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Original Research Article

Stature Estimation of Ikwerre Students in Rivers State University Using Middle Finger Length

Kenneth Shelu Ordu[1], John Nwolim Paul[1*], Amaka Azubuike Ogba[2], Leesi Sapira-Ordu[3], Anelechi Kenneth Madume[4], Chioma Akunnaya Ohanenye[5], Michael Manuchimso Morgan[1]

[1]Department of Human Anatomy, Faculty of Basic Medical Sciences, College of Medical Sciences, Rivers State University, Nigeria
[2]Department of Public Health Sciences, Faculty of Basic Medical Sciences, College of Medical Sciences, Rivers State University, Nigeria
[3]Department of Obstetrics and Gynecology, Faculty of Clinical Sciences, College of Medical Sciences, Rivers State University, Nigeria
[4]Department of Physiotherapy, Faculty of Basic Medical Sciences, College of Medical Sciences, Rivers State University, Nigeria
[5]Department of Anatomy, College of Medicine and Health Sciences, Rhema University, Nigeria

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Abstract: ***Background:*** The basic need for investigating the damaged remains is to create a biological profile that matches, resembles, and identifies the individual by estimating the age, gender, and stature of the remains. This profile serves to increase the chances of identification and investigation of the cause of death. The study aimed at estimating the stature of Ikwerre students at Rivers State University using middle finger length. ***Materials and Methods:*** Standing height and middle finger length of 267 subjects were measured using a digital stadiometer and digital vernier calliper, respectively. Statistical analysis, employing the t-test, Pearson correlation, and regression analysis, was carried out with the aid of SPSS version 23.0. ***Results and Discussions:*** Results showed that all parameters investigated were higher in males ($P < 0.05$) and that the correlations between middle finger lengths and stature were significant in both genders; no significant difference was found between the left and right middle finger lengths in the study population. ***Conclusion:*** The study concludes that it is possible to estimate the stature of an unknown Ikwerre student from the length of the right and left middle fingers. This study has demonstrated its application in identification, especially in cases of accidents with dismembered body parts. This study is recommended to forensic experts, anatomists, physicians, medical practitioners, and the government of Rivers State for use as a reference for other studies.

Keywords: Stature Estimation, Ikwerre Students, Rivers State University, Middle Finger Length.

INTRODUCTION

Height has been described as a polygenic trait with a high degree of heritability [1]. Stature, also referred to as "standing height," is the most commonly employed anthropometric dimension. It is employed by anthropologists to measure an individual's physique quantitatively, and by using this technique, they can access an individual's growth as well as development [2].

The Concept of Recumbent Height and Length and Standing Height (Stature)

Over time, an insight into the basic difference and relationship between a person's recumbent length as compared to their stature (standing height) has gained significant interest in many journals [3], whereas "diurnal variation" has suffered a minor interest from the research and publishing societies. "Standing Height," or stature, is the distance or length measured from the floor to the vertex of the head when an individual stands erect and the head aligns in the horizontal Frankfurt plane [4].

Recumbent height or length, or crown-heel length, is the height of a person in a supine position with their heads aligned in the vertical Frank-furt plane [5]. While stature is a very important dimension in anthropometry for considering height, recumbent height

***Corresponding Author:** John Nwolim Paul
Department of Human Anatomy, Faculty of Basic Medical Sciences, College of Medical Sciences, Rivers State University, Nigeria

and length can also be used as a predictor in infants with the use of an infantometer [5].

Stature as a Continuous Variation

An individual's stature is a manifestation of the collective interaction between genetic adaptation and climatic conditions [6]. A deductive conclusion can be drawn concerning the effect of climate conditions on stature if one considers Allen's and Bergmann's rule that an extreme cold climate drives short and rounder morphs of individuals, while a hot climate favours the formation of thin and tall individuals [7].

As regards Allen's rule, it was observed that the distal limb segments in equatorial Africans are longer than those from more temperate climates, as a study by Waxenbaum [8] proved. Practically, while an individual may be described as having a normal stature in a given average population, such an individual in comparison with an adjacent population of very tall individuals may be conclusively short [6]. Without much argument, stature has been regarded as a continuous variation with a wide range of variability among populations, even though most of the time it is represented discretely [6].

