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Research Article

Pattern and Determinants of Cervical Dysplasia and Accompanying Microbial Infections in a Tertiary Hospital, Nigeria

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ABSTRACT

Background: Cervical dysplasia may lead to cervical cancer, a major reproductive health problem of women in the developing countries.

Objective: This study assessed the pattern of cervical dysplasia and accompanying endocervical infections among women attending a Nigerian tertiary hospital.

Methods: Descriptive cross-sectional study of consenting 80 women attending the general practice clinic of a tertiary hospital recruited by systematic random sampling technique over two months. An interviewer administered questionnaire was used to assess the socio-demographics, relevant gynaecology history and past Pap smear results of the respondents. Pap smear screening and endocervical swabs were taken for cytology and microscopy, culture and sensitivity test. A second endocervical swab was taken for Chlamydia antigen test. The data was analyzed using descriptive and inferential statistics.

Results: Of the eighty women recruited, seventy seven (96.3%) completed the study. Most (40.3%) were within the age group 18-34 years, and most (93.5%) were of the Yoruba ethnic group. Seventy (90.9%) respondents were either currently or previously married. Cervical dysplasia was detected in 19.5% of the respondents, ASCUS (14.3%) and LGSIL (5.2%). The prevalence of endocervical infection was 39.0%, with multiple infective organisms detected in 9.1% of the respondents. The most common infective organisms were *Candida albican* (14.3%) and *Chlamydia trachomatis* (7.8%). The prevalence of cervical dysplasia increased from 13.0% among age group 18-34 years to 66.7% among 45-54 years age group (p=0.002). About 40% of those who had first sex before age 18 years had cervical dysplasia compared to 15.6% of those who had their sexual debut at ≥ 18 years and above (p=0.029). There was no significant relationship between endocervical infections and cervical dysplasia in this study.

Conclusion: Cervical dysplasia and endocervical infections were common among the respondents, with significant associations between cervical dysplasia, increasing age and early coitache. Strategies should be put in place to ensure regular Pap smear screening and appropriate interventions.

Keywords: Cervical dysplasia; Endocervical infections; Pap smear; Cervical cancer; Colposcopy

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INTRODUCTION

Cervical dysplasia is a precancerous condition in which abnormal cell growth occurs within the epithelial lining of the cervix [1]. It is strongly associated with persistent infection with oncogenic Human Papillomavirus (HPV) [1]. If left untreated, cervical dysplasia may progress to cervical cancer, which is an important reproductive health problem of women in developing countries, where it is the most common gynecological malignancy [2]. The highest mortality rates have been reported in the developing countries of Africa, South-Central Asia and South America, 17.0%, 23.3%, 14.1% and 10.5% respectively [3]. This has been attributed to inadequate screening and treatment programmers in such communities [4,5].

Persistent HPV infection is widespread and is the most important risk factor for cervical dysplasia, especially moderate-to-severe cervical dysplasia [6].

Since HPV is sexually transmitted, it has been postulated that other sexually transmitted organisms may be transmitted along with HPV [7]. In addition, HPV gain access to the basal cells of the epithelium through abrasions on the cervical epithelium, hence the inflammation produced by these other organisms may facilitate the acquisition of HPV [7,8]. Organisms that have been suspected to enhance the transmission of HPV include Chlamydia and Candida *infection causing varying degree of cervical inflammation, with or without accompanying* symptoms such as foul smelling purulent discharge, irritation and itching; some infections may be asymptomatic [9]. This study was aimed at assessing the pattern and determinants of cervical dysplasia and accompanying microbial infection among sexually active women attending Family Medicine clinic of OAUTHC, Ile Ife, Nigeria.

MATERIALS AND METHODS

This study was conducted at the Family Medicine clinic of Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife, Osun state. This clinic provides comprehensive and continuous care to patients seeking healthcare, from age 15 year and above.

Study population

The study population comprised of sexually active women aged 18 years and above, attending family medicine clinic of our institution.

