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A 10-year retrospective study on a population-based cervical cancer screening programme in Nigeria

Christie Divine Akwaowo, Uwemedimbuk Smart Ekanem, Enobong Cyril Mkpang[1], Catherine Sebastian Eyo[2], Emem A Abraham[3], Mabel Ino-Ekanem[4], Uduak Ime Usanga[5], Ubong Mbatt Ekaete[6], Ako Akpabio[5], Mfon Edyang-Ekpa[7], Medical Women's Association of Nigeria, Akwa Ibom State

Abstract:

BACKGROUND: Human papillomavirus (HPV) is the main cause of cervical cancer, and about 80% of women will be infected at least once in their life time. Cervical cancer is the fourth most common cancer in women and the second highest cause of cancer deaths. Persistent HPV infection progresses to cancer over several years, and during this period, pre-cancerous lesions can be detected by screening. Visual inspection under acetic acid (VIA) is an easy safe, affordable and effective test in cervical cancer screening in resource-poor countries like Nigeria.

AIM: The aim of the study is to determine the proportion of women with VIA-positive findings and the associated factors among those screened for cervical cancer in a screening programme between 2008 and 2017.

METHODS: This is a retrospective study using the database of women who presented for breast and cervical cancer screening by the Akwa-Ibom State branch of the Medical Women's Association of Nigeria between 2008 and 2017. A structured questionnaire was used to abstract data from the records of the attendees at the cancer screening sessions in the years indicated. There are many factors that discourage women from screening for cervical cancer. Some authors cite embarrassment, low perception of cancer risk, physician gender preference, lack of spousal support; high cost; belief that cancer is a death sentence, and societal discrimination.

RESULTS: A total of 2203 women were screened for cervical cancer between 2008 and 2017. The mean age was 40.2 years. Only 284 (12.9%) women had been previously screened for cervical cancer, and majority of these were screened over 2 years prior. The mean age at sexual debut was 19.4 years, those who had used contraceptive pills in the past were 639 (29.0%) while 124 (5.6%) used it currently. Forty-four (2.0%) of the screened women had VIA-positive lesions, and 1.6% had lesions suspicious for cancer. On bivariate analysis, age, marital status, age at sexual debut, number of pregnancies and previous use of oral contraceptive pills were significantly associated with findings on VIA.

CONCLUSION: This study found VIA-positive findings in a small proportion of the women screened. A follow-up of the definitive diagnosis and treatment of the VIA-positive women is strongly recommended. Efforts should be made to provide early comprehensive sex education and screening to detect early lesions to reduce morbidity and mortality from cervical cancer in the population.

Keywords:

Cervical cancer, Medical Women's Association of Nigeria, screening, visual inspection using acetic acid

Departments of Community Medicine, [1]Obstetrics and Gynaecology, [2]Anaesthesia, [3]Opthalmology and [4]Haematology, University of Uyo, [5]University of Uyo Health Centre, Uyo, [6]General Hospital Etinan, [7]MWAN, Akwa Ibom State Branch, Nigeria

Address for correspondence:
Dr. Christie Divine Akwaowo, Department of Community Medicine, University of Uyo, Uyo, Nigeria.
E-mail: christieakwaowo@uniuyo.edu.ng

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Introduction

Cervical cancer is the fourth most common cancer in women worldwide, after breast, colorectal, and lung cancers.[1] In 2018, there were about 570,000 cases of cervical cancer, and an estimated 311,000 women died from cervical cancer, with over 85% of these deaths occurring in low- and middle-income countries.[1] This means that one woman dies of cervical cancer every 2 min.[2] Cervical cancer currently ranks as the second most frequent cancer among women in Nigeria after breast cancer, accounting for 21% of all cancers in Nigerian women and 10,000 deaths annually.[3] Nearly, all cervical cancer cases arise as a result of persistent infection with the oncogenic serotypes of human papillomavirus (HPV), commonly types 16 and 18.[4] HPV infection is the most common sexually transmitted infection, and about 80% of women will be infected with it during their lifetime.[2] Persistent HPV infection has a slow progression to invasive cervical cancer (average 7–10 years), and during this period, pre-cancerous lesions can be detected by screening and treatment was initiated to prevent invasive cervical cancer.[1,4]