Classification of stature

Short Stature

An individual can be described as having a short stature when their height is in the 3rd percentile for the mean height of a given age, sex, and population group [6]. According to Ranked (1996), short stature" is described as a condition in which the height of a given individual is two standard deviations below the corresponding mean height of a given age, sex, and population. This condition is also termed "dwarfism" [6]. Short stature has also been evaluated into two types: proportionate short stature (PSS) and disproportionate short stature (DSS). According to the study of Rani [6], DSS is diagnostic of individuals with uncommon differences in their sitting as well as standing height compared to PSS, where individuals have the usual proportion in their limbs and trunk height.

Tall Stature

By convention, tall stature" is defined as a height greater than two standard increments, exceeding two standard deviations above the mean height for age and gender. i.e., greater than the 97th percentile for sex and age [9]. Likewise, short stature and tall stature can also be proportionate or disproportionate.

Distribution of stature

It was reported that Saudi Arabia recorded a comparatively high frequency of short stature, i.e., in boys; the study recorded a prevalence of 11.3% in children and 1.8% in adolescents. As for the case of girls, short stature was prevalent in 10.5% of children and 1.2% of adolescents; this was from the study of El Mouzan [10, 11]. Researchers estimated the prevalence rate of short stature in Jordan to be 4.9% [12]. A similar study of stature prevalence in the people of South China showed that the population registered a difference in prevalence of short stature as regards sex and that more males were observed as short than females [13]. In the meantime, Argentina was found to be statistically higher in females (16.4%) than males (8.4%), with significance ($p<0.001$) [14].

In Africa, the pigmies of Congo are known for their very short stature, paralleling the Dinkas of Sudan, a population of relatively tall indigenes with a mean height record of 150cm and 181.6cm for both populations, respectively [1]. Related studies have also recorded that seventeen African ethnic subgroups have a lower mean stature in comparison to the shortest European population [1].

In view of the European population, it was discovered that the Sardinians are the shortest, while the tallest population was observed to be the Pacific Islanders and Dutch [15]. In addition, African countries such as Kenya and Congo are represented by tribes of varying mean stature, ranging from as low as 150cm to as high as 173cm [1]. There is a paucity of literature on the stature estimation of Ikwerre students at Rivers State University. Hence, this was done to determine the stature of Ikwerre students at Rivers State University using the middle finger length. There are already studies in existence on stature estimation using diverse body parts in both local and foreign populations around the world [1, 9-15].

MATERIALS AND METHODS

Research design

This study is a correlational cross-sectional study of the Ikwerre students of Rivers State University.

Study area

The study focuses on the area bounded by the geography of Rivers State University and its various faculties and departments. The Rivers State University (RSU) Port Harcourt was established in October 1980 from the Rivers State College of Science and Technology, which was itself established in 1972. It is located at Nkpolu-Oroworukwo in Port Harcourt, the capital of Rivers State, Nigeria.

Research population

The scope of this study is to assess the finger length of the Ikwerre tribe, as ethnicity plays a vital role in morphologic variation among humans. The Ikwerre tribe (natively known as Iwhuruha) is one of the Igbo subgroups in Rivers State [16]. They are the biggest Igbo group, along with the Ngwa. Traditional history has classified Ikwerre into seven groups called "Ikwerre Essa". They are Elele, Isiokpo, Umuji, Emohua, Choba, Aluu Igwuruta, and the Obio group. This division was recognised by Forde and Jones in 1950 in their ethnographic study of the Igbo-speaking peoples of southern and eastern Nigeria in West Africa [16].

Eligibility criteria

Subjects are selected according to their availability and willingness to participate without payment or any other kind of reward, based on their origin and racial strain criteria, to ensure that the samples are true representatives of their respective target populations. Only consenting participants within the age bracket of 21–30 years were allowed to participate in this study.

Inclusion criteria

The sample subject must be within the speculated age range of 21–30 years and must be a current student at the university. The sample subject must belong to the Ikwerre tribe by birth. Students of the Rivers State University in Nigeria belonging to the Ikwerre tribe in Rivers State between the ages of 21 and 30 were selected. This age bracket was chosen because by age 21, ossification of bone plates should be complete, and above age 30, there is a reduction in vertebral column height due to loss of elasticity in the cartilages.