Those included in the study were women aged 18 years and above who were willing and gave written informed consent to participate in the study.

Patients with history of total hysterectomy, diagnosed cervical cancer and any history of cervical surgery and pregnant women were excluded from the study.

Sample size calculation

Sampling technique: Systematic random sampling was used to select the respondents. The available data in the records of Family Medicine Clinic showed that an average of twelve women were seen on each working day, 60 per week and 480 potential respondents in 8 weeks period expected for the data collection.

The sampling interval 'k' is calculated thus; K=N/n

Where n is the sample size (80), and N is the population size (480)

K=480/80=6

Thus every sixth consenting and eligible respondent was recruited into the study after randomly selecting the first participant through balloting on each research day.

Structured interviewer administered questionnaire. This comprised of 22 questions which explored the socio-demographic characteristics, clinical evaluation, obstetrics and gynaecology history of the respondents. The gynaecology history of coitarche was grouped into two based on literature which stated that cervical dysplasia was commoner in women with coitarche less than 18 years [10]. Oral contraceptive usage was categorized into positive (those who have ever used or are currently using OCP) and negative (those who have never used OCP); use of OCP increases the risk of cervical dysplasia [11]. The questionnaire was pretested in the family medicine clinic of Wesley Guild Hospital, Ilesa among 10 eligible women.

All participants had endocervical swabs and Pap smear screening test. The test was carried out in the procedure room of the General Outpatient Clinic with the departmental nurse as chaperone. The procedure was explained to each participant and written informed consent was obtained. All the materials and forms were pre-labelled with respondent's ID.

The cervical samples were collected with the assistance of a female chaperone that assisted to position the respondents on the examination couch after appropriate exposure. Under aseptic condition, a bivalve speculum was inserted into the vaginal to expose the cervix. Two endocervical swabs were collected from each participant by introducing pre-labelled sterile swab sticks, one at a time, into the endocervix. While the speculum was still inside the vagina, an Aylesbury spatula was used to scrape the cervix for collection of exfoliated cells for Pap smear. Two cervical smears were prepared for each participant. The pointed end of the spatula was inserted into the cervical os in a nulliparous cervix while the rounded end of the spatula inserted into the patulous cervical os. The device was rotated 360 degree to remove the cells from the region of the transformation zone, squamo-columnar junction and endocervical canal.

The material on the spatula was transferred immediately to a glass slide which has been previously labelled with the patient's ID number. The glass slides were fixed immediately with 95% ethanol and the slides were transported to the cytology laboratory in a jar for processing together with the corresponding cytology request form. The Pap smear slides were stained with the Pap stain, which is a multichromatic stain, and then microscopically examined by the hospital Pathologist. Five slides were reported as inadequate, which necessitated a rescheduled Pap smear for the affected participants.

One of the endocervical swabs from each participant was gram stained for microscopy and cultured on chocolate, Sabouraud and MacConkay agars. All culture plates were examined after 24 hours by the medical Microbiologist, and biochemical tests were performed on positive cultures to identify microbial genus and species. Sensitivity tests were also carried out using multidisc sensitivity discs (Mastring-S).

The second endocervical swab from each patient was used by the hospital chemical Pathologist for Chlamydia antigen test using

Mastazyme™ Chlamydia Kit (ref. number 695010). This is an enzyme immunoassay (EIA). Its sensitivity is 95% and it is specific for a lipopolysaccharide antigen of Chlamydia spp[R]. All known serotypes of Chlamydia trachomatis are detected by this kit. This involved boiling the endocervical swab to 100°C to denature the cell wall and thereby expose the intracellular Chlamydia infection which reacted with the monoclonal antibody and pre-labelled anti-mouse IgG-antibody in the wells of the Mastazyme™ kit. The antigen-antibody reactions in the wells were quantified using ELISA Reader according to the manufacturer's instruction.

