**East African Scholars Journal of Medical Sciences**
*Abbreviated Key Title: East African Scholars J Med Sci*
ISSN: 2617-4421 (Print) & ISSN: 2617-7188 (Online)
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-3 | Issue-1 | Jan-2020 | DOI: 10.36349/easjms.2020.v03i01.04

**Research Article**

# Analytical Study of Ancestral Relationship between Ikwerre, Bini and Igbo Ethnic Groups Using Digit Ratio (2d:4d)

John N. Paul[1]*, Chibuike Obiandu[2], Prince Sampson Ogbilikana[1], Deborah A. Akinola[1]

[1]Department of Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences, University of Port Harcourt, Nigeria
[2]Department of Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, University of Port Harcourt, Nigeria

**Article History**
Received: 04.01.2020
Accepted: 18.01.2020
Published: 27.01.2020

**Journal homepage:**
https://www.easpublisher.com/easjms

**Quick Response Code**

**Abstract:** **Background:** This study investigated gender variation in digit ratios of the Bini ethnic group. The study had 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 Nigerian of a particular ethnic group if the parents and four grandparents are of the same ethnic group. **Materials and Methods**: Purposive 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 1,200 subjects (Ikwerre 400, Bini 400, Igbo 400) subjects were recruited for the study. The fingerprints were obtained using print scanner (Hp G3110 Photo scanner). **Results and Discussion**: The mean digit ratio across the three ethnic groups indicated that the Ikwerre had the following on the left 0.99±0.03; Bini 0.98±0.05 while the Igbos had 0.88±0.02. On the right hand, the mean digit ratio showed that the Ikwerre had 0.98±0.04; Bini 0.98±0.04 while the Igbos had 0.87±0.04. The Ikwerre ethnic group was shown to have a digit ratio closer to the Bini ethnic group than the Igbos and there was no statistical significance ($p>0.05$) in the comparison of digit ratio between Bini and Ikwerre ethnic groups. There was statistical significance ($p<0.05$) in the comparison of digit ratio between the Igbos and Ikwerres. **Conclusion:** The mean of the digit ratios for the Bini people is closer to that of the Ikwerre people than the Igbos. Statistical comparison of the ethnic groups showed that the difference between the Ikwerre and Bini people was not significant meaning that they possibly have ancestral relationship whereas that of the Igbos and Ikwerre people was statistically significant showing that they have a reasonable difference large which ultimately may translate in them not having ancestral relationship.

**Keywords:** Ancestry, Digit Ratio, Ikwerre, Bini, Igbo.



## INTRODUCTION

Digit ratio is defined as the ratio of the second digit length (2D) to the fourth digit length (4D) of the hand (Manning, J.T., & Robert, T. 2002).

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

There are divers works on digit ratio as a subject matter insinuating that it expresses dimorphism in sexes. If this is true, it means that it could serve as a means of identification in forensic and population studies. Digit ratio has also been used to investigate interpopulation affinity stating tribal or population similarity (Manning, J. T. 2011).

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 (Manning, J. T. *et al.*, 1998; Manning, J. T. *et al.*, 2004; & Loehlin, J. C. *et al.*, 2006).

The Ikwerre people have stated that they have their ancestral root from the Bini ethnic group with history that documented how the ancestor of the Ikwerre fled the old Bini and came down to the present

***Corresponding Author:** John N. Paul Email: nwolim_paul [at]]uniport.edu.ng

location of the Ikwerre ethnic to settle. Again, the Igbo ethnic group lay claims on the Ikwerre people. This controversy has persisted for very long time without any thorough scientific investigation using digit ratios to back any of these claims. It is based on this dearth of information that this study was undertaken to explore whether there is an anatomical evidence to back or reject any of the claims (Paul, J. N. *et al.,* 2019a; Paul, J. N. *et al.,* 2019b, Paul, J.N. *et al.,* 2019c; Gabriel, S. O. *et al.,* 2009; & Gwunireama Israel, U. *et al.,* 2009).

There are some reports on investigations done by other researchers on digit ratios stating the findings which ranges from the mean value for each population to sexual dimorphism in the tribes or populations studied (Gwunireama, I. U., & Ihemelandu, E. C. 2009; Gwunireama, I. U., & Ihemelandu, E. C. 2010; Kullmann, J. A. P., & Pamphlett, R. 2017; Lu, H. *et al.,* 2008; Alonso, J. *et al.,* 2018; Aycinena, D., & Rentschler, L. 2018; Meggs, J. *et al.,* 2018; Chiu, A. 2018; Warrington, N. M. *et al.,* 2018; Richards, G. *et al.,* 2017; & Barrantes, R., & Segura-WW, M. 2009).

