The Dermatoglyphic Assessment of Umuahia Natives in Abia State University, Uturu

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ABSTRACT

Dermatoglyphic impressions and the effectiveness of friction ridge skin identification have been demonstrated through experimentation, fingerprints are now incorporated into anthropometric records, resulting in their increased usage. The research objectives include investigating the qualitative dermatoglyphic features (arch, loop and whorl patterns) in both hands; and, the quantitative dermatoglyphic features of total finger ridge count (TFRC) in both hands of Umuahia male and female individuals. Fifty (50) male and female students each who are natives of Umuahia in Abia State University, Uturu were examined using dermatoglyphics tool and interview-administered questionnaires. The distribution in percentage and frequency of the right- and left-hand finger pattern dermatoglyphics qualitative features of Umuahia reveal, ulnar loop, plain whorl, and plain arch patterns shown to be more prevalent in females. The paired sample test confirmed observations, indicating that males have a higher finger ridge count on the right hand and females have a higher finger ridge count on the left hand. However, there is a positive correlation between the FRC of the two hands, indicating a consistent relationship in ridge count between the right and left hands, particularly stronger in females compared to males.

Keywords: Dermatoglyphics, Gender, Umuahia, Population

INTRODUCTION

The unique patterns on our fingertips are determined by a combination of genetics and environmental factors, just like other aspects of our bodies (Kemelmacher-Shlizerman and Basri, 2011). There is a theory that people in different locations have unique dermatoglyphic patterns, but it has not been confirmed (Anyanwu, 2020). Throughout history, dermatoglyphics have provided insight into ethnic and

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ancestral origins (Mohammed *et al*., 2014; Fournier and Ross, 2016). Friction ridge skin impressions have been utilized for identification purposes across various cultures for thousands of years (Jeffery, 2011).As the effectiveness of friction ridge skin identification was demonstrated through experimentation, fingerprints were incorporated into anthropometric records, resulting in their increased usage (Jeffery, 2011). In various workplaces and legal situations, human fingerprints are commonly utilized for establishing one's biometric identity (Anyanwu, 2020). The absence of information regarding fingerprint patterns among the people of Umuahia in Abia State led to the need for this study. Hence there is a need to study the dermatoglyphic patterns among male and female Natives of Umuahia in Abia State University, to determine the true dermatoglyphic pattern between them. Therefore, the research objectives include investigating the qualitative dermatoglyphic features (arch, loop and whorl patterns) in right and left hands; and, investigating the quantitative dermatoglyphic features of total finger ridge count (TFRC) in right and left hands of Umuahia male and female individuals.

MATERIALS AND METHODS

Study Area and Population.

The study was conducted among Umuahia Male and Female indigenes in Abia state University, Uturu. A total of one hundred (100) samples were collected, 50 male and 50 female subjects from Abia State University, Uturu.

Eligibility Criteria

The following individuals will be excluded; individuals with any hand deformity like permanent scars on fingers which may be congenital or acquired due to trauma on fingers; individuals suffering from any chronic skin disease, having worn fingerprints or extra or bandaged finger; individuals outside the age range of 16 – 40; persons whose grandparents and parents are of Igbo origin in Umuahia; and, any individual that does not want to participate despite being eligible.

Equipment

The equipment used in this study include a HP Scanjet G3110 (digital photo scanner); a laptop; an AutoCAD software version 2014; writing materials (book and pen); a washing hand bowl, toilet soap and hand towel; a light source; a calculator; and, a handkerchief.

Data Collection

50 male and 50 female students who are from Umuahia in Abia state university, Uturu was examined using dermatoglyphics tool and interview-administered questionnaires to confirm their state of origin as regards to our study group. The male and female subjects willingly gave their consent to participate in the study. The subject's palmprints was obtained by placing their palms on a HP Scanjet with the thumb 300-400 along the other digits 10-150 abducted. This is a necessary to produce clear palmprints.

A digital scanner and HP Scanjet G3110 connected to a laptop was used to obtain bilateral palmprints of each subject. The palms were clean-dried thoroughly and placed gently on the scanner without exerting force and with all ten digits touching the surface of the scanner. The palmprints were taken and recorded in a jpeg format in a laptop. The pattern ridges of arches, whorls and loops will be counted according to the standard technique of Cummins and Midlo, 1926. Interpretation of prints will be done according to Cummins and Midlo (1961) and Penrose and Loesch (1963) which includes identification of patterns, finger ridge count and Total finger ridge count.

