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COMPARATIVE ASSESSMENT OF KNOWLEDGE OF CERVICAL CANCER SCREENING PRACTICES AMONG HIV-INFECTED AND UNINFECTED WOMEN ATTENDING TERTIARY HOSPITAL IN JOS, PLATEAU STATE, NIGERIA.

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Abstract

Introduction

Cervical cancer is caused by human papillomavirus that affects cervical cells. It is one of the leading causes of cancer-related death in Africa. Owing to the increasing rate of cervical cancer, there is a need to evaluate the knowledge of cervical cancer screening practices among women to minimize its occurrence and progression in at-risk individuals. This study aimed to assess the knowledge of cervical cancer among HIV-infected and HIV-uninfected women attending accessing care in a tertiary hospital in Jos, Plateau State.

Methods

The study was a comparative cross-sectional study, conducted at BHUTH among HIV-infected and HIV-uninfected women. A structured interviewer-administered questionnaire was used to collect data which was analyzed using SPSS version 23.

Results

Among the respondents, 50 (40.3%) and 55 (44.4%) of the HIV-infected and HIV-uninfected women had good knowledge of cervical screening practices. Among the HIV-infected women, those with tertiary education had 8 odds (AOR=8.233, 95%CI: 2.41–28.1, p=0.001) of having good knowledge of cervical screening practices compared to those without education. Married participants and those who had 2 or more sexual partners had 0.06 odds (AOR=0.056, 95%CI: 0.01–0.35, p=0.002) and 0.2 odds (AOR=0.236, 95%CI: 0.07–0.80, p=0.02) respectively of having good knowledge of cervical screening practices compared to those who were single with 1 sexual partner respectively. Among the HIV-uninfected women, those who were non-Plateau indigenes had 2.9 odds (AOR=2.921, 95%CI: 1.25 – 6.83, p=0.013) of having good knowledge of cervical screening practices compared to those who were Plateau indigenes.

Conclusion

The knowledge of cancer screening practices was poor among the study participants. Therefore, the government should ensure that awareness of cervical cancer among women is improved through the dissemination of accurate information and include cervical cancer vaccinations in the national immunization program.

Keywords: *Cervical cancer, knowledge of cervical cancer, Human Immunodeficiency Virus.*
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Introduction

Cervical cancer is one of the most frequently occurring cancers among women globally, with an estimated 570,000 new cases representing 7.5% of all cancers in women in 2018. [1,2] Africa was second to Asia for new cases of cervical cancer [119,284 [20.9%]), deaths

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[81,687 [26.2%]), and a 5-year prevalence of 16.1% in 2018. [3] In Africa, where cervical cancer is a leading cause of cancer death, [4, 5],[6] In West Africa, there were 31,955 new cases of cervical cancer and 23,529 cervical cancer deaths. [3] In Nigeria, there were 53.1 million women were at risk for cervical cancer (≥15 years) in 2018. The annual number of new cervical cancer cases was 14,943 (15.07%), with 10,403 (17.19%) cancer deaths and a 5-year prevalence of 14.03% in 2018. [3]

Increased communication with women to advance their knowledge is critical to increasing access to cervical cancer prevention at all levels. [7] The level of knowledge about cervical cancer and screening varies across and within countries. According to recent studies, people have varying levels of knowledge of cervical cancer risk factors, symptoms, and treatment options. [8] However, a Knowledge gap exists between the level of knowledge and screening practice and health system challenges. For HIV-infected women, service uptake is affected by the limited integration of HIV and cervical cancer prevention and treatment services. [9]

In Nigeria, less than 10% of women have undergone cervical screening, whereas developed countries screen 60%-80% of women. [10][11, 12] Worse still, the uptake of Pap smear tests in Nigeria is even lower when compared with other developing countries. [13, 14] In Nigeria, women's uptake in the general population ranges from 1.4% to 8.7%[15–17],[18] while it ranges from 2.9% to 32.6% among health workers and civil servants. [18–20],[21] In Jos, studies have revealed a 32.6%(26) uptake among tertiary hospital staff and a 2.4%-13.91%([21] among the staff of a tertiary hospital, 2.4%-13.91%[22] among undergraduate students Previous research has found that Pap smear uptake in HIV-infected women is also low. [23] This is worrisome because HIV infection increases the risk of cervical cancer development. [24] cervical cancer screening uptake among HIV-infected women in a Kenyan study was 19%[23], 23.5% in Ethiopia[7], and 9.4% in Nigeria. [25] These values did not seem to differ from those in HIV-uninfected women. [21]

