

**COMPARISON OF DIGITAL PATTERNS AT LEVEL 2 OF IKWERRE AND KALABARI
PEOPLE OF SOUTHERN NIGERIA**

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Article Received on 06/09/2017

Article Revised on 17/10/2017

Article Accepted on 08/11/2017

ABSTRACT

Introduction: Dermatoglyphics is defined as the branch of science which studies the patterns of the skin (dermal) ridges present on human fingers, toes and the soles (Mendenhall et al., 1989). Level 2 details of dermatoglyphics treat the subject at its minutest detail and is the basis for identification of human subjects. This study is therefore aimed at determining the level 2 details and comparing whether Kalabari and Ikwerre ethnic groups exhibit ethnic variations. **Materials and Methods:** The study was an analytical cross-sectional research. 82 (Ikwerre 52, Kalabari 30) subjects were recruited for the study. Simple random sampling with chi square and z-test tool analysis. **Results:** Comparisons of the patterns between both tribes have shown a great deal of difference statistically. In the females, there were statistical significance ($p < 0.05$) in the distribution of bifurcation, Dot, Lake, Double Bifurcation, Ridge ending and Ridge crossing on the right while on the left there was also statistical significance ($p < 0.05$) except for Dot, Lake and Double Bifurcation ($P > 0.05$). **Conclusion:** The result of the study has shown that there is difference in the distribution of the patterns between the two tribes which have been attributed to nutritional difference at the formative stage of the patterns.

KEYWORDS: Level 2; Bifurcation, Double Bifurcation; Ridge Ending; Ridge Crossing.

INTRODUCTION

Dermatoglyphics is defined as the branch of science which studies the patterns of the skin (dermal) ridges present on human fingers, toes and the soles.^[1] The development of dermatoglyphic features relatively begins by the end of the second trimester and remained constant throughout life.^[2,3]

Level 2 details of dermatoglyphics go beyond the conventional digital patterns arch, loops and whorls. It considers the individual ridges that make up the arch, loop and whorl patterns. It establishes uniqueness of individuals when done and the basis for identification in forensic studies. Some of the patterns seen at level 2 are bifurcations, trifurcation, ridge ending, dots, island, double bifurcation, opposed bifurcation etc.

Extensive work has been carried out on several populations, racial, and ethnic groups^[4-10] using the arch, loops and whorls but there has been no specific documented study at level 2 details for indigenous populations such as the Kalabari and Ikwerre ethnic groups of the South-South region of Nigeria. This study is therefore aimed at determining the level 2 details and comparing whether Kalabari and Ikwerre ethnic groups exhibit ethnic variations.

History of Kalabari: It is said that they were originally called 'Awome'. According to history, the name 'Kalabari' was gotten from their ancestor 'Perebo Kalabari' who was a son of Mein Owei.^[11] The Kalabari people have a total of thirty-three towns and communities on twenty-three islands on the coast of Rivers State. It is said that they were the very first people to mingle with the white men when they came to Rivers State which is exemplified in the way their towns and settlements are arranged which is a replica of what is obtainable in the Europe back in the 14th and 15th centuries.^[12] They are predominantly farmers and have an estimated population of 450,000 people.^[13]

Brief History of Ikwerre

The history of Ikwerre people as have been written existed before the coming of the whites and the Nigerian nation of 1914.^[14] Geographically, The Ikwerre people, were said to have been in the old Port Harcourt province and a homogeneous ethnic group who occupy a major part of the northern half of Rivers State in Southern Nigeria. The Ikwerre people are stretched over four local Government Areas of the state i.e. Emohua, Ikwerre, Obio/Akpor and Port Harcourt City of Rivers State. They are majorly farmers and fishermen with a population of about 2,000,000.^[15,16]

MATERIALS AND METHODS

Research Design: The study was an analytical cross-sectional research using the standard procedure for data capturing with Digital scanner. 82 subjects were recruited for the study with Ikwerre 52 (Males 30, Females 22) and Kalabari 30 (Males 18, Females 12). The sampling technique used was simple random sampling and Cochran 1963 formula was used to determine the sample size. The data obtained was subjected to statistical analysis using chi square and z test.

Data Collection

The selection and collection of required parameters was based on informed consent of volunteer subjects. The subjects recruited for the study had their age range between 18 – 70 years who were given a copy of the informed consent letter and they signed. The Palmar prints were obtained using print scanner (Hp G3110 Photo scanner). Participant's hands were thoroughly washed with water and detergent and dried before taking prints. This was done to remove dirt from the hands. A little pressure was applied to press the palm on the scanner for adequate contact between the palm and the scanner. The prints were magnified using the zooming tool on Hp mini-laptop connected to the scanner via USB cords. The prints were observed, identified and grouped into the different level 2 digital patterns. The angular tool was placed on both lines connecting the angle and clicked which indicated the angular dimension for each of the angles (ATD).

