

Sexual Dimorphism in Axial Triradii of the Igbo Ethnic Group in Eastern Nigeria

John Nwolim Paul¹, Chizindu Akubudike Alikor^{2*}, Idowu Elijah Adefisan¹, Chinyere O. Ndu-Akinla³, Deborah Abosede Akinola¹

¹Department of Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences, University of Port Harcourt, Nigeria

²Department of Internal Medicine, University of Port Harcourt Teaching Hospital, Port Harcourt, Rivers State Nigeria

³Department of Family Medicine, Rivers State University Teaching Hospital, Port Harcourt, Rivers State Nigeria

DOI: [10.36347/sajb.2019.v07i12.001](https://doi.org/10.36347/sajb.2019.v07i12.001)

| Received: 07.11.2019 | Accepted: 17.11.2019 | Published: 06.12.2019

*Corresponding author: Chizindu Akubudike Alikor

Abstract

Original Research Article

Background: This study was aimed at investigating sexual dimorphism in the axial triradii of the Igbo ethnic group. The study was an analytical cross-sectional study in which the volunteers were aged between 18 to 60 years. For the purpose of this study, an individual was considered to be a Nigeria of Igbo ethnic origin if the parents and four grandparents were all Igbo. **Materials and Methods:** The Cluster sampling method was used for the study. A written informed consent was signed and dated by the proposed respondents prior to the collection of data. A total of 340 subjects (170 males, 170 females) were recruited for the study. The fingerprints were obtained using a print scanner (Hp G3110 Photo scanner). **Results and Discussion:** The males (n=170) had the following: on the right 80(47.1%) had the **t** triradii, while 45(26.5%) each had **t¹** and **t²** triradii. Whereas on the left 81(47.6%) had the **t** triradii, 42(24.7%) had the **t¹** triradii and 47(27.7%) had the **t²** triradii. The females (n=170) had the following prevalence of the triradii on the right: **t** 77(45.3%), **t¹** 34(20.0%), **t²** 59(34.7%) while on the left **t** was 73(42.9%), **t¹** 38(22.4%) and **t²** 59(34.7%). The prevalence of the different triradii among the study population were thus for the right: **t** 340(45.3%), **t¹** 79(28.8%), **t²** 104(25.9%) while the results on the left were as follows, **t** 154(43.5%), **t¹** 80(29.0%) and **t²** 106(27.5%). The position of the axial triradii revealed a sexual dimorphism with a higher prevalence in the males than the females with regards to position **t** and **t¹** while the females had a consistently higher prevalence of **t²** position. **Conclusion:** The result of this study suggests that in a given population, if gender of an individual is unknown, the knowledge of axial triradii of that population can be used as a guide to gender identification.

Keywords: Dimorphism, Triradii, Igbo, Eastern, Nigeria.

Copyright © 2019: This is an open-access article distributed under the terms of the Creative Commons Attribution license which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use (NonCommercial, or CC-BY-NC) provided the original author and source are credited

INTRODUCTION

The use of the Triradii is one aspect of dermatoglyphics that is of interest to researchers when investigating populations. A triradius is formed by the confluence of three ridge systems at the base of each finger on the palm of the hand. The geometric center of the triradius is designated as the triradial point. Ideally, the triradial point is the meeting point of three ridges that form angles of approximately 120 degrees with another [1].

The triradius is recognized by the meeting point of the ridges as shown below:

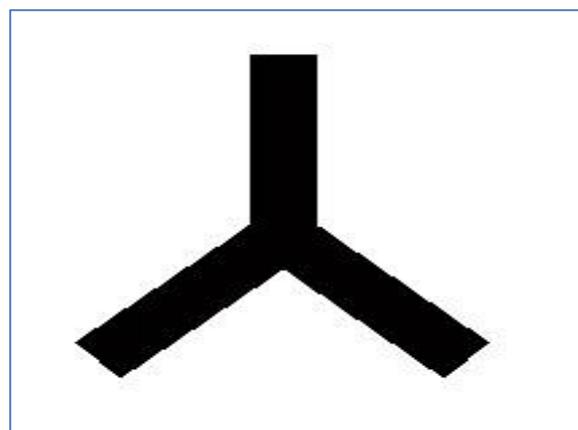


Fig-1: Showing the meeting point of the ridges to form a triradius [2]