There is paucity of information on the ancestral relationship of these tribes under investigation as such this study was undertaken.

The aim of this study was to investigate the ancestral relationship of the Ikwerre ethnic group with the Bin and Igbo ethnic groups using digit ratio (2D: 4D). The study will benefit the body of knowledge on ancestry of Ikwerres which will be significant to historians, sociologists, anthropologists, Rivers State people and Ikwerres specifically. This study was done specifically on the digit lengths.

## METHODS

The study was descriptive and cross-sectional. For the purpose of this study, an individual was considered to be a Nigerian 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 Bini extractions were recruited for this study by purposive sampling. The study was conducted from March 6 - October 20, 2019.

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 ±0.2mm (Manning, J.T., & Robert, T. 2002; Manning, J. T. 2011; & Manning, J. T. *et al.,* 1998). 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 (Manning, J.T., & Robert, T. 2002; Manning, J. T. 2011; & Manning, J. T. *et al.,* 1998).

Participants recruited were indigenes of the ethnic groups under investigation with no form of anatomical abnormality of the hands. The data obtained were analysed using SPSS version 21, independent t-test was used to determine the mean values and comparison between both sexes.

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.

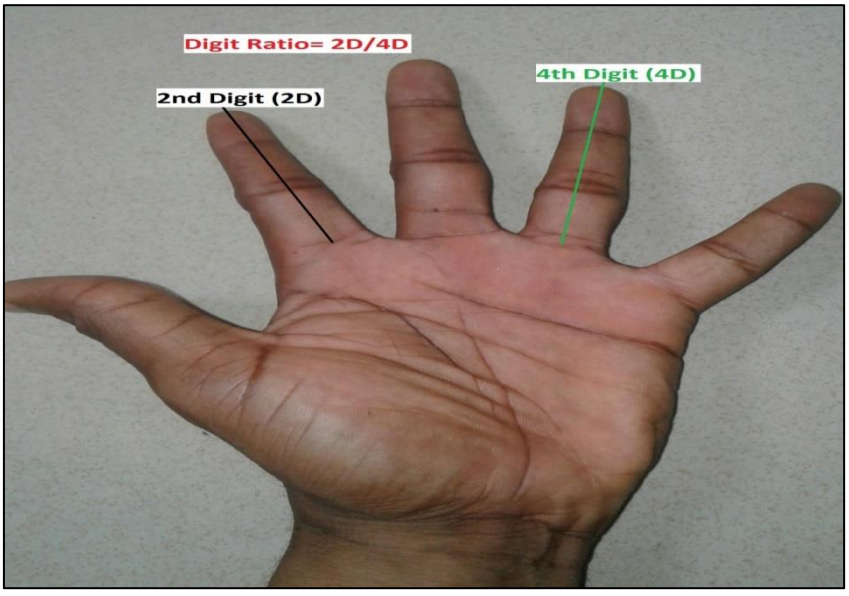


**Figure 1:** Digit ratio measurement from the study

**RESULTS**

In table 1 the mean digit ratio across the three ethnic groups indicated that the Ikwerre had the following on the left 0.99±0.03; Bini 0.98±0.05 while the Igbos had 0.88±0.02. On the right hand, the mean digit ratio showed that the Ikwerre had 0.98±0.04; Bini 0.98±0.04 while the Igbos had 0.87±0.04.

In table 2 the Ikwerre ethnic group was shown to have a digit ratio closer to the Bini ethnic group than the Igbos and there was no statistical significance ($p>0.05$) in the comparison of digit ratio between Bini and Ikwerre ethnic groups.

In table 3 there was statistical significance ($p<0.05$) in the comparison of digit ratio between the Igbos and Ikwerres.

