

Original Research Article

Relationship between Human Body Height and Hand Length (Any Significance or Implication?)

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Article History

Received: 01.06.2025

Accepted: 05.07.2025

Published: 12.07.2025

Journal homepage:

<https://www.easpublisher.com>

Quick Response Code



Abstract: Background: The scientific study of human body measurements is known as anthropometry, which plays a crucial role in identification and analysis of any human being. Notably, height and hand length exhibit a strong correlation or relationship, enabling the estimation of one parameter based on one another, through statistical proof or demonstration. This relationship has significant implications for various fields, including forensic analysis, biometric identification, and ergonomic design. And by leveraging anthropometric data, informed decisions and estimate of unknown measurements can be made, thereby enhancing identification and analysis processes. **Aim and Objective:** This study aims to investigate the relationship between hand length and height in individuals. **Methods and Material:** The study was conducted among patients coming for investigations at Blue Cross Medical Diagnostic Center. Based on their agreement to participate in the study, their heights, hand lengths and weight measurements were taken using the standardized tool for each measurement. **Results:** The study found distinctive features between male and female genders: males with 20-25cm hand length fall between 170-179cm height range, while females with 15-19cm hand length are between 150-170cm height range. **Conclusion:** The study found that participants with longer hand length have a higher body height; with the highest population of those with longer hand length being male (22%), while those with shorter hand lengths are females (78%). Thus, allowing for possible categorization or sorting of body parts or estimates, prior to detailed identification either by sex, age and occupation in certain disasters such as accidents or explosions where body parts are not yet totally destroyed.

Keywords: Relationship: Hand length, Human height and Age.

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INTRODUCTION

In the wake of devastating disasters, such as plane crashes, bomb explosions, vehicular accidents, terrorist attacks, human rituals and natural calamities, forensic experts often face significant challenges in identifying human remains that are severely damaged or dismembered. Estimating an individual's height or hand length using various tools in the identification process enables authorities to confirm and isolate a deceased individual remains for prosecution or forensic purposes and for release to concerned, appropriate families or institutions for documentations and record purposes [1]. Research has shown that various factors including genetics, nutrition, physical activity, and hormonal changes during puberty, influence an individual's height [2, 3]. Hand length has been found to correlate with age, nutritional status, and stature [4, 5]. Studies have

established a relationship between hand length measurements and overall height, providing valuable insight for other fields such as anthropology and food science, (since balanced nutrition affects overall body structures) [6].

AIMS AND OBJECTIVES

1. To examine the relationship between hand length measurement and overall height in individuals.
2. To establish a reliable method for predicting an individual's height, based on the measurements of the hand length.
3. To contribute to the development of more accurate and efficient methods for identifying human remains, particularly in cases where bodies are severely damaged or dismembered.

MATERIAL AND METHODS

This study was conducted at Blue Cross Medical Diagnostic Centre, in Ilorin, Kwara state, with a sample of 100 adults of both genders, from January 2024 to March 2025. Each subject was studied for measurement of body height and hand length. The length of each subject's hand was carefully measured using a flexible tape measure, with the measurement spanning between the prominent wrist crease to the distal tip of the middle finger; ensuring accuracy and consistency in the data collection process. Body heights were measured using a stadiometer to the nearest centimeter (cm). The subjects were instructed to stand upright without shoes and remove any headwear for accurate height measurement. The height was measured vertically from the plantar surface of the feet (soles) to the vertex of the

head (the highest point of the skull). Weight measurements were recorded to the nearest kilogram using a calibrated weighing scale. Participants stood erect on the scale, wearing minimal or light clothing, barefoot, and maintaining a standardized posture: looking straight ahead, with their palms by their sides and fingers extended downward, to allow for accurate and reliable data collection.

The collected data underwent statistical analysis utilizing SPSS 17.0 software, with results presented in comprehensive tables and visual graphs for clear interpretation and representation.

