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Digital Dermatoglyphic Patterns of Ibibio Ethnic Group of Akwa Ibom State, Nigeria

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ABSTRACT

Dermatoglyphics is the study of the configuration of epidermal ridges of the volar surfaces of palms, fingers, soles and toes. This study on digital dermatoglyphic patterns of Ibibio ethnic group of Akwa Ibom State was aimed at analyzing the dermatoglyphic patterns present on the fingers of the Ibibio people and the interrelationship existing among them. A total of two hundred and twenty (220) subjects who are indigenes of Ibibio ethnic group of Akwa Ibom State, Nigeria were selected for this research, one hundred and ten for both males and females. Informed consent was obtained from subjects prior to this research. The digital lipstick dermatoglyphic method was employed for the study. The subjects' hands were painted with lipstick, the subjects were asked to place their entire palms on a white duplicating paper which leaves the fingerprint on the paper. The fingerprints of subjects were analyzed with the aid of a magnifying glass to obtain the different print patterns. Chi-square was used as a statistical tool to analyse the fingerprints. The results obtained for the right fingerprints were as follows: 12.1%, 1.55%, 49.5%, 0.9%, 33.65, 0.5%, 0.9%, 0.5%, 0.5% for Plain Arch (PA), Tented Arch (TA), Ulnar Loop (UL), Radial Loop (RL), Plain Whorl (PW), Double Loop Whorl (DLW), Concentric Whorl Pattern (CWP), Central Pocketed Whorl (CPW) and composite whorl respectively. For the left fingerprints, the results obtained were: 13.4%, 3.2%, 48.4%, 1.1%, 31.1%, 1.1%, 0.7%, 0.1% and 1.0% for Plain Arch (PA), Tented Arch (TA), Ulnar Loop (UL), Radial Loop (RL), Plain Whorl (PW), Double Loop Whorl (DLW), Concentric Whorl Pattern (CWP), Central Pocketed Whorl (CPW) and composite whorl respectively. Results revealed that digital dermatoglyphic pattern differed significantly amongst the Ibibio subjects. Ulnar loop appeared most frequently distributed on the right hand with 49.5% and 48.4% on the left hand. This study presents the first ever documented record of dermatoglyphics of Ibibio tribe in Akwa Ibom State, Nigeria.

Keyword: Dermatoglyphics, Fingerprint pattern, Lipstick, Ibibio

INTRODUCTION

The word dermatoglyphics was derived from the Greek word, "dermis" meaning skin and "glyph" meaning curving. It is defined as the study of the epidermal ridge pattern present on the skin. These ridges are not uniform but present certain regular features pertinent to certain areas known as "dermatoglyphs"¹. The ridges and creases on the palms, fingers, soles and toes have a great significance in determining the identity of human beings because of their permanency, variability and unchangeability. Traditionally, dermatoglyphics has been regarded by physical anthropologist and population geneticist as a useful tool in analyzing the relationship in human populations². Finger print is one of the most interesting, reliable and unique feature of human body. It has been considered as the primary method for identification of human beings. This is because no two finger prints are exactly alike. Finger print is an impression left by the friction ridges of all or part of the finger; this friction ridge is a raised portion of the palmar or plantar skin of epidermis. Each ridge contains pores, which are attached to eccrine sweat gland under

the skin³.

The development of finger prints takes place between the 13th to 19th week of intra-uterine life. The study of fingerprints identification is referred to as dactyloscopy⁴; finger prints are an individual's blueprints. They can tell how perception, emotions, cognition, motivation and finally, the action of a person towards a situation are directed⁵. The identification of fingerprints is the process by which two instances of friction ridge skin impression from human fingers or toes or even the palms of the hand or soles of the foot are compared to determine whether these impressions could have come from the same individual⁴.

According to Galton, the simplest classification of the patterns are of three main classes - whorls, loops and arches according to the number of triradii. Triradii are the meeting point of three opposing ridge system. But according to the classification reported by Henry, (1937), there are four major types of patterns - whorls, loops, arches and composites. There are also more

complex classification systems that breakdown the patterns even further into plain arches, tented arches and loops that may be radial or ulnar depending on the side of the hand toward which the tail points⁶. Ulnar loops start on the pinky-side of the finger, the side closer to the ulnar bone while the radial loops start on the thumb side of the finger, the side closer to the radius.