Individuals who are true indigenes of the ethnic group by tracing down to their fourth generation. The subjects were interviewed orally and Individuals who gave consent for the study were included in the study whereas individuals with anatomical abnormality of the hand, individuals with foreign nationality, those with distorted palmar print and Prints that were not clear were excluded.

Ethical Approval: Ethical clearance was sort from the Research Ethics Committee of the University of Port Harcourt. Informed consent was obtained from the

individual before conducting the study. The subjects were assured of confidentiality of the information provided for the study.

Limitation of the Study: The study was limited to the finger and palmar examination.

RESULTS

In table 1 the males and females had their highest pattern distribution bifurcation with 46.8% on the right, 41.3% on the left for the males while the females had 53.6% on the right and 50.0% on the left. The least distributed pattern for the males was double bifurcation with 1.3% on the right and 1.2% on the left. Whereas the females had their least distributed patterns on the right as well as opposed bifurcation; on the left double bifurcation and trifurcation.

In table 2 the males and females again had their highest percentage frequency distributions in the following patterns: for male's bifurcation (right 51.5%, left 43.7%) and females bifurcation as well (right 40.3%, left 40.4%). The least distributions were seen in lakes (enclosure) as males (right 2.2%, left 1.5%), for females double bifurcation on the right 1.4% and on the left were opposed bifurcation, bridge and trifurcation.

In table 3 for the females there were statistical significance ($p < 0.05$) in the distribution of bifurcation, Dot, Lake, Double Bifurcation, Ridge ending and Ridge crossing on the right while on the left there was also statistical significance ($p < 0.05$) except for Dot, Lake and Double Bifurcation ($P > 0.05$).

In table 4 the males had most of the patterns statistically significant ($P < 0.05$) except for Dot, Lake, Double Bifurcation ($P > 0.05$) on the right; Bridge and Ridge ending on the left which were statistically insignificant.

In table 5 the Ikwerre males had higher mean ATD angles than the Kalabari males on both hands which was statistically significant ($P < 0.05$). Kalabari females had higher mean value for the ATD angles than the Ikwerre females though not statistically significant.

Table. 1: Dermatoglyphic patterns of the left and right hands of males and females of Ikwerre ethnic group.

S/N	Patterns	Males (%)		Females (%)	
		Right	Left	Right	Left
1	Ridge ending	28.9	38.1	13.6	7.6
2	Opposed bifurcation	3.2	2.1	0.7	5.3
3	Bridge	2.9	3.3	1.6	3.3
4	Lake (enclosure)	8.6	5.8	8.9	10.9
5	Bifurcation	46.8	41.3	53.6	50.0
6	Double bifurcation	1.3	1.2	1.6	2.8
7	Dot	2.7	2.3	7.7	4.2
8	Trifurcation	2.4	2.1	7.2	9.2
9	Island	1.6	1.2	2.9	2.8
10	Ridge crossing	1.6	2.6	2.2	3.9
Total		100	100	100	100

$P = .05$

Table 2: Comparison of Level 2 Digital Patterns of Kalabari Subjects.

S/N	Level 2 Patterns	Males (%)		Females (%)	
		Right	Left	Right	Left
1	Ridge ending	20.3	28.8	2.6	2.9
2	Opposed bifurcation	0.7	1.8	2.6	2.4
3	Bridge	5.5	4.9	4.7	2.4
4	Lake (enclosure)	2.2	1.5	4.7	4.3
5	Bifurcation	51.5	43.7	40.3	40.4
6	Double bifurcation	4.6	4.7	1.4	4.9
7	Dot	6.5	5.3	4.7	4.3
8	Trifurcation	5.5	4.3	4.7	2.4
9	Ridge crossing	3.9	4.3	2.6	2.9
10	Island	0	0	0	0
Total		100	100	100	100

$P=.05$

Table 3: Comparison of Level 2 Digital Patterns of Kalabari and Ikwerre Female Subjects.

Comparison of Level 2 Digital Patterns of Kalabari and Ikwerre Subjects									
RIGHT	BF	TF	Bridge	Dot	Lake	DBF	OBF	RE	RC
Ikwerre	610	70	70	20	60	100	70	390	120
Kalabari	600	70	70	70	70	20	40	510	140
Z score	-5.92	-1.68	-1.68	-6.74	-2.53	5.96	1.45	-9.84	-3.66
P-Value	0.001	0.091	0.091	0.001	0.014	0.001	0.147	0.001	0.0002
Inference	Sign	Insign	Insign	Sign	Sign	Sign	Insign	Sign	Sign
LEFT									
Ikwerre	660	70	40	30	30	40	60	440	127
Kalabari	650	40	40	70	70	80	40	570	139
Z score	10.84	5.58	2.21	-1.68	-1.68	-1.09	4.55	4.05	3.33
P-Value	0.001	0.001	0.027	0.091	0.091	0.275	0.001	0.001	0.0008
Inference	Sign	Sign	Sign	Insign	Insign	Insign	Sign	Sign	Sign

$P<0.05$, BF-Bifurcation, TF- Trifurcation, DBF-Double Bifurcation, OBF-Opposed Bifurcation, RE- Ridge Ending, RC-Ridge crossing.

