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Gender Variation Studies at Level 2 Dermatoglyphic Details of the Kalabari Ethnic Group in Rivers State, Nigeria

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Original Research Article

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Abstract: Dermatoglyphics was used by Dr. Harold Cummins which was coined from derma, skin + the Greek glyphe, carve''. Simply put, 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. 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. This study was therefore aimed at determining the level 2 details of the Kalabari people and to check for gender variations in the ethnic group. Non-experimental and analytical research with Digital Print Model adopted from Oghenemavwe and Osaat model. The sampling technique used was multi-stage sampling with 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. Bifurcation was found to be the most distributed pattern on both hands and in both sexes. The least distributed pattern was opposed bifurcation for the males, for the females double bifurcation on the right, opposed bifurcation and bridge on the left. Comparison of the patterns showed there was statistical significance ($p<0.05$) in the patterns between the males and females except Trifurcation and Dot. It therefore means that there is a big difference in the pattern distribution; this could be a result of the difference in hormones present in both sexes. This study has established that there is gender difference in the distribution of patterns at level 2 details which could be a diagnostic tool in forensics and a database at level 2 for this specific population.
Keywords: Bifurcation; Trifurcation; Enclosure; Bridge; Dot

INTRODUCTION

Dermatoglyphics was used in 1926 by Dr. Harold Cummins which was coined from derma, skin + the Greek glyphe, carve''. Simply put, 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].

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 using the arch, loops and whorls [3-15]. But there has been no specific documented study at level 2 details for indigenous populations such as the Kalabari ethnic group of the South-South region of Nigeria.

Aim and Objective

This study was therefore aimed at determining the level 2 details of the Kalabari people and to check for gender variations in the ethnic group.

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 [16]. 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 [17]. They are predominantly farmers and have an estimated population of 450,000 people [18].

MATERIALS AND METHODS

Research Design

Non-experimental and analytical research using the standard procedure. The sampling technique used was multi-stage sampling with simple random sampling and Cochran 1963 formula was used to determine the sample size. The data obtained was subjected to statistical analysis with chi-square and z-test using SPSS [19].

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 and sharp prints of the fingers were captured. 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.

Individuals who are true indigenes of Kalabari 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 bifurcation was found to be the most distributed pattern on both hands and in both sexes. The least distributed pattern was opposed bifurcation for the males, for the females double bifurcation on the right, opposed bifurcation and bridge on the left.

In table-2 the pattern distribution in the fingers does did not follow any definite trend on observation.

In table -3 comparison of the patterns showed there was statistical significance ($p<0.05$) in the patterns between the males and females except Trifurcation and Dot.

Table-1: 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

Table-2: Total Level 2 Digital Patterns of Kalabari Subjects

TOTAL LEVEL 2 DIGITAL PATTERNS OF KALABARI SUBJECTS (%)										
	Sex	BF	TF	Bridge	Dot	Lake	DBF	OBF	RE	Enclosure
Thumb	M	13.8	16.6	14.2	26.6	33.3	15.4	40.0	8.7	25.0
	F	20.0	27.2	18.2	14.2	14.2	30.0	50.0	14.8	24.4
Index	M	16.4	25.1	28.7	13.3	0	23.1	20.0	14.8	25.0
	F	18.4	18.2	18.2	28.7	28.7	10.0	0	17.6	16.2
Middle	M	24.4	16.6	14.2	26.6	33.3	15.4	20.0	32.1	8.3
	F	24.8	18.2	36.3	14.2	14.2	20.0	25.0	17.6	20.9
Ring	M	22.7	16.6	28.7	13.3	16.6	30.7	0	28.4	25.0
	F	21.6	18.2	9.1	28.7	28.7	20.0	0	23.2	19.8
Little	M	22.7	25.1	14.2	20.3	33.4	15.4	20.0	16.0	16.7
	F	15.2	18.2	18.2	14.2	14.2	20.0	25.0	26.8	18.7

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

Table-3: Comparison of Level 2 Digital Patterns of Kalabari Subjects

COMPARISON OF LEVEL 2 DIGITAL PATTERNS OF KALABARI SUBJECTS									
	BF	TF	Bridge	Dot	Lake	DBF	OBF	RE	Enclosure
Male	1230	120	140	150	60	130	50	810	120
Female	1250	110	110	140	140	100	80	1080	86
Z score	2.642	1.423	2.724	1.449	-5.064	2.770	-2.104	-4.984	3.122
P-Value	0.008	0.155	0.006	0.147	0.001	0.005	0.035	0.001	0.001
Inference	Sign	Insign	Sign	Insign	Sign	Sign	Sign	Sign	Sign

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

DISCUSSION

Generally, the males had higher distributions than the females which was explicitly shown in the patterns where in nine different patterns, males had higher distribution in six (Bifurcation, Trifurcation, Bridge, Dot, Double Bifurcation and Enclosure) while the females had higher distribution only in three patterns (Island, Opposed Bifurcation and Ridge Ending) which could have happened by chance. This to a great extent exemplifies sexual dimorphism in the distributions. It also emphasizes that the marked difference in the distribution can be used as a forensic marker in differentiating between males and females when the sexes are not established beforehand. The sexual dimorphism seen could be traceable to hormonal difference and may also be genetic. This result negates the results already published by previous authors [20-39].

Comparison of the patterns showed there was statistical significance ($p<0.05$) in the patterns between the males and females except Trifurcation and Dot. It therefore means that there is a big difference in the pattern distribution; this could be a result of the difference in hormones present in both sexes.

CONCLUSION

This study has established that there is gender difference in the distribution of patterns at level 2 details which could be a diagnostic tool in forensics and a database at level 2 for this specific population.

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