IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 8, Issue 2 Ser. IX. (Mar. - Apr .2019), PP 46-51
www.iosrjournals.org

Dermatoglyphic of Cervical Intraepithelial Neoplasia among Nigerians: A Case-Control Study

[1]Ikpe, K.R., *[1]Ibeachu, P.C., [1]Aigbogun (Jr), E.A
[1]Department of Human Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences, University of Port Harcourt, Rivers State. Nigeria
Corresponding Author:Dr. (Mrs) P.C Ibeachu, Department of Human Anatomy, College of Health Sciences, University of Port-Harcourt, Rivers State, PMB 5323 Choba, Rivers State, Nigeria.

Abstract: ***Background:*** *Females are plagued with reproductive cancers of which cervical cancer (neoplasia) takes a significant share; with high mortality and morbidity. The predictive application of dermatoglyphic spans a range of neoplastic diseases such as breast and prostate cancer. This study, therefore, evaluated the dermatoglyphic characteristics of cervical intraepithelial neoplasia.*
Methods: *This study was designed as a case-control study, involving 42 randomly selected women with histologically confirmed cases of cervical neoplasia in different stages as the case group and 42 healthy females (control) within the age range of 18 to 65 years. Digital dermatoglyphic prints were obtained using Oghenemavwe and Osaat's method and the prints classified using the American F.B.I's fingerprint classification. Alphanumeric characters were used to describe the finger: D1 to D5 according to Aigbogun et al. The qualitative and quantitative (FRC) fingerprint characteristics were determined, and the obtained data analysed using SPSS version 23 (Armonk, USA). Fisher's Chi-square and Z-test were used to test association and proportionality differences, while Mann-Whitney U evaluated distributional differences.*
Result: *Significantly higher frequency of arches was found on both hands of the case group (R: case=25.0%; control=10.5%, [Z=2.57; P=0.01]) and right (L: case=19.5%; control=6.7%; [Z=3.54; P<0.001]), while TL was supressed in the case group of both hands (L [case=0.56%; control=2.9%], R [case=0.0%; control=3.3%], P<0.001). The distribution of TFRC on D1 on both hands (R, U=634.50; P=0.02 and L, U=569.50; P<0.001) and D4 on the left (U=621.50; P=0.02) were significantly distinctive in both study groups.*
Conclusion: *This study has shown certain associations between cervical neoplasia and dermatoglyphics. Its findings could serve as a tool for preliminary identification of susceptible women, who may require monitoring and further investigations.*

Keywords*: Dermatoglyphics, Digital fingerprint, cervical neoplasia, case-control study*
Running title*:Dermatoglyphics and Cervical Intraepithelial Neoplasia*

Date of Submission: 02-04-2019 Date of acceptance: 17-04-2019

I. Introduction

Cancer is a main public health problem and a leading cause of death in the United States among the non-communicable diseases and many countries of the world.1 Generally, cancer is said to arise when a group of cells undergo unregulated growth and will often form a mass or lump. This unregulated cell growth is usually due to loss of control of the regulatory genes. Cervical intraepithelial neoplasia and cancer arise from the cells of the cervix.2 About 90% of cervical cancers are caused by Human Papilloma Virus (HPV) which is sexually transmitted and comes in different strains notably strains 16 and 18 that has been widely implicated in the aetiology of cervical neoplasia.2 According to the WHO report of 2018,3 Cervical cancer is the fourth most frequent cancer in women with an estimated 570,000 new cases in 2018 representing 6.6% of all female cancers of which Nigeria has 14,000 cases annually. Most women with cervical cancer experience a long asymptomatic period prior to the onset of clinical disease. There is usually a spectrum of cervical intraepithelial neoplasia commonly known as CIN 1, CIN 2, and CIN 3 before the invasive cervical cancer. In view of this, early recognition of cytological changes through regular screening may prevent the onset of clinically invasive disease. This is the reason women are offered routine cervical screening in developed parts of the world.4

The study of the patterns of epidermal ridges of the finger (dermatoglyphics) has served as a diagnostic tool and aided in a number of diseases such as leukaemia, Down's syndrome, Turner's syndrome, Klinefelter's syndrome and Cri-du-chat syndrome that are known to have a strong hereditary background.5Studies have shown that certain qualitative and quantitative fingerprint characteristicsare associated with certain neoplastic conditionssuch as breast cancer, 6,7,8,9,10 cervical cancer,11 and oral cavity cancer.12The predictive pattern in

dermatoglyphic studies of cervical cancer has shown a general increase in the number of arches and a reduction in the finger ridge count in the case group when compared to the control group. This study was therefore carried out to determine the dermatoglyphic presentations of cervical neoplasia and its differentiating characteristics from apparent normalcy.