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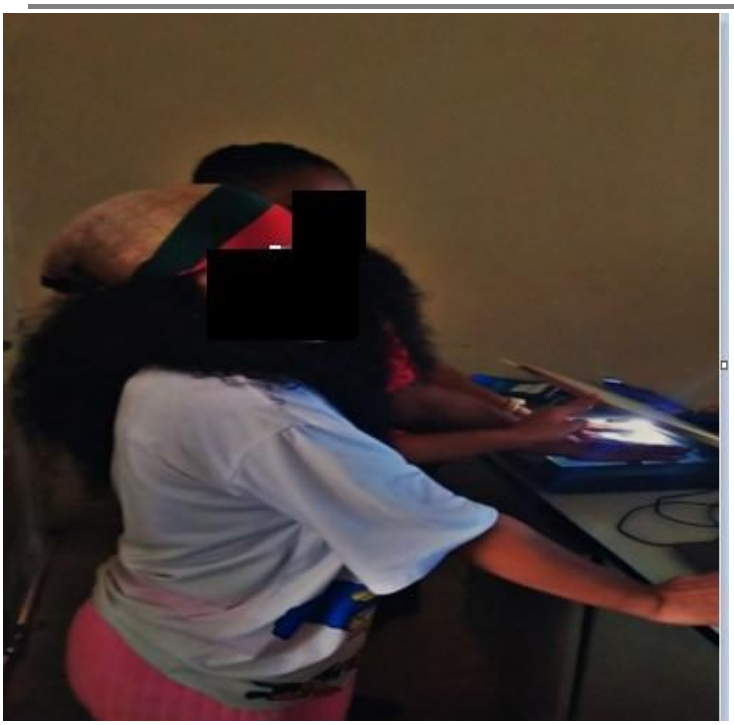

Figure 1: An Image showing data collection

Data Analysis

Data were analysed using SPSS for windows version 25 and statistical analysis system. All data were tabulated and statistically treated. Descriptive statistics were used to establish significant frequencies in the sample. The comparative analysis was done using analysis of variance. The correlation analysis was done to determine the Finger Ridge Count (FRC) and Total Finger Ridge Count (TFRC). The Chi-square test of significance was also computed to determine whether there are significant differences in the occurrences of patterns in every individual. All inferential statistical analysis was carried out at a 95% confidence level, with $P < 0.05$ as the significant value. The results are represented in form of tables and bar charts.

RESULTS

Normal distribution in percentage and frequency of the right- and left-hand finger pattern dermatoglyphics qualitative features of Umuahia. Table 1: Right hand fingerprint pattern of Males

Right Hand	AW	CPLW	DLW	PA	PW	RL	TA	UL	TOTAL
Thumb	2 (0.8%)	2 (0.8%)	0 (0%)	8 (3.2%)	16 (6.4%)	0 (0%)	2 (0.8%)	20 (8.0%)	50 (20%)
Index	1 (0.4%)	5 (2.0%)	2 (0.8%)	7 (2.8%)	10 (4.0%)	2 (0.8%)	1 (0.4%)	22 (8.8%)	50 (20%)
Middle	1 (0.4%)	4 (1.6%)	0 (0%)	5 (2%)	11 (4.4%)	1 (0.4%)	2 (0.8%)	26 (10.4%)	50 (20%)
Ring	1 (0.4%)	2 (0.8%)	0 (0.0%)	1 (0.4%)	20 (8%)	0 (0%)	2 (0.8%)	24 (9.6%)	50 (20%)
Little	4 (1.6%)	8 (3.2%)	0 (0.0%)	0 (0.0%)	5 (2%)	2 (0.8%)	1 (0.4%)	30 (12%)	50 (20%)

TOTAL	9 (3.6%)	21 (8.4%)	2 (0.8%)	21 (8.4%)	62 (24.8%)	5 (2%)	8 (3.2%)	122 (48.8%)	250 (100%)
X^2 = 47.70									
P = 0.01									

Table 2: Left hand fingerprint pattern of Males

Left Hand	**AW**	**CPLW**	**DLW**	**PA**	**PW**	**RL**	**TA**	**UL**	**TOTAL**
Thumb	0 (0%)	1 (0.4%)	0 (0%)	11 (4.4%)	11 (4.4%)	2 (0.8%)	2 (0.8%)	23 (9.2%)	50 (20%)
Index	0 (0%)	2 (0.8%)	0 (0%)	3 (1.2%)	13 (5.2%)	6 (2.4%)	2 (0.8%)	24 (9.4%)	50 (20%)
Middle	0 (0%)	2 (0.8%)	0 (0%)	2 (0.8%)	10 (4.0%)	1 (0.4%)	3 (1.2%)	32 (12.8%)	50 (20%)
Ring	2 (0.8%)	4 (1.6%)	2 (0.8%)	1 (0.4%)	14 (5.6%)	1 (0.4%)	2 (0.8%)	24 (9.4%)	50 (20%)
Little	1 (0.4%)	3 (1.2%)	0 (0%)	2 (0.8%)	7 (2.8%)	3 (1.2%)	0 (0%)	34 (13.6%)	50 (20%)
TOTAL	3 (1.2%)	12 (4.8%)	2 (0.8%)	19 (7.6%)	55 (22%)	13 (5.2%)	9 (3.6%)	137 (54.8%)	250 (100%)
X_2 = 49.00									
P=0.01									

