Gender Variation in Palmar Dermatoglyphics among Students of University of Ilorin, Nigeria

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ABSTRACT

The study was designed to focus on the variation in dermatoglyphics of randomly selected students of University of Ilorin along gender, ethnic and religious lines. The science of dermatoglyphics has evolved over many years and it has been employed in resolutions of crimes, and identifications of persons. Unilateral digital prints of 215 undergraduate students of University of Ilorin comprising of 137 males and 77 females between ages of 16 and 36 years were studied in the course of this work. The result was analyzed using ANOVA and Chi-Square was used to determine any level of association. P 0.05 was considered significant. The findings of the study indicate that there are gender and age differences in relation to total ridge count and pattern intensity index among the sampled population. However, religion and ethnicity have no significant role in dermatoglyphics indices of the studied population.

Key words: *Dermatoglyphics, Total Ridge Count, Pattern Intensity Index, Gender, Religion, Ethnicity*

INTRODUCTION

The Greek word, 'Derma" meaning skin, and' Glyphic' which means curved, is the study of dermal ridge pattern on volar surface of the digits, palm of the hand and sole of the foot[1]. The ridge patterns are characteristically formed during the third to fourth month of the intra uterine fetal live[2], and these patterns remain unchanged throughout life; except for the increase in its size in parallel with the general growth[3] and in some cases of strenuous physical condition that can lead to partial or complete disfigurement of the palmar surfaces as seen in burns injuries and farming[4,5,6,7]. Dermatoglyphics consist of alignment of sweat glands pores though shaped in the first trimester of gestation, they remain so through life[4]. It patterns are determined partly by hereditary factors and influenced by accidental or environment activities which have the ability to produces stress and tension on growth during the fetal life[1]. The direct consequences of this surface topography, in the dermatoglyphic pattern of foetal palms during which these ridges are formed, are transversally lie to the line of growth of the stress[8].

Fingerprint are believed to be unique across individuals, and across finger of the same individual, and even identical twins having similar DNA, the finger prints patterns are believed to be different[1].

The use of dermatoglyphic was first employed by Herschel (in 1880), an Indian who employed it as a tool of personal identification[5], and since then, finger printing pattern has since been employed in forensic analysis, determinations of family members and crime control measures[7]. Studies have also shown that the type of fingerprint pattern reveals the quality of consciousness inherent in an individual and could be related to certain fundamental patterns. These revealed inherent orientations could be in forms of abilities or talent, and are equally specific to individuality[9, 10]. Hence, the study was designed to look into gender variation in digital dermatoglyphics among students of University of Ilorin, Nigeria

MATERIALS AND METHODS

The study was carried out in accordance with the University of Ilorin guidelines in the use of human

subjects for experimentation which parallel that of the national guidelines. The informed consent of all the participants were obtained and the exclusive criteria for the study were individuals with congenital deformities of the digits, burns injuries of the hands, hypertrophy scars on the palms and non-students of university of Ilorin. Self-administered semi structure questionnaires were used in the collection of demographic indices of each participant requesting for their age, sex, religion and ethnicity.

Multistage sampling technique was employed in the gathering and selection of the respondents during the course of the study. Unilateral digital prints of 215 undergraduate of university of Ilorin comprising of 138 males and 77 females, between ages of 16 and 36 years were obtained during the course of this study. The subjects were from the faculties of the university, and this gave a good mixture of backgrounds of students from different regions to allow for the inclusions of quantitative digital variables.

The students were directed to press the pups of their distal digital segments firmly against the black inkpad. The ink-stained digits were firmly pressed against the white fools-cap sheets one after the other until all the five fingers (print) of the left hand have been taken. The fingerprints were analyzed, classified and the total ridge counts, and pattern intensity index were record along gender, religion and ethnic lines. The ridge counts were calculated for each finger of individuals by drawing a line from the tri-radii to the core or center of the fingerprint. This was magnified by the aid of magnifying lens for ease of counting of the ridges especially for those that crossed the line. The number of ridges that crosses the lines is referenced as the total

ridges counts (TRC). The calculated counting of all the ridges in the fingers of individual respondents were done according to sex, ethnicity, religion and their means calculated.