II. Materials And Methods

Study design

This study was designed as a case-control study, involving 84 women (within the age range of 18 to 65 years). The case group was comprised of 42 randomly selected women who were histologically diagnosed with different stages of cervical neoplasia, and the control group was made up of 42 healthy females. The study was carried out from September 2018 to January 2019.

Study Location

The study was conducted at Optimal Cancer Care Foundation, Lagos, Nigeria.

Sample size

84 randomly selected females comprising of two (2) groups: case group made up of women with cervical neoplasia and the control group, made up of apparently healthy women.

Sample size calculation

Proportion sample size formula[13] for prevalence was used

$$SS = \frac{Z^2 P(1-P)}{d^2}$$

Where *SS* = sample size,

Z = Z score at 95% confidence level (1.96)

P = expected prevalence or proportion (for this study prevalence was used

d = precision (in proportion of one; for example1.0%, d = 0.01)

Cervical cancer (CA Cervix)

The prevalence of CA cervix as at 2013 was 250/100,000[14]

$$P = \frac{250}{100000} = 0.0025$$

d= 1.5% (0.015) precision was chosen due to the low prevalence rate, thus enable wider capture of population.

$$SS = \frac{1.96^2 \times 0.0025(1-0.0025)}{0.015^2}$$

$$SS = \frac{0.00958}{0.000225}$$

SS = 42.57 (approximated to 42 cases)

The study employed the simple random sampling technique which involved the use of convenience sampling, then sequence generated sampling (on excel)to reduce the bias introduced by the initial purposive sampling conveniently.

Data collection

The study obtained digital fingerprints of outpatients visiting the Optimal Cancer Care Foundation, Lagos using Oghenemavwe and Osaat[15]methods; after obtaining a duly signed informed consent from the volunteer subjects. The qualitative and quantitative (TFRC) fingerprint characteristics were determined and the patterns defined using the American F.B.I[16] fingerprint classification. Alphanumeric characters were used to describe the fingers: D1 to D5 representing the thumb to little finger.[17]

Data analysis

Statistical Package for Social Sciences (SPSS version 23.0, Armonk, USA) and Microsoft Excel 2016 were used in the data analysis. Case-group distributional differences were tested using Pearson's Chi-square and Z-test. The total finger ridge count (TFRC) distribution was evaluated using Mann Whitney U. Confidence level was set at 95%; hence $p<0.05$ was considered significant.

Ethical consideration

Prior to the commencement of this research, ethical approvalswereobtained from the University of Port Harcourt Ethics Committee, Rivers State and the Management of Optimal Cancer Care Foundation, Lagos State. Informed consent was additionally obtained from all research participant.

III. Results

In this present study after taking the fingerprints of all 84 subjects; 42 diagnosed cervical neoplastic patients as the case group and 42 normal females as the control group. The sociodemographic characteristics of the study population are presented in Figs. 1 and 2. The ethnic distribution and marital status of the subjects are shown in Fig. 1 and 2 respectively. The distribution according to the clinical diagnosis in the case group showed that 54.8% of the females were diagnosed with cervical intraepithelial neoplasia (Grade1), while 10 (23.8%) had cervical intraepithelial neoplasia (Grade 2), and 8 females (19%) had cervical intraepithelial neoplasia (Grade 3) and only 1 female (2.4%) was diagnosed with invasive cervical carcinoma.

In comparing the qualitative dermatoglyphic characteristics of the control and case group, the Chi-square test of association in Table 1 (left hand) and Table 2 (right hand) showed that the case group presented with significantly higher frequency of ulnar loop (UL; 59.5%) on the index finger (D2) of the left hand (χ^2=22.23; P<0.001) when compared to the control group (UL; 19.0%), while on the right hand, the distribution was significantly different (χ^2=17.79; P<0.001) on the middle finger (D3); with higher distribution of whorl (35.7%) in the control group when compared with the case group (9.5%) that presented with higher ulnar loop (76.2%). The Z-test of distributional difference of the pattern for the entire left and right hand in Table 3 showed that arch (A) pattern was significantly higher in case group (L: *Z*=2.57, P=0.01; R: *Z*=2.57, P=0.04), while tented loop (TL) was significantly higher in the control (L: χ^2=3.54; P<0.001). The right could not be tested because the case group did not present with any tented loop pattern.

