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Screening For Cervical Pre-Cancerous Lesions Using Visual Inspection with Acetic Acid Among Women in Ekiti State, Southwest Nigeria

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Abstract

Introduction: Cervical cancer, though preventable, is the fourth most common cancer among women globally and the second most common cancer among women in developing countries. Nigeria has an annual estimate of 12,075 cases of cervical cancer with 7,968 deaths among 60.9 million susceptible women. Cervical cancer screening has the potential to reduce the incidence of cervical cancer and provide opportunities for better treatment outcomes, leading to reduced morbidity and mortality. Yet cervical cancer screening in Nigeria is poor, taking place mainly during outreaches and clinic visits to a few tertiary and secondary hospitals.

Methods: This was a retrospective review of the data generated from the mass screening of women following the training of some healthcare workers to provide screening at the primary level of healthcare using visual inspection with acetic acid (VIA) and immediate treatment with thermal ablation.

Result: There were 535 participants recruited for cervical cancer screening with VIA. Their ages ranged between 16 and 78 years, with a mean age of 38.6 years and a standard deviation of 9.7. Age distribution of the participants was 30-39 yrs (n=202; 37.8%), 40-49 yrs (n=164;30.7%),20-29 yrs (n= 89;16.6%), 50-59 yrs(n=63;11.8%), ≥ 60yrs (n=13;2.4%) and≤20yrs (n= 3; 0.6%). Most participants were married, 512 (95.7%), and 23 (4.3%) were single. Only 10 (1.9%) were previously screened for cervical cancer, while 451(84.3%) had never been screened for cervicalcancer. Of the 535 screened in this study, 29 (5.4%) tested positive for precancerous lesions, while 503 (94%) tested negative. The cervical os could not be located in one woman (0.2%). Of those with positive VIA, 75% were in the age bracket 30-49 years, 54.5% had parities 2 & 3, and 96.4% were actively employed. The distribution of educational levels was roughly equal among positive and negative VIA results. The distribution ofHIV status among women with positive VIA results was 3.70% HIV positive,22.20% HIV negative, and 74.10% unknown status. The trend wasnot different in women with negative VIA results at 7.7% HIV positive,29.7% HIV negative, and 62.60% unknown HIV status.

Conclusion: Mass screening for cervical cancer at the community level is beneficial in detecting precancerous cervical lesions. However, for a more significant impact, this has to be scaled up from periodical opportunistic activities to a regularly planned and executed health intervention at the community level.

Keywords: visual inspection with acetic acid, cancer, cervix, precancerous

Introduction

The global crude incidence rate of cervical cancer was 15.8, while it was 19.9 and 19.3 in West Africa and Nigeria, respectively, according to the Global Cancer Observatory in 2018 **[1]**. Cervical cancer is a disease of public health importance not only because it is largely preventable but also because it affects women in their prime age. Cervical cancer is the most common gynecological cancer among women in Nigeria, with an estimation of about 1.4 million cases worldwide **[2,3.4,5]**. Despite being preventable, it is the fourth most common cancer among women globally and the second most common cancer among women in developing countries, with developing countries accounting for 80% of its incidence rate **[1,2,4,6,7,8,9]**. Nigeria has a yearly estimate of 12,075 cases of cervical cancer with 7968 deaths among 60.9 million susceptible women **[10]**.In 2009, there were 11,270 new cases and 4,070 deaths from cervical cancer in the United States of America **[11]**. It has precancerous lesions, most often caused by HPV, that take a span of many years to develop into a cancerous stage. There are about 7 million such precancerous lesions globally **[3]**. The incidence rate of cervical cancer in Nigeria is 25/100,000, while that of HPV in the general population and women with cervical cancer are 26.3% and 24.8%, respectively **[3,12]**. Most cases presented at an advanced stage with consequent poor prognosis **[7,13,14.15]**. The 3-year survival rate in Africa was 44.5%, while