Exclusion criteria

Students with a musculoskeletal defect, spinal disorder, amputated finger, malformed finger (finger anomaly), or injury to the finger (accident), students who have undergone any form of reconstructive plastic surgery of the finger, and students whose ages don't fall within the age bracket

Sample size

The study used a sample size of 267 students comprising 134 males and 133 females from the Rivers State University, which was calculated using Cochran's formula [17] with a confidence interval of 0.6, a confidence level of 95%, a z-score of 1.96, and a 50% standard deviation considering that the population of Ikwerre students in the institution is unknown.

Sample Size = [z2 * p(1-p)] / e2, where z = z-score, e = margin of error, and p = standard deviation.

Sampling Technique

Block sampling was used for this study in order to ensure that the students of the various faculties and departments were selected randomly and represented in the sample collected.

Method of data collection and instrumentation:

Reliable data depends on the source and degree of error, which may be from a faulty instrument or wrong method of data collection as well as an observer's error. Each variable (height and middle finger length) was measured twice and the average recorded by the same person to prevent inter-observer error.

Stature

The subjects were made to stand barefoot in the standard standing position on the stadio-metre baseboard. Both feet are in close contact with each other, and the head is oriented in the horizontal Frankfurt plane. The height was then recorded in centimetres from the floor to the vertex of the head. Shoulders and buttocks were made to stand out and touch the vertical surface posterior to the person to measure the correct standing height.

Middle Finger Length

The middle finger is the third digit of a human hand. The right and left MFL were measured on the ventral surface of the hand from the most proximal crease of the 3rd digit to the tip of the 3rd digit, or MFL, in the right and left hands using a Vernier calliper, correcting up to 0.01 mm. The middle finger was fully extended, and measurements were carefully taken. All measurements were converted to centimetres.

Method of data analysis

The data was analysed using Statistical Package for the Social Sciences (SPSS IBM version 23.0) and Microsoft Excel 2019 edition. Continuous variables were presented as minimum, maximum, and mean SD in descriptive statistics. Inferential statistics (comparing mean values and/or sexual dimorphism) were carried out using an independent sample (unpaired t-test), while bi-laterality or side differences were analysed using a paired t-test. A Pearson correlation analysis was done to determine the correlation between height and middle finger length (MFL). Also, regression analysis was done, and a regression equation for stature estimation (using MFL) was derived. The confidence interval was set at 95%; therefore, $P<0.05$ was considered significant. The general regression equation y=Bo+B1x was used to derive a gender-specific formula for stature estimation.

Ethical consideration

Ethical clearance was obtained from the research ethics committee of Rivers State University before the commencement of the study.

RESULTS

Figure 1 is a bar chart showing the distribution of the subjects according to sex. It shows that 134 (50.2%) of the subjects are males, while 133 (49.8%) are females.