In comparing the quantitative dermatoglyphic characteristics (FRC) of the control and case group, the Mann-Whitney U test for distributional difference in Table 4 and 5 showed that the distribution of TFRC on D1 of both hands was significantly different in the case and control groups (R, U=634.50; P=0.02 and L, U=569.50; P<0.001); as the control had greater mean ranks (R; 48.39, L; 49.94) than the case group (R; 36.61, L; 35.06), while the TFRC on D4 of the left hand of the control (Mean rank = 48.70) and case (Mean rank = 36.30) groups were significantly distinctive (U=621.50; P=0.02).

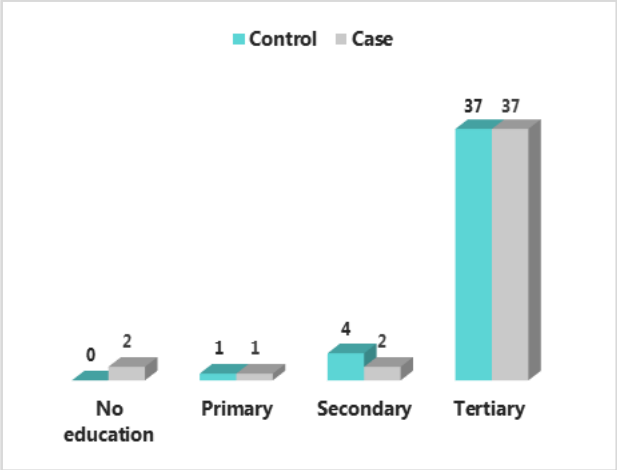

Figure 1: Distribution of the subjects according to educational status

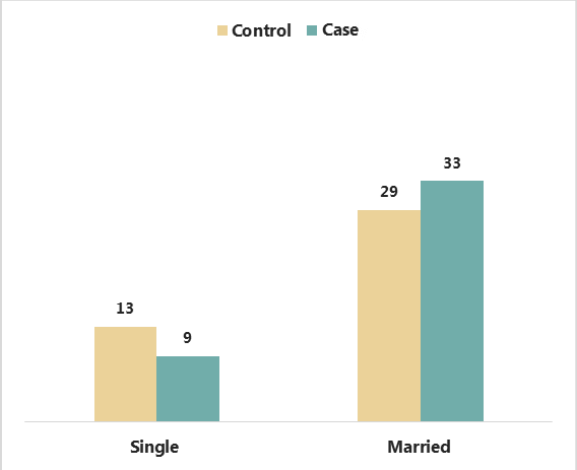

Figure 2: Distribution of the subjects according to marital status

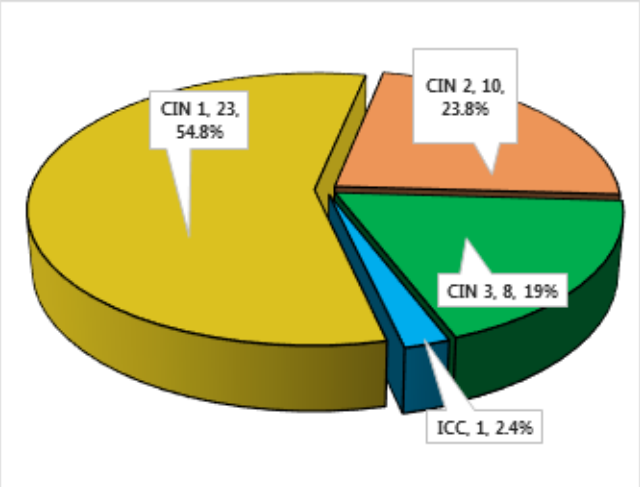

Figure 3: Distribution of the subjects with cancer according to type of cancer (CIN 1= Cervical Intraepithelial Neoplasia [Grade 1], CIN 2= Cervical Intraepithelial Neoplasia [Grade 2], CIN 3=Cervical Intraepithelial Neoplasia [Grade 3], ICC = Invasive Cancer of Cervix

Table 1: Distribution and test of association of left dermatoglyphic patterns of the case and control groups