in the United States of America, it was 73.7% **[15]**. Comparative age-standardized incidence (ASIR) and age-standardized mortality rate (ASMR) between developed and developing countries showed that developing countries are worse off. While ASIR and ASMR for developed countries were 9.0 per 100,000 and 3.0 per 100,000, for developing countries, they were 26.7 per 100,000 and 20.0 per 100,000, respectively **[6]**. The observed difference in the incidence and mortality rates between the two is attributable to the difference in their screening programs for cervicalcancer. Cervical screening in developing countries is poor because of poverty, lack of infrastructure, and marginalization of women **[3]**. A modeling analysis showed that the incidence of cervical cancer in developed countries like Denmark, Sweden, Finland, and Norway would have been as high as that of developing countries if not for a well-organized screening program **[13]**. Organized screening in Finland and Norway was observed to reduce ASIR by up to 70% and 22%, respectively **[13].** Cervical cancer screening for women between the ages of 30 and 40 years has the capability of reducing theincidence of cervical cancer by 20% to 25% **[7,14]**. While developedcountries have institutionalized screening, developing countries rarely have screening programs. This is because organized screening is costly and difficult in resource-constrained settings of developing countries **[16]**. In addition, the developed countries have incorporated vaccination against HPV into their routine immunization program, while many developing countries are yet to do so. Thankfully, Nigeria has recently included HPV vaccination into its routine immunization, though in selected pilot states of the country. In Nigeria, uptake of cervical screening is low with subsequent high ASIR, which was 36.0 per 100,000, most of which usually present late with attendant complications and high mortality **[1,6,7,17,18]**. Cervical cancer screening in Nigeria is primarily opportunistic and takes place mainly when patients come for other services, mostly at the teaching hospital and secondary level **[4,6,13]**. However, in collaboration with non-governmental organizations and multinational agencies, the government organizes occasional screening programs in the communities. Even at this, the screening has reached less than 9% of the target population, which is far below the 90-70-90 elimination target for the elimination of cervical cancer by 2030 **[4]**. Various factors responsible for the low uptake of cervical screening tests have been identified. These factors included lack of accessibility to testing facilities, low educational status and socio-economic level, fear of diagnosis of cervical cancer, low perceived risk, inadequate female health workers, feeling embarrassed or fear of pain, or belief that suchscreening is unnecessary **[1]**.

The global target of reducing the high incidence and mortality rate of cervical cancer can be achieved through effective coordination at different levels of prevention. At the primary level of prevention, a well-coordinated vaccination against HPV can drastically reduce the incidence of cervical cancer and can be a step in the direction of eradication. Infection with HPV type 16 and 18 are associated with about 70% of all cervical cancer cases globally and while HPV, in general, also causes anal, penile, vulva, vagina, and head and neck cancers **[19,14]**. While this has been incorporated into immunization programs in developed countries, it is still rudimentary in many developing countries. At the secondary level of prevention, screening of women for pre-cancer lesions and subsequent treatment is cost-effective in the prevention of cervical cancer, however, its uptake is deficient in developing countries for reasons that include paucity of required resources, cost of implementation and challenges of follow up **[1,20,19,21]**. Early identification of cervical cancer at the third level of prevention can reduce mobility and mortality associated with cervical cancer, but most women in Sub–Saharan Africa, Nigeria inclusive, report at the advanced stage of the disease **[1,12,22]**.

Different screening methods, such as HPV DNA test, Pap smear, and visual inspection, with acetic acid (VIA) or Lugo's iodine (VILI), are available for screening cervical cancer. Although a Pap smear is the most specific method for the screening of cervical cancer, its requirement of high expertise makes it impracticable for mass public screening in developing countries like Nigeria. However, VIA and VILI can be conducted by averagely skilled health workers after receiving short-term training and are thus suitable for mass screening. In addition, VIA and VILI offer an opportunity for immediate treatment of precancerous lesions using cryotherapy or thermal ablations with no need for a second visit. This study evaluates the incidence of precancerous lesions and the association between VIA results and some risk factors for cervical cancer among women in Ado-Ekiti, Ekiti Southwest Nigeria.

Methodology

The study was conducted in the Ado-Ekiti local government of Ekiti state, southwest Nigeria. It is predominantly an urban area with pockets of rural settings and has an extrapolated population of 518 588 based on the 2006 population census. It has 1 public and 1 private tertiary hospital, one general hospital, 27 primary health facilities, and many private hospitals.

This was a retrospective review of the data generated from the mass screening of women following the training of 1 doctor, 3 nurses, 1 medical laboratory scientist, and 1 community health extension worker on visual inspection with acetic acid (VIA) and immediate treatment with thermal ablation. These 6 health workers were among participants drawn across the three levels of care and health facilities in the state that underwent a five-day training on VIA at a tertiary health institution. Participants for the screening were mobilized by community mobilizers from their homes and among women who came to access health services at the center. Participants were counselled and written consent was sought and received individually before screening was conducted.