Data analysis
SPSS version 12 was used in the analyses of the result. Chi square test was used to determine the level of significance among the quantifiable variables and where necessary, ANOVA was employed. $P \leqslant 0.5$ was considered to be significant within the calculated statistical test. In some cases, graphical representation was used for ease of presentation of the data.

RESULTS
The age distribution of the respondents was between the ages of 21-25 years had the highest frequency. The average age of the respondent also falls into the age range (21-25 years). This was followed by those who were between 16-20 years, then those between 26-30 years old and 6 of the respondents were 30 years and above (Figure 1).

The male respondents accounts for 64% while the female respondents are 36%. Most of the respondents are Christians accounting for 77% and the Yoruba speaking respondents account for 86% of the respondents (Table 1).

There was significant statistical difference across gender in relation to the Total Ridge Count and Pattern Intensity Index (Table 2 and 3). However, there were no statistical significance differences based on religion in respect to total ridge counts, pattern intensity and ethnicity among the students (Table 4, 5, 6 and 7).
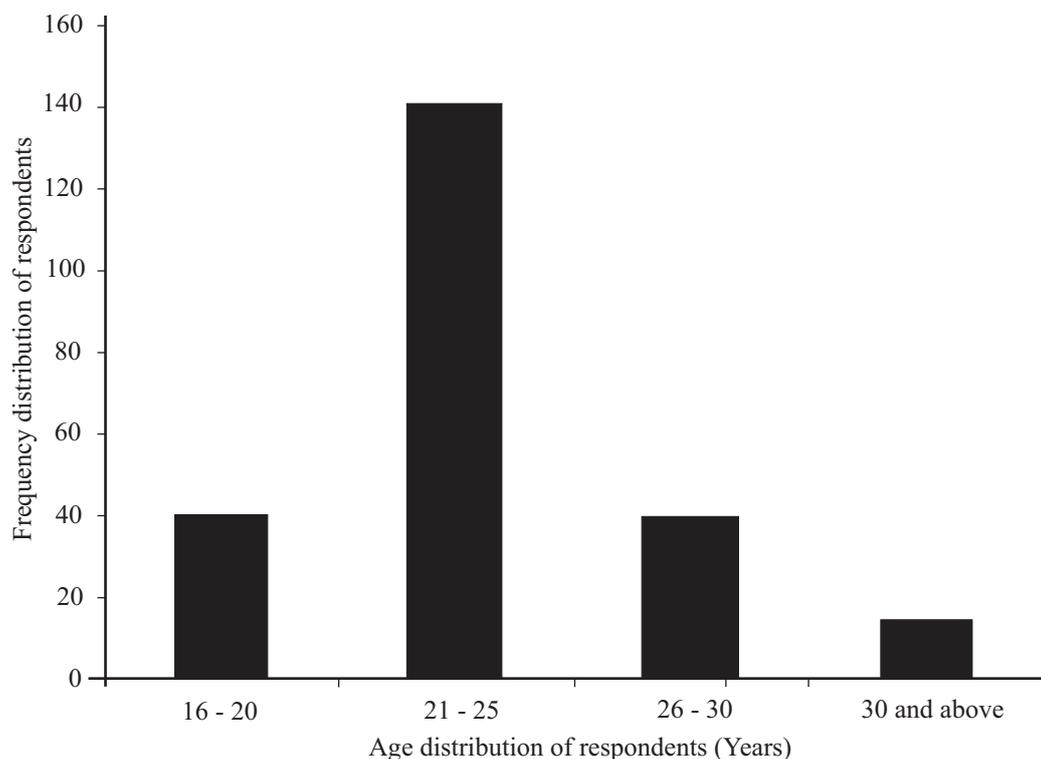

Figure 1: Age Distribution of Respondents

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Table 1: Gender, Religion and Ethnic distribution of the participants

Demography	Sub Groups	Frequency	Percentage
Gender	Male	138	64%
	Female	77	36%
Religion	Christian	166	77%
	Muslim	49	23%
Ethnicity	Yoruba	184	86%
	Igbo	22	10%
	Others	9	4%

n=215

Table 2: Total Ridge Count by Gender

	Observed values, and ( ) expected value										
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	TOTAL
Male	5 (9.6)	4 (4.5)	6 (9.6)	6 (10.9)	21 (20.5)	28 (24.4)	32 (28.2)	24 (21.8)	10 (7.06)	2 (1.28)	138
Female	10 (5.4)	3 (2.5)	9 (5.4)	11 (6.1)	11 (11.5)	10 (13.6)	12 (15.8)	10 (12.2)	1 (3.94)	0 (0.72)	77
Total	15	7	15	17	32	38	44	34	11	2	215

