

Gender Variation in Digit Ratio of the Igbo Ethnic Group in Eastern Nigeria

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DOI: [10.36347/sajb.2019.v07i11.005](https://doi.org/10.36347/sajb.2019.v07i11.005)

| Received: 07.11.2019 | Accepted: 17.11.2019 | Published: 28.11.2019

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Abstract

Original Research Article

Background: This study was aimed at investigating gender variation in digit ratios of the Igbo ethnic group. The study was an analytical cross-sectional design with volunteers age ranging from 18-60 years. For the purpose of this study, an individual was considered to be a Nigeria of a particular ethnic group if the parents and four grandparents are of the same ethnic group. **Materials and Methods:** Cluster sampling method was used for the study. The selection and collection of required parameters relied on informed consent of volunteers. This was done by giving them a copy of the informed consent letter which was signed and dated. A total of 460 subjects (230 males, 230 females) subjects were recruited for the study. The fingerprints were obtained using print scanner (Hp G3110 Photo scanner). **Results and Discussion:** Descriptive statistics of digit lengths and ratios of Igbo ethnic group. In the males the following Mean±SD were seen: Males Left L2D (cm) 7.05±0.72, Right L2D(cm), 7.07±0.69, Left L4D(cm) 8.14±1.23, Right L4D(cm) 8.10±1.27, In females: Left L2D (cm) 7.50±1.01, Right L2D(cm) 7.48±0.99, Left L4D(cm) 8.20±1.06, Right L4D(cm) 8.21±1.21. The males on the left had the Digit Ratio 0.87±0.04, while on the Right Digit Ratio was 0.87±0.02; In the females, the Left Digit Ratio was 0.91±0.03, Right Digit Ratio 0.91±0.04. In the total population, the Left Digit Ratio was 0.88±0.02 while the Right Digit Ratio was 0.87±0.04. Sexual dimorphism was seen in the mean lengths of the digits with the females having higher values than the men. It suggests that there could be hormonal contribution in the formation of the digit lengths. These implies that averagely, females have longer digit than men which could be used in forensic investigation where the sex of victim or assailant is unknown. **Conclusion:** The longer digits in women is thought to be a typical feminine feature. The result of the study depicted sexual dimorphism again in the digit ratios with the females having higher digit ratios than the males. This dimorphism results from the difference in androgen level between both genders. The more exposure to testosterone, the lower the digit ratio. This further strengthens what has been reported in the digit lengths.

Keywords: Gender, Digit ratio, Igbo, Eastern, Nigeria.

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INTRODUCTION

Digit ratio is defined as the ratio of the second digit length (2D) to the fourth digit length (4D) of the hand [1].

$$\text{Digit Ratio} = \frac{2D}{4D} = \frac{\text{Length of the second digit of the finger}}{\text{Length of the fourth digit of the finger}}$$

Digit ratio as a subject matter have been widely explored by different researchers in indigenous and foreign populations with very remarkable findings. Digit ratio has also been used to investigate interpopulation affinity stating tribal or population similarity [2].

It has been speculated that sexual differences in 2D:4D are mainly caused by the shift along the common

allometric line with non-zero intercept, which means 2D:4D necessarily decreases with increasing finger length, and the fact that men have longer fingers than women (which may be the basis for the sex difference in digit ratios and/or any putative hormonal influence on the ratios [3-5]).

This gender has not been investigated in the Igbo tribe yet as such the study was carried out to know whether this characteristic is present in the Igbo extraction. This study will add to the body of knowledge information on the population characteristics of indigenous population especially in Sub-Saharan Africa.

The Igbo people, historically spelt Ibo, are an ethnic group of south eastern Nigeria. They speak Igbo, which includes various Igbo languages and dialect. Igbo people are one of the largest ethnic groups in Africa. In rural Nigeria, Igbo people are mostly craftsmen, farmers and traders. They are found majorly in the five eastern states (Abia, Imo, Enugu, Anambara and Ebonyi), but have some minor settlements in some other states like Rivers, Delta, Kogi and Edo states. They have been estimated to have a population of 22,000,000 million [6, 7].

There are some reports on investigations by other researchers on digit ratios in various indigenous populations [8-19].

There is paucity of information on digit ratio in Igbo tribe under investigation.

Aim and Objective: This study was aimed at gender variation in digit ratio of the Igbo ethnic group.

Scope of the Study: This study was done specifically on the second- and fourth-digit lengths.

Significance of the Study: This study will benefit the body of knowledge on population studies of ethnic groups in Nigeria which will be significant to historians, sociologists, anthropologists, the Igbo people specifically.

METHODS

Research Design

The study was descriptive and cross-sectional. For the purpose of this study, an individual was considered to be a Nigeria of a particular ethnic group if the parents and four grandparents are of the same ethnic group. Volunteers with age ranging from 18-60 years from the Igbo extractions were recruited for this study by random sampling. The study was conducted from March 6 - October 20, 2019.

Data Collection

The lengths of the second and fourth digits of the left and right hands were measured on the ventral (inferior) surface of the hand from the basal crease of the 2nd and 4th digits to the tip of the finger of the subjects. In situations where there was a band of creases at the base of the digit, the most proximal crease was used. All measurements were done with a digital vernier caliper having an accuracy of $\pm 0.2\text{mm}$ [1-3]. The measurements were done three times and the average value was

recorded. The lengths of the second digits were divided by the lengths of the fourth digits to obtain the digit ratios [1-3].



Fig-1: Digit ratio measurement from the study

Data Analysis: Data obtained were inputted into Microsoft excel 2010 for data analysis using independent t test to determine the mean values in the males and females.

Criteria for Subject Selection: Volunteers recruited were indigenes of the ethnic groups under investigation with no form of anatomical abnormality of the hands.