Study population and sample size

Participants for the screening were selected by convenient sampling from among women who came to access health care services at the health center and those mobilized from neighboring communities and markets. They were given group counselling on screening for cervical cancer and offered to be part of the screening exercise. In addition, women living with HIV and attending clinics in the facility were also recruited into the screening exercise after due counseling. A total of 535 women were selected for the screening. This sample size was based on the sample sizes used in similar studies in the country, whichranged between 200 and 400.

Procedure for VIA Screening

Each participant was placed in a lithotomy position; the labia were separated using gloved hands, and a sterile cuscus speculum lubricated with warm saline water was inserted with the edges in a vertical direction and rotated appropriately when fully inserted before it was opened up and locked in place after the cervix was seen. The cervix and vaginal walls were inspected for any discharge, growth, or abnormality. The cervix was cleaned with normal saline water, and using an appropriate quantity of cotton wool, firmly held with forceps, freshly prepared acetic acid was applied around the cervical os. This was left for sixty seconds to observe if there would be a change in the colour of the cervical os to aceto-white. If the color changes to aceto-white, it is positive; otherwise, it is negative. Positive meant that there was the presence of a precancerous lesion of the cervix. All cervixes that turned to aceto-white were treated using thermal ablation.

Accuracy and sensitivity of VIA alone and in comparison

The sensitivity of VIA in the screening of cervical cancer is higher than that of Pap smear, the gold standard in cervical screening. However, its specificity is lower than that of a Pap smear. In a comparative study between pap smear and visual inspection with acetic acid (VIA) by Bhattacharyya AK et al. **[23]**, the sensitivity of VIA was found to be 89% (versus pap smear-52%), specificity of VIA was 87% (versus pap smear-95%) and the accuracy of VIA was 87% compared to 93% in pap smear. Because of the simplicity of VIA and its high sensitivity, it has been found helpful in the screening of cervical cancer in low-resource settings. It is, however, recommended that VIA be combined with Pap smear for improved sensitivity.

Results

There were 535 participants in this study, and their ages ranged between 16 and 78 years, with a mean age of 38.6 years and a standard deviation of 9.7. Many participants, 202 (37.8%) were between 30-39 years age range, 164(30.7%) were between 40-49 years, 89 (16.6%) between 20-29 years and 63 (11.8%) between 50-59 years while only 13(2.4%) and 3 (0.6%) were ≥ 60yrs and ≤20 years respectively. Most participants, 512 (95.7%), were married, and 23 (4.3%) were single. 369 (69%) had post-secondary education, 129 (24.1%) and 28 (5.2%) had secondary and primary education, respectively, with 9 (1.7%) missing values. Civil service 225 (42.1%) was the most common occupation of the participants, followed by trading, 176(32.9%), others were artisans, 73(13.6%), students, 19 (3.6%), housewife, 7(1.3%), retiree, 9 (1.7%) while clerics and youth corpers were 2 (0.4 %%) each with only 1(0.2%) unemployed and 22 (4.1%) missing value **[Table 1]**.

Table 1: Demography of women screened.

S/N	Age (years)	Counts	% Frequencies
1	<20	3	0.60%
2	20 – 29	89	16.60%
3	30 – 39	202	37.80%
4	40 – 49	164	30.70%
5	50 - 59	63	11.80%
6	≥60	13	2.40%
7	Missing	1	0.10%
	Total	535	100.00%
	Marital status	**Counts**	**% Frequencies**
1	Married	512	95.70%
2	Single	23	4.30%
	Total	535	100.00%
	Level of Education	**Counts**	**% Frequencies**
1	Primary	28	5.20%

2	Secondary	129	24.10%
3	Post Secondary	369	69.00%
4	Missing	9	0.70%
	Total	535	100.00%
	Occupation	**Counts**	**% Frequencies**
1	Trading	176	32.90%
2	Civil Servant	225	42.06%
3	Artisan	72	13.46%
4	Cleric	2	0.37%
5	Youth Corper	2	0.37%
6	Retiree	9	1.68%
7	Student	19	3.55%
8	Unemployed	1	0.19%
9	Housewife	7	1.31%
10	Missing	22	4.11%
	Total	535	100.00%

Table 2: Parity of the women screened.