**Table 1:** Mean digit ratio across the three ethnic groups

| 2D:4D | Digit ratio across the ethnic groups<br>Left<br>Mean±SD | <br>Right<br>Mean±SD |
|---|---|---|
| Ikwerre (n=400) | 0.99±0.03 | 0.98±0.04 |
| Bini (n=400) | 0.98±0.05 | 0.98±0.04 |
| Igbo (n=400) | 0.88±0.02 | 0.87±0.04 |

Ikwerre had closer values to Bini than the Igbos

**Table 2:** t test comparison of total digit ratio between Ikwerre and Bini ethnic groups

| Ethnic Group | Left Digit Ratio | t-value | p-value 0.05 | Inference |
|---|---|---|---|---|
| Ikwerre | 0.99±0.03 | 1.561 | 0.424 | Not significant |
| Bini | 0.98±0.05 | | | |
| | **Right Digit Ratio** | | | |
| Ikwerre | 0.98±0.04 | 1.828 | 0.204 | Not significant |
| Bini | 0.99±0.04 | | | |

($p>0.05$)

In table 3 there was statistical significance ($p<0.05$) in the comparison of total digit ratio between the Igbos and Ikwerres.

**Table 3:** t test comparison of total digit ratio between Igbo and Ikwerre ethnic groups

| Ethnic Groups | Left Digit Ratio | t-value | p-value 0.05 | Inference |
|---|---|---|---|---|
| Ikwerre | 0.99±0.03 | 23.0012 | 0.004 | Significant |
| Igbo | 0.88±0.02 | | | |
| | **Right Digit Ratio** | | | |
| Ikwerre | 0.98±0.04 | 21.922 | 0.005 | Significant |
| Igbo | 0.87±0.04 | | | |

($p<0.05$)

## DISCUSSION

Comparison of the total digit ratios in Ikwerre and Bini ethnic groups indicated that they differed but not significantly. This may further suggest that they probably do have ancestral relationship. This result corroborates the findings of Segura-Wang and Barrantes (2009) who stated that statistical insignificance in results of comparison depicts interpopulation affinities in their study. It could be inferred that the Ikwerre people had their descent from the Bini people.

Comparison of the total digit ratios in Ikwerre and Igbo ethnic groups (Ikwerre and Igbo) indicated that they differed significantly. This may further suggest that they probably have no ancestral relationship. This result agrees with the reports of Namouchi (2011) and Fournier and Ross (2016) who stated that statistical insignificance in digital pattern difference suggests close ancestral relationship whereas statistical significance does not depict ancestral relationship.

The Ikwerre people from the result of this study have a higher digit ratio which is followed by that of the Bini people and Igbo being the least. The mean total of the digit ratios for the Bini people is closer to the Ikwerre mean value than is that of Igbos. This again reiterates the trend that has already being established.

## CONCLUSION

The mean of the digit ratios for the Bini people is closer to that of the Ikwerre people than the Igbos. Statistical comparison of the ethnic groups showed that the difference between the Ikwerre and Bini people was not significant meaning that they possibly have ancestral relationship whereas that of the Igbos and Ikwerre people was statistically significant showing that they have a reasonable difference large which ultimately may translate in them not having ancestral relationship.

**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. 'Author A' (John N. Paul and) designed the study and protocol, wrote the first draft of the manuscript; reviewed the design, protocol; 'Authors B' (Chibuike Obiandu and Prince Sampson Ogbilikana) examined the intellectual content of the manuscript, 'Authors C' (Deborah A. Akinola) did the analysis of the study and literature search. All authors read and approved the final manuscript.