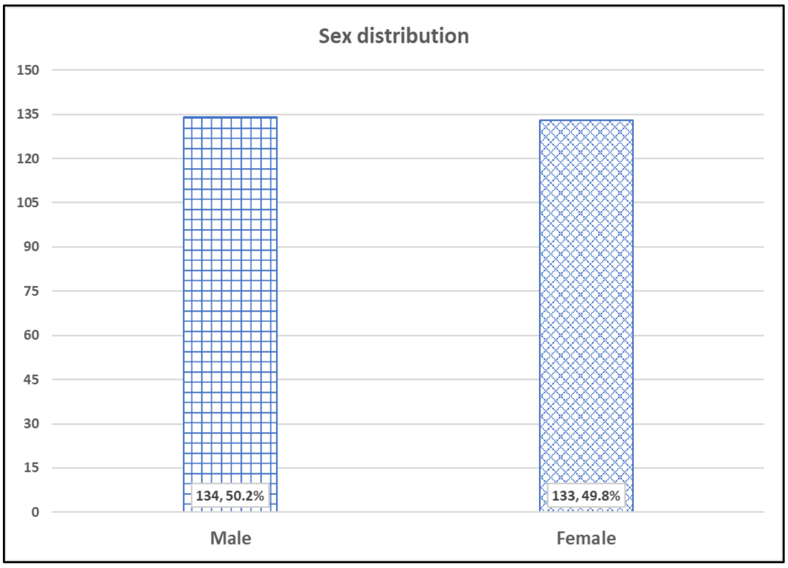

Figure 1: Distribution of the subjects according to sex

Table 1: Descriptive characteristics of the measured parameters

Measured parameters	Male [N = 134]			Female [N = 133]			Total [N = 267]		
	Min	Max	Mean±SD	Min	Max	Mean±SD	Min	Max	Mean±SD
Height (cm)	147.30	197.85	172.63±11.98	146.40	193.50	162.74±9.86	146.40	197.85	167.70±± 12.02
RightMFL (cm)	7.35	9.88	8.30±0.55	6.59	8.99	7.91±0.55	6.59	9.88	8.11±0.58
Left MFL (cm)	7.29	9.85	8.30±0.55	6.65	8.99	7.87±0.56	6.65	9.85	8.08±0.59

***MFL** = Middle finger length, **Min** = Minimum, **Max** = Maximum, **SD** = Standard deviation, **N** = Number of subjects*

Table 1 shows the descriptive statistics of the measured parameters. The mean values for the measured parameters include; height [male (172.63±11.98); female (162.74±9.86)], right middle finger length [male (8.30±0.55); female (7.91±0.55)] and left middle finger length [male (8.30±0.55); female (7.87±0.56)]. All measured parameters were higher in males.

Table 2: Sexual dimorphism in the distribution of the measured parameters

Measured parameters	Measured differences				t-test for Equality of Means		
	MD	SE	95% C.I of the Difference		df	t-value	P-value
			Lower	Upper			
Height (cm)	9.89	1.34	7.25	12.53	256.27	7.37	**0.00***
Right MFL (cm)	0.39	0.07	0.26	0.52	265.00	5.76	**0.00***
Left MFL (cm)	0.43	0.07	0.30	0.56	265.00	6.33	**0.00***

*** = Significant at P < 0.05, **MFL** = Middle finger length, **MD** = Mean difference, **SE** = Standard error, **C.I** = Confidence interval*

In table 2, sexual dimorphism in height, right and left middle finger length was presented. Male subjects have higher values in all measured parameters compared to the females. The difference in height (t-value = 7.37; P = 0.00), right middle finger length (t-value = 5.76; P = 0.00) and left middle finger length (t-value = 6.33; P = 0.00) were statistically significant between male and female subjects. Hence these parameters are said to be sexually dimorphic in Ikwerre students of the university.

Table 3: Bi-laterality / side differences in the measured parameters in male and female subjects

Comparison	Paired Differences					Paired t-test		
	MD	SD	SE	95% C.I of the Difference		df	t-value	P-value
				Lower	Upper			
Male subjects								
Right MFL vs Left MFL (cm)	0.01	0.12	0.01	-0.02	0.03	133.00	0.47	0.64
Female subjects								
Right MFL vs Left MFL (cm)	0.02	0.11	0.01	0.03	0.05	132.00	1.25	0.45

*** = Significant at P < 0.05, **MFL** = Middle finger length, **MD** = Mean difference, **SD** = Standard deviation, **SE** = Standard error, **C.I** = Confidence interval*

Table 3 shows bi-laterality and or side differences in right and left middle finger length in male and well as female subjects. Higher values in the measured parameters was observed on the right middle finger in both sexes. The difference in right and left middle finger length in both genders were not significant statistically (t-value = 0.47; P = 0.64) was not statistically significant.

Table 4: Correlation of height and middle finger length in male and female subjects

Measured variables		Height (cm)
Male [N = 134]		
Right MFL (cm)	Pearson Correlation	0.701**
	Sig. (2-tailed)	**0.000**
Left MFL (cm)	Pearson Correlation	0.664**
	Sig. (2-tailed)	**0.000**
Female [N = 133]		
Right MFL (cm)	Pearson Correlation	0.654**
	Sig. (2-tailed)	**0.000**
Left MFL (cm)	Pearson Correlation	0.655**
	Sig. (2-tailed)	**0.000**

** = Correlation is significant at the 0.01 level (2-tailed), MFL = Middle finger length, N = Number of subjects.

In table 4, correlation between height and middle finger length was presented. For male subjects, strong positive significant correlations were observed between right (*r* = 0.701) and left (*r* = 0.664) middle finger length with height. Similar observations were made for females. Strong positive significant correlations were observed between right (*r* = 0.654) and left (*r* = 0.655) middle finger length with height.