Effective primary prevention (i.e. HPV vaccination) and secondary prevention approaches (i.e., screening for, and treating precancerous lesions) can prevent most cervical cancer cases. With early diagnosis and effective management, cervical cancer has one of the best prognoses when compared to other cancers.[1] In developed countries, several programmes have been put in place to ensure HPV vaccination of young girls and regular screening of women for pre-cancerous lesions;[4] however, in developing countries, there is poor access to these preventative measures and cervical cancer is often not identified until it is further advanced, resulting in higher rates of death from the disease in these developing countries.[5,6] Screening for cervical cancer involves testing for pre-cancerous and cancerous lesions among women who have no symptoms. Pre-cancerous lesions detected are then treated and cancer can be avoided. Further, when screening detects cancer at an early stage, treatment has a high potential for cure.[5]

Cervical cancer screening using the cost-effective visual inspection using acetic acid (VIA) method followed by treatment once abnormal lesions are identified can help reduce cervical cancer incidence and mortality. However, government involvement in community-based cervical cancer prevention and control in Nigeria has been low, and most screening centres are found in tertiary facilities.[7] Despite the availability of large-scale programmes for screening in developed countries, low–middle-income countries have no access to routine screening for cancers. There are several reasons identified for this. In a review of barriers to accessing cervical cancer interventions in Nigeria, lack of awareness, cost and availability were identified as major barriers to access.[8]

The Medical Women's Association of Nigeria (MWAN) in Akwa Ibom State (AKS) was established in 1992. It is an affiliate of the Medical Women's International Association.[9] The organisation has been conducting cancer screening for women living in the state as a pet project. Screening is conducted monthly on the second Tuesday of every month. In 2007, a structured questionnaire was introduced to guide screening for breast and cervical cancers. This study presents the findings from the MWAN, AKS branch's cancer screening programme over a 10-year period (2008–2017).

This study aimed to determine the proportion of women with VIA-positive findings and to assess the associated factors among those screened for cervical cancer in a screening programme between 2008 and 2017.

Methods

This study was a population-based retrospective study of the database of the MWAN, AKS branch. Data from all women who were screened during the routine monthly cervical cancer screening were retrieved for women screened between 2008 and 2017. Study population included all women who presented at the MWAN Well Women Clinic for cervical cancer screening within the study duration.

The database comprises information obtained using a structured questionnaire on socio-demographic characteristics, modifiable and non-modifiable risk factors of breast and cervical cancers and VIA tests performed on the respondents. The instrument used to create the database was a two-part questionnaire, adapted from the IARC/WHO Standardised Format for reporting results of VIA/VILI.[10] Section I obtained information on socio-demographics and history of contraceptive use. This section of the questionnaire was self-administered; however, respondents who could not read and write, or those who needed assistance in completing the questionnaires, were assisted by the medical women. Section II reported on findings from clinical and cervical screening. This section was filled by the doctors carrying out the screening, as the women presented themselves.

The VIA screening tests were performed by the trained medical doctors. After insertion of a sterile Cusco's self-retaining vaginal speculum, the VIA test was performed by applying freshly prepared 5% acetic acid to the cervix. The results were recorded after 1 min using a light source to provide good illumination. The test results were scored as positive when a well-defined, dense

Table 1: Socio-demographic characteristics of respondents who attended cancer screening

Variable	Frequency (*n*=2203), *n* (%)
Age (years)	
Mean±SD	40.2±11.7
≤20	94 (4.3)
21-30	377 (17.1)
31-40	814 (36.9)
41-50	521 (23.6)
51-60	295 (13.4)
≥61	102 (4.6)
Marital status	n=2117
Single	496 (23.4)
Married	1251 (59.1)
Living with partner	31 (1.5)
Separated/divorced	90 (4.3)
Widowed	249 (11.8)
Occupation	
Homemaker	140 (6.4)
Peasant (farmers, fisher people)	184 (8.4)
Artisan	397 (18.0)
Civil/public services	570 (25.9)
Teaching	291 (13.2)
Professional	101 (4.6)
Business	511 (23.2)
CSW	9 (0.4)
Tribe	
Ibibio	1288 (58.5)
Annang	418 (19.0)
Oron	60 (2.7)
Igbo	116 (5.3)
Others	321 (14.6)

SD: Standard deviation, CSW: Commercial sex workers

acetowhite area with regular margins appeared attached on the squamocolumnar junction and as negative if no change was observed. Respondents who had suspicious looking lesions, such as ulcerative lesions, were classified as "suspicious for cancer." These were then requested to return within 3 months for repeat screening. All VIA-positive cases were referred for further screening for definitive diagnosis of cervical cancer using the Pap smear test. Table 1 summarizes the sociodemographic characteristics of the respondents.