S/N	Parity	Counts	% Frequencies
1	0	44	8.40%
2	1	87	16.70%
3	2	121	23.20%
4	3	163	31.30%
5	4	79	15.20%
6	5	23	4.40%
7	6	4	0.80%
8	Missing	14	2.62%
	Total	535	100.00%

The recorded parities of the screening participants were between 0 and 6 with mean and standard deviation of 2.4 and 1.3 respectively

The majority of the participants, 314(58.7%), had unknown HIV status, 147 (27.5%) were HIV negative, while 37 (6.9%) were positive and on ART with a missing value of 37 (3.9%) **[Table 3]**.

Table 3: HIV status of the women screened.

S/N	HIV status	Counts	% Frequencies
1	Positive on ART	37	6.90%
2	Positive non- ART	0	0.00%
3	HIV negative	147	27.50%
4	Unknown	314	58.70%
5	Missing	37	6.90%
	Total	535	100.00%

Only 10 (1.9%) had previously been screened for cervical cancer, and 451(84.3%) had never been screened, with a missing value of 74 (13.8%). VIA was the common method of cervical cancer screening among those with a history of previous screening. **[Table 4]**.

Of the 535 recently screened with VIA for pre-cancerous lesions, 29 (5.4%) tested positive, while 503 (94%) tested negative. Two (0.4%) results were missing, and the external OS was not seen in one (0.2%) **[Table 4]**.

Table 4: Cervical Screening

	Previous cervical cancer screening		
S/N	**Cervical CA screening**	**Counts**	**% Frequencies**
1	Yes	10	1.90%
2	No	451	84.30%
3	Missing	74	13.80%
	Total	535	100.00%
S/N	**Types of previous cervical cancer screening**		
1	VIA	8	1.50%
2	HPV antibody	2	0.40%
3	Not applicable	450	84.10%
4	Missing	75	14.00%
	Total	535	100.00%
	Recent Screening VIA Results		
S/N	**Test results**	**Counts**	**% Frequencies**
1	Positive	29	5.40%
2	Negative	503	94.00%
3	Os not seen	1	0.20%
4	Missing	2	0.40%
	Total	535	100.00%

Among the 29(5.5%) positive cases of pre-cancerous lesions, none (0%) was less than 20yrs and none was ≥ 60 years, 3 (10.3%) were 20 -29 years, 10 (34.5%) were 30-39 years, 12 (41.4%) were 40-49 years and 4 (13.8%) were 50- 59 years. The distribution of the 502(94.4%) negative VIA screening results was 190(37.8%) for women aged 30-39yrs, 151(30.1%) for women aged 40-49yrs,86(17.1%) for those aged 20-29yrs,59(11.8%) for aged 50-59yrs ,13(2.6%) for those aged 60yrs and above. In a woman, the cervical os could not be located **[Table 5]**.

Table 5: VIA Screening results by Age

VIA results		**Age in group**						**Total**
		<20	**20-29**	**30-39**	**40-49**	**50-59**	**≥60**	
Negative	Count	3.00	86.00	190.00	151.00	59.00	13.00	502.00
	% within VIA Result	0.60%	17.10%	37.80%	30.10%	11.80%	2.60%	100.00%
	% within Age	100.00%	96.60%	95.00%	92.10%	93.70%	100.00%	94.40%
	% of Total	0.60%	16.20%	35.70%	28.40%	11.10%	2.40%	94.40%
Positive	Count	0.00	3.00	10.00	12.00	4.00	0.00	29.00
	% within VIA Result	0.00%	10.30%	34.50%	41.40%	13.80%	0.00%	100.00%
	% within Age	0.00%	3.40%	5.00%	7.30%	6.30%	0.00%	5.50%
	% of Total	0.00%	0.60%	1.90%	2.30%	0.80%	0.00%	5.50%
os not seen	Count	0.00	0.00	0.00	1.00	0.00	0.00	1.00
	% within VIA Result	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
	% within Age	0.00%	0.00%	0.00%	0.60%	0.00%	0.00%	0.20%
	% of Total	0.00%	0.00%	0.00%	0.20%	0.00%	0.00%	0.20%
Total	Count	3.00	89.00	200.00	164.00	63.00	13.00	532.00
	% within VIA Result	0.60%	16.70%	37.60%	30.80%	11.80%	2.40%	100.00%
	% within Age	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	% of Total	0.60%	16.70%	37.60%	30.80%	11.80%	2.40%	100.00%