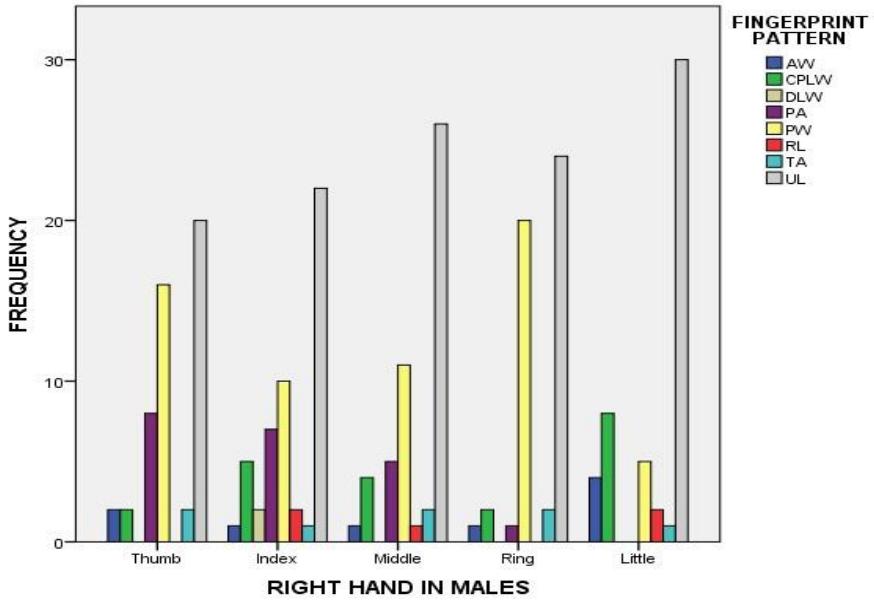

Fig 2: Fingerprint pattern in the right hand of males.

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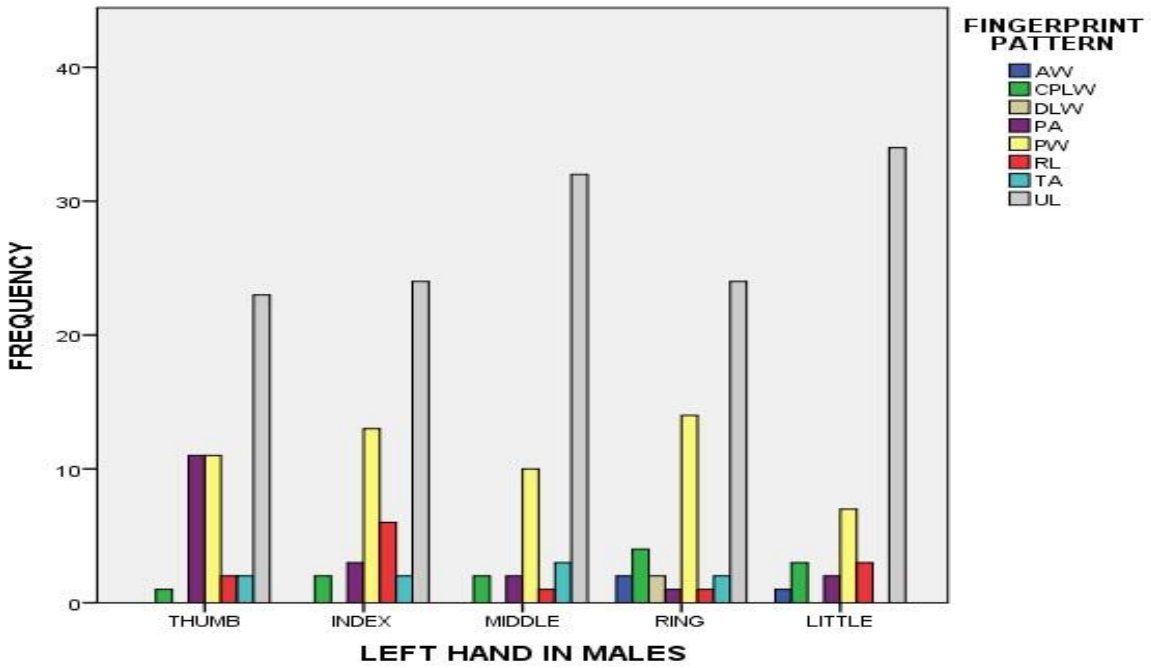