## REFERENCES

1. Manning, J.T., & Robert, T. (2002). Sexual dimorphism in the 2nd and 4th digit ratio. Hormone and Behaviour, 24, 56-60.
2. Manning, J. T. (2011). Resolving the role of prenatal sex steroids in the development of digit ratio. *Proceedings of the National Academy of Sciences*, *108*(39), 16143-16144.
3. Manning, J. T., Scutt, D., Wilson, J., & Lewis-Jones, D. I. (1998). The ratio of 2nd to 4th digit length: a predictor of sperm numbers and concentrations of testosterone, luteinizing hormone and oestrogen. *Human Reproduction (Oxford, England)*, *13*(11), 3000-3004.
4. Manning, J. T., Wood, S., Vang, E., Walton, J., Bundred, P. E., Van Heyningen, C., & Lewis-Jones, D. I. (2004). Second to fourth digit ratio (2D: 4D) and testosterone in men. *Asian journal of andrology*, *6*(3), 211-216.
5. Loehlin, J. C., McFadden, D., Medland, S. E., & Martin, N. G. (2006). Population differences in finger-length ratios: ethnicity or latitude?. *Archives of Sexual Behavior*, *35*(6), 739-742.
6. Paul, J. N., Akinola, D. A., Obiandu, C. A., & Loveday, E. O. (2019). Investigation of Ancestral Relationship of Ikwerres' with Binis' and Igbos' Using Level 2 Dermatoglyphic (Minutiae) Patterns. International Journal of Pharma Research and Health Science,7 (5), 3043-3046.
7. Paul, J.N., Oladipo, S.G., & Oghenemavwe, E.L. (2019). Investigation of Prevalence Pattern of Axial Triradii in the Ikwerres', Binis' and Igbos'. Saudi Journal of Biomed Research, 4(10), 349-354.
8. Paul, J.N., Akinola, A.D., & Erezih, O. F. (2019). Descriptive Cross-sectional Study of Minutiae Patterns in the Bini People ethnic group of Nigeria. International Journal of Research and Scientific Innovation, 6(12), 19-22.
9. Gabriel, S. O., Hakeem, B. F., Ezon-Ebidor, I. E., Emeka, A. O., & Kenneth, S. O. (2009). Second to fourth digit ratio in Nigerian Igbos and Yorubas. *Sci Res Essay*, *4*, 1146-1148.
10. Gwunireama Israel, U., Osunwoke, E. A., & Orish Chinna, N. (2009). Anthropometrical study of 2nd to 4th digit ratio of Andoni (Obolo) groups of Ijaw ethnic nationality in Nigeria. In *International e-Conference on Biomedical, Environmental & Nutritional Health Sciences* (Vol. 4, No. 3, pp. 1460-1465).
11. Gwunireama, I. U., & Ihemelandu, E. C. (2009) Geographical influence on digit ratio (2D:4D): a case study of Andoni and Ikwerre ethnic groups in Niger delta, Nigeria. *International e-Conference on Biomedical, Environmental & Nutritional Health Sciences. 2009;* 1461.
12. Gwunireama, I. U., & Ihemelandu, E. C. (2010). Geographical influence on digit ratio (2D: 4D): a case study of Andoni and Ikwerre ethnic groups in Niger Delta, Nigeria. *Journal of Applied Biosciences*, *27*, 1736-1741.
13. Kullmann, J. A. P., & Pamphlett, R. (2017). Does the index-to-ring finger length ratio (2D: 4D) differ in amyotrophic lateral sclerosis (ALS)? Results from an international online case–control study. *BMJ open*, *7*(8), e016924.
14. Lu, H., Shen, D., Wang, L., Niu, S., Bai, C., Ma, Z., & Huo, Z. (2008). Study on the Digit Ratio of Hui and Han Ethnic Groups in Ningxia Acta Anatomica Sinica,15(9), 176-179.
15. Alonso, J., Di Paolo, R., Ponti, G., & Sartarelli, M. (2018). Facts and misconceptions about 2D: 4D, social and risk preferences. *Frontiers in Behavioral Neuroscience*, *12*, 22.
16. Aycinena, D., & Rentschler, L. (2018). Discounting and digit ratio: Low 2D: 4D predicts patience for a sample of females. *Frontiers in behavioral neuroscience*, *11*, 257.
17. Meggs, J., Chen, M., & Mounfield, D. (2018). The Organizational Effect of Prenatal Testosterone upon Gender Role Identity and Mental Toughness in Female Athletes. Journal of Women in Sport and Physical Activity. 5(2):10.

18. Chiu, A. (2018). Female athletes with naturally high testosterone levels face hurdles under new IAAF rules. Morning Mix, the Washington Post's Morning Mix team.
19. Warrington, N. M., Shevroja, E., Hemani, G., Hysi, P. G., Jiang, Y., Auton, A., ... & McMahon, G. (2018). Genome-wide association study identifies nine novel loci for 2D: 4D finger ratio, a putative retrospective biomarker of testosterone exposure in utero. *Human molecular genetics*, *27*(11), 2025-2038.
20. Richards, G., Bellin, W., & Davies, W. (2017). Familial digit ratio (2D: 4D) associations in a general population sample from Wales. *Early human development*, *112*, 14-19.
21. Barrantes, R., & Segura-WW, M. (2009). Dermatoglyphic traits of six Chibcha-speaking Amerindians of Costa Rica, and an assessment of the genetic affinities among populations. *Revista de Biología Tropical*, *57*, 357-369.
22. Namouchi, I. (2011). Anthropological significance of dermatoglyphic trait variation: an intra-Tunisian population analysis. *International Journal of Modern Anthropology*, *1*(4), 12-27.
23. Fournier, N. A., & Ross, A. H. (2016). Sex, Ancestral, and pattern type variation of fingerprint minutiae: A forensic perspective on anthropological dermatoglyphics. *American journal of physical anthropology*, *160*(4), 625-632.