Digit	Group	Left Digit						Chi-square test		
		A	PL	RL	TL	UL	W	df	X^2	*p*-value
D1	Control	5 (11.9)	2 (4.8)	4 (9.5)	1 (2.4)	24 (57.1)	6 (14.3)	5	6.23	0.28
	Case	12 (28.6)	0 (0.0)	3 (7.1)	0 (0.0)	21 (50.0)	6 (14.3)			
D2	Control	6 (14.3)	0 (0.0)	3 (7.1)	1 (2.4)	23 (54.8)	9 (21.4)	5	22.23	**<0.001***
	Case	16 (38.1)	6 (14.3)	0 (0.0)	0 (0.0)	8 (19.0)	12 (28.6)			
D3	Control	9 (21.4)	0 (0.0)	0 (0.0)	1 (2.4)	29 (69.0)	3 (7.1)	5	6.71	0.24
	Case	12 (28.6)	1 (2.4)	2 (4.8)	0 (0.0)	21 (50.0)	6 (14.3)			
D4	Control	1 (2.4)	1 (2.4)	1 (2.4)	2 (4.8)	28 (66.7)	9 (21.4)	5	9.03	0.11
	Case	10 (23.8)	1 (2.4)	1 (2.4)	1 (2.4)	20 (47.6)	9 (21.4)			
D5	Control	1 (2.4)	-	3 (7.1)	1 (2.4)	34 (81.0)	3 (7.1)	4	5.81	0.21
	Case	4 (9.5)	-	0 (0.0)	0 (0.0)	35 (83.3)	3 (7.1)			

***** = *Significant*, ***A*** = *Arch*, ***PL*** = *Plain Loop*, ***RL*** = *Radial Loop*, ***TL*** = *Tented Loop*, ***UL*** = *Ulnar Loop*, ***W*** = *Whorl*

Table 2: Distribution and test of association of right dermatoglyphic patterns of the case and control groups

Digit	Group	Right Digit						Chi-square test		
		A	PL	RL	TL	UL	W	df	X^2	*p*-value
D1	Control	5 (11.9)	2 (4.8)	4 (9.5)	1 (2.4)	16 (38.1)	14 (33.3)	5	6.17	0.29
	Case	8 (19.0)	0 (0.0)	6 (14.3)	0 (0.0)	20 (47.6)	8 (19.0)			
D2	Control	4 (9.5)	1 (2.4)	1 (2.4)	1 (2.4)	25 (59.5)	10 (23.8)	5	7.35	0.20
	Case	12 (28.6)	3 (7.1)	1 (2.4)	0 (0.0)	19 (45.2)	7 (16.7)			
D3	Control	4 (9.5)	0 (0.0)	2 (4.8)	1 (2.4)	32 (76.2)	3 (7.1)	5	17.79	**<0.001***
	Case	15 (35.7)	4 (9.5)	0 (0.0)	0 (0.0)	18 (42.9)	5 (11.9)			
D4	Control	0 (0.0)	1 (2.4)	2 (4.8)	3 (7.1)	28 (66.7)	8 (19.0)	5	7.89	0.16
	Case	2 (4.8)	2 (4.8)	0 (0.0)	0 (0.0)	32 (76.2)	6 (14.3)			
D5	Control	1 (2.4)	0 (0.0)	3 (7.1)	1 (2.4)	35 (83.3)	2 (4.8)	5	9.81	0.08
	Case	4 (9.5)	2 (4.8)	0 (0.0)	0 (0.0)	36 (85.7)	0 (0.0)			

***** = *Significant*, ***A*** = *Arch*, ***PL*** = *Plain Loop*, ***RL*** = *Radial Loop*, ***TL*** = *Tented Loop*, ***UL*** = *Ulnar Loop*, ***W*** = *Whorl*

Table 3: Distribution of left and right dermatoglyphic patterns of the case and control groups

Patterns	Left digit				Right digit			
	Control (%)	Case (%)	z-value	p-value	Control (%)	Case (%)	z-value	p-value
A	22 (10.5)	54 (25.7)	-2.57	**0.01***	14 (6.7)	41 (19.5)	-2.07	**0.04***
PL	3 (1.4)	8 (3.8)	-0.87	0.38	4 (1.9)	11 (5.3)	-1.84	0.07
RL	11 (5.2)	6 (2.9)	1.07	0.29	12 (5.7)	7 (3.3)	0.79	0.43
TL	6 (2.9)	1 (0.5)	3.54	**0.00***	7 (3.3)	0 (0)	-	**-***
UL	138 (65.7)	105 (50.0)	1.4	0.16	136 (64.8)	125 (49.5)	0.44	0.66
W	30 (14.29)	36 (17.1)	-0.59	0.56	37 (17.6)	26 (12.4)	0.84	0.40

***** = *Significant*, ***A*** = *Arch*, ***PL*** = *Plain Loop*, ***RL*** = *Radial Loop*, ***TL*** = *Tented Loop*, ***UL*** = *Ulnar Loop*, ***W*** = *Whorl*

