREDICTING HEIGHT FROM PERCUTANEOUS HAND LENGTH AMONG UNDERGRADUATE STUDENTS (30TH BATCH) AT MGM MEDICAL COLLEGE & HOSPITAL IN BIHAR

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Abstract

Background: The estimation of stature through anthropometric measurements serves as a pivotal aspect in forensic investigations and medical assessments. This study aimed to assess the relationship between percutaneous hand length and stature in undergraduate students from the 30th batch enrolled at MGM Medical College & Hospital, Bihar. **Materials and Methods:** A total of 100 participants 65 Males and 35 females were included in this cross-sectional study. Percutaneous hand length was measured. The study participants were asked to stand in the anatomical position with bare foot and the height was measured with the help of stadiometer. The hand length was measured by using Vernier callipers. The variables were recorded as age, sex, hand length and height, and corresponding stature measurements were recorded concurrently. Statistical analyses was done by SPSS(ver-26), including correlation coefficients and regression models, were employed to establish the relationship between hand length and stature. **Result:** The comparative measurements of hand bone length and height between male and female students, indicating that among 65 males, the mean hand bone length was 18.88±1.45 cm, while for 35 females, the mean hand bone length was 16.83±0.71 cm.. Additionally, the average height for males (169.74 ±3.76 cm) was notably higher compared to females (166.06 ±0.91 cm), the p-values found statistical significance (<0.0001). And a strong positive correlation (Pearson's r = .928**) between hand bone length and height among the total 100 students, signifying a highly significant relationship (p < 0.0001). **Conclusion:** The study results emphasize significant gender-based variations in hand bone length and height among the student population. Males displayed longer hand bone lengths and taller heights compared to females, supported by robust statistical significance.

INTRODUCTION

Anthropometry, the measurement of various human body dimensions, plays a fundamental role in forensic science, clinical diagnostics, and biological anthropology. Estimation of stature from skeletal remains or living individuals holds substantial significance in diverse fields, including forensic investigations, anatomical studies, and clinical assessments.

Anthropometric parameters, particularly percutaneous hand length, have been proposed as reliable proxies for estimating stature. The relationship between hand length and stature has been explored in various populations, contributing to the body of knowledge on anthropometric indices and their predictive value in estimating stature.

In a study by Krishan et al., 2012, the relevance of hand length in stature estimation among diverse populations was emphasized, indicating its potential in forensic contexts. Additionally, the research conducted by Trotter and Gleser, 1952, underscored the correlation between hand length and stature, laying the groundwork for subsequent investigations in this area.[1,2]

However, despite existing literature supporting the association between hand length and stature, population-specific studies are essential to establish precise equations for stature estimation within distinct demographic groups. Furthermore, comprehensive investigations exploring this

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relationship among specific cohorts, such as undergraduate students in medical colleges, remain limited in the current scientific literature.

Therefore, this study aims to assess the correlation between percutaneous hand length and stature among undergraduate students from the 30th batch enrolled at MGM Medical College & Hospital, Bihar. The investigation seeks to contribute empirical data to the existing body of research and establish a population-specific relationship between hand length and stature in this cohort.

Through rigorous measurements and statistical analyses, this research endeavors to provide valuable insights into the predictive accuracy of hand length in estimating stature among the students at MGM Medical College & Hospital, Bihar. The findings are anticipated to contribute to forensic and clinical practices by offering reliable estimations of stature based on easily measurable anthropometric parameters.

MATERIALS AND METHODS

Type of Study: This study was designed as a cross-sectional study.

Place of Study: The study was conducted in the department of FMT at MGM Medical College & Hospital located in Bihar.

Study Duration: The study was carried out over a period of 8 months from February 2023 to September 2023.

Study Population: The study population comprised undergraduate students from the 30th batch enrolled at MGM Medical College & Hospital, Bihar.

Inclusion Criteria

Undergraduate students from the 30th batch at MGM Medical College & Hospital.

Participants who provided informed consent to participate in the study.

Exclusion Criteria

Participants who did not consent to be part of the study.

Individuals with any physical condition or disability that could affect accurate measurements.

Sample Size: A total of 100 participants were included in the study, consisting of 65 males and 35 females.