The gynaecological and social history of respondents is seen in Table 2. Information obtained from the database was collated, validated and entered into Microsoft Excel. Data were analysed using SPSS version 22 (IBM Corp., Armonk, NY), and descriptive statistics were presented in tables and charts, and relationships were established using Chi-square test and regression analysis to predict relationships. A $P < 0.05$ was considered statistically significant.

Ethical considerations

Ethical clearance to access the database was obtained from the Health Research Ethics Committee of the University of Uyo Teaching Hospital. Permission was also sought from the current President of the association.

Results

Socio-demographic characteristics of those screened

A total of 2203 women participated in the screening exercise between 2008 and 2017, most of whom were aged 31–40 years (36.9%), married (59.1%), worked in the civil/public service (25.9%) and were of the Ibibio tribe (58.5%).

Previous cervical cancer screening

Only 284 (12.9%) respondents had been previously screened for cervical cancer, while 1919 (87.1%) had never been screened. Of those who had previously been screened, 132 (46.5%) were screened within 2 years, while 152 (53.5%) were screened over 2 years before when they presented for current screening. While 262 (11.6%) respondents knew friends or relatives who had undergone screening for cervical cancer, 1941 (87.8%) did not. There was significant relationship between having a friend or relative who had screened for cervical cancer and being screened for cervical cancer in the past ($\chi^2 = 53.926$; $P = 0.000$). Over a quarter (28.2%, $n = 74$) of those who knew relatives who had been screened were previously screened themselves, compared to 14.5% ($n = 210$) of the respondents who did not know any relative who had been previously screened.

Gynaecological and social history of screened women

As shown in Table 2, the mean age at sexual debut was 19.4 ± 2.2 years and most had their sexual debut between 15–19 years (1407, 63.9%). While 30.6% of the respondents were nulliparous, 30.2% had 5 pregnancies and above as at the time of screening. Less than 30% had used oral contraceptive pills in the past, and only 5.6% currently used it. Nearly, all respondents had never smoked a cigarette (99.2%), while a vast majority had not lived or worked with a regular smoker (86.5%). Nearly, a third of the respondents took alcohol (32.5%).

Visual inspection of the cervix

Table 3 summarizes the results of the cervical cancer screening. On acetic acid visual inspection, a vast majority (94.8%) of the screened women had VIA-negative findings, while 2.0% had VIA-positive findings and 1.6% were suspicious for cancer. In about 1% of the respondents, there was extension of identified lesions into the endocervix.

Table 2: Gynaecological and social history of respondents

Variables	Frequency (*n*=2203), *n* (%)
Age at sexual debut (years)	
Mean age±SD	19.4±2.2
10-14	97 (4.4)
15-19	1407 (63.9)
20-24	497 (22.6)
25-29	164 (7.4)
≥30	24 (1.1)
M	14 (0.6)
Number of pregnancies	
None	675 (30.6)
1-2	338 (15.3)
3-4	524 (23.8)
≥5	666 (30.2)
Have you used oral contraceptive pills in the past?	
Yes	639 (29.0)
No	1564 (71.0)
Do you currently use oral contraceptive pills?	
Yes	124 (5.6)
No	2079 (94.4)
Have you ever smoked cigarettes?	
Yes	17 (0.8)
No	2186 (99.2)
Have you ever lived in a house or worked in an office with a regular smoker?	
Yes	298 (13.5)
No	1905 (86.5)
Do you take alcohol?	
Yes	717 (32.5)
No	1486 (67.5)

SD: Standard deviation

Table 3: Cervical cancer screening

VIA	N=2222	%
VIA negative	2090	94.9
VIA positive	44	2.0
Suspicious for cancer	36	1.6
Unclear	33	1.5
Extension of lesion into endocervix	19	0.9

VIA: Visual inspection under acetic acid

Association between socio-demographic characteristics of respondents and visual inspection using acetic acid finding

The association between the VIA finding and the respondents age, marital status and occupation was statistically significant; however, the relationship with tribe was not significant. Table 4 shows the distribution of result of visual inspection under acetic acid by selected respondents' socio-demographic characteristics. All respondents <20 years had negative VIA findings, while women aged between 51 and 60 years had the highest proportion of those with VIA-positive findings (4.8%) and findings that were suspicious for cancer (4.1%). This was followed by women aged 61 years and above ($P = 0.000$). Respondents who were separated had the highest proportion of VIA-positive finding (5.4%), while those who were widowed had the highest proportion of findings that were suspicious for cancer (4.0%) ($P = 0.000$). While 1 (11.1%) commercial sex worker had lesions suggestive of cancer, teachers had the highest proportion of VIA-positive findings (3.1%) ($P = 0.000$).