Ethical Consideration

Ethical clearance was obtained from the Research Ethics Committee of the University of Port Harcourt with REC Number: UPH/CEREMAD/REC/MM59/036 before commencement of the study.

RESULTS

In Table-1, descriptive statistics of digit lengths and ratios of Igbo ethnic group. In the males the following Mean \pm SD were seen: Males Left L2D (cm) 7.05 \pm 0.72, Right L2D(cm), 7.07 \pm 0.69, Left L4D(cm) 8.14 \pm 1.23, Right L4D(cm) 8.10 \pm 1.27, In females: Left L2D (cm) 7.50 \pm 1.01, Right L2D(cm) 7.48 \pm 0.99, Left L4D(cm) 8.20 \pm 1.06, Right L4D(cm) 8.21 \pm 1.21.

In Table-2, the males, the Left Digit Ratio was 0.87 \pm 0.04, Right Digit Ratio was 0.87 \pm 0.02; In the females, the Left Digit Ratio was 0.91 \pm 0.03, Right Digit Ratio 0.91 \pm 0.04. In the total population, the Left Digit Ratio was 0.88 \pm 0.02 while the Right Digit Ratio was 0.87 \pm 0.04.

Table-1: Descriptive statistics of digit lengths of Igbo ethnic group

IGBO ETHNIC GROUP			
Parameters	Male [N = 230]	Female [N =230]	Total [N = 460]
	Mean±SD	Mean±SD	Mean±SD
Left L2D (cm)	7.05±0.72	7.50±1.01	7.20±1.01
Right L2D(cm)	7.07±0.69	7.48±0.99	7.22±0.99
left L4D(cm)	8.14±1.23	8.20±1.06	8.18±0.89
Right L4D(cm)	8.10±1.27	8.21±1.21	8.21±0.90

L2D (cm) < L4D (cm), Females > Males

Table-2: Descriptive statistics of digit ratios of Igbo ethnic group

IGBO ETHNIC GROUP			
Parameters	Male [N = 230]	Female [N =230]	Total [N = 460]
	Mean±SD	Mean±SD	Mean±SD
Left Digit Ratio	0.87±0.04	0.91±0.03	0.88±0.02
Right Digit Ratio	0.87±0.02	0.91±0.04	0.87±0.04

L2D (cm) < L4D (cm), Females > Males

DISCUSSIONS

Sexual dimorphism was seen in the mean lengths of the digits with the females having higher values than the men. It suggests that there could be hormonal contribution in the formation of the digit lengths. These implies that averagely, females have longer digit than men which could be used in forensic investigation where the sex of victim or assailant is unknown. The longer digits in women is thought to be a typical feminine feature.

The result of the study depicted sexual dimorphism again in the digit ratios with the females having higher digit ratios than the males. This dimorphism results from the difference in androgen level between both genders. The more exposure to testosterone, the lower the digit ratio. This further strengthens what has been reported in the digit lengths. The result of this present study agrees strongly with the reports of previous investigators who have expressly stated that there is sexual dimorphism in the digit ratios [8-13]. In this study, it was found that the males repeatedly had low digit ratios compared to the females. This low digit ratio seen in men is considered a positive trait as several other authors who have worked on this subject reported that low digit ratios are typical masculine traits. Alonso *et al.*, [14] reported that low digit ratio correlates with high social preference; Aycinena *et al.*, [15] in his study asserted that women with low digit ratio tend to be more patient; motioned that a low digit ratio positively correlates with static and explosive strength, speed and agility which is a typical masculine trait exemplified in digit ratio. Furthermore, it was also mentioned that a study on sports activities showed that those who got to the highest level of competition in their respective games had low digit ratios [16] which were mostly men. Another report had it that women were more attracted to men with lower digit ratios as compared to those with high digit ratio. Recalling the rule of magnetism in physics that says

‘opposites attract’, it is not preposterous to say that women were attracted to those men because men with low digit ratios have typical and attractive masculine features that is considered an ideal male feature. This may also imply that women who have low digit ratios, may possibly have more masculine features with high testosterone level if investigated than the normal women with high digit ratio. Just recently, in April 2018, a female South African athlete by name Caster Semenya, who was reported to have a higher than normal testosterone level had serious issues with participating in the games because of a new rule by the International Association of Athletics Federations, that stipulates that athletes should lower and maintain their testosterone levels to no more than 5 nanomoles per liter of blood, the IAAF said that’s half the amount previously allowed [17]. They maintained that athlete who refuses to adhere strictly to this rule should in the alternative compete with men in sports instead of females.

Here, the knowledge of digit ratio can be employed to screen athletes who have lower digit ratios and exclude them from the games, till it has been proven that they have stabilized their testosterone level according to the IAAF standard. Finally, Warrington *et al.*, [18] said that it is possible that there is genetic contribution to the formation of digit ratios. All these reports from the previous authors affirm the results got from this present study which showed that males had lower digit ratios than the females.

CONCLUSION

The longer digits and higher digit ratios in women are thought to be typical feminine features as such could be used as a marker for gender differentiation in a forensic investigation.

ACKNOWLEDGEMENTS

We want to appreciate the entire management and staff of the Department of Anatomy, University of Port Harcourt.

Conflict of Interest: We write to state that there is no conflict of interest.

Source of Funding: Self-funding.

AUTHOR'S CONTRIBUTION

We write to state that all authors have contributed significantly, and that all authors are in agreement with the contents of the manuscript. 'Authors A' (John Nwolim Paul) designed the study and protocol, wrote the first draft of the manuscript; 'Authors B' (ThankGod C. Omuruka and Deborah A. Akinola) 'reviewed the design, protocol; 'Author C' (Tarimobo M. Otobo) examined the intellectual content of the manuscript. All authors read and approved the final manuscript.

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