Among women with positive VIA results for precancerous cervical lesions, those with parities of 3 and 4 accounted for the highest proportions of 31% each. This was followed by women, with parities of 2 and 1 accounting for 24.1% and 10.3% respectively. Women with a parity of 5 had the lowest proportion (3.4%; n=1) of women with positive precancerous lesions. None of the women with parities 0 and 6 had a positive precancerous lesion test result. The proportions of women with negative precancerous lesions range from 31.4% for women with parity 3(n=154), 23.2%(n=114) for women with parity 2,16.9%(n=83) for women with parity 1, 9%(n=44) for women with parity 0, 4.5%(n=22) for women with parity 5 and 0.8%(n=4) for women with parity 6 **[Table 6]**.

Table 6: VIA Screening results by Parity

VIA results		**Parity**							
		0	**1**	**2**	**3**	**4**	**5**	**6**	**Total**
Negative	Count	44.00	83.00	114.00	154.00	70.00	22.00	4.00	491.00
	% within VIA Result	9.00%	16.90%	23.20%	31.40%	14.30%	4.50%	0.80%	100.00%
	% within Parity	100.00%	95.40%	94.20%	94.50%	88.60%	95.70%	100.00%	94.20%
	% of Total	8.40%	15.90%	21.90%	29.60%	13.40%	4.20%	0.80%	94.20%
Positive	Count	0.00	3.00	7.00	9.00	9.00	1.00	0.00	29.00
	% within Result	0.00%	10.30%	24.10%	31.00%	31.00%	3.40%	0.00%	100.00%
	% within Parity	0.00%	3.40%	5.80%	5.50%	11.40%	4.30%	0.00%	5.60%
	% of Total	0.00%	0.60%	1.30%	1.70%	1.70%	0.20%	0.00%	5.60%
os not seen	Count	0.00	1.00	0.00	0.00	0.00	0.00	0.00	1.00
	% within VIA Result	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
	% within Parity	0.00%	1.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%
	% of Total	0.00%	0.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%
Total		44.00	87.00	121.00	163.00	79.00	23.00	4.00	521.00
		8.40%	16.70%	23.20%	31.30%	15.20%	4.40%	0.80%	100.00%
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		8.40%	16.70%	23.20%	31.30%	15.20%	4.40%	0.80%	100.00%

As seen in Table 7, the majority 13 (46.4%) of the participants with positive VIA results were civil servants, followed by traders accounting for 9 (31.0%) positive cases, and artisans accounted for 4 (14.3%) precancerous cases, clerics and the unemployed accounted for 1(3.4%) each. Among those with negative VIA screening results, the occupation distribution was civil servant 212(43.8%), trading 166(34.3%), Artisan 68(14%), Student 19(3.9%), retiree 9(1.9%), housewife 7(1.4%), Youth corper 2(0.4%) and Cleric 1(0.2%).

Table 7: VIA Screening results by Occupation

VIA results		**Occupation**									
		Trading	**Civil service**	**Artisan**	**Cleric**	**Youth corps**	**Retiree**	**Student**	**Unemployed**	**Housewife**	
Negative	Count	166.00	212.00	68.00	1.00	2.00	9.00	19.00	0.00	7.00	484.00
	% within VIA Result	34.30%	43.80%	14.00%	0.20%	0.40%	1.90%	3.90%	0.00%	1.40%	100.%
	% within Occupation	94.30%	94.20%	94.40%	50.00%	100.0%	100.0%	100.0%	0.00%	100.00%	94.3%
	% of Total	32.40%	41.30%	13.30%	0.20%	0.40%	1.80%	3.70%	0.00%	1.40%	94.3%
Positive	Count	9.00	13.00	4.00	1.00	0.00	0.00	0.00	1.00	0.00	28.00
	% within VIA Result	32.10%	46.40%	14.30%	3.60%	0.00%	0.00%	0.00%	3.60%	0.00%	100.%

	% within Occupation	5.10%	5.80%	5.60%	50.00%	0.00%	0.00%	0.00%	100.00%	0.00%	5.50%
	% of Total	1.80%	2.50%	0.80%	0.20%	0.00%	0.00%	0.00%	0.20%	0.00%	5.50%
os not seen	Count	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
	% within VIA Result	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.0%
	% within Occupation	0.60%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%
	% of Total	0.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%
Total	Count	176.00	225.00	72.00	2.00	2.00	9.00	19.00	1.00	7.00	513.00
	% within VIA Result	34.30%	43.90%	14.00%	0.40%	0.40%	1.80%	3.70%	0.20%	1.40%	100.%
	% within Occupation	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.00%	100.00%	100.%
	% of Total	34.30%	43.90%	14.00%	0.40%	0.40%	1.80%	3.70%	0.20%	1.40%	100.%