$X^2 = 24.41$ Significant at P   0.05

Table 3: Pattern intensity index by gender

	( ) indicate the expected value											
	0	1	2	3	4	5	6	7	8	9	10	TOTAL
Male	1 (3.85)	3 (6.42)	6 (7.06)	5 (5.13)	14 (14.1)	30 (27.6)	23 (19.9)	21 (23.8)	15 (14.8)	18 (13.6)	2 (1.93)	138
Female	5 (2.15)	7 (3.58)	5 (3.94)	3 (2.87)	8 (7.88)	13 (15.4)	8 (11.1)	16 (13.3)	8 (8.24)	3 (7.52)	1 (1.07)	77
Total	6	10	11	8	22	43	31	37	23	21	3	215

$X^2 = 18.51$ Significant at P   0.05

Table 4: Total Ridge Count versus Religion

	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	TOTAL
	Observed values, and ( ) expected value										
Christian	12 (11.6)	5 (5.4)	11 (11.6)	14 (13.1)	28 (25.5)	26 (28.6)	31 (34.7)	27 (26.3)	10 (7.7)	2 (1.5)	166
Muslim	3 (3.4)	2 (1.6)	4 (3.4)	3 (3.9)	5 (7.5)	11 (8.4)	14 (10.3)	7 (7.8)	0 (2.3)	0 (0.5)	49

$X^2 = 8.10$ not significant P   0.05

Table : Pattern Intensity Index and Religion

	.	1	2	3	4	5	6	7	8	9	10	TOTAL
	Observed values, and ( ) expected value											
Christian	5 (4.6)	8 (7.7)	6 (8.5)	7 (6.2)	18 (17)	32 (34)	25 (23.9)	29 (28.6)	19 (17)	15 (16.2)	2 (2.3)	166
Muslim	1 (1.4)	2 (2.3)	5 (2.5)	1 (1.8)	4 (5)	12 (10)	6 (7.1)	8 (8.4)	3 (5)	6 (4.8)	1 (0.7)	49

$X^2 = 6.51$ not significant   P   0.05

Table 6: Variation of Observed and Expected Values of Total Ridge Count across Ethnicity

	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	Total
	Observed values, and ( ) expected value										
Yoruba	15 (13.7)	7 (6.8)	13 (12.8)	14 (13.7)	26 (28.2)	29 (30.8)	38 (37.7)	31 (29.1)	9 (9.4)	2 (1.7)	184
Others	1 (1.9)	1 (0.9)	2 (1.7)	1 (1.9)	6 (3.8)	6 (4.2)	3 (5.1)	3 (4)	2 (1.3)	0 (0.2)	25
Igbo	0 (0.4)	0 (0.2)	0 (0.4)	1 (0.4)	1 (0.9)	1 (1)	3 (1.2)	0 (0.9)	0 (0.3)	0 (0.1)	6
Total	16	8	15	16	33	36	44	34	11	2	215

$X^2 = 13.66$ *not significant*   P   0.05

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Table 7: Variation of Observed and Expected Values of Pattern Intensity Index Values across Ethnicity

						Observed values, and ( ) expected value						
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
Yoruba	6 (6)	10 (9.4)	10 (9.4)	8 (6.8)	18 (18.8)	34 (35.9)	28 (26.5)	30 (31.7)	18 (18.8)	19 (18)	3 (2.6)	184
Others	1 (0.8)	0 (1.2)	1 (1.2)	0 (0.9)	2 (2.5)	6 (4.7)	3 (3.5)	6 (4.1)	3 (2.5)	2 (2.3)	0 (0.3)	24
Igbo	0 (0.2)	1 (0.4)	0 (0.4)	0 (0.3)	2 (0.7)	2 (1.4)	0 (1)	1 (1.2)	1 (0.7)	0 (0.7)	0 (0.1)	7
Total	7	11	11	8	22	42	31	37	22	21	3	215