Data analysis

The data obtained were entered and analyzed using Statistical Package for the Social Sciences version 16.0. For categorical variables, frequency and percentages were calculated, and for continuous variables, mean, median and standard deviation were calculated. Appropriate bivariate analyses were carried out to determine relevant associations. Association between two categorical variables was determined using Chi-square test. Chi-square test was also used to determine the relationship between the degree of cervical dysplasia and presence of endocervical infection.

The main outcome measure was the pattern of cervical dysplasia and accompanying cervical microbial infection among the participants. Other measures include the relationships between known risk factor, presence of endocervical infection and cervical dysplasia among the respondents.

RESULTS

A total of eighty respondents were recruited, however seventy-seven respondents completed the study, three respondents did not complete the study; two travelled out of town while one got pregnant before her appointment date for colposcopy.

As shown in Table 1, the age of the subjects ranged from 18 years to 65 years with a mean age of 38.48 years (S.D 9.46 years). The 18-34 years age group had the largest proportion of 40.3%, while most (71.4%) had tertiary education and majority (90.9%) had ever married. The prevalence of cervical dysplasia among the respondents was 19.5% with ASCUS being the commoner type which represents 14.3% of the respondents (Figure 1 and Table 1).

Endocervical infection was present in 39.0% of the respondents, and single infective organisms were more common in those that were infected, occurring in 29.9% of the respondent, as depicted in Figure 2. Furthermore, Figure 3 shows that *Candida albican* was the most common form of infection among the respondents (14.3%), followed by *Staph. aureus* (13.0%), while 7.8% of the respondent had Chlamydia as either single or co infective organism (Figures 2 and 3).

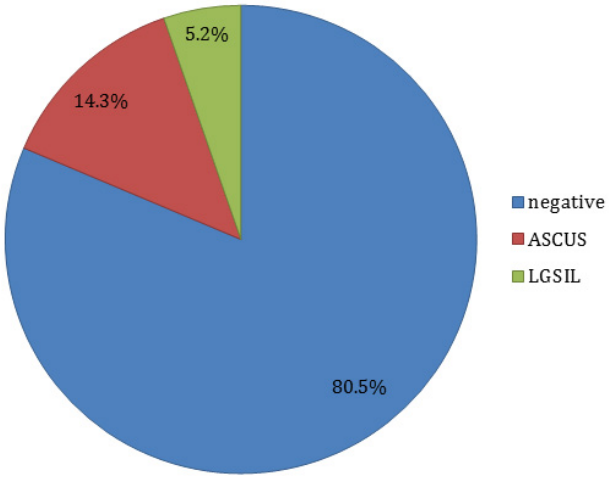

Figure 1: Pattern of cervical dysplasia among the respondents.

Table 1: Socio-demographic characteristics of the respondents (N=77).

Characteristics	Categories	N	%
Age(years)	18-34	31	40.3
	35-44	28	36.3
	45-54	12	15.6
	≥ 55	6	7.8
Religion	Christianity	69	89.6
	Islam	8	10.4
Occupation	Health professions	5	6.5
	Other occupations*	72	93.5
Ethnicity	Yoruba	72	93.5
	Others**	5	6.5
Education	Primary	5	6.5
	Secondary	17	22.1
	Tertiary	55	71.4
Marital status	Never married	7	9.1
	Ever married	70	90.9

*-other occupations including banking, trading, teaching, and office secretary; **-other ethnic groups including Igbo, Hausa, and Urhobo

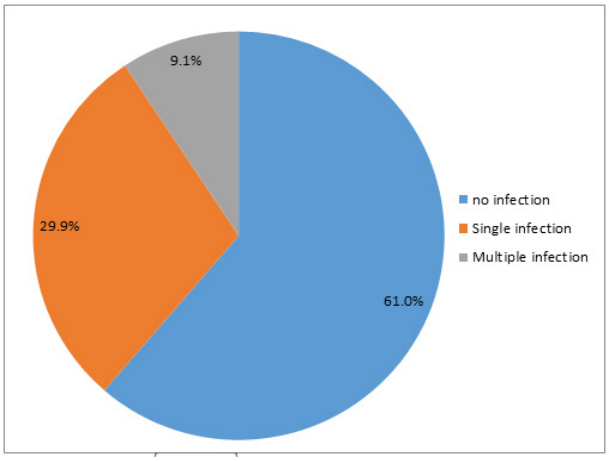

Figure 2: Pattern of endocervical infection among the respondents.