Relationship between gynaecological and social characteristics of respondents and findings on visual inspection using acetic acid

As seen in Table 5, respondents who had their sexual debut between the age of 10 and 14 had the highest proportion of lesions that were suspicious for cancer (6.2%), and those who had their sexual debut between 15 and 19 years had significantly higher proportion of VIA-positive findings (2.2%) ($P = 0.001$). Respondents who had not used oral contraceptive pills in the past had significantly higher proportion of VIA-positive lesions (2.2%) compared to others ($P = 0.000$). Smoking cigarettes, living or working with a regular smoker and taking alcohol were not significantly related to findings on VIA.

Table 4: Distribution of result of visual inspection under acetic acid by selected respondents' socio-demographic characteristics

Socio-demographic characteristics	VIA				Test statistic/*P*
	VIA negative (*n*=2090; 94.9), *n* (%)	VIA positive (*n*=44; 2.0), *n* (%)	Suspicious for cancer (*n*=36; 1.6), *n* (%)	Unclear (*n*=33; 1.5), *n* (%)	
Age (years)					
≤20	94 (100.0)	0	0	0	Fisher's exact=219.912; *P*=0.000*
21-30	368 (97.6)	5 (1.3)	2 (0.1)	2 (0.1)	
31-40	783 (96.2)	12 (1.5)	10 (1.2)	9 (1.1)	
41-50	490 (94.1)	10 (1.9)	9 (1.7)	12 (2.3)	
51-60	262 (88.8)	14 (4.8)	12 (4.1)	7 (2.4)	
≥61	93 (91.2)	3 (2.9)	3 (2.9)	3 (2.9)	
Marital status (*n*=2117)					
Single	485 (97.8)	6 (1.2)	2 (0.4)	3 (0.6)	Fisher's exact=99.946; *P*=0.000*
Married	1183 (94.6)	22 (1.8)	21 (1.7)	25 (2.0)	
Living with partner	29 (93.6)	1 (3.2)	1 (3.2)	0	
Separated/divorced	82 (91.1)	4 (4.4)	1 (1.1)	3 (3.3)	
Widowed	228 (91.6)	10 (4.0)	10 (4.0)	1 (0.4)	
Occupation					
Homemaker	132 (94.3)	2 (1.4)	5 (3.6)	1 (0.7)	Fisher's exact=149.315; *P*=0.000*
Peasant	174 (94.6)	5 (2.7)	4 (2.2)	1 (0.5)	
Artisan	385 (97.0)	8 (2.0)	3 (0.8)	1 (0.2)	
Civil/public services	544 (95.4)	8 (1.4)	5 (0.9)	13 (2.3)	
Teaching	266 (92.4)	9 (3.1)	5 (1.7)	8 (2.8)	
Professional	98 (97.0)	1 (1.0)	2 (2.0)	0	
Business	484 (94.6)	11 (2.2)	11 (2.2)	5 (1.0)	
CSW	7 (77.7)	0	1 (11.1)	1 (11.1)	
Tribe					
Ibibio	1229 (95.4)	19 (1.5)	21 (1.6)	19 (1.5)	Fisher's exact=19.797; *P*=0.471
Annang	394 (94.3)	14 (3.4)	4 (1.0)	6 (1.4)	
Oron	54 (90.0)	2 (3.3)	2 (3.3)	2 (3.3)	
Igbo	107 (92.2)	3 (2.6)	5 (4.3)	1 (0.9)	
Others	306 (95.3)	6 (1.9)	4 (1.3)	5 (1.6)	

*Statistically significant. VIA: Visual inspection under acetic acid

Regression analysis of factors predisposing to visual inspection using acetic acid-positive result

On regression analysis, none of the respondents' demographic and gynaecological characteristics was a significant predictor of having a VIA-positive result, as shown in Table 6.

