A CHEILOSCOPIC STUDY IN RELATION TO FINGER PRINTS OF EBIRA ETHNIC GROUP, KOGI STATE, NIGERIA

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ABSTRACT

Lip prints permanency, finger print as well as the number of easily observable and measurable characteristics have been one of the most suitable parameters for studying personal identification. The study, aimed at determining the relationship between lip and finger prints with relation to sex among Ebira Ethnic Group of Nigeria. Four hundred and ten subjects (205 males and 205 females) aged between 18-65 years, participated in the study. Fischer's formula or infinite population was used to calculate the optimal sample size. Lip prints of the participants were collected using lip gloss and microscopic slides pressed gently on

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the lips, ink powder is slightly blown on the slides to show the prints. A HP G3110 Scanjet Scanner (9000 x 4800 dpi resolution) which is a classical type of scanner was used to determine digital patterns of the fingers. SPSS version 20.0 was used in analysing the data. Statistical significance was put into consideration using one-way Analysis of Variance (ANOVA) when (P = 0.05 or P \leq 0.05). The predominant lip print pattern of the upper and lower lip of both sexes distributed as Type II and Type IV which are sexually dimorphic, on both hands the most prominent finger print pattern was the loop for both female and males which shows no significant sex difference. The association between lip and finger prints was significant. This is very important in personal identification in forensics.

KEYWORDS: Cheiloscopy, Dermatoglyphics, Ebira, Fingerprint, Lip print, Personal Identification.

INTRODUCTION

Cheiloscopy is a word gotten from the Greek language, cheilos means lips while skopein connotes to see or to study and it is a forensic investigation technique that has to do with identification of humans by tracing the prints of the lips (1). Dermatoglyphics is the study of the ridges of the epidermis that covers the skin of the digits, palms, and soles of the extremities (2).

Many studies have been conducted on cheiloscopy and dermatoglyphics. Adequate data on various forms which are used in personal identification such as fingerprints, lip prints etc. are of paramount importance in solving security findings (3). The system of furrows on the red part of human lips was first explained in 1902, by anthropologist R. S. Fischer. In 1932, Edmond Locard, one of France's greatest criminologists, suggested the use of lip prints in personal identification (4). In 1970–1971, Suzuki and Tsuchihashi carried out a study and they devised their own classification and established the biological phenomenon that the arrangement of lines and prints on the lips of an individual is unique for each human

being (5). Fingerprint is described anatomically as an impression made by the friction ridges that are almost parallel at constant crest to crest wavelength. Different central features dominate fingerprints, such as whorls, loops, arches and triradii (6). Vivid inspection of fingerprints reveals several other not perfect patterns such as ridge endings, ridge bifurcations, island ridges etc. The type and relative geometry of these dislocations provides the insight for the uniqueness of the fingerprints (6).

The Ebiras are people who have been documented to have single- origin but have come to settle in different geographic locations giving rise to different groups.

AIMAND OBJECTIVES

AIM

This study aims to determine relationship between the lip print pattern and finger print among Ebira ethnic group of Kogi State, Nigeria.

OBJECTIVES

1 To determine the predominant lip and finger print of Ebira ethnic group.

- 2 The study seeks to determine sexual dimorphism in lip and finger prints of Ebira ethnic group.
- 3 To see if there is association between lip and finger prints of Ebira ethnic group.

MATERIALS AND METHODS STUDY TYPE AND STUDY DESIGN

Kogi is a state found in the north-central geopolitical zone of Nigeria. It is a Confluence State because it is made up of the confluence of rivers basically formed by River Niger and River Benue (7). The study was conducted among Ebira people in Otite and Okene, Kogi State, Nigeria. The study population was derived from the total population of Ebira ethnic group Local Government (Okehi, Adavi and Okene). The study involved the use of questionnaire for the study design.

EXCLUSION CRITERIA

- 1 Those who refused to give their consent
- 2 Individuals who are not Ebira ethnic group traced to second generation
- 3 Those with deformities or injuries in the lips
- 4 Thos with deformities, injuries or amputation of the fingers.

The subjects comprised both males and female adults of Ebira ethnicity. The sample size is composed of 410 subjects, each of 205 males and females respectively, between the ages of 18 to 65 years. They are normal subjects, selected through simple random sampling method from the following towns, Otite and Okene.

$$\mathbf{S} = \frac{\mathbf{Z}^2 \mathbf{X} \mathbf{P} \mathbf{X} \mathbf{Q}}{\mathbf{D}^2}$$

The optimal sample size was calculated using, Fischer's formula for large population or infinite population was used according to the formula below:

Where:

S=Sample Size

Z=1.96 (Constant)

Q=1-P

D=Tolerance level=0.05

P=Population = age group

Total population

The research was completed in line with the ethical principles as ethical clearance was gotten from the Anatomy Department, University of Ilorin, Nigeria and 410 voluntary participants who gave their consents were used.