Fig 3: Fingerprint pattern in the left hand of Males

Table 3: Right hand fingerprint pattern of Females

Right hand	AW	CPLW	DLW	PA	PW	RL	TA	UL	TOTAL
Thumb	2 (0.8%)	0 (0%)	1 (0.4%)	9 (3.6%)	17 (6.8%)	1 (0.4%)	0 (0%)	20 (8%)	50 (20%)
Index	2 (0.8%)	1 (0.4%)	3 (1.2%)	13 (5.2%)	10 (4%)	5 (2%)	0 (0%)	16 (6.4%)	50 (20%)
Middle	1 (0.4%)	1 (0.4%)	1 (0.4%)	11 (4.4%)	6 (2.4%)	3 (1.2%)	2 (0.8%)	25 (10%)	50 (20%)
Ring	0 (0%)	0 (0%)	0 (0%)	3 (1.2%)	15 (6%)	4 (1.6%)	0 (0%)	28 (11.2%)	50 (20%)
Little	0 (0%)	2 (0.8%)	0 (0%)	2 (0.8%)	4 (1.6%)	5 (2%)	0 (0%)	37 (14.8%)	50 (20%)
TOTAL	5 (2%)	4 (1.6%)	5 (2%)	38 (15.2%)	52 (20.8%)	18 (7.2%)	2 (0.8%)	126 (50.4%)	250 (100%)
X^2 = 59.45									
P = 0.00									

Table 4: Left hand fingerprint pattern of Females

Left Hand	AW	CPLW	DLW	PA	PW	RL	TA	UL	TOTAL

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Thumb	1 (0.4%)	0 (0%)	2 (0.8%)	10 (4%)	13 (5.2%)	2 (0.8%)	1 (0.4%)	21 (8.4%)	50 (20%)
Index	1 (0.4%)	0 (0%)	0 (0%)	9 (3.6%)	13 (5.2%)	3 (1.2%)	2 (0.8%)	22 (8.8%)	50 (20%)
Middle	1 (0.4%)	2 (0.8%)	0 (0%)	12 (4.8%)	8 (3.2%)	1 (0.4%)	3 (1.2%)	23 (9.2%)	50 (20%)
Ring	1 (0.4%)	4 (1.6%)	0 (0%)	4 (1.6%)	11 (4.4%)	2 (0.8%)	1 (0.4%)	27 (10.8%)	50 (20%)
Little	0 (0%)	1 (0.4%)	1 (0.4%)	0 (0%)	4 (1.6%)	2 (0.8%)	1 (0.4%)	41 (16.4%)	50 (20%)
TOTAL	4 (1.6%)	7 (2.8%)	3 (1.2%)	35 (14%)	49 (19.6%)	10 (4%)	8 (3.2%)	134 (53.6%)	250 (100%)
$X^2 = 47.23$									
P = 0.01									