Discussion

This paper has presented the findings from a screening programme organised by the MWAN, AKS. The cancer screening programme tested 2203 women for breast and cervical cancers between 2008 and 2017. The mean age was 40.2 ± 11.7 years, and majority of the respondents were 31–40 years old. This implies that a good number of them are within the age range where cervical cancer is most frequently diagnosed[11] and therefore benefitted from the cervical cancer screening. About 17% of the respondents were between 21 and 30 years old. This is below the WHO-recommended age for the commencement of cervical cancer screening which is 30 years;[12] however, the American Cancer Society recommends the commencement of cervical cancer screening by 25 years.[13] The age range seen here may be due to the fact that this was a combined breast and cervical cancer screening programme, as such their primary reason for visiting the screening centre was the breast cancer screening and not cervical cancer. We recommend that cervical cancer screening should be limited to those 25 years and above in accordance with stipulated guidelines.

Only a small proportion of the respondents had been previously screened for cervical cancer (12.9%), and less than half of those had been screened within the last 2 years. Poor uptake of cervical cancer screening is largely due to poor awareness.[14] A study in Lagos reported a 45.8% awareness of cervical cancer among their respondents and a cervical cancer screening uptake of 18.4%.[14] Another study in Northern Nigeria reported that only 13.6% were aware of cervical cancer screening and the screening uptake was 1.5%.[15] Our study showed a significant relationship between having a friend or relative who had been screened for cervical cancer and previous screening. A study in Lagos reported that

Table 5: Distribution of result of visual inspection under acetic acid by respondents' gynaecological and social characteristics

Respondents' characteristics	VIA				Test statistic/*P*
	VIA negative (*n*=2089; 94.8), *n* (%)	VIA positive (*n*=44; 2.0), *n* (%)	Suspicious for cancer (*n*=36; 1.6), *n* (%)	Unclear (*n*=33; 1.5), *n* (%)	
Age at sexual debut (years)					
10-14	90 (92.8)	1 (1.0)	6 (6.2)	0	Fisher's exact=51.794; *P*=0.001*
15-19	1340 (95.2)	31 (2.2)	17 (1.2)	18 (1.3)	
20-24	468 (94.2)	10 (2.0)	8 (1.6)	11 (2.2)	
25-29	153 (93.3)	2 (1.2)	5 (3.1)	4 (2.4)	
≥30	24 (100.0)	0	0	0	
Missing	14 (100.0)	0	0	0	
Number of pregnancies					
None	653 (96.7)	12 (1.8)	3 (0.4)	7 (1.0)	Fisher's exact=52.512; *P*=0.000*
1-2	324 (95.9)	5 (1.5)	4 (1.2)	5 (1.5)	
3-4	504 (96.2)	6 (1.1)	7 (1.3)	7 (1.3)	
≥5	608 (91.3)	21 (3.2)	22 (3.3)	14 (2.1)	
Have you used oral contraceptive pills in the past?					
Yes	607 (95.1)	10 (1.6)	13 (2.0)	9 (1.4)	χ^2=22.228; *P*=0.000*
No	1483 (94.8)	34 (2.2)	34 (2.2)	24 (0.6)	
Do you currently use oral contraceptive pills?					
Yes	121 (97.6)	0	0	3 (2.4)	Fisher's exact=5.727; *P*=0.334
No	1969 (94.7)	44 (2.1)	36 (1.7)	30 (1.4)	
Have you ever smoked cigarettes?					
Yes	15 (88.2)	0	2 (11.8)	0	Fisher's exact=12.4608; *P*=0.092
No	2075 (94.9)	44 (2.0)	34 (1.6)	33 (1.5)	
Have you ever lived in a house or worked in an office with a regular smoker?					
Yes	281 (94.0)	5 (1.7)	9 (3.0)	3 (1.0)	Fisher's exact=13.398; *P*=0.050
No	1809 (95.0)	29 (2.1)	27 (1.4)	30 (1.6)	
Do you take alcohol?					
Yes	683 (95.2)	14 (2.0)	12 (1.7)	8 (1.2)	Fisher's exact=3.142; *P*=0.678
No	1407 (94.7)	30 (2.0)	24 (1.6)	25 (1.7)	

*Statistically significant. VIA: Visual inspection under acetic acid

about a tenth of their respondents who had cervical cancer screening did it because they knew someone who had done it.[14] There are many factors that discourage women from screening for cervical cancer. Reasons cited in previous studies include embarrassment, low perception of cancer risk, physician gender preference, lack of spousal support; high cost; belief that cancer is a death sentence, and societal discrimination.[16] This shows the importance of cervical cancer screening programmes such as the one organised by the MWAN, AKS branch, as it will encourage more women to participate.