Table 5: Model summary for the multivariate regression analysis of stature, using middle finger length among Ikwerre subjects

Model	R	R^2 (%)	Adjusted R^2	S.E of the Estimate	ANOVA		
					df	F-value	P-value
Male subjects							
Height (cm)	0.71	0.50 (50)	0.49	8.53	2	65.55	**0.00***
Female subjects							
Height (cm)	0.66	0.43 (43)	0.42	7.48	2	49.59	**0.00***

*** = Significant at P < 0.05, **R** = Pearson correlation, $\boldsymbol{R^2}$ = Coefficient of determination, **ANOVA** = Analysis of variance*
Predictors: (Constant), Left MFL (cm), Right MFL (cm)

Table 5 shows multivariate regression analysis of height and middle finger length. For male subjects, strong positive significant correlation was observed when both middle fingers (right and left) were involved in estimating height (*r* = 0.71). It shows that when combined, right and left middle finger length can estimate height with 50% accuracy. For females, strong positive significant correlation (*r* = 0.66) was also observed when both middle fingers (right and left) were used to estimate height. It shows that when used together, height can be estimated with 43% accuracy using the right and left middle finger length.

Table 6: Multivariate regression analysis of stature, using the middle finger length in Ikwerre subjects

Model	Unstandardized Coefficients		Standardized Coefficients	t-value	P-value
	B	SE	Beta		
Male subjects					
(Constant)	47.20	11.24		4.20	**0.00***
Right MFL (cm)	23.91	6.06	1.10	3.94	**0.00***
Left MFL (cm)	-8.81	6.04	-0.41	-1.46	0.15
Female subjects					
(Constant)	69.88	9.37		7.45	**0.00***
Right MFL (cm)	5.61	5.86	0.31	0.96	0.34
Left MFL (cm)	6.16	5.81	0.35	1.06	0.29

*** = Significant at P < 0.05, **SE** = Standard error, **MFL** = Middle finger length*

Regression equation for stature Using the right and left middle finger length (combined) to estimate stature. Height in cm (male) = 47.20 + 23.91 (Right MFL) - 8.81 (Left MFL); Height in cm (female) = 69.88 + 5.61 (Right MFL) + 6.16 (Left MFL).