The Ibibio populace constitutes the largest ethnic group in Akwa Ibom State with thirteen Local Government Areas comprising Uyo, Uruan, Nsit Ubium, Nsit Ibom, Nsit Atai, Mkpata Enin, Itu, Ini, Ikot Abasi, Ikono, Ibiono Ibom, Ibesikpo-Asutan and Etinan. Digital dermatoglyphics has been around for more than 70 years as a branch of science in which patterns present on the palms and fingers are studied systematically. Physical anthropologists studying digital dermatoglyphics are interested in the patterns of ridged skin on the human fingers or toes, this is because of the uniqueness and hereditary basis of an individual's fingerprint. Study on the dermatoglyphic patterns among several Nigerian populace have been carried out. Dermatoglyphic patterns of Ibo and Ikwerre ethnic groups have been studied⁷. Palmar and digital dermatoglyphic patterns on the Ndokwas of Delta State, Nigeria have been studied and analyzed². The Research on digital and palmar dermatoglyphics has been undertaken among the Ijaw people of the Niger Delta Region of southern Nigeria. Research on digital dermatoglyphics of the right hand of the Annang ethnic group in Akwa Ibom State have been studied¹, the present study was to examine and provide information on the digital dermatoglyphic patterns among the Ibibio ethnic group in Akwa Ibom State, Nigeria and to find out interrelation existing among this ethnic group.

MATERIALS AND METHODS

This study was conducted in the thirteen Local Government Areas that make up the Ibibio tribe in Akwa Ibom State. A total number of 220 subjects who are indigenes of the Ibibio ethnic group of Akwa Ibom State, Nigeria were used for this study, 110 were males while 110 were females. Informed consent was obtained from subjects prior to the study.

The dermatoglyphic method employed by the researcher was the lipstick method according to Roopamet *et al.*⁸. The digital prints were collected on a plain paper, prints were analyzed with the aid of hand lens and classified. The frequencies of the various patterns were expressed in percentages and chi square was used as a statistical tool for the analysis.

This study was approved by the Health research and Ethics Committee, University of Calabar Teaching Hospital, Calabar.

RESULTS

The percentage distribution of digital dermatoglyphic pattern shows the following results: plain arch (PA) shows 12.1% pattern distribution. The highest of this pattern appeared on digit I with 24.5%, 15% on digit II, 10.0% on digit III, 5.9% on digit IV and 5.0% on digit V. Tented arch (TA) had pattern distribution of 1.55%, the highest pattern occurrence on digit III with 3.2%, 2.7% on digit II, 0.5% on digit I, IV and V respectively.

The results as presented on table 1 showed Pattern distribution on the right hand of the Ibibios showed 49.5% ulnar loop (UL), 74.1% occurred on digit V, 62.7% on digit III, 45.9% on digit IV, 38.6% on digit II and 25.9% on digit I. The Radial loop (RL) showed 0.9% pattern distribution, 3.2% on digit II, 0.9% on digit V and 0.5% on digit III. The plain whorl (PW) showed 33.6%, 45.5% appeared on digit IV, 45.0% on digit I, 37.7% on digit II, 21.8% on digit III and 18.2% on digit V. Double loop whorl (DLW) distribution showed 0.5% with 2.3% on digit I. Concentric whorl pattern (CWP) distribution was 0.9%, 1.4% appeared evenly on digit II, IV. Central pocketed whorl (CPW) appeared 0.5, composite whorl appeared 0.5%.

Digital dermatoglyphics of the right hand of Ibibio subjects differed significantly across the fingers, the ulnar loop was the most frequently appeared pattern with percentage distribution of 49.5% (Table 1)

Table 1: Right Finger Print Pattern of Subjects from Ibibio Tribe

Pattern	I	II	III	IV	V	Total
CiW	2 (0.9)	2 (0.9)	1 (0.5)	0 (0.0)	0 (0.0)	5 (0.5)
CPW	2 (0.9)	1 (0.5)	1 (0.5)	2 (0.9)	0 (0.0)	6 (0.5)
CW	0 (0.0)	3 (1.4)	2 (0.9)	3 (1.4)	2 (0.9)	10 (0.9)
DLW	5 (2.3)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.5)	6 (0.5)
PA	54 (24.5)	33 (15.0)	22 (10.0)	13 (5.9)	11 (5.0)	133 (12.1)
PW	99 (45.0)	83 (37.7)	48 (21.8)	100 (45.5)	40 (18.2)	370 (33.6)
RL	0 (0.0)	7 (3.2)	1 (0.5)	0 (0.0)	2 (0.9)	10 (0.9)
TA	1 (0.5)	6 (2.7)	7 (3.2)	1 (0.5)	1 (0.5)	16 (1.5)
UL	57 (25.9)	85 (38.6)	138 (62.7)	101 (45.9)	163 (74.1)	544 (49.5)
Total	220	220	220	220	220	1100