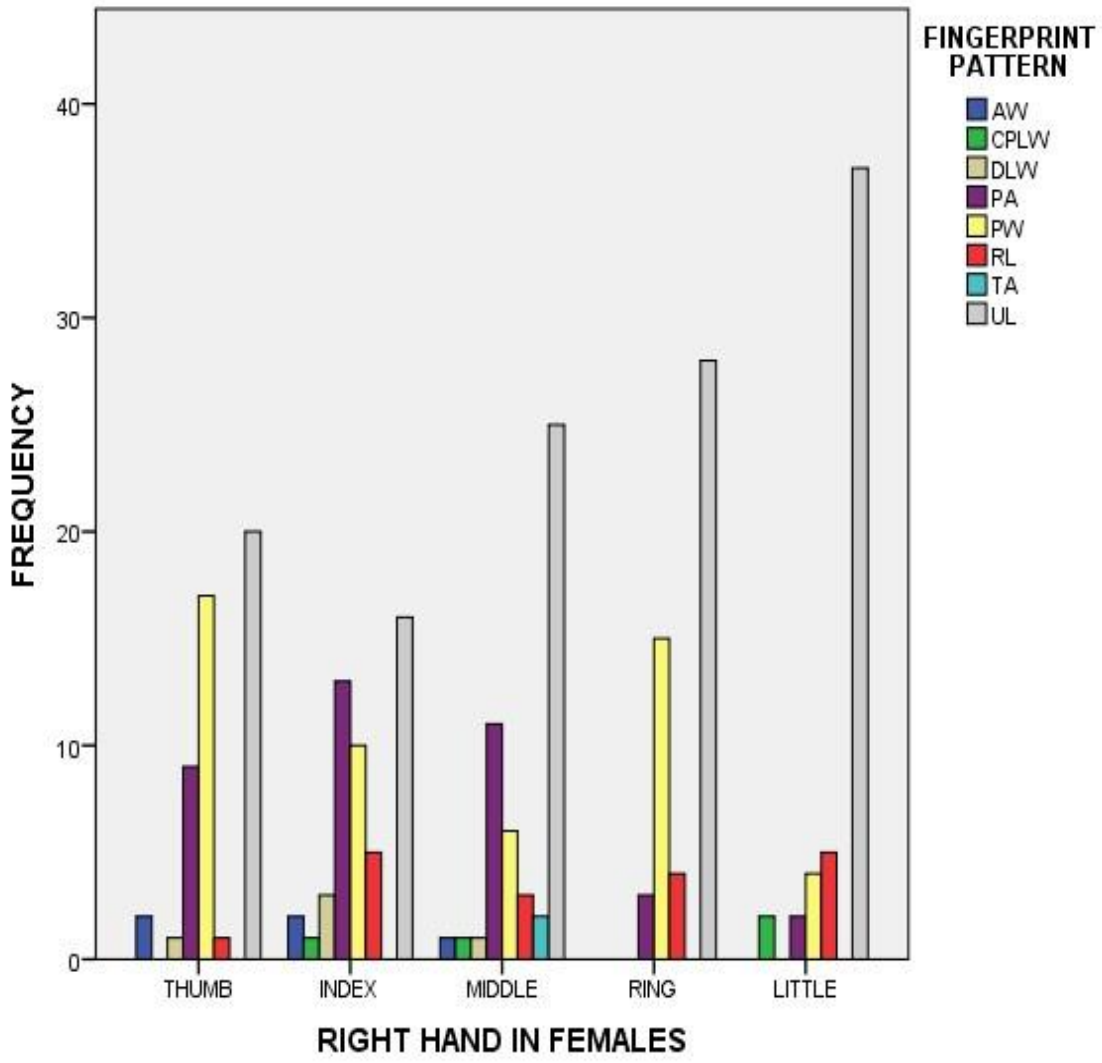

Fig 4: Fingerprint pattern in the right hand of female

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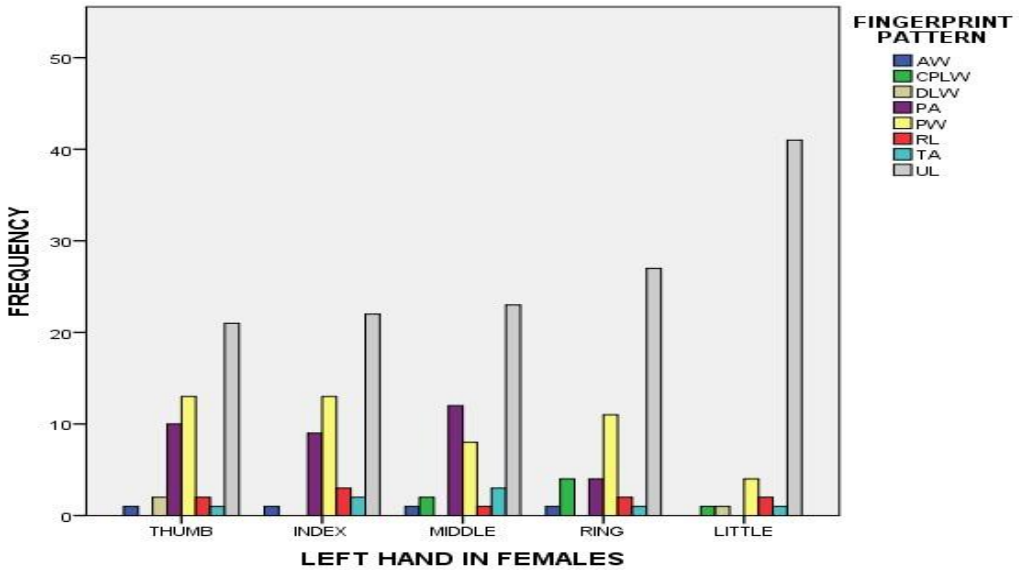

Fig 5: Fingerprint pattern in the Left hand of females

Comparison of frequency distribution of the right- and left-hand finger pattern dermatoglyphics qualitative features of Umuahia Male and Female participants.

Table 5: Comparison of frequency distribution of different finger patterns on both right and left digits of Males

Fingers		AW	CPLW	DLW	PA	PW	RL	TA	UL	TOTAL	
Thumb	Right	2 (2%)	2 (2%)	0 (0%)	8 (8%)	16 (16%)	0 (0%)	2 (2%)	20 (20%)	50 (50%)	$X^2 = 5.94$ df = 6 P = 0.43
	Left	0 (0%)	1 (1%)	0 (0%)	11 (11%)	11 (11%)	2 (2%)	2 (2%)	23 (23%)	50 (50%)	
	Total	2 (2%)	3 (3%)	0 (0%)	19 (19%)	27 (27%)	2 (2%)	4 (4%)	43 (43%)	100 (100%)	
Index	Right	1 (1%)	5 (5%)	2 (2%)	7 (7%)	10 (10%)	2 (2%)	1 (1%)	22 (22%)	50 (50%)	$X^2 = 8.70$ df = 7 P = 0.28
	Left	0 (0%)	2 (2%)	0 (0%)	3 (3%)	13 (13%)	6 (6%)	2 (2%)	24 (24%)	50 (50%)	
	Total	1 (1%)	7 (7%)	2 (2%)	10 (10%)	23 (23%)	8 (8%)	3 (3%)	46 (46%)	100 (100%)	
Middle	Right	1 (1%)	4 (4%)	0 (0%)	5 (5%)	11 (11%)	1 (1%)	2 (2%)	26 (26%)	50 (50%)	$X^2 = 3.82$ df = 6 P = 0.70
	Left	0 (0%)	2 (2%)	0 (0%)	2 (2%)	10 (10%)	1 (1%)	3 (3%)	32 (32%)	50 (50%)	
	Total	1 (1%)	6 (6%)	0 (0%)	7 (7%)	21 (21%)	2 (2%)	5 (5%)	58 (58%)	100 (100%)	
Ring	Right	1 (1%)	2 (2%)	0 (0%)	1 (1%)	20 (20%)	0 (0%)	2 (2%)	24 (24%)	50 (50%)	$X^2 = 56$ df = 7 P