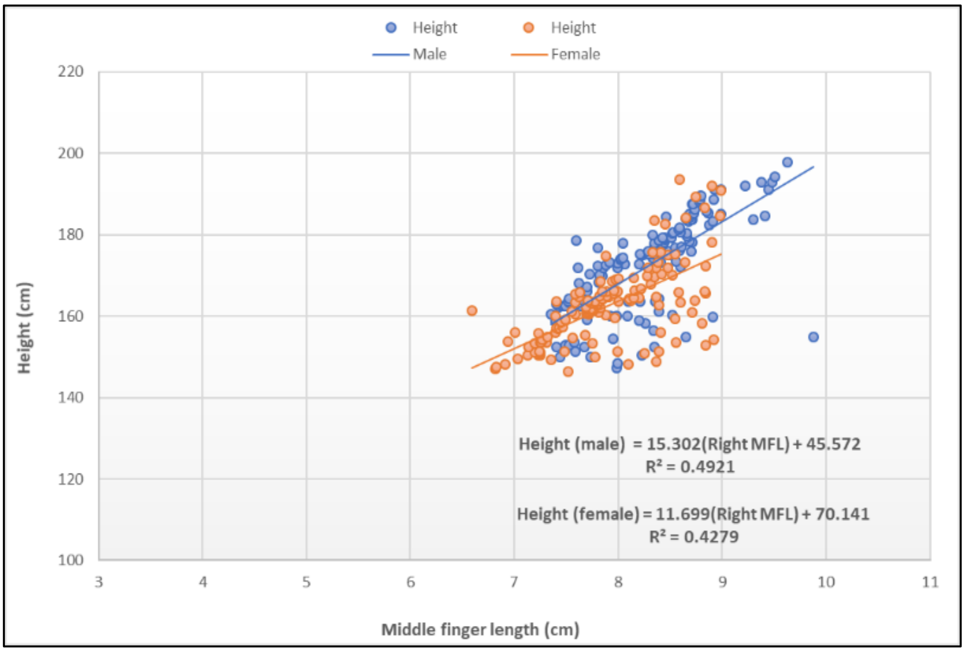

Figure 4: Scatterplot of height against right middle finger length

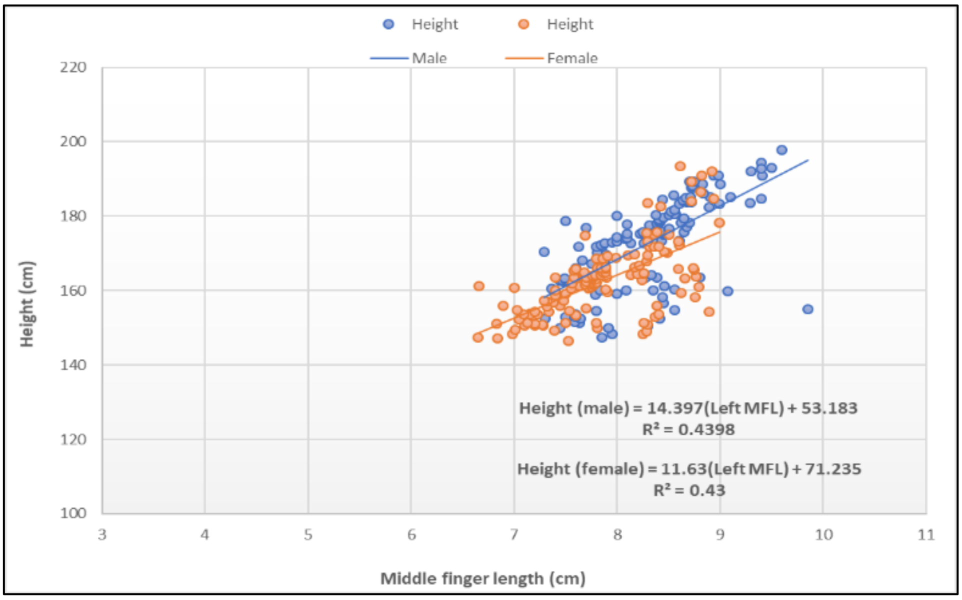

Figure 5: Scatterplot of height against left middle finger length

Table 7: Summary of correlation and univariate regression analysis for estimating stature using middle finger length

Sex	Dependent variable	Predictors	Prediction model			
			r	***R***^{2} **(%)**	***P*-value**	***R***^{E}
Male	Height	Right MFL	0.70**	49.21	0.00	15.302(Right MFL) + 45.572
		Left MFL	0.66**	43.98	0.00	14.397(Left MFL) + 53.183
Female	Height	Right MFL	0.65**	42.79	0.00	11.699(Right MFL) + 70.141
		Left MFL	0.66**	43.00	0.00	11.63(Left MFL) + 71.235

r *= Pearson Correlation,* R^2 *= Coefficient of determination,* R^E *= Regression equation,* ***MFL*** *= Middle finger length, ** = Correlation is significant at the 0.01 level (2-tailed)*

Table 7 shows the summary of univariate regression analysis of height and middle finger length. Height can be estimated using the following regression equation;

Height in males (using the right MFL) = 15.302(Right MFL) + 45.572

Height in males (using the left MFL) = 14.397(Left MFL) + 53.183

Height in females (using the right MFL) = 11.699(Right MFL) + 70.141
Height in females (using the left MFL) = 11.63(Left MFL) + 71.235

In males, height can be estimated from right MFL with 49.21% accuracy and 43.98% accuracy using the left MFL. This implies that right MFL predicts better than the left.

In females, height can be estimated from right MFL with 42.79% accuracy and 43.00% accuracy using the left MFL. This implies that left MFL predicts better than the right.