RESULTS

Table 1: Frequency Table Showing the Distribution of Hand Length, Height and Gender among Patients

Hand length * height * gender Cross-tabulation							
Count							
Gender			Height				Total
			150-159	160-169	170-179	180-189	
Male	Hand length	15-19	3	8	6	1	18
		20-25	0	0	2	2	4
	Total		3	8	8	3	22
Female	Hand length	15-19	11	32	20	4	67
		20-25	1	7	3	0	11
	Total		12	39	23	4	78

As seen in **Table 1**, twenty-seven (22) out of the participants were male, while seventy-seven (78) were female. Among male participants, the most common hand length was 15-19cm; they were predominantly in the 160-169cm and 170-179cm height categories. Those that falls between 20-25cm hand length appeared mostly to be in the taller height groups.

While significant majority of female participants had hand lengths within 15-19cm range. These figures suggest significant concentration of females with moderate height and average hand length, while males presented a more diverse spread across hand lengths and height range.

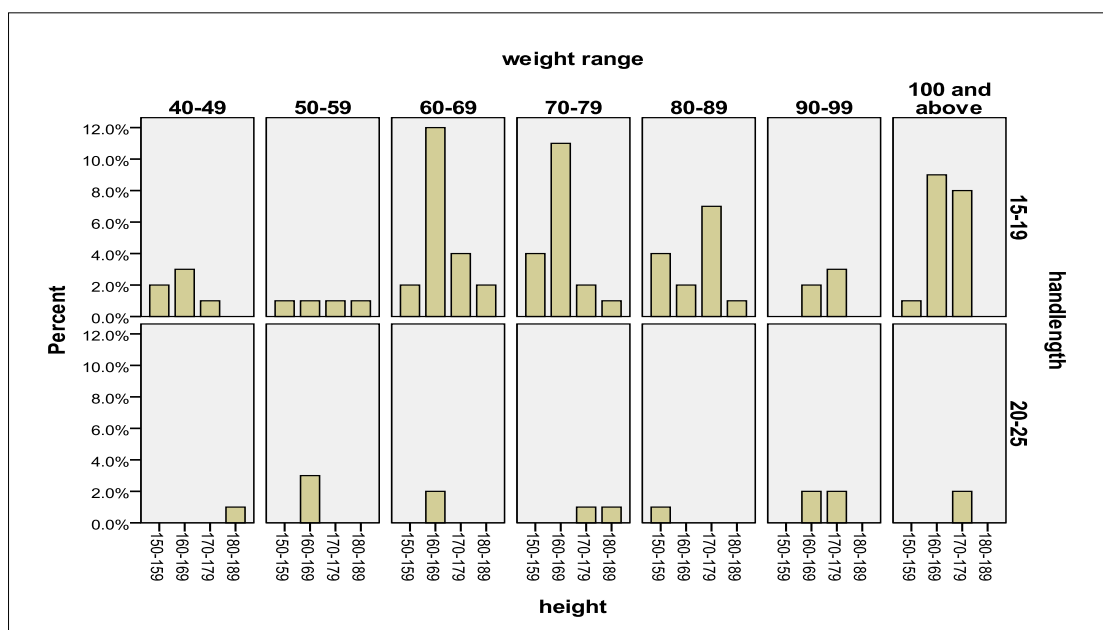


Fig. 1: Bar Chart Showing the Cross-Tabulation of Weight Range, Height and Hand Length

The bar chart in **Fig 1** indicates that participants with hand lengths of 15-19cm commonly fall within weight range of 60-79kg and, especially within the 160-

170cm height bracket. Individuals with longer hand lengths (20-25cm) were fewer and scattered across weight and height groups.