According to Table 8, n=20 (69%) of the participants with positive precancerous cervical lesion results had tertiary education, n=7 (24.1%) had secondary education, and only n=2 (6.9%) had primary education. The distribution was almost similar among those with negative VIA screening results, with 70%(n=348) having tertiary education, 24.6%(n=122) having secondary education, and 5.1%(n=25) having elementary or primary education **[Table 8]**.

Table 8: VIA Screening results by educational level

VIA result		Educational level			Total
		Primary	**Secondary**	**Tertiary**	
Negative	Count	25.00	122.00	348.00	495.00
	% within VIA Result	5.10%	24.60%	70.30%	100.00%
	% within educational level	89.30%	94.60%	94.60%	94.30%
	% of Total	4.80%	23.20%	66.30%	94.30%
Positive	Count	2.00	7.00	20.00	29.00
	% within VIA Result	6.90%	24.10%	69.00%	100.00%
	% within educational level	7.10%	5.40%	5.40%	5.50%
	% of Total	0.40%	1.30%	3.80%	5.50%
os not seen	Count	1.00	0.00	0.00	1.00
	% within VIA Result	100.00%	0.00%	0.00%	100.00%
	% within educational level	3.60%	0.00%	0.00%	0.20%
	% of Total	0.20%	0.00%	0.00%	0.20%
Total	Count	28.00	129.00	368.00	525.00
	% within VIA Result	5.30%	24.60%	70.10%	100.00%
	% within educational level	100.00%	100.00%	100.00%	100.00%
	% of Total	5.30%	24.60%	70.10%	100.00%

Among women with positive precancerous screening results, only 1 (3.7%) was HIV positive and placed on antiretroviral therapy (ART). Others were HIV negative (n= 6; 22.2%) and unknown HIV status(n=20;74.1%). For women with negative VIA results, 36(7.7%) were HIV positive, and on ART, 139(29.7%) were HIV negative, and 293(62.6%) were of unknown HIV **[Table 9]**.

Table 9: VIA Screening results by HIV status

VIA result		**HIV test result**			**Total**
		Positive on ART	**Negative**	**Unknown**	
Negative	Count	36.00	139.00	293.00	468.00
	% within VIA result	7.70%	29.70%	62.60%	100.00%
	% within HIV test result	97.30%	95.90%	93.30%	94.40%
	% of Total	7.30%	28.00%	59.10%	94.40%
Positive	Count	1.00	6.00	20.00	27.00
	% within VIA result	3.70%	22.20%	74.10%	100.00%
	% within HIV test result	2.70%	4.10%	6.40%	5.40%
	% of Total	0.20%	1.20%	4.00%	5.40%
os not seen	Count	0.00	0.00	1.00	1.00
	% within VIA result	0.00%	0.00%	100.00%	100.00%
	% within HIV test result	0.00%	0.00%	0.30%	0.20%
	% of Total	0.00%	0.00%	0.20%	0.20%
Total	Count	37.00	145.00	314.00	496.00
	% within VIA Result	7.50%	29.20%	63.30%	100.00%
	% within HIV test result	100.00%	100.00%	100.00%	100.00%
	% of Total	7.50%	29.20%	63.30%	100.00%

Table 10: Regression of factors on CIA result

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Significant**	**Decision**
		B	Std. Error	Beta			
	(Constant)	.974	.141		6.886	.000	
	Parity	.007	.011	.039	.677	.498	Not significant
	Educational level	-.040	.020	-.093	-1.964	.050	Not significant
	Occupation	-.001	.008	-.007	-.149	.882	Not significant
	Age in group	-.002	.014	-.009	-.168	.867	Not significant
	HIV test result	.021	.014	.070	1.480	.140	Not significant
	Marital status	.056	.063	.048	.899	.369	Not significant
There was no statistically significant relationship between positive VIA result for precancerous lesions and the participants' parity, educational level, occupation, age, HIV infection and marital status.							