DISCUSSIONS

Summary of results

In summary, the mean heights of male and female subjects were described as 172.63cm and 162.74 cm, respectively. The total mean height of the population is 167.70cm. The results of this study showed that the mean heights of males and females are statistically different; hence, the alternative hypothesis is rejected. For males, the right middle finger ranged from 7.35cm to 9.88 cm, with a mean length of 8.30cm. On the female side, the right middle finger recorded a mean length of 7.91cm and a range of 6.59cm to 9.88cm. The left middle finger length varied within a range of 7.29cm to 9.85 cm, with a summary mean length of 8.30cm in males, while the female counterparts recorded a mean length of 7.87cm within a range of 6.65 cm to 8.89cm for the left middle finger.

A linear relationship was found between right and left middle finger length in both genders. The summary table 10 shows that a very strong correlation was observed in both the right and left middle fingers of the male (right, r = 0.701; left, r = 0.664), while the female had a strong correlation in the left middle finger (r = 0.655) compared to the right finger (r = 0.654), with a very little difference.

In total, the male right middle finger had the highest correlation to stature. Also, the left middle finger in both genders had the lowest SE (standard error), 6.04 in males and 5.81 in females. Multivariate regression analysis using finger length improved the correlation coefficient when both left and right fingers were combined for stature estimation. The coefficients were 0.71 in males and 0.66 in females, and the percentage accuracy (R2 (%)) of estimation of stature while using the combined finger lengths also increased to 50% and 43%, respectively. As with many populations, a unique formula is established for stature estimation using finger length. The derived gender-specific formulas were thus:

Stature estimation in males using the right or left middle finger length:
Height in males (using the right MFL) = 15.302 (right MFL) + 45.572
Height in males (using the left MFL) = 14.397 (left MFL) + 53.183

Stature estimation in females using the right or left middle finger length:
Height in females (using the right MFL) = 11.699 (right MFL) + 70.141
Height in females (using the left MFL) = 11.63 (left MFL) + 71.23

Stature estimation in males and females using both right and left middle finger length:
Height in cm (male) = 47.20 + 23.91 (right MFL) + 8.81 (left MFL).
Height in cm (female) = 69.88 + 5.61 (right MFL) + 6.16 (left MFL).

Implications of the study

The observation from this study implies that the male Ikwerre students among the participants are taller in height than their female counterparts. The study also revealed that the males displayed a wider range of variation in height when compared to the females. The study showed sexual dimorphism in the values for heights, with the males consistently higher than the females.

The right middle finger length of males (8.30 cm) is higher than that of females (7.91 cm), with a T-value of 5.76, which proved to be statistically significant; thus, sexual dimorphism exists in the right middle finger of Ikwerre students at Rivers State University (Table 1&2). The left middle finger between both genders also expressed sexual dimorphism with a T-value of 6.33 and a p-value of 0.00.

No statistical significance was found between the right and left middle fingers of males and females (t-value = 0.47; P = 0.64; t-value = 1.25; P = 0.45). Hence, the difference in the right and left middle finger length in both genders was not statistically significant47; P = 0.64; t-value = 1.25; P = 0.45). Hence, the difference in the right and left middle finger length in both genders was not statistically significant. Therefore, dimorphism does not exist between both fingers in both males and females.

In males, a higher correlation was found between the right middle finger and height (r = 0.701), while in females, the left middle finger correlated more with height (r = 0.655). This information suggests the right and left middle fingers as the best determinants of male and female stature, respectively. Although the multivariate analysis elevated the coefficient of determination (accuracy) to height when both the left and right middle fingers were used, we can thus deduce that a combination of both fingers in each gender is the best method of stature estimation.

An implication of the different formula for stature estimation is that both using either or combined middle fingers in each gender is an advantage in predicting stature as one or both finger lengths can be used differentially or integrated in the procedure. Thus, both the left and right middle fingers are useful.