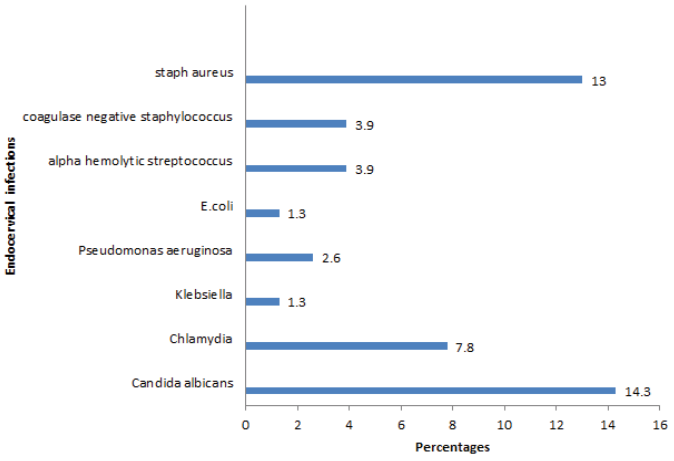

Figure 3: Pattern of infective organisms in respondent with endocervical infection.

According to Table 2, cervical dysplasia was most common within age group 45-54 years, occurring in 66.7%, whereas only 13% of the age group 18-34 years had dysplasia. Worse form of dysplasia was seen in the age group 45-54 years. Age of the respondent is the only socio-demographic characteristic that has a statistically significant relationship with cervical dysplasia (p=0.002) (Table 2).

In Table 3, there was progressive decrease in the percentage of respondents with endocervical infection with advancing age. The prevalence decreased from 45.2% among the age group 18-34

Table 2: Relationship between socio-demographic characteristic of the respondents and cervical dysplasia.

Socio-demographic characteristic	Pattern of cervical dysplasia				Statistics	
	Negative n (%)	ASCUS n (%)	LGSIL n (%)	Total n (%)	χ^2	P
Age(years)						
18-34	27 (87.0)	4 (13.0)	0	31 (100)	20.75	0.002
35-44	25 (89.3)	2 (7.1)	1 (3.6)	28 (100)		
45-54	4 (33.3)	5 (41.7)	3 (25.0)	12 (100)		
≥55	6 (100)	0	0	6 (100)		
Religion						
Christianity	54 (78.3)	11 (15.9)	4 (5.8)	69 (100)	3.685	0.158
Islam	8 (100)	0	0	8 (100)		
Occupation						
Health professions	5 (100)	0	0	5 (100)	2.249	0.325
Other occupations	57 (79.2)	11(15.2)	4 (5.6)	72 (100)		
Ethnicity						
Yoruba	57 (79.2)	11 (15.2)	4 (5.6)	72 (100)	2.249	0.325
Others	5 (100)	0	0	5 (100)		
Education						
Primary	5 (100.0)	0	0	5 (100)	3.847	0.427
Secondary	12 (70.6)	3 (17.6)	2 (11.8)	17 (100)		
Tertiary	45 (81.9)	8 (14.5)	2 (3.6)	55 (100)		
Marital status						
Never married	5 (71.4)	2 (28.6)	0	7 (100)	1.72	0.423
Ever married	57 (81.4)	9 (12.9)	4 (5.7)	70 (100)		

Table 3: Relationship between socio-demographic characteristics and endocervical infection in the respondents.