Lip prints were collected by asking the subject to clean his/her lip with a baby wipe and little quantity of lip gloss applied evenly on the sulci laborium of the upper ERA'S JOURNAL OF MEDICAL RESEARCH, VOL.8 NO.1 and lower lips. A clear new microscopic glass slide was placed on the relaxed lips of the subject in a single motion tilting it slightly to the right and left. The glass slide was then removed from the surface of the lip and carbon black powder was dusted on the surface of the slide that was in contact with the lips, then the excess powder was dusted by mouth blow, resulting in the production of well-developed lip prints on the slide ready for preservation and analysis.

A HP G3110 Scanjet Scanner (9000 x 4800 dpi resolution) which is a classical type of scanner was used to determine digital patterns of the fingers (Arch, ulnar loop, radial loop, and whorl). Then a concise description of the fingers was made to the subjects. After which the fingers were cleaned from dirt with baby wipes before taking the prints and the subjects was asked to roll their thumb and finger from side to side across the surface of the scanner and to apply little pressure on the scanner for adequate contact between the fingers and the scanner to create a clear image of the print and the prints were taken twice (for each palm). Each finger to be used was given a name to avoid mix up - starting from Thumb= T, Index =I, Middle = M, Ring = R and Little = L for both left and right fingers (8).

Descriptive statistics for variables were used with tables. The percentage (%) distribution of lip prints pattern for the following parameters (Sex and finger print) was calculated using SPSS (Statistical package for the social science, version 20.0) software. Statistical significance was put into consideration using one-way Analysis of Variance (ANOVA) when (P=0.05 or P \leq 0.05).

RESULTS

The Subjects age range was from 18 to 65 years of Ebira Ethnic group of Kogi State, Nigeria. The results presented are the cheiloscopic pattern in relations to the finger print among Ebira Ethnic Group. The values obtained were described as categorical variable presented as frequency (%) in tables and graphs.

The distribution of the lip print types and test of sexassociated differences for the upper and lower quadrants are presented in Tables 1 and 2 respectively, while the fingerprint pattern distribution for the left and right hand, and test of sex differences are presented in Tables 3 and 4 respectively

The association between fingerprint and the cheiloscopic patterns; for the right fingers & upper quadrant, right finger & lower quadrants are presented in Figures 1 and 2 respectively, while the left fingers & upper quadrant, left finger & lower quadrants are presented in Figures3 and 4.

Quadrants	Sex	Lip print pattern							Chi-Square Tests		
		Type I	Type I'	Type II	Type III	Type IV	Type V	df	X ²	P-value	
URO	Mala	6	17	120	12	42	8				
UNQ	Male	2.9%	8.3%	58.5%	5.9%	20.5%	3.9%	5	18.394	0.002	
	Female	3	24	148	3	20	7				
		1.5%	11.7%	72.2%	1.5%	9.8%	3.4%				
	Total	9	41	268	15	62	15				
	Total	2.2%	10.0%	65.4%	3.7%	15.1%	3.7%				
UMO	Mala	10	21	39	10	115	10				
UMQ	Male	4.9%	10.2%	19.0%	4.9%	56.1%	4.9%	5	10.022	0.002	
	Famala	13	16	64	16	77	19	3	18.855	0.002	
	Temale	6.3%	7.8%	31.2%	7.8%	37.6%	9.3%				
	Total	23	37	103	26	192	29				
	Total	5.6%	9.0%	25.1%	6.3%	46.8%	7.1%				
ULO	Male	6	20	112	13	43	11				
		2.9%	9.8%	54.6%	6.3%	21.0%	5.4%	5	12.204		
	Female	3	14	144	6	33	5			0.032	
		1.5%	6.8%	70.2%	2.9%	16.1%	2.4%				
	Total	9	34	256	19	76	16				
		2.2%	8.3%	62.4%	4.6%	18.5%	3.9%				

Tab. 1: Distribution of Lip Print Types on The Upper Quadrants and Test of Association

Note: URQ=Upper right quadrant, UMQ=Uppermiddle quadrant, ULQ=Upper left quadrant, $X^2=Chi$ square, df=degree of freedom

In Table 1, for the URQ; the female lip print is dominantly Type II with (72.2%) however for male it is distributed with Type II making up (58.5%) and Type IV making up (20.5%). For the UMQ; the lip

print pattern was distributed with Type IV making up (37.6%) and Type II making up for (31.2%) for female and the most frequent pattern for the male with (56.1%). In the ULQ, the predominant patterns were Type II (70.2%) for female and (54.6%) for male. Therefore, Chi-square analysis showed that sex was a significant influence for lip print pattern in all quadrants of the Upper lip.