Table 8: summary of the mean heights in different population

Article	Study population	Mean Height(cm)	
		Males	**Females**
Current study	Rivers State University (ikwerre students)	172.63cm	162.74cm
Paul & Paul, [18]	Ikwerre tribe	173.41cm	160.77cm
Numan *et al.* [19]	Maiduguri University (igbo tribe)	171.58cm	169.40cm
Numan *et al.* [19]	Maiduguri University (yoruba tribe)	170.53cm	164.05cm
Numan *et al.* [19]	Maiduguri University (Hausa tribe)	174.79cm	167.03cm
Oladipo *et al*. [20]	Nigerian subjects in Rivers state	171.53cm	161.81cm
Rhiu & Kim, [4]	South koreans	171.7cm	160.2cm
Koulapur *et al.* [21]	North Karnataka, India	167.59cm	156.48cm
Katwal *et al.* [22]	Nepalese (medical students of Nepal medical college)	170.02cm	157.76cm

The height of males in the mentioned populations ranged from 167.59cm (North Karnataka, India) to 174.79 cm (Maiduguri University) (Hausa tribe) (male) for males and 156.48cm (North Karnataka, India) (female) to 169.40cm (Maiduguri University) (Igbo tribe) (female) for females.

The results on height dimorphism also revealed that female heights vary along a wider range than male heights, with the Hausa having the highest mean height for males and the Igbo having the highest mean height for females [19]. This general observed difference or dimorphism in stature between males and females of different populations could be a result of genetic and hormonal differences. The input of oestrogen causes females to stop growing a few years earlier than males. Thus, as a result, males have a higher mean height than females [23]. The present study correlates with that of Paul & Paul [18], who reported a similar trend on the Ikwerre tribe; similarly, Oladipo *et al.* [20] reported similar findings in their study on Nigerians.

This study negates the result of Koulapur [21] on the recorded mean height of males and females, as he observed a higher height in males compared to females but a lower mean height in both males and females when compared to the result of the present study. This could be a result of ethnical or geographical differences.

The right middle finger length in males was higher than that of females. The left middle finger lengths in males were also found to be significantly higher than those of females. This finding is consistent with that of Koulapur [21], who found both finger lengths of males to be higher than females, although it contradicts the fact that he found a statistical difference between both finger lengths of a given sex, as this study found no significant difference between the left and right fingers in both genders. Furthermore, this study correlates with the findings of Ahuja [24], with no record of significance in the difference between both fingers of each gender.

The study showed a very strong correlation was found between right middle finger length in males and stature, with r = 0.701; this was exactly the same as the results of Rhiu and Kim [4], although this negates the summary fact of Rhiu & Kim, [4] which stated that the right middle finger length correlated best for female stature, as this study indicates the left middle finger as the best correlator to female stature. With respect to these observations, the study of Rhiu and Kim was limited only to the right hand.

In addition, Katwal [22] presented a higher correlation coefficient of right middle finger length to stature in females (r = 0.442) than males (r = 0.422), which contradicts both the study of Koulapur *et al.* [21], who found a greater correlation between right middle finger length and stature in males than females. These findings agree with our current study. Moreso, Christal *et al.* [24] also found a greater correlation between the right middle finger and stature in males compared to females.

Christal *et al.* [24] proposed a regression formula for the determination of stature in both genders using the five digits, while a similar study by Koulapur *et al.* [21] proposed a similar formula for stature estimation in both genders using either the right or left middle finger. Whereas this current study has proposed a regression formula for stature estimation in either gender using left or right middle finger length or a combination of both in Ikwerre students of Rivers State University.

CONCLUSIONS

The results of this study showed that there is a statistically significant relationship between the length of the middle finger of Ikwerre students and their stature. Males had greater finger length and height, but females showed a wider range of variability in height.

This study showed sexual dimorphism in the distribution of values in the length of the middle fingers. An investigation of the linear relationship between the right and left middle fingers and height indicates that both finger lengths correlate with height in both genders. Generally, the highest correlation was found in the right middle finger of males, while the left middle finger expressed a higher correlation with female stature. Practically, the study demonstrates that the combination of the right and left middle fingers indicates greater accuracy for estimating stature in both genders. The study concludes that the length of the fingers on both hands successfully estimated the stature of Ikwerre students at Rivers State University.

Recommendation

We recommend that the findings of this study be used as a reference for the population and for future studies. The regression models derived will be of various practical uses in medico-legal, anthropological, and archaeological studies, as well as in clinical and surgical cases where the total height of a subject can be calculated if the middle finger length is known.

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