Despite the existence of a Nigerian National Cancer Control Plan 2018-2022, the country lacks a well-coordinated national cervical cancer screening program. [26],[27] In the absence of an organized screening policy, women are screened at the request of patients, at the recommendation of health workers, or through awareness programs organized by individuals or non-governmental organizations. Some screening programs are episodic and mostly available at secondary and tertiary health facilities, leaving out PHCs, which serve the majority of the population. [14, 28] 42 In most developing countries, primary healthcare facilities, where preventive healthcare such as cervical screening should be available, are either devoid of such services, have limited availability, or are under-resourced and overburdened. Most resource-poor countries have limited cancer diagnostics, treatment, and palliative care services, which are exacerbated by the urban/rural divide in healthcare availability and access. [29] This study aimed to assess the knowledge of cervical cancer among HIV-infected and HIV-uninfected women attending accessing care in a tertiary hospital in Jos, Plateau State.

Methods and tools

Study Design

This was a cross-sectional comparative study.

Study Setting

The study was carried out at Bingham University Teaching Hospital (BHUTH) [DATE]*, which is situated in Plateau State's Jos North LGA, and served as the study site. [30] The Hospital has a vesicovaginal fistula center that provides clinical services to hundreds of thousands of women from within and outside the country. [31]

The Jos North LGA has an HIV prevalence of 16%, which is the highest among the 17 LGAs of the State. [32][33] The Local Government Area is home to seven healthcare facilities, providing comprehensive HIV treatment, including Jos University Teaching Hospital (JUTH), BHUTH, Plateau Specialist Hospital, Our Lady of Apostle Hospital, Faith Alive Foundation, Hwolshe Medical Center, and Solat Hospital, all of which are funded by the PEPFAR program through APIN Public Health Initiative.

Study Participants

The study was carried out among two groups consisting of 124 HIV-infected groups and 124 HIV-uninfected groups.

HIV-infected group: All HIV-infected women of reproductive age group, confirmed by evident test results, with a history of at least one childbirth and accessing HIV care and treatment BHUTH, Jos.

HIV uninfected group: This group consists of HIV uninfected women of reproductive age group, confirmed by evident test results with a history of at least one childbirth attending postpartum/immunization clinics in BHUTH, Jos.

Inclusion criteria

HIV-infected group:

HIV-infected women confirmed positive HIV test results within the reproductive age of 15-49 years, with at least one childbirth and access to HIV care and treatment in BHUTH, Jos.

HIV uninfected group:

HIV-uninfected women confirmed from evident negative HIV test results within the reproductive age of 15-49 years, with at least one childbirth and attending a post-partum/immunization clinic in BHUTH, Jos.

Exclusion criteria

HIV-infected and HIV-uninfected women who have been diagnosed with cervical cancer were excluded from the study.

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Data source/ measurement

A structured interviewer-administered questionnaire was used to obtain relevant information from the participants. This was adapted from Champion's Health Belief Model (CHBM) scale and WHO "Improving data for decision-making: a toolkit for cervical cancer prevention and control programs [34]. The questionnaire had four sections: a) sociodemographic, b) knowledge, c) screening practices, and d) factors affecting risk perception and screening uptake.

Five research assistants were trained to assist with data collection. The questionnaire was pretested on 10% of the total sample at the Comprehensive Health Center Dadin Kowa in Jos South. This aided in detecting ambiguities, assessing the ease of administration of the questionnaire, and including relevant questions that were previously omitted. Data were collected over four weeks, from May 10th to June 15, 2021. HIV status was determined from the participant files for both HIV-infected and uninfected participants. Data were collected in the HIV clinic for the HIV-infected group and in the immunization/post-partum clinic for the HIV-uninfected group until the sample size was reached.

The cervical cancer knowledge questions included knowing what cervical cancer is, risk factors for cervical cancer, and signs and symptoms of cervical cancer and screening. The screening knowledge included ever having a Pap smear and the recommended age to start cervical screening tests. Each correct answer was assigned a score of one while an incorrect answer was scored zero, with the knowledge score calculated as the sum of the scores for knowledge regarding cervical cancer. Cervical cancer knowledge and screening uptake among HIV-infected and uninfected women were measured as the dependent variables. Sociodemographic characteristics, as well as factors influencing knowledge and screening uptake, were measured as independent variables.