The axial triradius is one parameter that is often used in dermatoglyphics to establish a relationship between individuals, or uniqueness. It is considered an appropriate tool for the the investigation of uniqueness of tribes because its formation and distribution are regulated by genes. Similarity in expression depicts genetic proximity. This implies that siblings, relatives or homogenous tribes will share similarity in expressions of the triradii. These triradii are classed based on their position on the palm. Thus, we have the positions as t triradius, when it is located at the base of the palm, t^1 – when it is located midway to the centre of the palm and t^{11} when it is located very close to the centre of the palm [3].

The Igbo people, historically spelt Ibo, are an ethnic group of South-eastern Nigeria. They speak Igbo, which includes various Igbo languages and dialects. Igbo people make up 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 other states such as Rivers, Delta, Kogi and Edo states. They have been estimated to have a population of 22,000,000 million [4-7].

They are known to be very industrious and in their account of their ancestral origin, have asserted that they migrated from Israel to settle in Nigeria. This assertion has not been investigated anatomically [5-7].

There are some reports on investigations done by other researchers on the positions of the axial triradii [8-20]. There is paucity of information on the position of the axial triradii in the tribe under investigation.

Aim and Objective: This study was aimed at investigating sexual dimorphism in axial triradii of the Igbo ethnic group.

Scope of the Study: This study was done specifically on the digital prints.

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, and the Igbo people in particular.

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 the Igbo ethnic group if the parents and four grandparents were Igbo. Volunteers with age ranging from 18-60 years from the Igbo extractions were recruited for this study using purposive sampling. The study was conducted from March 6 - October 20, 2019.

Data Collection: A written informed consent was signed and dated by the proposed respondents prior to the collection of data. A brief self-administered questionnaire on the age, sex, ethnicity of the parents and grandparents was completed by the respondents. In the case of illiterate respondents, the questionnaire was administered by the researcher. A total of 340 (170 male and 170 female) volunteers were recruited for the study. The fingerprints were obtained using a print scanner (Hp G3110 Photo scanner) as was used by Paul *et al.* [9].



Fig-1: t position of the triradius (zoomed) from the study

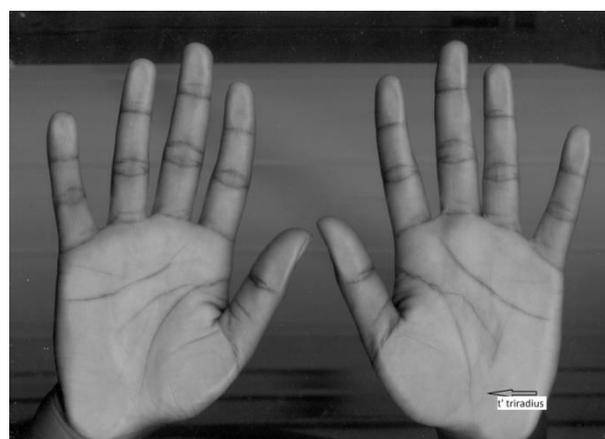


Fig-2a: t^1 position of the triradius from the study



Fig-2b: t^1 position of the triradius (zoomed) from the study



Fig-3a: t^{11} position of the triradius from the study

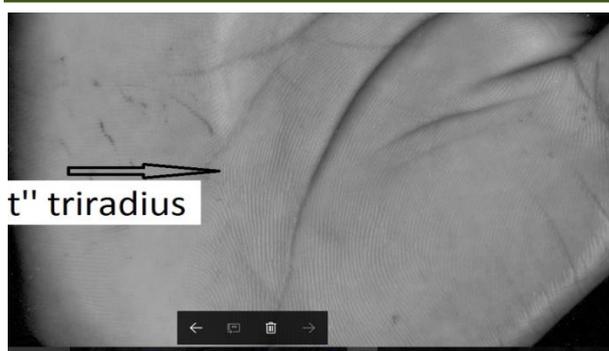


Fig-3b: t'' position of the triradius (zoomed) from the study

Data Analysis: Data obtained were inputted into Microsoft excel 2010 and imported for analysis using chi square test (SPSS version software) to compare the prevalence of triradii positions between males and females.

