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Original Research Article

# Comparison of Palmar Ridge Counts in Igbos and Okrika People of Southern Nigeria

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## Abstract

***Background:*** Dermatoglyphics is referred to as study of the friction ridge formation that appears on the palms of the hands and soles of the feet. There have been works done by different researchers on dermatoglyphics in the field of medicine which has helped in the detection of diseases like breast cancer, anemia. ***Objective:*** This study was aimed at determining the Palmar Ridge Counts of the Igbos' and Okirikas' in Southern Nigeria. Materials and ***Methods:*** The study was non-experimental and analytical. Two hundred subjects selected by simple random sampling. One-way Anova was done using SPSS twenty version. Results and Discussion: The Igbo males with AB ridge count 38.3±4.9156 on the left hand while 37.3± 5.5698 for Okrika males. The Igbo males had BC ridge count 27.4± 5.3560 on the left hand while Okrika males had BC ridge count of 25.0±6.0527. The Igbo males had CD ridge count of 36.0 ±9.1109 on the right hand while Okrika males had CD ridge count of 33.5± 7.3289. Test of significance showed significant difference between the Right CD, Left AB and Left BC Ridge count of Igbo and Okrika subjects (P<0.05). ***Conclusion:*** The study has shown the palmar ridge counts of the Igbos and Okrikas. It also showed traces of sexual dimorphism in both populations and explicitly revealed that both populations have nothing to show common ancestry, the similarity seen may have occurred by chance which further implies that both populations could be regarded distinct and unrelated entities.
**Keywords:** Palmar, Ridge Counts, Dermatoglyphics, Igbo, Okrika.



## INTRODUCTION

Dermatoglyphics is referred to as study of the friction ridge formation that appears on the palms of the hands and soles of the feet. Palmar ridge counts takes into consideration the dermal ridges on the surface of the palm of the hand.

There have been works done by different researchers on dermatoglyphics in the field of medicine which has helped in the detection of diseases like breast cancer, anemia, diabetes mellitus and Down's syndrome [1-10]. Genetic oriented diseases have received scrutiny but correlation have been found with Alzheimer's disease, tuberculosis, diabetes mellitus and many other medical conditions [7-10]. However, there is paucity of information on the Palmar Ridge Counts of the Igbos' and Okrikas' in Southern Nigeria.

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

Okrika is a port town in Rivers State, Nigeria, capital of the Local Government Area of the same name. The town is situated on a small island just south of Port Harcourt, making it a suburb of the much larger city. The average elevation of Okrika is 452 meters.

## MATERIALS AND METHODS

### Research Design

The study was non-experimental and analytical. A total of two hundred subjects were used for the study. 100 were Igbos (49 males; 51 females), 100 were Okrikas (49 males; 51 females), all of which were normal subjects. These subjects were randomly selected through simple random sampling method from Igbo and Okrika Population. Ethical approval was obtained from the Ethics Committee of the University of Port Harcourt, Nigeria. Duration of the study was

between November 8, 2016, - August 14, 2017 in the Igbo and Okrika communities resident in Port Harcourt, Rivers State, Nigeria.

**Data Collection**

Dermatoglyphs of the finger and palmar areas were determined using a classical scanner type, Hp G3110 Scanjet Scanner (9000x4800 dpi resolution). Hands were cleaned from dirt before taking prints and a little pressure was put to press the palm on the scanner for adequate contact between the fingers and the scanner to have a clear image of the print and the prints were taken twice.

Subjects included in this study were those without finger or hand deformities and subjects who were either Igbos or Okrikas by both parents and genealogies. Those who have finger or hand deformities or have had surgical procedure on their finger/hand were excluded.

The sample population was calculated using Fisher's formula for large population greater than 10,000 [11].

**Statistical Analysis**

One-way Anova was done using Statistical Package for the Social Sciences (SPSS twenty version).