Sociodemographic characteristic	Endocervical status		Total	Statistics	
	Not infected n (%)	Infected n (%)	n (%)	$\chi 2$	p
Age(years)					
18-34	17 (54.8)	14 (45.2)	31 (100)	3.13	0.372
35-44	16 (57.1)	12 (42.9)	28 (100)		
45-54	9 (75.0)	3 (25.0)	12 (100)		
≥55	5 (83.3)	1 (16.7)	6 (100)		
Religion					
Christianity	44 (63.8)	25 (36.2)	69 (100)	2.021	0.25
Islam	3 (37.5)	5 (62.5)	8 (100)		
Occupation					
Health professions	3 (60.0)	2 (40.0)	5 (100)	0.002	1
Other occupations	44 (61.1)	28 (38.9)	72 (100)		
Ethnicity					
Yoruba	44 (61.1)	28 (38.9)	72 (100)	0.002	1
Others	3 (60.0)	2 (40.0)	5 (100)		
Education					
Primary	4 (80.0)	1 (20.0)	5 (100)	0.89	0.641
Secondary	10 (58.8)	7 (41.2)	17 (100)		
Tertiary	33 (60.0)	22 (40.0)	55 (100)		
Marital status					
Never married	2 (28.6)	5 (71.4)	7 (100)	3.339	0.103
Ever married	45 (64.3)	25 (35.7)	70 (100)		

years to 16.7% among the older age group ≥ 55 years; however this was not statistically significant. Also, 71.4% of the participants who were never married had endocervical infection, whereas a lower percentage (35.7%) of those who had ever been married had endocervical infection. Table 4 shows that cervical dysplasia was more common (38.5%) in respondents with coitarche before 18 years than (15.6%) in those with coitarche after 18 years (p=0.029); this was statistically significant. ASCUS was the more common type in all categories. Also, higher percentage (23.3%) of respondent with abnormal weight had cervical dysplasia as against 15.0% in those with normal weight (p=0.089). this was not significant statistically. Cervical dysplasia was found more (38.9%) in OCP users than among those who never used OCP (13.5%) (p=0.058) (Tables 3 and 4).

Table 4: Relationship between risk factors for, and presence of cervical dysplasia.

Risk factors	Cervical dysplasia				Statistics	
	Negative n (%)	ASCUS n (%)	LGSIL n (%)	Total n (%)	χ2	p
Age(years)						
18-34	27 (87.0)	4 (13.0)	0	31 (100)	20.747	0.002
35-44	25 (89.3)	2 (7.1)	1 (3.6)	28 (100)		
45-54	4 (33.3)	5 (41.7)	3 (25.0)	12 (100)		
≥55	6 (100)	0	0	6 (100)		
BMI						
Normal BMI	29 (85.5)	5 (15.0)	0	34 (100)	4.84	0.089
Abnormal BMI	33 (76.7)	6 (14.0)	4 (9.3)	43 (100)		
Oral contraceptive use						
Negative	51 (86.5)	6 (10.0)	2 (3.5)	59 (100)	5.075	0.079
Positive	11 (61.1)	5 (27.8)	2 (11.1)	18 (100)		
Single						
Single	21 (87.5)	3 (12.5)	0	24 (100)	3.276	0.194
Multiple	41 (77.3)	8 (15.1)	4 (7.6)	53 (100)		
Blood Pressure						
Normal BP	60 (82.2)	9 (12.3)	4 (5.5)	73 (100)	3.347	0.188
Hypertensive	2 (50.0)	2 (50.0)	0	4 (100)		
Parity						
0	4 (57.0)	3 (43.0)	0	7 (100)	8.828	0.184
1 to 2	26 (89.7)	2 (6.9)	1 (3.4)	29 (100)		
3 to 4	26 (76.5)	6 (17.6)	2 (5.9)	34 (100)		
5 or more	6 (85.7)	0	1 (14.3)	7 (100)		

Table 5: Relationship between risk factors for cervical dysplasia and presence of endocervical infection.