	Left	2 (2%)	4 (4%)	2 (2%)	1 (1%)	14 (14%)	1 (1%)	2 (2%)	24 (24%)	50 (50%)	= 0.65
	Total	3 (3%)	6 (6%)	2 (2%)	2 (2%)	34 (34%)	1 (1%)	4 (4%)	48 (48%)	100 (100%)	
Little	Right	4 (4%)	8 (8%)	0 (0%)	0 (0%)	5 (5%)	2 (2%)	1 (1%)	30 (30%)	50 (50%)	X^2 = 7.86 df = 6 P = 0.25
	Left	1 (1%)	3 (3%)	0 (0%)	2 (2%)	7 (7%)	3 (3%)	0 (0%)	34 (34%)	50 (50%)	
	Total	5 (5%)	11 (11%)	0 (0%)	2 (2%)	12 (12%)	5 (5%)	1 (1%)	64 (64%)	100 (100%)	

Table 6: Comparison of frequency distribution of different finger patterns on both right and left digits of Females

Fingers		**AW**	**CPLW**	**DLW**	**PA**	**PW**	**RL**	**TA**	**UL**	**TOTAL**	
Thumb	Right	2 (2%)	0 (0%)	1 (1%)	9 (9%)	17 (17%)	1 (1%)	0 (0%)	20 (20%)	50 (50%)	X^2 = 2.61 df = 6 P = 0.86
	Left	1 (1%)	0 (0%)	2 (2%)	10 (10%)	13 (13%)	2 (2%)	1 (1%)	21 (21%)	50 (50%)	
	Total	3 (3%)	0 (0%)	3 (3%)	19 (19%)	30 (30%)	3 (3%)	1 (1%)	41 (41%)	100 (100%)	
Index	Right	2 (2%)	1 (1%)	3 (3%)	13 (13%)	10 (10%)	5 (5%)	0 (0%)	16 (16%)	50 (50%)	X^2 = 8.90 df = 7 P = 0.26
	Left	1 (1%)	0 (0%)	0 (0%)	9 (9%)	13 (13%)	3 (3%)	2 (2%)	22 (22%)	50 (50%)	
	Total	3 (3%)	1 (1%)	3 (3%)	22 (22%)	23 (23%)	8 (8%)	2 (2%)	38 (38%)	100 (100%)	
Middle	Right	1 (1%)	1 (1%)	1 (1%)	11 (11%)	6 (6%)	3 (3%)	2 (2%)	25 (25%)	50 (50%)	X^2 = 2.95 df = 7 P = 0.89
	Left	1 (1%)	2 (2%)	0 (0%)	12 (12%)	8 (8%)	1 (1%)	3 (3%)	23 (23%)	50 (50%)	
	Total	2 (2%)	3 (3%)	1 (1%)	23 (23%)	14 (14%)	4 (4%)	5 (5%)	48 (48%)	100 (100%)	
Ring	Right	0 (0%)	0 (0%)	0 (0%)	3 (3%)	15 (15%)	4 (4%)	0 (0%)	28 (28%)	50 (50%)	X^2 = 7.44 df = 6 P = 0.28
	Left	1 (1%)	4 (4%)	0 (0%)	4 (4%)	11 (11%)	2 (2%)	1 (1%)	27 (27%)	50 (50%)	
	Total	1 (1%)	4 (4%)	0 (0%)	7 (7%)	26 (26%)	6 (6%)	1 (1%)	55 (55%)	100 (100%)	

Little	Right	2 (2%)	0 (0%)	0 (0%)	2 (2%)	4 (4%)	5 (5%)	0 (0%)	37 (37%)	50 (50%)	$X^2 = 5.82$ df = 6 P = 0.44
	Left	1 (1%)	0 (0%)	1 (1%)	0 (0%)	4 (4%)	2 (2%)	1 (1%)	41 (41%)	50 (50%)	
	Total	3 (3%)	0 (0%)	1 (1%)	2 (2%)	8 (8%)	7 (7%)	1 (1%)	78 (78%)	100 (100%)	

Evaluating mean and standard error of mean in finger ridge count (FRC)

Table 7: Relationship between right and left finger ridge count (FRC) in males and females

Sex	**FRC**	**Mean ± SE**	**Paired T Test**		**Pearson correlation**	
			T-value	**P-value**	**T-Value**	**P-value**
Male(N=50)	Right	67.20±1.88	1.310	0.196	0.330	0.019
	Left	64.24±2.02				
Female(N=50)	Right	65.00±1.98	-1.082	0.284	0.534	0.000
	Left	67.06±1.97				

Evaluating mean and standard error of mean in total finger ridge count (TFRC).