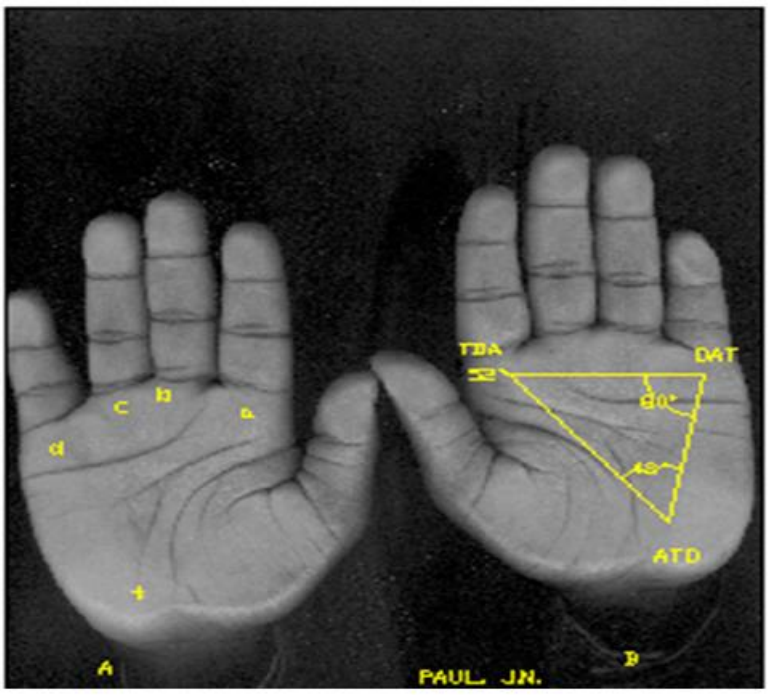


**Fig-1: The four triradii of the palm a, b, c, d, ATD, TDA and DAT angles**

## RESULTS

Table-1 showed the mean values of the palmar ridge count for both the right and left hands of all Igbo and Okrika subjects.

**Table-1: Descriptive Statistics of Palmar ridge count for the left and right hand of Igbo and Okrika Subjects**

| Subjects | | AB Ridge Count | | BC Ridge Count | | CD Ridge Count | |
|---|---|---|---|---|---|---|---|
| **LEFT HAND** | N | Mean | SD(±) | Mean | SD(±) | Mean | SD(±) |
| Igbo Male | 51 | 38.2745 | 4.9156 | 27.4118 | 5.3560 | 35.0981 | 9.1109 |
| Igbo Female | 49 | 39.9388 | 4.7232 | 29.2041 | 5.7625 | 33.4694 | 10.4125 |
| Okrika Male | 49 | 37.3469 | 5.5698 | 24.8982 | 6.0527 | 33.5102 | 7.3289 |
| Okrika Female | 51 | 36.9804 | 5.1826 | 26.6863 | 3.8703 | 34.7451 | 5.8577 |
| **RIGHT HAND** | | | | | | | |
| Igbo Male | 51 | 38.1176 | 5.6978 | 27.9022 | 4.8672 | 36.0196 | 5.2018 |
| Igbo Female | 49 | 39.1837 | 5.5776 | 28.0612 | 5.1413 | 36.5306 | 8.1703 |
| Okrika Male | 49 | 36.6531 | 7.1342 | 25.7959 | 6.7050 | 33.5102 | 6.9135 |
| Okrika Female | 51 | 36.1569 | 5.4124 | 27.7059 | 4.3602 | 34.4510 | 5.8696 |

($P<0.05$)

The Igbo males had mean AB ridge count of 38.3 ± 4.9156 on the left hand while it was 37.3 ± 5.5698 for Okrika males. The Igbo females had mean AB ridge count values of 39.9±4.7232 while Okrika females had mean AB ridge count values of 37.0± 5.1826. It was observed that there were ethnic differences in both cases with the Igbos showing higher mean AB ridge count than Okrikas (P<0.05).

The Igbo males had mean BC ridge count of 27.4± 5.3560 on the left hand while Okrika males had mean BC ridge count of 25.0 ±6.0527 . The Igbo females had mean BC ridge count of 29.2± 29.2041 while it was 26.7± 3.8703 for Okrika females. Again there was ethnic difference seen with the Igbos showing higher mean BC ridge count than Okrikas (P<0.05).

The Igbo males had mean CD ridge count of 36.0 ±9.1109 on the right hand while Okrika males had mean CD ridge count of 33.5 ± 7.3289. The Ig bo females had mean CD ridge count of 36.5 ±10.4125 while Okrika females had mean CD ridge count values of 34.5±5.8577. Ethnic difference was evident with Igbos showing higher mean CD ridge count than Okrikas (P<0.05).

Table-2 showed the test of significance between the Right CD, Left AB and Left BC Ridge count of Igbo and Okrika subjects (P<0.05).

**Table-2: Hypothesis Summary**

| S/N | Null Hypothesis | Test | Significance | Decision |
|---|---|---|---|---|
| 1. | The distribution of Right AB Ridge count is the same across categories of Tribe (sex) | Independent-samples Kruskal-Wallis Test | 0.054 | Retain the null hypothesis |
| 2. | The distribution of Right BC Ridge count is the same across categories of Tribe (sex) | Independent-samples Kruskal-Wallis Test | 0.146 | Retain the null hypothesis |
| 3. | The distribution of Right CD Ridge count is the same across categories of Tribe (sex) | Independent-samples Kruskal-Wallis Test | 0.013 | Reject the null hypothesis |
| 4. | The distribution of left AB Ridge count is the same across categories of Tribe (sex) | Independent-samples Kruskal-Wallis Test | 0.047 | Reject the null hypothesis |
| 5. | The distribution of left BC Ridge count is the same across categories of Tribe (sex) | Independent-samples Kruskal-Wallis Test | 0.006 | Reject the null hypothesis |
| 6. | The distribution of left CD Ridge count is the same across categories of Tribe (sex) | Independent-samples Kruskal-Wallis Test | 0.422 | Retain the null hypothesis |

The significant level is 0.05

In table-3 the ATD angle was seen with the highest value in the Igbo males 43.22° on the right and on the left 42.98°. The Okrika population had the highest value 42.94° on the right and 43.20° on left in the females.