Risk factors	Endocervical status			Statistics	
	Not infected n (%)	Infected n (%)	Total n (%)	χ2	p
Age(years)					
18-34	17 (54.8)	14 (45.2)	31 (100)	3.13	0.375
35-44	16 (57.1)	12 (42.9)	28 (100)		
45-54	9 (75.0)	3 (25.0)	12 (100)		
≥55	5 (83.3)	1 (16.7)	6 (100)		
BMI					
Normal BMI	23(67.6)	11(32.4)	34(100)	1.118	0.29
Abnormal BMI	24(55.8)	19(44.2)	43(100)		
Oral contraceptive use					
Negative	33(55.9)	26(44.1)	59(100)	2.768	0.096
Positive	14(77.8)	4(22.2)	18(100)		
History of smoking					
Negative	46(61.3)	29(38.7)	75(100)	0.103	1
Positive	1(50.0)	1(50.0)	2(100)		
Sexual partners					

Single	16(66.7)	8(33.3)	24(100)	0.464	0.496
Multiple	31(58.5)	22(41.5)	53(100)		
Coitarche					
Before 18 years	9(69.2)	4(30.8)	13(100)	0.441	0.506
≥ 18 years	38(59.7)	26(40.3)	64(100)		
Parity					
0	1(14.3)	6(85.7)	7(100)	8.88	0.031
1 to 2	19 (65.5)	10(34.5)	29(100)		
3 to 4	21 (61.8)	13(38.2)	34(100)		
5 or more	6 (85.7)	1(14.3)	6(100)		

Table 6: Relationship between presence of endocervical infection and cervical dysplasia.

Endocervical status	Cervical dysplasia				Statistics	
	Negative n (%)	ASCUS n (%)	LGSIL n (%)	Total n (%)	χ2	p
Not infected	37(78.7)	7(14.9)	3(6.4)	47(100)	0.428*	0.807
Infected	25(83.4)	4(13.3)	1(3.3)	30(100)		

* – Likelihood ratio used due to large number of expected count less than 5 in the cells

Table 7: Distribution of infective organism among respondents with endocervical infection.

Infective organism	Cervical dysplasia			Total (%)
	NEGATIVE (%)	ASCUS (%)	LGSIL (%)	
Staph. Aureus	9(90.0)	0	1(10.0)	10(100)
Coagulase negative staph	3(100)	0	0	3(100)
α-hemolytic streptococcus	1(33.3)	2(66.7)	0	3(100)
E.coli	0	1(100)	0	1(100)
Pseudomonas aeruginosa	2(100)	0	0	2(100)
Klebsiella	1(100)	0	0	1(100)
Chlamydia	6(100)	0	0	6(100)
Candida albican	10(90.9)	1(9.1)	0	11(100)

In Table 5, there was a gradual decline in endocervical infection from 45.2% among age group 18-34 to 16.7% among age group ≥ 55 years (p=0.375). Endocervical infection was more common among respondents with multiple sexual partners (41.5%) than in those with single sexual partner (33.3%) (p=0.496). The prevalence of endocervical infection decreased with higher order parity, from 85.7% among the nulliparous to 14.3% among the multiparous women (p=0.031). This was statistically significant. Only five (6.5%) of the 77 respondents had cervical dysplasia and accompanying endocervical infection. Also, none of the respondents with Chlamydia infection had any form of cervical dysplasia (Tables 5-7).

DISCUSSION

The pattern of cervical dysplasia and accompanying endocervical infections among the family medicine clinic attendees was explored. Of the 77 respondents that completed the study, 19.5% had cervical dysplasia, with ASCUS (14.3%) being the commoner type.