Table 8: Relationship between right and left total finger ridge count (TFRC) in male and female

	Sex	**Mean ± SE**	**Independent T-Test**		**Pearson Correlation**	
			T-value	**P-value**	**P-value**	**Sig.**
Total Finger Ridge Count	Male	131.30 ± 3.20	-0.137	0.891	0.086	0.553
	Female	131.94 ± 3.39				

DISCUSSION

Fingerprints are unique, difficult to alter (Huynh *et al*., 2015) and made up mostly of water with organic and

inorganic components (Cadd *et al*., 2015). Contaminants like cosmetics, drugs, and food residues may also be present (Khare and Singla, 2022). Fingerprint patterns on fingertips are hereditary, with similarities between monozygotic twins and less similarity with dizygotic twins. 12 dermatoglyphic characteristics have significant heritability and are inherited through Mendelian transmission with additional effects from major genes (Machado *et al*., 2010). Fingerprints are determined by genes and environment, with environmental factors causing slight differences. The influence of genetics on the environment is not completely clear, but one study found that 5% of the variability is due to environmental factors. There are different models for how fingerprints form, such as buckling instability in the basal cell layer or changes in amniotic fluid surrounding each finger. These factors affect each finger differently, resulting in unique but similar patterns (Kücken and Newell, 2005; Kücken, 2007).

Qualitative Dermatoglyphic Features

Our study just like most of the African studies conducted in Tunisia, Ghana, Kenya and Tanzania reported the ulnar loop as their most predominant pattern which was consistent with different studies. Africans have been more associated with the ulnar loop as compared to the whorls and arches linked with Asians, Tibetans' and Eskimos (Bandameedi et al., 2016).

The ulnar loop pattern was found to be prevalent in both male and female subjects in this study, with a higher occurrence in females compared to males. The left hand exhibited higher ulnar loop values than the right hand for both genders. These findings align with previous studies (Ekanem, 2009; Ezejindu *et al*., 2015; Iso *et al*., 2019) that also reported ulnar loops as the most prevalent fingerprint pattern, with females showing a higher occurrence of ulnar loops.

The radial loop pattern was observed in all left hands for males and females, with females showing higher occurrence and values. The occurrence of radial loops varied between the right and left hands for males, while females exhibited a similar occurrence in both hands. These results are consistent with the findings of Ezejindu *et al*. (2015) and indicate a gender-specific difference in the prevalence and distribution of radial loops among Umuahia subjects.

Plain whorls were found to be prevalent in both male and female subjects, with males showing higher occurrence and values compared to females. The right hand exhibited higher values of plain whorls compared to the left hand for both genders, suggesting a potential dominance of this pattern in the right hand. These findings are in line with previous studies (Ekanem, 2009; Iso *et al*., 2015) that also reported plain whorls as common fingerprint patterns.

The accidental whorl pattern showed a low occurrence in both male and female subjects, with males having a slightly higher occurrence and values than females. The occurrence of accidental whorls was predominantly observed in the right hand for both genders. These results align with previous research by Ekanem (2009) and Ezejindu *et al*. (2015), indicating the relative rarity of accidental whorls among Umuahia subjects.

Central pocket loop whorls were present in both male and female subjects, with males showing a higher occurrence compared to females. The right hand exhibited higher values of central pocket loop whorls for males, while females showed left-hand dominance. These findings are consistent with previous studies (Ekanem, 2009; Ezejindu *et al*., 2015) that also reported a higher prevalence of central pocket loop whorls in males.

The double loop whorl pattern was found to be absent in most digits of both male and female subjects, indicating its relative rarity in the Umuahia population. Females exhibited a higher occurrence and values of double loop whorls on the right hand, particularly on the right index finger. These results contrast with the findings of Ezejindu *et al*. (2015), highlighting potential variations in the prevalence and distribution of double-loop whorls. Plain arches were observed in both male and female subjects, with females showing higher occurrence and values compared to males. The right hand exhibited higher values of plain arches compared to the left hand for both genders. These findings are consistent with previous studies (Ekanem, 2009; Ezejindu *et al*., 2015) that also reported a higher prevalence of plain arches in females.

Tented arches were present in both male and female subjects, with males showing a higher occurrence in the left hand, while females exhibited left-hand dominance. The results for tented arches do not align with previous studies (Ekanem, 2009; Ezejindu *et al*., 2015), suggesting potential variations in the prevalence and distribution of tented arches among different populations.