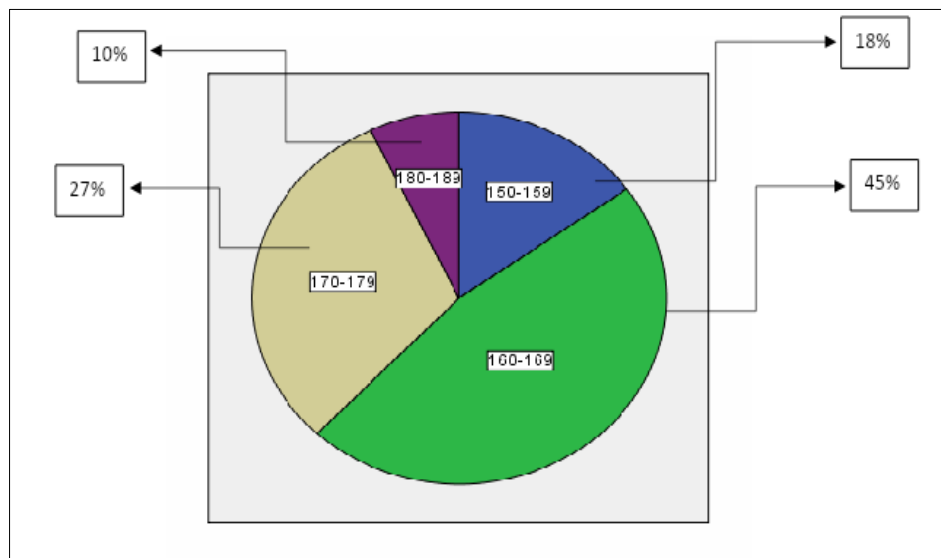


Fig. 2: Pie Chart Showing the Distribution of Height

Fig 2 with a pie chart shows that the largest proportion of the sample (45%) had height between 160-169cm, 27% were in the 170-179cm range, 18% were between 150-159cm and only 10% were in the tallest

group (180-189cm). This implies that moderate height (160-169cm) is the most common among the study population.

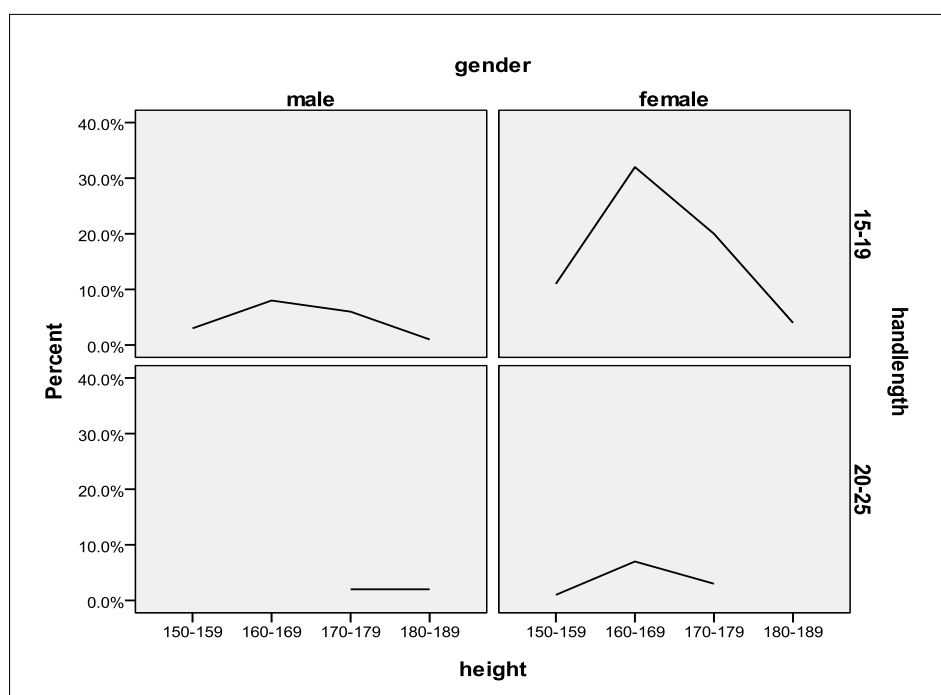


Fig. 3: Line Graph Showing the Cross-Tabulation of Gender, Hand and Height Length

Fig 3 presents a line graph showing the percentage distribution of individuals across height categories, split by gender and hand length. Males with hand lengths between 15-19cm peaked in the 160-169cm height group. Similarly, females with hand lengths between 15-19cm showed a sharp rise in the 160-169cm

height group, peaking above 35% then tapering off as height increased. These patterns suggest that the majority of both genders with shorter hand lengths fall into average height categories (160-169cm), which further supports the relationship between the hand length and height.