Criteria for Subject Selection: Only subjects whose four grandparents were Igbo were admitted into the study. Subjects with anatomical abnormalities of the hands or whose prints were blurry were excluded from the study.

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

Table 1 shows the prevalence of the axial triradii of the Igbo ethnic group. The males (n=170) had the following: on the right 80(47.1%) had the t triradii, while 45(26.5%) each had t^1 and t^2 triradii. Whereas on the left 81(47.6%) had the t triradii, 42(24.7%) had the t^1 triradii and 47(27.7%) had the t^2 triradii. The females (n=170) had the following prevalence of the triradii on the right: t 77(45.3%), t^1 34(20.0%), t^2 59(34.7%) while on the left t was 73(42.9%), t^1 38(22.4%) and t^2 59(34.7%). The prevalence of the different triradii among the study population were thus for the right: t 340(45.3%), t^1 79(28.8%), t^2 104(25.9%) while the results on the left were as follows, t 154(43.5%), t^1 80(29.0%) and t^2 106(27.5%).

In table 2 the comparison between both sexes was not statistically significant although the males consistently had higher prevalence than the females except in the t^2 prevalence where the females had higher prevalence.

Table-1: Prevalence of axial triradii in Igbo ethnic group

Parameters	Right			Left		
	t	t^1	t^2	t	t^1	t^2
Males (n=170)	80(47.1)	45(26.5)	45(26.4)	81(47.6)	42(24.7)	47(27.7)
Females (n=170)	77(45.3)	34(20.0)	59(34.7)	73(42.9)	38(22.4)	59(34.7)
Total (n=340)	157(45.3)	79(28.8)	104(25.9)	154(43.5)	80(29.0)	106(27.5)

Table-2: Prevalence of axial triradii in Igbo ethnic group

Sex	t	X^2 (p-value)	t^1	X^2 (p-value)	t^2	X^2 (p-value)
Right						
Males (n=170)	80(47.1)	0.1065(0.744)	45(26.5)	1.995(0.157)	45(26.4)	2.7151(0.099)
Females (n=170)	77(45.3)		34(20.0)		59(34.7)	
Left						
Males (n=170)	81(47.6)	0.7597(0.383)	42(24.7)	0.2615(0.609)	47(27.7)	1.9739(0.160)
Females (n=170)	73(42.9)		38(22.4)		59(34.7)	

$P < 0.05$, the difference between the males and females are not significant.

DISCUSSION

The position of the axial triradii showed a sexual dimorphism in the prevalence of the triradii with males having a higher prevalence than the females in position t and t^1 while the females displayed a higher prevalence of t^2 position. The results of present study agree with the findings of Paul *et al.* [3, 9] and Badiyea *et al.* [10] where they reported a sexual dimorphism in the distribution of the triradii with the males having a higher prevalence of both t , t^1 while the least prevalent position was t'' .

The comparison between both sexes were not statistically significant although the males consistently had higher prevalence than the females except in the t^2 prevalence where the females had higher prevalence.

The results of this study suggest that in an investigation where the sex or gender of an individual is unknown, the knowledge of axial triradii of the population can be used as a guide to determine the gender.

CONCLUSION

The prevalence of the position of the axial triradii showed a sexual dimorphism in the prevalence of the triradii with males having a higher prevalence than the females in position t and t^1 while the females had a consistently higher prevalence of the t^2 position.

ACKNOWLEDGEMENTS

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

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 and Chizindu Akubudike Alikor) designed the study and protocol, wrote the first draft of the manuscript; 'Authors B' (Idowu Elijah Adefisan and Deborah Abosede Akinola) 'reviewed the design, protocol; 'Author C' (Chinyere O. Ndu-Akinla) examined the intellectual content of the manuscript. All authors read and approved the final manuscript.