Therefore, the ulnar loop, plain whorl, and plain arch patterns were shown to be more prevalent in females, whereas central pocket loop whorl, tented arch, accidental whorl, and double loop whorl had relatively low frequencies in both sexes. There were also differences between both genders when the fingers were compared, though, it was not significant. This is different from the works of Yusuf *et al*.

(2019) who reported that males have a higher prevalence of ulnar, arch and radial loops while females have whorl as a prevalent pattern and that there were significant differences between the genders' patterns. The difference between our study could be the fact that they studied a different ethnic group (Ebira Ethnic Group of Kogi State) while we looked at the Igbos. Similar to what was previously stated, gender variations in trait heritability from the parents and developmental variation between genres may be the causes of the observed gender differences in fingerprint patterns (Kücken and Newell, 2005; Kücken, 2007; Machado *et al*., 2010; Imene, 2011; Alhaji *et al*., 2015).

Quantitative Dermatoglyphic Features of Finger Ridge Count (FRC) and Total Finger Ridge Count (TFRC)

The patterns on one's fingerprints reveal various properties that reflect their biology. These traits, such as ridge count, density, thickness ratio, width, and pattern type, can be used to determine an individual's gender. Statistical analysis shows that there are variations in these traits between males and females (Kralík and Novotny, 2003). It is an established fact that the majority of individuals exhibit a greater number of ridges on their right hand (R >) as compared to their left hand (L >). This particular asymmetry has been found to be linked to male-typical performance on sexually dimorphic tasks in those with R >, while those with L > tend to display female-typical performance. It is worth noting that these observations are primarily seen in adults (Sanders and Kadam, 2001). The quantitative analysis of finger ridge count in this study revealed interesting findings. The results from Table 7 showed that males had a higher finger ridge count on the right hand (67.20±1.88) compared to the left hand (64.24±2.02). On the other hand, females had a higher finger ridge count on the left hand (67.06±1.97) compared to the right hand (65.00±1.98). The paired sample test confirmed these observations, indicating that males have a higher finger ridge count on the right hand and females have a higher finger ridge count on the left hand. These findings are in accordance with a previous study conducted by Imene (2011), which reported that males tend to have a higher finger ridge count on the right hand, while females have a higher finger ridge count on the left hand. Additionally, the results of the t-tests indicated no significant differences in finger ridge counts between sexes. However, there is a positive correlation between the FRC of the two hands, indicating a consistent relationship in ridge count between the right and left hands, particularly stronger in females compared to males. Furthermore, when considering the TFRC, which is the sum of ridge counts for all ten fingers, we observed that the mean TFRC for males is 131.30 ± 3.20, while for females it is 131.94 ± 3.39. This indicates that the TFRC of females is higher than that of our male participants. This signifies sexual dimorphism. This is in support of a study by Igbigbi and Msamati (1999) in Malawi where the female participants had higher TFRC than the males. This is different from another study by Igbigbi and Msamati (2002) among Sub-Saharan Africans (SSAs) that it was been observed that Zimbabwean men tend to have higher TFRC values than women. According to a study conducted by Hajn and Gasiorowski in 1999 on Czech and Polish populations, it was found that men had a higher TFRC than women. This aligns with the results of a study on the Araucanian Indians from Patagonia, which also showed sexual differences, with TFRC being more significant in men, as reported by Arquimbau *et al*. in 1993. Kar *et al*. (2012) in a study in India reported that males have higher TFRC than females. However, statistical analysis did not reveal a significant difference between the left and right hands in both males and females.

CONCLUSION

This study revealed valuable insights into the dermatoglyphic features of Umuahia male and female indigene in Abia State University, Uturu. The findings demonstrated that the ulnar loop pattern was the most prevalent fingerprint pattern among both male and female subjects, which aligns with previous research. The frequency distribution of patterns showed a consistent order of occurrence, with ulnar loop, plain whorl, plain arch, radial loop, central pocket loop whorl, tented arch, accidental whorl, and double loop whorl. These results contribute to our understanding of the dermatoglyphic features specific to the Umuahia population and provide a foundation for further research in this field.

RECOMMENDATION

More research work in line with the present study should be following;

Research should be encouraged in comparative dermatoglyphics studies in other related areas of health and diseases, dermatoglyphics and congenital malformation of the hand and feet etc. in same population

Research should be encouraged in dermatoglyphics comparisons for male and female individuals of other parts of Abia State.

Research should be encouraged in dermatoglyphics and behavioral study as well as on mental health

Contribution to Knowledge

This study's findings will rebound to society's benefit, considering that dermatoglyphics plays a vital role in science and technology today. This present research work aimed at establishing the true dermatoglyphic pattern between Umuahia Male and female natives in Abia state, University, Uturu and it is totally Anthropological research which is mainly of Biological, physical, medical anthropology and spice with cultural anthropology.

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