Discussion

Cervical cancer is a chronic disease that often presents with minor symptoms that may go unnoticed or neglected for years until it gets to the clinically apparent stage when all available treatment interventions only have a marginal effect on prognosis **[11]**. Unfortunately, in most developing countries, including Nigeria, most women present at late stages of the cancer with consequent poor prognosis and increased burden of mortality **[22]**. The five-year overall survival rate in African countries for cervical cancer was found to be 40.9% 24. The mortality rate for cervical cancer was high in Nigeria; it was found to be 30.5 per 100 women years at 2.2 years of follow-up in a study by Ola et al. **[25]**. In this study, diagnosis of pre-cancerous lesions of the cervix was made by positive VIA test result. This early stage of cervical cancer provides excellent opportunities for a significant reduction in the burden of cervical cancer if detected before transformation to malignancy and treated appropriately. These treatments are simple and cheap but primarily come with very little or no complications. Screening, the veritable tool for detection of the pre-cancerous lesions, can prevent up to 80% of cervical cancer1, 14, 26 and reduce mortality by about 70% **[12]**. Detection of cervical cancer at an early stage has been found to be associated with better treatment outcomes, but the majority in developing countries present late **[27]**. In addition, organized and mass screening is low in most developing countries. Less than 9% of women in Nigeria have been reportedly screened for cervical cancer, while in South Africa, the rate was between 0.4% and 20.2% **[1,4,16]**. In this research, mobilizing women from both hospitals and

communities was very effective in recruiting enough participants for cervical screening. Part of our findings showed that only 1.9% of the participants had been previously screened, while in another study in Ibadan, 13.5% had previously presented themselves for screening **[22]**. The goal of cervical cancer screening is to detect and treat the precursors of cervical cancer and ultimately reduce the incidence of invasive cancer and its morbidity and mortality [**28,29]**. However, the attitudeof Nigerians to screening seems very poor. Only 34.4% of the participants in this study knew their HIV status despite the seemingly ubiquitous availability of HIV screening services in the countrydespite low or no cost for HIV screening. This rate is even relativelyhigh compared with 3% and 17.8% in Ghana and Nigeria, respectively, but lower than the 42.1% rate in South Africa in a study on the prevalence of invasive cervical cancer **[17]**. The high rate in this study was probably because some participants in this study were among clients attending ART clinics for people living with HIV. HIV/AIDS has been associated with increased occurrence of different types of cancers, which include Kaposi sarcoma, non- Hodgkin lymphoma, Hodgkin lymphoma, and cervical cancer. While a study in Nigeria showed a marginal increase in pre- cancerous and cancer ofthe cervix in people living with HIV, a study in Tanzania had a statistically significant association between HIV and the development of pre-cancerous lesions of the cervix **[30]**. However, in this study, there was no statistically significant association between HIV and pre-cancerous lesions of the cervix, probably because all HIV- positive participants in this study were on anti-retroviral drugs. This also underscores the critical role of screening and treatment of HIV in the prevention of opportunistic diseases in HIV/AIDS.

The incidence of pre-cancerous cervical lesions, indicated by positive VIA, in this study, was 5.4%, lower than the 27.4 prevalence rate in Ethiopia but similar to the 5% prevalence rate in a survey by Durowade et al. and was in tandem with WHO reported pattern **[11,31]**. Unlike in the study in South Africa, where prevalence was highest in the lower age group of 20-24years for low-grade squamous intraepithelial lesions (LSIL) with no specific pattern for high-grade squamous intraepithelial lesions, the peak incidence in this study was among 30- 49yrs which accounted for about 75% of the positive result **[32]**. While the South African survey used a Pap smear, VIA, which has no capacity to differentiate the intraepithelial lesions, was used in this study. As in the study in South Africa and Ethiopia, there was no significant relationship between socio-economic level (marital status, educational level, and occupation), parity, and age in this study **[31,32]**.

Conclusion

Although invasive cervical cancer is preventable, it remains one of the most common causes of cancer deaths among women in developing countries, mainly due to poor attitudes towards and poor access to screening.

Using a two-pronged approach of community-based and health facility-based mobilization strategies to recruit participants in this study effectively yielded the required sample size to the screen.

Mass and regular screening and vaccination with the HPV vaccine can drastically reduce the morbidity and mortality associated with cervical cancer, but this requires concerted efforts by the government and other concerned organizations to create awareness and provide necessary logistics for mass and regular screening. The very low rate of women who had had previous screening showed a significant gap in accessing cervical cancer screening.

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