REFERENCES

- Schaumann B, Alter M. Medical disorders with associated dermatoglyphic abnormalities. In *Dermatoglyphics in Medical Disorders* 1976 (pp. 131-252). Springer, Berlin, Heidelberg.
- Martijn. The triradius in a fingerprint: how it develops, its characteristics. <http://www.modernhandreadingforum.com/t736-the-triradius-in-a-fingerprint-how-it-develops-it-s-characteristics-a-definition>. 2011. Accessed October 10, 2019.
- Paul CW, Osunwoke EA, Paul JN. Determination of the prevalence of position of axial triradii in acquired idiopathy blindness in some selected schools for the blind in Nigeria. *Scho. J. Appli Med Sci.* 2018; 6(1):136-138.
- Uchendu E. Being Igbo and Muslim: The Igbo of south-eastern Nigeria and conversions to Islam, 1930s to recent times. *The Journal of African History.* 2010 Mar;51(1):63-87.
- Uchendu E. "Being Igbo and Muslim: The Igbo of South-Eastern Nigeria and Conversions to Islam, 1930s to Recent Times". *The J. Afri. Hist.* 2010; 51(1). 63-87.
- Udeani C. Inculturation as Dialogue: Igbo Culture and the Message of Christ. *Rodopi.* 2007; Pp12.
- Slattery K. "The Igbo People – Origins & History". School of English, Queen's University of Belfast. 2016.
- Holt SB and Sharma PD. Absence of triradius d on the palms of normal people. *Ann Hum Genet.* 1977; 41:195-197.
- Paul JN, Oladipo GS, Oghenemavwe LE. Investigation of Prevalence Pattern of Axial Triradii in the Ikwerres', Binis' and Igbos. *Saudi J Biomed Res.* 2019; 4(10): 349-354
- Badiyea A, Kapoora N, Mishrab SD. A novel approach for sex determination using palmar tri-radii: A pilot study. *Journal of Forensic and Legal Medicine.* 2019; 65: 22-26.
- Vashist M, Yadav R, Neelkamal, kumar A. Axial triradius as a preliminary diagnostic tool in patients of mental retardation. *The Internet Journal of Biological Anthropology.* 2009; 4(1).
- Beldeu S, Sandhu R, Pathak K and Kaul S. Lateral Displacement of the Axial Triradius with Reference to the Hand Skeleton: A-New Genetic Marker for Population Definition. *Indian Anthropologist,* 1985; 15(2): 161-166.
- Micle S, Kobylansky E, Arensburg B, and Nathan H. The digital triradii of the palm: a dermatoglyphic study. *Zeitschrift für Morphologie und Anthropologie.* 1980; 21: 322-328.
- Karmakar B, Malhotra KC. Types and Combinations of Axial Triradii among the 20 Dhangar Castes of Maharashtra, India. *International Journal of Anthropology.* 1987; 2(2): 171-181.
- Karmakar B. Distribution and population variation of total number of palmar triradii among 20 Dhangar castes of Maharashtra, India. *International Journal of Anthropology.* 1990; 5(3): 255-269.
- Mukherjee DP. Inheritance of total number of triradii on fingers palms and soles. *Annals of Human Genetics.* 1966; 29:349.
- Natekar PE, Desouza F, Pandey AK. Axial Triradii in Carcinoma of Breast, the Anthropologist. 2006; 8(3): 193-195.
- David TJ. The Palmar Axial Triradius T. A New Method of Location. *Human Heredity.* 1971; 21:624-627.
- Ranganath P, Rajangam S, Kulkarni RN. Triradii of the Palm in Idiopathic Epilepsy. *Journal of Anatomical Society of India.* 2004; 53(2): 22-24.
- Paul CW and Paul JN. Gender Variation Studies in Dermatoglyphic Patterns (Level 2 Details) of the Ikwerre Ethnic Group in Rivers State, Nigeria. *Journal of Pharmaceutical Research International.* 2017; 19(2): 2231-2919.