Table 4: Comparison of Level 2 Digital Patterns of Kalabari and Ikwerre Male Subjects.

Comparison of Level 2 Digital Patterns of Kalabari And Ikwerre Subjects									
RIGHT	BF	TF	Bridge	Dot	Lake	DBF	OBF	RE	RC
Ikwerre	670	90	100	80	10	60	50	500	130
Kalabari	660	70	70	80	20	60	10	260	50
Z score	2.45	2.17	2.93	0.54	-1.60	0.46	5.54	11.50	6.74
P-Value	0.014	0.03	0.003	0.589	0.107	0.638	0.001	0.001	0.001
Inference	Sign	Sign	Sign	Insign	Insign	Insign	Sign	Sign	Sign
LEFT									
Ikwerre	650	90	80	110	10	90	120	480	100
Kalabari	570	50	70	70	40	70	40	550	700
Z score	6.27	4.35	1.75	4.08	-3.77	2.57	7.46	0.17	-22.44
P-Value	0.001	0.001	0.080	0.001	0.0001	0.010	0.001	0.857	0.001
Inference	Sign	Sign	Insign	Sign	Sign	Sign	Sign	Insign	Sign

$P<0.05$, BF-Bifurcation, TF- Trifurcation, DBF-Double Bifurcation, OBF-Opposed Bifurcation, RE- Ridge Ending.

Table 5: ATD angles of the right and left hands of male and female participants from the Ikwerre and Kalabari.

Hand side	Gender	Ikwerre	Kalabari	Z-value	p-value
		Mean ± SD	Mean ± SD		
Right	Male	42.86±3.14	41.55±1.59	3.256	0.001*
	Female	40.79±2.17	41.25±1.55	-1.456	0.147
	All	41.90±2.92	41.42±1.57	1.737	0.083
Left	Male	42.96±3.32	41.61±1.36	3.241	0.001*
	Female	40.91±1.93	41.45±1.45	-1.939	0.054
	All	42.01±2.94	41.52±1.40	1.690	0.092

Key: The figures in parenthesis are in percentages.

DISCUSSION

Digital Patterns

There digital patterns at level 2 under study showed that bifurcation was the most frequent pattern in both ethnic groups and in both sexes while the least pattern varied in the population. This could be a result of the fact that the genetic consistent of the Negro race is majorly involved in the development of bifurcation as compared with other races which less frequency of bifurcations.

Comparisons of the patterns between both tribes have shown a great deal of difference statistically. In the females, there were statistical significance ($p < 0.05$) in the distribution of bifurcation, Dot, Lake, Double Bifurcation, Ridge ending and Ridge crossing on the right while on the left there was also statistical significance ($p < 0.05$) except for Dot, Lake and Double Bifurcation ($P > 0.05$). What it implies is that when you place side by side the females from Ikwerre and Kalabari, you would notice observable marked difference in there pattern distribution with Ikwerre females having more frequency distribution than the Kalabari in all the patterns seen. It suggests that there could be environmental factors at display varying the distribution of the patterns but since the two tribes are relatively in a close environment it becomes difficulty to categorically say that there is an environmental factor contributing to the difference in the distribution of the patterns. It would be more suitable to say probably that the difference could have resulted from genes and nutrition during the formative stage. The food types available to both populations even though they are not too far apart may be the closest explanation to the difference. The result of these findings does not agree with the works of the previous authors though there works were done at level 1 dermatoglyphics.^[17-25]

In the distribution of patterns in the males between Ikwerre and Kalabari, it appears to follow similar route with that of females where Ikwerre males are seen to have more distributions than the females.

Palmar Angles

In this present study, the Ikwerre males had ATD angles with values higher than those of Kalabari males. But reverse was the case with the females where the Kalabari females had higher values than the Kalabari males. In all, the males had higher values of ATD angles than the females in both populations which depicted sexual

dimorphism. Comparing the result obtained from this study with that obtained by previous authors there is a difference in the results because they had lesser value for ATD angles. Also they stated in their findings that there was significant difference in the values they obtained which is contrary to the result of this present study. Again, another author^[18] mentioned that there was a significant difference obtained in their result which also does not agree with the result of this present study. The findings of the following^[18-22] showed that the ATD angles were higher in values compared to the other angles and this negates the findings of this present study. In another study^[23-25] the authors stated that their values for the ATD angles were lesser than the other angles which agree with the result of the present study.

CONCLUSION

The result of the study has shown that there is difference in the distribution of the patterns between the two tribes which have been attributed to nutritional difference at the formative stage of the patterns.

ACKNOWLEDGEMENT

We want to appreciate the members of staff of the Department of Anatomy, University of Port Harcourt, Nigeria.

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