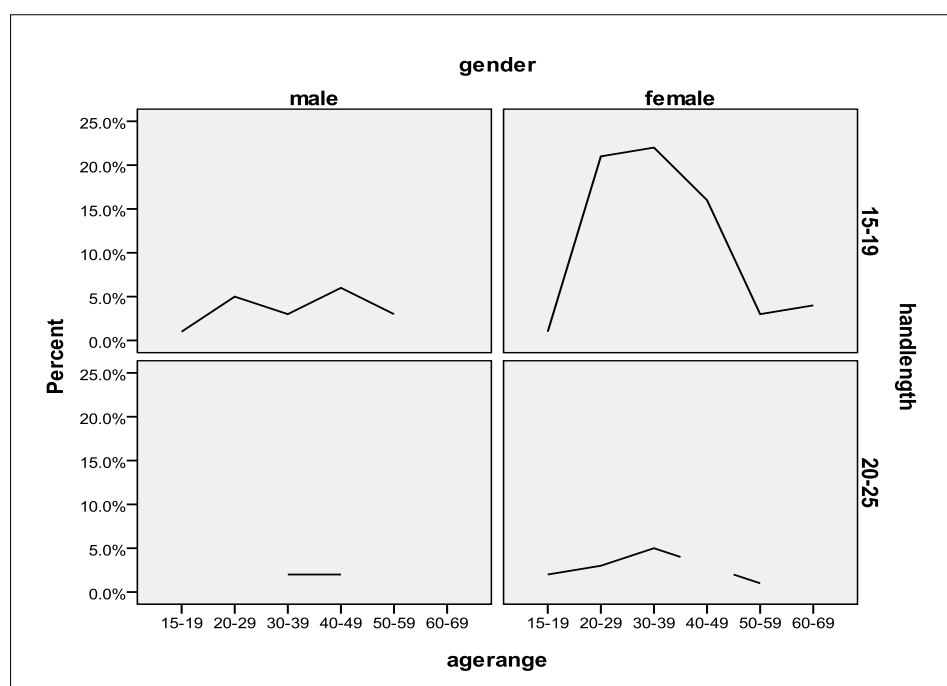


Fig. 4: Line Graph Showing Age Range, Gender and Hand Length Cross-Tabulation

Fig 4 displays another line graph, this time plotting age range against hand length and gender. Females with hand lengths of 15-19cm showed a prominent peak in the 20-29 and 30-39 age groups, which contributed over 20% of our study population or sample. A steady decline in hand length is seen in the older age group, indicating that the younger females are more likely to have on the average longer hand lengths. That is, the older group in this study are more likely to have a shorter hand length, which is probably age related. Among males, the distribution across age range was more balanced, suggesting a more even spread of hand length across age groups. Individuals with longer hand lengths (20-25cm) were found more in the male age group, especially among the 30-39 and 40-49 age groups.

DISCUSSION

The study revealed a positive relationship between body height and hand length, indicating that taller individuals generally have proportional longer hands. This is in agreement with what Ilayperuma reported that hand length and height have linear relationship, particularly in adolescents and young adults [7].

The gender differences observed in this study as shown in table 1 is also well documented in the literature. According to Mohanty *et al.*, males typically have larger body dimensions, including hand length and height, than females [8]. This study supports this as most males with longer hands (20-25cm) were in taller height categories, whereas females were more clustered within average ranges for both height and hand length.

Additionally, the height distribution found in our study is consistent with regional and national height

averages reported in West Africa, where average adult female height falls around 160-165cm, and male height around 170cm (WHO Growth Reference Data, 2007) [9]. This supports the dominance of the 160-169cm height group in our study as shown in figure 2.

In relation to weight, the patterns observed in Figure 1 hint at an indirect association between hand length and body composition. Studies like Nath and Krishan (1991) and Mansur *et al.*, (2013), also discussed that although hand length correlates most strongly with height, there is some connection with overall body weight or physique, which includes weight and frame size [10, 11].

CONCLUSION

In our analysis of gender, height, hand length, and age, most of the younger females (particularly age 20-39) are found to have average hand lengths of 15-19cm, and moderate heights of 160-169cm. While males though fewer in number, show greater variability in both hand length and height. This study further validates existing literature on anthropometric relationships and emphasizes the potential for using hand length as a non-invasive predictor of stature. Potentials for use of this study in forensic medicine, ergonomic design, sports sciences, and even biometric identifications can be explored.

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Cite This Article: Oguntoyinbo AE, Ibrahim TH, Yahaya K (2025). Relationship between Human Body Height and Hand Length (Any Significance or Implication?). *East African Scholars J Med Sci*, 8(7), 255-259.