Quadrants	Sex	Lip pri	nt pattern					Chi-So	quare Tests	
		Type I	Туре І'	Type II	Type III	Type IV	Type V	df	X ²	P-value
LRQ	Male	6	11	125	21	40	2			
		2.9%	5.4%	61.0%	10.2%	19.5%	1.0%			
	Female	4 2.0%	14 6.8%	156 76.1%	3 1.5%	26 12.7%	2 1.0%	5	20.65	0.001
	Total	10 2.4%	25 6.1%	281 68.5%	24 5.9%	66 16.1%	4 1.0%			
LMO	Male	17 8.3%	16 7.8%	29 14.1%	16 7.8%	120 58.5%	7 3.4%	5	15.645	0.008
	Female	16 7.8%	30 14.6%	49 23.9%	16 7.8%	85 41.5%	9 4.4%			
	Total	33 8.0%	46 11.2%	78 19.0%	32 7.8%	205 50.0%	16 3.9%			
LLQ	Male	3 1.5%	18 8.8%	140 68.3%	6 2.9%	18 8.8%	3 1.5%			
	Female	0 0.0%	12 5.9%	166 81.0%	6 2.9%	18 8.8%	3 1.5%	5	15.609	0.008
	Total	3 0.7%	30 7.3%	306 74.6%	20 4.9%	48 11.7%	3 0.7%			

Tab. 2: Distribution of Lip Print Types on the Lower Quadrants and Test of Association

Note: LRQ=Lower right quadrant, LMQ=Lower middle quadrant, LLQ=Lower left quadrant; X^2 =Chi square, df= degree of freedom

In Table 2, for the LRQ; the female lip print is dominantly Type II with (76.1%) and Type IV making up (12.1%) however for male it is distributed with

Type II making up (61.0%) and Type IV making up (19.5%). For the LMQ, it is distributed as Type II making up for (23.9%) and Type IV making up for (41.5%) however for the male it is also distributed as Type II making up for (14.1%) and Type IV making up for (58.5%). For the LLQ, the most frequent lip pattern is Type II (81.0%) for female and Type II with (68.3%) for male. Also with the Lower lip print pattern, Chi-square analysis showed that sex was a significant influence in all quadrants of the lip.

R1D	Male	15 7.3%	157 76.6%	33 16.1%			
	Female	19 9.3%	156 76.1%	30 14.6%	3	0.617	0.735
	Total	34 8.3%	313 76.3%	63 15.4%			
	Male	29 14.1%	124 60.5%	52 25.4%	3	0.122	0.941
R2D	Female	30 14.6%	126	49 23.9%	3	0.122	0.941
	Total	59 14.4%	250 61.0%	101 24.6%			
R3D	Male	22 10.7%	146 71.2%	37 18.0%	3	1.282	0.527
	Female	19 9.3%	156 76.1%	30 14.6%			
	Total	41 10.0%	302 73.7%	67 16.3%			
R4D	Male	10 4.9%	148 72.2%	47 22.9%	3	2.956	0.228
	Female	18 8.8%	136 66.3%	51 24.9%			
	Total	28 6.8%	284 69.3%	98 23.9%			
R5D	Male	4 2.0%	182 88.8%	19 9.3%	3	2.672	0.263
	Female	10 4.9%	176 85.9%	19 9.3%			
	Total	14 3.4%	358 87.3%	38 9.3%			

Tab. 3: Distribution of Right Fingerprint Types and Test of Association

$X^2 = Chi \, square,$

df=degree of freedom

The Right hand finger prints was observed to exhibit no significant sex-associated distributional difference. With R1D, (α^2 =0.617, P=0.735); with females (76.1%) and males (76.6%) having a large proportion of LOOP and reversed situation for ARCH (Female = 7.3%; Male=9.3%).

X²=Chi square, df=degree of freedom

The Left hand finger prints was observed to exhibit no significant sex-associated distributional difference. With L1D being (χ^2 =4.598, P=0.100); with females (88.3%) and males (91.2%) having a large proportion of LOOP and reversed situation for ARCH (Female = 3.4%; Male=0.1%) and WHORL (Female= 8.3%; Male=8.3%). For the finger print patterns, Chi-square analysis showed that sex does not the affect the finger print pattern of both the left and right hand because the P-value are not significant that is, it is greater than 0.05.