The prevalence of cervical dysplasia in this study was slightly higher than the prevalence of 18.6% reported by Fadahunsi et al. in a study conducted at the Well Woman clinic of the same institution two years earlier, and 16.2% prevalence reported by Obaseki et al. in Benin [12,13]. These studies engaged similar primary care populations as the current study. Conversely, a prevalence of 4.8% was recorded in Zaria at the Obstetrics and Gynaecology clinic [14]. The wide difference between these primary care studies and the one done in at specialist clinic underscores the importance of screening at primary care level. Also, the prevalence of cervical dysplasia has wide variations across different countries, geopolitical zones, and period of the study [15-23].

There were only two classes of cervical dysplasia found among the study participants which were ASCUS and LGSIL with prevalence of 14.3% and 5.2% respectively. This shows a reversal of the 4.2% ASCUS and 14.4% LGSIL reported by Fadahunsi et al. 2013 [12]. The worse pattern reported by Fadahunsi et al. 2013, reflected the proportional difference in the respondents in the age group 45-54 years, which constituted 27.0% in Fadahunsi study against 15.6% in the current study. Similar pattern of absence of HGSIL was observed by Mosuro *et al*, 2015 in UCH Ibadan in 2015, where ASCUS and LGSIL represented 11.8% and 2.1% of the 13.9% prevalence reported [22]. This dynamics in prevalence and pattern of dysplasia further emphasizes the need for continuous screening. The importance of establishing appropriate grade in cervical dysplasia studies is well documented [24-26]. This guides decisions of treatment, method and frequency of follow up.

In the Avidime study in Zaria, ASCUS, LGSIL and HGSIL accounted for 2.3%, 3.1% and 1.6% respectively [19]. However, the same study reported 13% inflammatory slides which if further

evaluated, as done in the current study, could have had effect on the prevalence and pattern reported. This was demonstrated by Dasari et al. 2010 who found out that 20.9% of the patients with inflammatory cervical smear were confirmed with cervical dysplasia upon further evaluation with colposcopy and histology [24].

In this study, the prevalence of cervical dysplasia was observed to increase with age, from 4.0% among 18-34 years age group to 66.7% among age group 45-54 years. Age is one of the most important risk factors to be considered when formulating cervical screening policy, and prompt treatment of any detected abnormality has been recommended [27,28]. The absence of dysplastic lesions in ≥ 55 years age group could be due to the fact that Pap smear in postmenopausal women can be very challenging because of cervical atrophy which increases the risk of false negative results [29].

Gupta et al found increasing prevalence of cervical dysplasia and higher grades of dysplasia as age progresses (from 1.37% in age group 20-30 years to 5.12% in age group 40%-49%) until 50 years when it was noticed to decrease [23]. This compares well with the absence of dysplastic lesion beyond age 55 years in this study. This could explain the absence of cervical dysplasia in age group ≥ 55 years, aside from the fact that they were the least represented group in this study.

Although the use of OCP, obesity and multiple sexual partners have been implicated as risk factors in cervical dysplasia [22,30,31] there was no significant association between these factors and cervical dysplasia in this study.

Cervical dysplasia was more common in (38.5%) respondents with coitarche before 18 years than in (15.6%) those after 18 years (p=0.029). Although sexual exposure earlier than 18 years has been reported to increase the chance of developing cervical dysplasia, the main reason for this is said to be the tendency that early coitus poses, including having multiple sexual partners, which in turn increases the chance of HPV infection, the role of which is well documented [32-36].

Asymptomatic endocervical infection is very common, with wide variety in prevalence and types of infective organisms across social strata [37-40]. Overall, endocervical infection prevalence in this study was 39.0%, with multiple infective organisms found in 9.1% of those who had infection. This is slightly lower than the prevalence of 48.2% reported by Omoregie et al. in Benin [40].

The gradual decline in endocervical infection from 45.2% among age group 18-34 years to 16.7% among age group >55 years could be explained by a supposed decline in sexual activities with increasing age. Greater percentage (44.2%) of participants with abnormal BMI had endocervical infection as against 32.4% of participants with normal weight. This increase can be explained by the reduction in immunity which usually characterizes overweight and obese status. There is dearth of literature comparing BMI and endocervical infection in this environment.