**Table-3: Descriptive Statistics of ATD angle for the right and left hands of Igbo and Okrika Subjects**

| | Right ATD (°) Angle | | | Left ATD (°) Angle | | |
|---|---|---|---|---|---|---|
| **Subjects** | **N** | **Mean** | **Standard Deviation (±)** | **N** | **Mean** | **Standard Deviation (±)** |
| Igbo male | 51 | 43.22 | 5.825 | 51 | 41.29 | 4.473 |
| Igbo female | 49 | 42.65 | 6.454 | 49 | 42.98 | 5.019 |
| Okrika male | 49 | 41.02 | 5.060 | 49 | 40.45 | 3.720 |
| Okrika female | 51 | 42.94 | 5.319 | 51 | 43.20 | 5.977 |

(P<0.05)

In table-4 there was a significant difference seen on the left hand of both tribes on comparison.

**Table-4: Test for Differences in the Mean of ATD angles for both hands in Igbo and Okrika subjects**

| Hypothesis Test Summary | | | | |
|---|---|---|---|---|
| | **Null Hypothesis** | **Test** | **Significance** | **Decision** |
| 1 | The distribution of right ATD angle is the same across categories of Tribe (sex) | Independent - samples Kruskal –Wallis Test | 0.274 | Retain the null hypothesis |
| 2 | The distribution of left ATD angle is the same across categories of Tribe (sex) | Independent - samples Kruskal –Wallis Test | 0.027 | Reject the null hypothesis |

The significance level is 0.05

## DISCUSSIONS

### AB Ridge Count

The study revealed that the Igbo males than higher ridge counts than the Okrika males and Igbo females equally had higher values of the ridge counts than Okrika females on both hands. This suggests that the Igbo population in general had higher ridge counts than Okrika population this could attributed to genetic difference in number and pattern of AB ridge counts during the formative stage. This result is in synergy with the results obtained by other authors [12-23].

Comparing the AB ridge counts of males and females, it was evident that the Igbo females had higher ridge counts than Igbo males on both hands which depict sexual dimorphism which could be a result of hormonal difference in both sexes. In the same way, the Okrika males had consistently higher values than the females which re-affirm sexual dimorphism. These findings refute the results obtained by the following authors in their previous studies [24-34].

### BC Ridge Count

Similarly, for the BC ridge counts the Igbo males than higher ridge counts than the Okrika males and Igbo females equally had higher values of the ridge counts than Okrika females on both hands. This also indicates that the Igbo population in general had higher BC ridge counts than Okrika population this could attributed to genetic difference in number and pattern of BC ridge counts during the formative stage.

Comparing the BC ridge counts of males and females, it was seen that the Igbo females had higher ridge counts than Igbo males on both hands which depict sexual dimorphism which could be a result of hormonal difference in both sexes. Contrarily, the Okrika males had consistently lower values than the females which reiterate sexual dimorphism in the Okrika population. Similarly, the results of our study disagree with the results of the following authors in their previous study [24-34].

### CD Ridge Count

The study showed that the CD ridge counts in the Igbo males were higher than those in the Okrika males on both hands indicating that the Igbo population in general had higher CD ridge counts than Okrika population this again could be attributed to genetic difference in number and pattern of CD ridge counts during the process of development in-utero. This result affirms the findings of the following authors [12-23] in their previous works. Regarding the distribution of CD ridge counts in females, it was observed that the Igbo females had higher values on the right hand than the Okrika females, but on the left hand reverse was the case where the Okrika females had higher values than the Igbo females which are a slight deviation from the common trend seen. This change in trend is suggestive of occurrence by chance.

Comparing the CD ridge counts in the sexes showed that the Igbo females had higher ridge counts than Igbo males on the right hand while on the left, reverse was the case.

Contrarily, the Okrika females had consistently higher values than the Okrika males which reiterate sexual dimorphism in the Okrika population.

The test of significance ($P<0.05$) for the AB, BC, & CD ridge counts on both hands were seen significant on the following sides: left AB and BC ridge counts, right CD ridge counts. It suggests that the populations under study have similarity in the distribution of their ridge counts where it tested positive for significance ($P<0.05$) though not strong enough evidence to prove that the Igbos and Okrikas have common ancestry.

This study was limited to the Palmar Ridge Counts of the Igbos and Okrikas no other tribe was considered.

## CONCLUSION

The study has shown palmar ridge counts of the Igbos and Okrikas. It also showed traces of sexual dimorphism in both populations and explicitly revealed that both populations have nothing to show common ancestry, except for slight similarity in few ridge counts which is thought to have occurred by chance which further implies that both populations could be regarded distinct and unrelated entities.

This result could be adopted to solve current problems in the world today bordering origin of ethnicity, ethnic impersonation in electoral practice peculiar to African nations and forensic identification.

We recommend that more works be done in other tribes to have data to would help solve these peculiar issues of ethnic impersonation during electoral process.

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**CONFLICT OF INTEREST**

The authors declare that there is no Conflict of interest

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