Digit	Sex	Fingerprint Pattern				Chi-Square Tests			
		Туре І	Туре І'	Type II	df	X ²	P-value		
L1D	Male	1 0.5%	187 91.2%	17 8.3%		1.500	0.100		
	Female	7 3.4%	181 88.3%	17 8.3%	3	4.598	0.100		
	Total	8 2.0%	368 89.8%	34 8.3%					
L2D	Male	16 7.8%	158 77.1%	31 15.1%	3	0.334	0.846		
	Female	17 8.3%	161 78.5%	27 13.2%	5	0.554	0.0+0		
	Total	33 8.0%	319 77.8%	58 14.1%					
L3D	Male	24 11.7%	131 63.9%	50 24.4%	3	0 709	0 702		
	Female	24 11.7%	138 67.3%	43 21.0%	5	0.709	0.702		
	Total	48 11.7%	269 65.6%	93 22.7%					
L4D	Male	17 8.3%	162 79.0%	26 12.7%					
	Female	14 6.8%	161 78.5%	30 14.6%	3	0.573	0.749		
	Total	31 7.6%	323 78.8%	56 13.7%					
L5D	Male	10 4.9%	149 72.7%	46 22.4%			0.005		
	Female	9 4.4%	151 73.7%	45 22.0%	3	0.077	0.962		
	Total	19 4.6%	300 73.2%	91 22.2%					

Tab. 4: Distribution of Left Fingerprint Types and Test of Association



Fig. 1: Decision Tree For Explaining The Relationship Between Fingerprint and The URQ.

The print pattern on the Left 2^{nd} (index) and 5^{th} (little) fingers were significantly associated with the lip prints of the URQ. From the model, the most important finger was L2D with arch and loop providing explanation for the presence of Type II (65.9%) with suppressed Type 1' (1.1%) when compared to node 2 with whorl with increased Type 1' (8.5%). The next important finger was the L5D which showed that whorl explained an increase in Type 1', while arch & loop explained more of the Type II (67.8%); same as the pattern observed for the L2D.





The print pattern on the Left 2^{nd} (index) fingers was significantly associated with the lip prints of the UMQ. From the model, L2D with arch & loop providing

explanation for the presence of Type IV (48%) with suppressed Type V (5.4%) when compared to node 2 that had whorl with increased Type V (17.2%)



Fig. 3: Decision Tree for Explaining The Relationship Between Fingerprint and The ULQ.

No additional node was created except the initial grouping and thus, it can be concluded that fingerprint patterns were not predictors of the lip print pattern of the ULQ.





Fig. 4: Decision Tree for Explaining The Relationship Between Fingerprint and The Different Quadrants (LRQ, LMQ and LLQ) of The Lower Lip.

No additional node was created except the initial grouping and thus, it can be concluded that fingerprint patterns were not predictors of the lip print pattern of the LRQ, LMQ and LLQ.

DISCUSSION

Inter and intra-ethnic variation has been a subject of study among the human race (2). In rural areas and developing countries like Nigeria, the use of conventional anthropometric methods like fingerprints and lip prints are of great importance, because human and personality identification by the use of sophisticated methods such as DNA analysis are grossly expensive and scarce. Finger print is the commonest type of print used in forensic anthropology to unravel human personality (9).

Fingerprints are unique to individuals and do not change over time, this is often used by various security agents around the world. Their use as a means of identification shows how important they are as a means of identification; and their peculiarity to individuals shows and contributes to their significance. Researches affirmed that these patterns do not only have significant genetical roles but that they also betray certain distinctive psychological characteristics (11).

It was observed in the study that the most predominant lip pattern was Type II for both sexes at the upper quadrant, while Type II and IV for the lower quadrant was observed in both males and females and it was significantly sexually dimorphic. This is similar to the findings by Alabi *et al*. Who found out that lip prints patterns among different yoruba dialects of Kwara State, showed that Ekiti-kwara dialect has Type II and Type I lip pattern to be predominant in upper and lower margins respectively (9). Also a study by Vahanwala & Parekh of 100 individuals in Mumbai found type I as the most frequently observed pattern followed by type II (1). This contradicts the study carried out by Tim *et al.* in Calicut, which revealed the predominance of Type IV, Type V patterns among females and Type I', Type I in males (12).

The result of this study showed that the females and males have a large proportion of loop pattern and there was no significant sex difference, compared with the fingerprints of other African countries, Namouchi, reported loops were the most common pattern followed by whorls and arches in Tunisian population (13). Loop pattern is common in both males and females followed by Whorl pattern (14). This contradicts the study carried out by Anyanwu, who found out that in Malawians, arches were found to be the most predominant digital pattern in both males and females (13).

In this study, lip prints were significantly associated with finger print similar to Bhargava *et al.* Who found out that Cheiloscopy is analogous to fingerprint analysis, and is a genuine subspecialty of forensic odontology (10).

CONCLUSION

Lip prints and finger prints vary from one individual to another and among gender. The unique lip print in this study was type II and IV which differs in sex and the predominant finger print was loop. The association between lip and finger print gives varieties and alternate means of personality identification in forensic anthropology.

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