Values are presented as frequency and percentage (in parenthesis)

Chi-square cal. = 208.859; df = 32; p < 0.05

The print patterns varied significantly across the fingers

On the left, finger print patterns of subjects, varied significantly amongst the fingers. Plain arch (PA) showed 13.4% pattern distribution with the highest percentage on digit I (27.7%). 17.7% on digit II, 9.1% on digit III, 6.8% on digit IV and 5.5% on digit V. The Tented arch (TA) showed 3.2% pattern distribution, 6.8% on digit II, 5.5% on digit III, 3.6% on digit IV. Ulnar loop (UL) showed 48.4% pattern distribution, 70.9% appeared on digit V, 55.9% on the digit III, 50.0% on digit IV, 39.1% on digit II and 25.9% on digit I.

The radial loop (RL) pattern showed 1.1% distribution on the left hand of Ibibios, 3.2% on digit II, 1.4% on digit III and 0.5% evenly distributed on digits IV & V. The pattern distribution for the plain whorl showed

31.1%, 41.4% on the thumb (I), 36.4% on digit IV, 31.4% on digit II, 24.5% on digit III and 21% on digit V. Double loop whorl (DLW) was 1.1%, the highest distribution with 4.1% appeared on the thumb and 0.5% appeared on the digit II, III, IV. Concentric whorl (CW) had 0.7% distribution, 1.8% was found on digit (III). Composite whorl (CiW) had a percentage distribution of 1.4%, 1.0% and 1.4% appeared on digit III, V respectively and digit I, II showed 0.9% pattern distribution (Table 2). The finger print patterns varied significantly amongst the left fingers of Ibibios. Ulnar loop was the most frequently occurring finger print with 48.4% while the least frequently occurring is central pocketed whorl with 0.01% (Table 2).

Table 2: Left Finger Print Pattern of Subjects from Ibibio Tribe

Pattern	I	II	III	IV	V	Total
CiW	2 (0.9)	2 (0.9)	3 (1.4)	1 (0.5)	3 (1.4)	11 (1.0)
CPW	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.5)	0 (0.0)	1 (0.1)
CW	0 (0.0)	1 (0.5)	4 (1.8)	3 (1.4)	0 (0.0)	8 (0.7)
DLW	9 (4.1)	1 (0.5)	1 (0.5)	1 (0.5)	0 (0.0)	12 (1.1)
PA	61 (27.7)	39 (17.7)	20 (9.1)	15 (6.8)	12 (5.5)	147 (13.4)
PW	91 (41.4)	69 (31.4)	54 (24.5)	80 (36.4)	48 (21.8)	342 (31.1)
RL	0 (0.0)	7 (3.2)	3 (1.4)	1 (0.5)	1 (0.5)	12 (1.1)
TA	0 (0.0)	15 (6.8)	12 (5.5)	8 (3.6)	0 (0.0)	35 (3.2)
UL	57 (25.9)	86 (39.1)	123 (55.9)	110 (50.0)	156 (70.9)	532 (48.4)
Total	220	220	220	220	220	1100

Values are presented as frequency and percentage (in parenthesis)

Chi-square cal. = 205.072; df = 32; p<0.05

The print patterns varied significantly amongst the fingers

DISCUSSION

The science of dermatoglyphics is of interest in various fields such as medicine, anthropology, and criminology. Dermatoglyphic patterns of the hand are the intimate and private symbol of the individual. Everyone possesses a unique set of fingerprints, a knowledge which is used by police forces around the world, and these patterns do not change. Their use as a means of identification shows how significant they are as an indicator of identity; their uniqueness shows how significant they are as a measure of individuality. Research has confirmed that these patterns not only have a genetic significance but that they also betray

certain distinctive psychological characteristics⁹.