Table 4: Distribution of the left total finger ridge count (TFRC) of the caseand control groups

Left Digit pattern	Group	*N*	Mean Rank	Mann-Whitney U	Wilcoxon W	Z	*p*-value
D1	**Control**	42	48.39	634.50	1537.50	-2.30	**0.02***
	Case	42	36.61				
D2	**Control**	42	42.54	880.50	1783.50	-0.01	0.99
	Case	42	42.46				
D3	**Control**	42	43.81	827.00	1730.00	-0.50	0.61
	Case	42	41.19				
D4	**Control**	42	48.70	621.50	1524.50	-2.41	**0.02***
	Case	42	36.30				
D5	**Control**	42	43.82	826.50	1729.50	-0.51	0.61
	Case	42	41.18				

***** = *Significant*

Table 5: Distribution of the right total finger ridge (TFRC) count of the case and control groups

Right Digit pattern	Group	*N*	Mean Rank	Mann-Whitney U	Wilcoxon W	Z	*p*-value
D1	**Control**	42	49.94	569.50	1472.50	-2.88	**<0.001***
	Case	42	35.06				
D2	**Control**	42	46.95	695.00	1598.00	-1.72	0.09
	Case	42	38.05				
D3	**Control**	42	47.50	672.00	1575.00	-1.93	0.05
	Case	42	37.50				
D4	**Control**	42	47.07	690.00	1593.00	-1.80	0.07
	Case	42	37.93				
D5	**Control**	42	45.52	755.00	1658.00	-1.19	0.24
	Case	42	39.48				

***** = *Significant*

IV. Discussion

Cervical neoplasia is one of the world's disturbing gynaecological cancers.[3] In developing countries such as Nigeria, the burden still remains huge and available research on the dermatoglyphics of cervical neoplasia in Africa and Nigeria is relatively scarce. Thus, this study has attempted to identify significant dermatoglyphic characteristics of cervical neoplasia.

The analysis of the qualitative dermatoglyphic characteristics revealed that on the left digits, arches (*A*) and plain loop (PL) were more in the case than the control, while ulnar loop (*UL*) were more in the control and whorl (*W*) was relatively evenly distributed between the groups. However, the most significant distributive difference in both groups was *PL* on D3, *A* on D3 of the case group, and *UL* on D2 and 4D of the control group. Similar patterns were observed for D3 of the right hand, with a significantly higher distribution of *PL* and A in the case group, whereas the control had a higher frequency of *UL*. On the hand, radial loop (*RL*) was decreased in the study group when compared with the control group; with higher distribution on the left than the right in the control group. Studies by Pal *et al*.[18] and Inamdar *et al*.[19] had shown a consistent significantly increased distribution of *A* in the case group, while the control had significant increase in *UL*.[11,18,19,20] When the distribution of *W* in this study was compared to other researches; Kashinathappa and Khanzode,[11]Pal *et al*.[18] and Inamdar *et al*.,[19] it was evident that their findings suggested a significant increase. However, this difference could be attributed to the difference in the study populations between both groups in their studies. Although, because of the classification chosen by other research, *PL* and *TL* were not reported, however, this study observed an increase in the number of *PL* in the case group and *TL* in the control; as the case group presented with less than a fraction of a percent. Unfortunately, because of the paucity of literature regarding the use of FBI classification in case-control studies associated with neoplastic diseases, comparative findings were inevitably impossible.

The analysis of the qualitative dermatoglyphic characteristics using the total finger ridge count (*TFRC*) revealed that there was an overall decrease in *TFRC* in both hands of the case group when compared to the control.Similar trends have been reported by Pal *et al*.[18] and Priya and Hosmani.[19]However, it was striking to see a significantly unevenly distributed on the D1 (thumb) and D4 (ring finger) of the left and right digits.But, in studies by Kashinathappa and Khanzode[11]and Inamdar *et al*.,[19]significant uneven distribution with increased*TFRC*was found in the case group.In this study, the most notable differences in the qualitative and quantitative dermatoglyphic attributes in the case and control groups was observed for the D1.

V. Conclusion

This study has shown certain associations between cervical neoplasia and dermatoglyphics. Its findings could serve as a tool for preliminary identification of susceptible women, who may require monitoring and further investigations.Nevertheless, further studies are required to substantiate the findings in this study.