This screening exercise employed the use of VIA as screening tool for pre-cancerous and cancerous cervical lesions. VIA has high sensitivity, but its accuracy is still limited in pre-cancerous lesions during cervical cancer screening.[17] A vast majority of the screened women were VIA negative. Two per cent had VIA-positive lesions and while 1.6% had lesions suspicious for cancer. These were then sent for histology to confirm diagnosis of pre-cancer or cancer; however, this result was not included in the present study. The proportion of positive findings in this study is lower than was seen in other studies where positive results ranged from 6.6% to 10.7%.[18,19] This may be due to differences in the characteristics of the study population. Globally, the incidence of cervical cancer peaks at 50–54 years,[20] which may explain why a significantly higher proportion of women between 51 and 60 years had VIA-positive lesions and lesions suspicious for cancer.

The finding that only 2% of women screened had positive findings must be considered against the background of lives saved and the socioeconomic implications of the loss of the woman to the household. These include the pain and suffering imposed by the disease and which could lead to premature death. The loss incurred by a household when a family member has cervical cancer comes from a direct loss of earnings and the out of pocket expenditure required for treatment of this condition. The household can thus go into catastrophic expenditure, which will further deepen household poverty.[8] Therefore, the benefits of expanding this

Table 6: Regression analysis of factors predisposing to visual inspection under acetic acid positive result

Respondents' characteristics	Adjusted OR	95% CI	*P*
Age (years)			
≤20	0.101	0.001-7.323	0.294
21-30	0.621	0.118-3.255	0.573
31-40	0.690	0.179-2.661	0.590
41-50	0.785	0.199-3.094	0.730
51-60	2.323	0.643-8.391	0.198
≥61	***	***	***
Marital status			
Single	3.998	0.000-383.418	0.767
Married	4.715	0.000-457.479	0.741
Living with partner	9.153	0.001-106.868	0.643
Separated/divorced	5.751	0.002-191.047	0.534
Widowed	***	***	***
Occupation			
Housewife	0.475	0.091-2.494	0.379
Peasant	0.598	0.171-2.093	0.421
Artisan	0.705	0.251-1.983	0.688
Civil/public services	0.482	0.159-1.466	0.198
Teaching	1.179	0.392-3.544	0.770
Professional	0.354	0.047-2.686	0.315
Business	0.705	0.358-3.935	0.508
CSW	***	***	***
Age at sexual debut (years)			
10-14	2.311	0.006-895.388	0.783
15-19	5.449	0.020-1472.420	0.553
20-24	5.397	0.020-1487.682	0.556
25-29	3.228	0.010-1011.297	0.689
≥3	***	***	***
Number of pregnancies			
None	0.784	0.311-1.974	0.605
1-2	0.661	0.239-1.831	0.426
3-4	0.445	0.182-1.090	0.076
≥5	***	***	***
Have you used oral contraceptive pills in the past?			
Yes	0.722	0.349-1.492	0.379
No	***	***	***

***Reference category. OR: Odds ratio, CI: Confidence interval

screening programme for early detection of cervical cancer are imperative.

One of the factors seen to affect cervical cancer in the index study is marital status. Marital status has been found to affect stage at diagnosis of cervical cancer and prognosis, but not the incidence of cervical cancer.[21,22] In our study, marital status was seen to have significant relationship with findings on VIA on bivariate analysis, with separated women and widows having higher proportion of VIA-positive lesions and lesions suspicious for cancer, respectively. This may be related to the association of the disease age as separated or widowed women are more likely to be older than other categories of women.

Early age at sexual debut has been defined as the onset of sexual activity before 15 years of age.[23,24] The mean age at sexual debut in this study was 19.4 ± 2.2 years, and majority commenced sexual intercourse between 15 and 19 years of age. Several other studies in Nigeria that have reported lower ages at sexual debut;[24,25] however, it is similar to Fagbamigbe *et al*. who reported a mean age at sexual debut of 19 years.[26] Early age at first sexual intercourse has been established as a risk factor for cervical cancer, irrespective of other risk factors. This risk further increases if sexual debut is followed shortly by pregnancy.[27,28] In the present study, age at sexual debut was significantly related to the findings on VIA ($P < 0.000$). Respondents whose sexual debut was <15 years had the highest proportion of lesions that was suspicious for cancer. This confirms the increased risk of cancer with this risk factor.