There were eight different isolates from this study. Several organisms have been cultured from endocervical swabs in previous studies. Omoregie et al. cultured over 10 different organisms from endocervical swab and high vaginal swab samples of symptomatic patients in University of Benin Teaching hospital [40]. However, Oguntoyinbo et al. targeted asymptomatic subjects as done in this study [41]. The pattern of infective organisms in this study compares well with pattern isolated by Oguntoyinbo et al. among infertility clinic patients in Ilorin, comprising of *Staph aureus, Coliform bacteria, Streptococcus, Pseudomonas Klebsiella, Candida albican,* and *E. coli* [41].

The pattern of infective organism in this study showed predominance of *Candida albican, Staph aureus* and *Chlamydia trachomatis,* with prevalence of 14.3%, 13.0% and 7.8% respectively. The other organisms isolated are *Coagulase negative Staph. aureus, alpha hemolytic Streptococcus, Pseudomonas aeruginosa, E coli and Klebsiella* with prevalence of 3.9%, 3.9%, 2.6%, 1.3% and 1.3% respectively.

Candida infection may not be pathological in 10 to 20% of women, however its role in subclinical inflammation of the cervix which enhances the progression of dysplastic lesions is worthy of note [7,8]. Almost all local studies involving endocervical swabs or high vaginal swab tests have *Candida* on their list [40,41]. On the other hand, Chlamydia is the most common sexually transmitted bacterial infection and it has a varying prevalence across different population [42-45].

In this study, only 16.6% of those infected had cervical dysplasia while 28.6% of those with dysplasia had endocervical infection. There is dearth of literature on the correlation between cervical dysplasia and endocervical infections other than HPV. The organisms associated with cervical dysplasia in this study were *Staph aureus*, *alpha hemolytic streptococcus*, *E coli* and *Candida albican*, as shown in Table 7. Although the association of Chlamydia trachomatis with persistence of high-risk types of HPV has been established, [46,47] it is important to note that there were no participants with Chlamydia infection who also had cervical dysplasia in this study. This is likely due to chance, or the Chlamydia infections detected were recently acquired because it can take up to 10 years before dysplastic changes start to manifest [47]. There was a statistically significant inverse relationship between parity and prevalence of endocervical infection (p=0.031). This is likely due to other factors such as sexual activities which is more prominent in the young people which mostly belong to the lower parity group in this study.

CONCLUSION

It is thus concluded that the prevalence of cervical dysplasia in this study was 19.5%, with ASCUS being the predominant type (14.3%) of the only two forms observed. This prevalence of cervical dysplasia increased with age until age 54 years. Coitarche before 18 years is associated with increased prevalence of cervical dysplasia. Also, the prevalence of endocervical infection in the studied population was 39.0%, with *Candida albican, Staph aureus* and *Chlamydia trachomatis* being the most common of the eight infective organisms identified. Overall, there was no significant association between the observed endocervical infections and cervical premalignant lesions. The dynamic nature of both cervical dysplasia and pattern of endocervical infection is well demonstrated in various studies; values are subject to myriads of factors. Therefore, there is need to concentrate effort at studying this deadly but preventable cancer in primary care setting in order to ensure early detection and appropriate management.

ETHICAL CONSIDERATION

Ethical clearance was obtained from OAUTHC Research and Ethics Committee, Ref. number ERC/2015/05/03.

Written Informed consent was obtained from each participant. Anonymity was maintained by restricting identification of the participants to only their initials and a special code number on the questionnaire. The data was stored in a pass-worded personal computer. Only the researchers had access to the research materials, results and the data.

DECLARATION OF CONFLICTING INTERESTS

The authors declared no potential conflicts of interests as regards the research, authorship, and/or publication of this article.

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