Acknowledgement

This study wishes to appreciate the Head of Department of Anatomy, University of Port Harcourt and the Director of Optimal Cancer Care Foundation, Lagos for their contributions toward the success of this study.

References

[1]. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2015. *"CA Cancer J Clin*. 2015; 65:5-29.
[2]. Dolinsky C. Cervical cancer: The basics. *Oncolink. Abramson Cancer Centre of the University of Pennsylvania*. 2017; Retrieved 02-12-2007.
[3]. World Health Organisation (WHO). Cervical cancer. 2018. available at https://www.who.int/cancer/prevention/diagnosis-screening/cervical-cancer/en/ [Accessed on 15 January, 2019].
[4]. Canavan TP, Doshi, NR. Cervical Cancer. *Am Fam Physician*. 1998; 61(5): 1369-1376.
[5]. Ramesh M, Kumari KG, Kalpana VL, Sudhakar G. Palmar and digital dermatoglyphic patterns in sickle cell anaemia patients of north coastal Andhra Pradesh, South India. *Antrocom Online Journal of Anthropology*. 2012; 8:23-32.
[6]. Abbasi S, Einollahi N, Dashti N, Vaez-Zadeh F. Study of dermatoglyphic patterns of hands in women with breast cancer. *Pak J Med Sci*.2006; 22:18-22.
[7]. Chintamani KR, Khandelwal R, Mittal A, Tuteja A, Bhansal A, Bhatnagar D, Saxena S, Saijanani S. Qualitative and quantitative dermatoglyphic traits in patients with breast cancer: A prospective clinical study. *BMC Cancer*. 2007; 7: 44-47.
[8]. Sridevi NS, Delphine SCR, Kulkarni R, Seshagiri C. Palmar dermatoglyphics in carcinoma breast of Indian women. *Rom J Morphol Embryol*. 2010; 51: 547-550.
[9]. Sariri E, Kashanian M, Vahdt M, Yari S. Comparison of the dermatoglyphic characteristics of women with and without breast cancer. *Eur J Obstet Gynecol Reprod Biol*. 2012; 160: 201-204.
[10]. Raizada A, Johri V, Ramnath T, Chowdhary D. A cross sectional study on the palmar dermatoglyphics in relation to carcinoma breast patients. *J Clin Diagn Res*. 2013; 7: 609-612.
[11]. Kashinathappa BS Khanzode LS. Study of palmar dermatoglyphics in carcinoma of the cervix. *IJCRR*. 2013; 5: 136-140.
[12]. Jatti D, Kantraj YB, Nagaraju R. Role of dermatoglyphics in malignant and potentially malignant disorders of the oral cavity: A cross sectional study. *Journal of Indian Academy of Oral medicine and Radiology*.2014; 26:379-384.
[13]. Daniel WW. Biostatistics: A Foundation for Analysis in the Health Sciences (7th Ed.). New York: John Wiley & Sons. 1999.
[14]. Ahmed SA, Sabitu K, Idris SH, Ahmed R. Knowledge, attitude and practice of cervical cancer screening among market women in Zaria, Nigeria. *Niger Med J*. 2013;54:316-319.
[15]. Oghenemavwe EL, Osaat RS. An improvised easy digital method for palmar and plantar dermatoglyphics. Bioscience & Bioengineering. 2016; 1(3): 58-59.
[16]. Federal Bureau of Investigation (FBI). The Science of Fingerprints: Classification and Uses. Department of Justice - Government Printing Office. 1988; 211 pages.
[17]. Aigbogun (Jr.) EO, Ibeachu PC, Didia BC, Ordu KS. A novel classification for finger friction ridges (dermatoglyphic patterns). *European J Biomed Pharm*.2018; 5(11): 115-120.
[18]. Pal GP, Roufal RV, Bhagwat SS. Dermatoglyphics in carcinoma cervix. *J Anat Soc India*. 1985; 34(3): 157-161.
[19]. Inamdar VV, Vaidya SA, Kulkarni P, Devarshi DB, Kulkarni S, Tungikar SL. Dermatoglyphics in Carcinoma Cervix. *J. Anat. Soc. India*. 2006;55(1):57–59.
[20]. Priya P, Hosmani PB. Study of Dermatoglyphics in Carcinoma cervix. *International Journal of Anatomical Research*. 2016; 4(2):2349-2353.

Ikpe, K.R. "Dermatoglyphic of Cervical Intraepithelial Neoplasia Among Nigerians: A Case-Control Study" .IOSR Journal of Nursing and Health Science (IOSR-JNHS), vol. 8, no.02 , 2019, pp. 46-51.