Methodology: Anthropometric Measurements: Percutaneous hand length was measured using Vernier calipers, while height was measured using a stadiometer. Participants were positioned barefoot in the anatomical stance for height measurements. The measurements were taken twice to ensure accuracy, and the mean value was used for analysis.

Data Collection: Information on age, sex, hand length, and height was collected for each participant.

Data Analysis: Statistical analysis was performed using SPSS software (version 26). Descriptive statistics such as mean, standard deviation, and range were calculated for hand length and stature. Student's t-test was employed to assess differences between genders. Pearson's correlation coefficients were calculated to determine the relationship between hand length and stature. Regression models were developed to establish equations for stature estimation based on hand length.

Ethical Considerations: Informed consent was obtained from all participants, and the study protocol was approved by the Institutional Ethics Committee.

RESULTS

The table depicts that among the participants, 65 individuals were male, comprising 65.0%, while 35 individuals were female, making up 35.0% of the total Student. [Table 1]

The measurements obtained from 100 students, indicating an average age of 24.11 years with a standard deviation of ±0.87, a mean hand bone length of 18.16 ±1.58 cm, and an average height of 168.45 ±3.54 cm. [Table 2]

The [Table 3] provides comparative measurements of hand bone length and height between male and female students, indicating that among 65 males, the mean hand bone length was 18.88±1.45 cm, while for 35 females, the mean hand bone length was 16.83±0.71 cm.. Additionally, the average height for males (169.74 ±3.76 cm) was notably higher compared to females (166.06 ±0.91 cm), the p-values found statistical significance (<0.0001) for both hand bone length and height differences between genders.

The [Table 4] demonstrates a strong positive correlation (Pearson's r = .928**) between hand bone length and height among the total 100 students, signifying a highly significant relationship (p < 0.0001)

A notably strong positive correlation (Pearson's r = .934**) between hand length and height specifically within the male subset of 65 students, signifying a highly significant relationship (p < 0.0001). [Table 5]

Within the female subset of 35 students, the table indicates a strong positive correlation (Pearson's r = .751**) between hand length and height, highlighting a highly significant relationship (p < 0.0001).
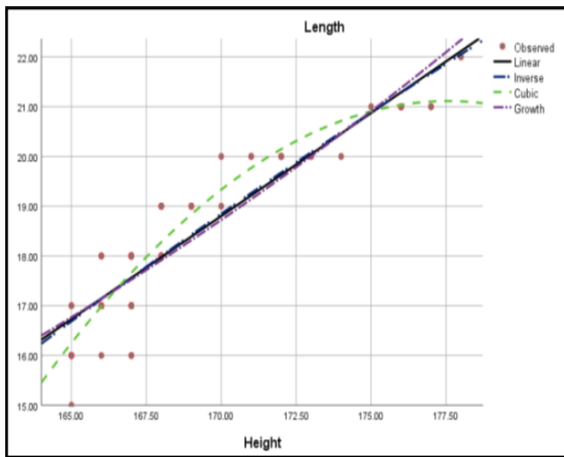
[Table 6]

Figure1: Regression curve analysis of Hand length and Height among male & Female students

Table 1: Gender Distribution

Sex Distribution	Frequency	Percentage
Male	65	65.0
Female	35	35.0

Table 2: Age, Hand bone length and Height among total students

	No of Students	Mean (cm)	Std. Deviation	Std. Error Mean
Age	100	24.1100	±0.87496	.08750
Length	100	18.1600	±1.58095	.15809
Height	100	168.4500	±3.54303	.35430

Table 3: Hand bone length and Height among Male & Female students

	Group	No	Mean (cm)	Std. Deviation	Std. Error Mean	P value
Length	Male	65	18.8769	±1.45245	.18015	<0.0001
	Female	35	16.8286	±0.70651	.11942	
Height	Male	65	169.7385	±3.76363	.46682	<0.0001
	Female	35	166.0571	±0.90563	.15308	

Table 4: Correlation between Length & Height among total students.