The results of investigation of the digital dermatoglyphic patterns of the right fingers of Ibibio ethnic group revealed the following results; 12.1%, 1.5%, 0.9%, 33.6% & 49.5% for Plain arch, tented arch, radial loop, Plain whorls & Ulnar loop respectively. Ulnar loop was seen with the following frequency distribution - highest on digit V with 74.1%, 62.7% on digit III, and 45.9% on digit IV, 38.6% on digit II, 25.9% on digit I. Plain whorls showed 33.6% pattern distribution on the right hand of the Ibibio populace. The highest of 45.5% was seen on digit IV, 45.0% on digit I, and 37.7% on digit II, 21.85 on

digit III and 18.2% on digit V. Radial loop pattern showed 0.9% frequency distribution on the right fingers of Ibibios. 3.2% was seen on digit II, 0.9% on digit V, 0.5% on digit III. There was no radial loop pattern on the digit I, IV. Tented arch showed 1.5% pattern distribution, 3.2% was seen on digit III, 2.7% on digit II, 0.5% on digits I, IV, V respectively. Plain arch showed 12.1% frequency distribution on the right fingers of the Ibibio tribes. The highest appeared on digit I with 24.5%, 15.0% on digit II, 10.0% on digit III, 5.9% on digit IV and 5.0% on digit V. Results revealed the presence of composite whorls with 0.9% on digit I & II, 0.5% on digit III, absent on digits IV, V. This results obtained is in tandem with the work done by Mohammed et al., (2014)¹⁰ on digital dermatoglyphic pattern of the Kanuri ethnic group of the North east which showed 80% whorl, 59.10% loops and 7.07% arch. This result is different when compared with dermatoglyphic data in Tibetan which had whorl with the highest frequency of 54.46%, followed by the loop with frequency of 44.06% and arch with frequency of 1.8%¹¹. Dermatoglyphic is ethnic dependent, this present study conforms with the work by Gauldi, et al.,¹¹ who reported high frequency of 63.33% for loop, followed by 31.20% for whorl and 5.47% for arch in Bolognese in Italy. A cross sectional study of palmar and digital patterns randomly studied in Malawian subjects carried out by Igbigbi et al., (1996)¹² showed that the arches were the most predominant digital pattern in both sexes followed by radial loops in males and whorls in females. In a study conducted on Zimbabweans, ulnar loop was the most predominant digital pattern type in both sexes followed by whorls in males and arches in females.

The results of the left hand digital dermatoglyphic pattern of the Ibibio ethnic group showed the following results; 13.4%, 3.2%, 1.1%, 31.1% and 48.4% for plain arch, tented arch, radial loop, plain whorls and ulnar loop. Ulnar loop was seen most frequently on digit V with 70.9%, 55.9% on digit III, 50.0% on digit IV, 39.1% on digit II and least occurred on digit I with 25.9%. Plain whorls pattern distribution on the left fingers of Ibibio ethnic group was as follows; total frequency distribution of 31.1%, the highest appeared on digit I with 41.4%, 36.4% on digit IV, 31.4% on digit II, 24.5% on digit III and 21.8% on digit V. Radial loop was seen with the frequency of 1.1% on the left fingers of Ibibio, the highest on the digit II with 3.2%, 1.4% on digit III, 0.5% was seen on digits IV, V and no radial loop pattern on digit I. Tented arch had 3.2% pattern distribution; the highest was seen on digits II with 6.8%, 5.5% on digit III, 3.6% on digit IV, it was that digit I, V had no tented arch pattern. Plain arch had 13.4%, highest on digit I with 27.7%, 17.7% on digit II, 9.1% on digit III, 6.8% on digit IV and 5.5% on digit V. The results also revealed the present of composite whorls with the following frequencies; 0.9% on digits I, II, 1.4% on digits III, IV, 0.5% on digit IV. In this present study, ulnar loop appeared highest on the left fingers of the Ibibio ethnic group, followed by plain whorl. However, in a study by Osunwoke et al.,¹³ on Urhobo

people, it was observed that the highest frequency distribution was loop in all the fingers, followed by whorl patterns.

In a research carried out on digital and palmar dermatoglyphics among the Ijaw people of the Niger Delta region of Southern Nigeria by Jaja et al.,² the results showed that the most prevalent digital ridge pattern type was ulnar loops followed by whorls and arches, the least prevalent was radial loops. The result of this study conforms with findings of other research work done on a typical Nigerian population.¹³

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