$X^2 = 12.20$ not significant $\quad$ P $\quad$ 0.05

DISCUSSION

The finding of the study shows that there are more male respondents than female in this study. This may be an indication that more males are willing to voluntarily participated studies of this nature, or that we have more males in our various institutions of higher learning in the country and, or that the admission policies of the university favours the male. This observation was consistence with other worker that there is generally more male students than female students in our various universities[17, 18]. However, the respondents' distribution according to religion is in contrast to the geographical location of the university, because of her location in Ilorin, Kwara State in the North Central Nigeria that it is supposedly seen as a Muslim dominated city[19]. The reason for this observation may be partly due to the stability in the academic programme of the university that make it attractive to many candidates as there first choice university couple with the liberalization of admission policies of the university.

The mean age distribution of the respondents' ranges between 21-25 years and this correspond to the mean average ages of the students of University of Ilorin, and second to them are those in the ages between 16-20 years while those in the age range of 26 years and above accounts for the rest of the respondents. The finding was not surprising because that is consistence with age distribution at which most Nigerian has access to the university education. Many of the applicants have to stay at home for a year or two before been able to pass the entrance examination and this add to their age as at the time of securing their respective admissions. The fact that many of the respondents are Yoruba was not surprising as the may be influenced by the geographical location of the university and her proximity to many of the core Yoruba speaking states of the South West.

Since studies involving the use of dermatoglyphics in the establishment of the significance of palmer and digital ridges from well-defined patterns are exhibiting traits that are genetically determined which are consistence with the theory of conservative evolution, it is therefore very reliable for screening and confirming the historical relationships between and within populations[16]. The finding of gender variation in the dermatoglyphics patterns and that of the pattern intensity between the students was a confirmation of the aforementioned statement. The statistical significant difference in the total ridge count and pattern intensity index observed in this study with respect to gender was strongly canvassed by the findings of Igbigbi et al [16] and other authors[24, 25, 26]. The is more so very important among the various age groups of the students in our various universities as this can be employed in the detection and preventions of crimes in our universities. Finger prints will offer an infallible means of personal identification and confirmation of individual identity in our various universities. This partly explained why finger print pattern had been supplanted as part of other methods in the establishments of the identities of criminals who very reluctant to admit to their previous arrests in most developed countries[15]. Dermatoglyphics is not only employed in medicine in modern worlds, but they are also very useful in other fields such as anthropology, criminology, psychology and forensic pathology.

Though there is no work comparing the Yoruba, Hausa and Igbo tribes in their dermatoglyphic pattern, quite a number of authors agree that there are variations along ethnic lines. However, this submission was at variant with the finding of our study we found that the total ridge count and the pattern intensity have no statistical significant different along the ethnic lines. Though, there are no research findings along religion inclination, the finding of this study shows that religion have no bearing on the total ridge counts and pattern intensity index of finger print among the respondents. The finding of this study can be used in crime detection among university students especially in examination

malpractice, rape, cultism and in some cases, theft etc. The three basic finger print patterns classified by Galton[6], and a number of other workers in the field agrees that the patterns have genetic variations between them and that of these basic three that have been recognized, the loop predominates followed by whorl and arches[1, 6]. The current study does not look into the variation pattern but that is being considered for future study.

The finding of this study shows that there were statistical significant differences along gender in the study population. These differences were observed in both the total ridge counts and pattern intensity index between male and female students of the university. The finding of the study was consistence with those reported by some other workers where they found that the difference in number of derma ridges on the right and left hand also show sexual dimorphism. Although both men and women have higher number of ridges on the right hand than the left, the incidence of minority leftward symmetry is higher in women than men[12, 13]. There is also static symmetry of relative differences in the size of feet demonstrates sexual dimorphism[11, 14], and the right side is favored in men while the left are more dominant in women. This was not study in the present study but it is been considered for future study.

CONCLUSION
The findings of this study confirmed that gender and age are very significant in determination of dermatoglyphic variations among individuals and could be used as a form screening for various purposes in our various universities. The use of finger print is relatively cheap, safe, reliable and effective in the control of crimes which are becoming more worrisome in our various universities and within those age groups in both sexes.

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