Increased parity, increased number of pregnancies and early age at pregnancy are also risk factors of

cervical cancer.[28-31] Respondents who had 5 and above pregnancies in our study had significantly higher proportion of VIA-positive finding, and lesions suspicious for cancer ($P < 0.000$), confirming that increased parity is a strong risk factor for cervical cancer. However, one study reports a contrary finding to ours as the number of pregnancy was not seen to increase the risk of cervical cancer in another study.[32]

The mechanism by which early sexual debut and first pregnancy could increase the risk of cervical carcinogenesis may be explained by the fact that there is increased risk of contracting HPV and other sexually transmitted infection at that age,[27] coupled with the influence of steroid hormone on HPV infection and on the host's immune response to HPV during pre-adolescence and adolescence.[24] Steroid hormone has been seen to act as a co-factor to HPV in the development of cervical cancer.[33,34] Several mechanisms have been proposed to explain the increased risk for pre-cancerous or cancerous lesions in relation to pregnancy and childbirth. One is increased hormone levels and impaired immune response during pregnancy, and another is the fact that the transformation zone remains on the ectocervix for longer in multiparous women which facilitates direct and multiple exposure to HPV and other cofactors.[32]

In our study, respondents who had never used oral contraceptives had significantly higher prevalence of VIA-positive and suspicious, lesions compared to those who had used oral contraceptives in the past ($P = 0.000$). This was a surprising finding as there is established evidence that prolonged use of oral contraceptives (5 years or more) increases the risk of cervical cancer in those who have been infected with HPV. The risk however goes back down again after the oral contraceptives are stopped and returns to normal years after stopping.[35-37] We attempt to explain this contrary finding in our study by two related factors: short duration and erroneous perception of oral contraceptive use. The first may be due to a shorter duration of usage of oral contraceptives by the respondents in this study. Only 5.6% of women reported being on any oral contraceptive pills as at the time of their screening. This is in keeping with similar findings that the use of daily oral contraceptive pills in the prevention of pregnancy is not popular in our environment.[38] Therefore, this finding may be explained by the use of the emergency contraceptive pill (Postinor) which is popular after unprotected sexual intercourse.[39] The use of this emergency contraceptive may be what the women erroneously reported as oral contraceptive use.

Smoking has also been found to be strongly associated with the development of pre-cancerous cervical lesions and cancer. Studies show at least a twofold risk for current smokers compared to non-smokers.[40,41] Second-hand smoking has also been linked to increased cervical cancer risk. A study in Thailand showed an increased risk of cervical cancer in women whose partners formerly or currently smoked by an odds ratio of 2.17 and 3.36, respectively.[28] In support of this, the present study showed higher prevalence of suspicious cervical lesions among ever-smokers and second-hand smokers compared to non-smokers and those who had not worked or lived with smokers. These relationships were however not statistically significant. Alcohol intake has been linked with increased risk of several cancer; nevertheless, it has not been found to be linked to increased risk of precancerous or cancerous cervical lesions.[42] This was congruent with the findings in the present study.

A limitation of this study is the lack of histological confirmation of the VIA-positive lesions found; despite its limitations VIA is an accepted cervical screening method in low-resource countries such as Nigeria. In addition to this, since the number of women who had VIA positive lesions was low, this might limit the ability to adequately examine association with various risk factors.

Conclusion

This study showed that a small proportion of the women screened were VIA positive. Age, marital status, age at sexual debut, number of pregnancies and the previous use of oral contraceptive pills were associated with VIA findings. However, the socio-economic implications of disease place substantial burden on households and communities, hence the need to strengthen this screening programme. We recommend the integration of affordable and culturally acceptable histological methods for screening the women to ensure accurate diagnosis and treatment of cervical cancer. Comprehensive sex education, with emphasis on family planning and contraceptive use, should be incorporated early into the school curriculum. The widespread vaccination of girls against HPV to prevent the development of pre-cancerous lesions should be integrated into the routine national immunisation programmes. This cervical cancer screening model could be adopted and supported by the government in resource-poor settings where there is no large-scale screening programme. This is especially needed in low- and middle-income countries where the burden of cervical cancer is highest to reduce the burden of the disease.

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Conflicts of interest

There are no conflicts of interest.

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