Correlations			
		Length	Height
Length	Pearson Correlation	1	.928**
	p Value		<0.0001
	No of students	100	100

Table 5: Correlation between Male Hand Length & Height

Correlations			
		Male Hand Length	Male Height
Male Hand Length	Pearson Correlation	1	.934**
	p Value		<0.0001
	No of students	65	65

Table 6: Correlation between Female Hand Length & Height

Correlations			
		Female Hand Length	Female Height
Female Hand Length	Pearson Correlation	1	.751**
	p Value		<0.0001
	No of students	35	35

DISCUSSION

Personal identity is crucial in medico-legal endeavours. During instances of mass catastrophe where body parts are severed, it is the responsibility of a forensic specialist to ascertain the identity of the body and facilitate its return to the relatives for the purpose of concluding ceremonies. Among the different methods of personal identification, the calculation of stature based on body component measurements is extensively employed by forensic anthropologists.[3] The study conducted at the Jos Medical School in Nigeria among male students demonstrates a notable link between hand length and stature, which aligns with our own findings.[4]

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A study conducted in Egypt also found a favourable link between hand length and tall among students from various colleges.[5]

Moreover, the study carried out at various colleges in New Delhi also found a notable correlation between hand length and stature, which aligns with our own study.[6] A further investigation was carried out at the National Institute of Technology in Korea, which included Sudanese adults. The results showed substantial disparities in the measurements between males and females, with males having greater values. These findings align with our own study.[7]

One possible explanation is that males have a genetically predisposed bigger size in comparison to females. Female puberty often commences around two years sooner than male puberty, resulting in early fusion of the epiphysis and a shorter period for growth.[8] Nevertheless, multiple research have indicated that proximal limb bones serve as a more accurate indicator for predicting stature compared to distal limb bones.[9,10] The study facilitated the computation of the regression equation for male and female students at MGM Medical College & Hospital.

CONCLUSION

The study results emphasize significant gender-based variations in hand bone length and height among the student population. Males displayed longer hand bone lengths and taller heights compared to females, supported by robust statistical significance.

Additionally, the identified strong positive correlation between hand bone length and height across the entire cohort suggests that changes in hand bone length correspond closely with changes in height. These findings may have implications in various fields such as orthopedics, anatomy, and forensic anthropology, highlighting the potential utility of hand bone length as a marker for estimating height and emphasizing gender-specific differences in skeletal dimensions. Further studies with larger and diverse populations are warranted to validate these findings and ascertain their broader applicability.

REFERENCES

1. Krishan K, Kanchan T, Passi N. Estimation of stature from cephalo-facial anthropometry in north Indian population. Forensic Sci Int. 2012; 217(1-3): 110.e1-110.e6.
2. Trotter M, Gleser GC. Estimation of stature from long bones of American whites and Negroes. Am J Phys Anthropol. 1952; 10(4): 463-514.
3. Pal A, De S, Sengupta P, Maity P, Dhara PC. Estimation of stature from hand dimensions in Bengalee population, West Bengal, India. Egypt J of Forensic Sci. 2016;6:90–8.
4. Saxena SK. A study of correlations and estimation of stature from hand length, hand breadth and sole length. Anthropol Anz. 1984;42(4):271–6.
5. Abdel-Malek AK, Ahmed AM, El-Sharkawi SA, El-Hamid NA. Prediction of stature from hand measurements. Forensic Sci Int. 1990;46(3):181–7.
6. Sunil, Dikshit PC, Aggrawal A, Rani M. Estimation of stature from hand length. JIAFM. 2005;27(4):219–21.
7. Kim W, Kim YM, Yun MH. Estimation of stature from hand and foot dimensions in a Korean population. J Forensic Leg Med. 2018 Apr;55:87–92.
8. Rastogi P1, Nagesh KR, Yoganarasimha K. Estimation of stature from hand dimensions of north and south Indians. Leg Med (Tokyo). 2008;10(4):185–9.
9. Akhlaghi M1, Hajibeygi M, Zamani N, Moradi B. Estimation of stature from upper limb anthropometry in Iranian population. J Forensic Leg Med. 2012;19(5):280–4.
10. ercellotti G, Agnew AM, Justus HM, Sciulli PW. Stature estimation in an early medieval (XI-XII c.) Polish population: testing the accuracy of regression equations in a bioarcheological sample. Am J Phys Anthropol. 2009;140(1):135–42.

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