A 16-point knowledge score was used to assess the knowledge of cervical cancer. The respondents were asked 16 knowledge questions, with 16 correct answers. Each correct response received a score of one, whereas incorrect responses received a score of zero. It asks about cervical cancer symptoms, prevention, early detection, and treatment. Women with summary scores greater than or equal to the mean value were categorized as having "good knowledge" and those with scores less than the mean were categorized as having "poor knowledge."[35] The logistic regression model dichotomized the data using the mean.

Sample size and sampling technique

The minimum sample size was determined using the formula for determining the sample size for a comparative study.

$$n = \frac{2(z\alpha + z\beta)^2 \; P(1-P)}{(p1-p2)2}$$

Where n = minimum sample size in the 2 groups

$z\alpha$ = standard normal deviate corresponding to a 5% level of significance =1.96 Confidence

$z\beta$ = standard normal deviate corresponding to a power of 80%=0.84

p1= proportion of Pap smear uptake among HIV-infected women in Botswana =80% [44]

p2= proportion of Pap smear uptake among HIV uninfected women in Botswana=64% [44]

$P = \frac{p1 + p2}{2} = 80+64/2=72\%=0.72$

d = expected difference between the two groups= p1-p2=80%-64%=16%

The minimum sample size calculated is 124 HIV-infected and uninfected women for each group.

Convenience sampling was used to recruit participants who met the inclusion criteria for each group. This procedure was repeated on each HIV clinic day until the sample size was reached. Similarly, women who met the inclusion criteria for the uninfected group were recruited at each post-partum/immunization clinic until the sample size was met as shown in Figure 1 below.

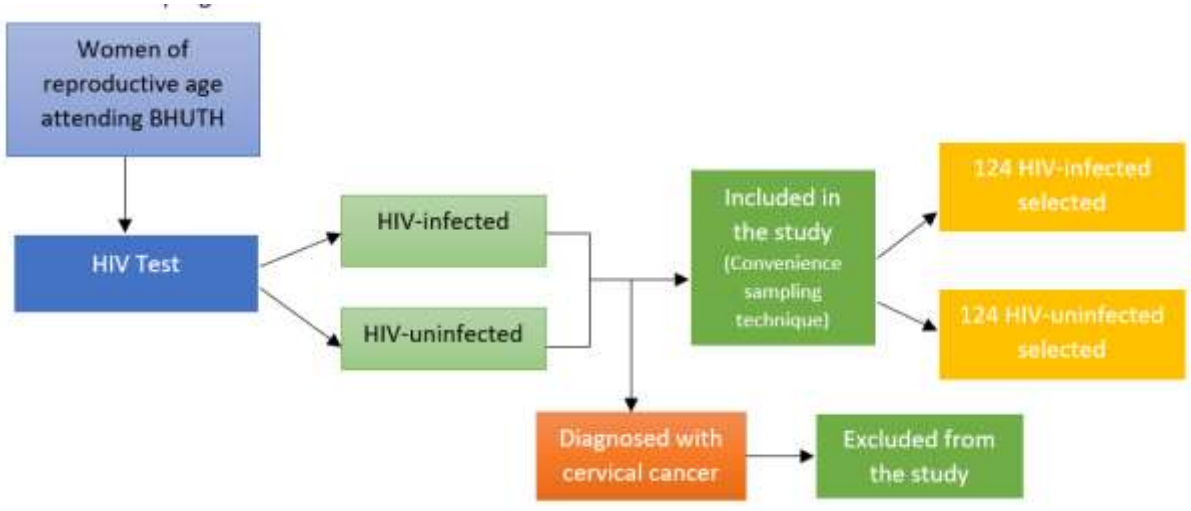

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Figure 1: Showing a selection of study participants

Data analysis

All generated data were entered into Excel and analyzed using the IBM Statistical Package for Social Sciences (SPSS) version 23. For all statistical tests, a p-value of 0.05 was considered statistically significant. The quantitative variables were described with means and standard deviations, while the basic descriptive statistics of the socio-demographic characteristics were presented as frequencies and percentages.

The chi-square test was used to describe associations between socio-demographic features stratified by HIV status. The significance of the relationship between these groups was also evaluated. Mean and standard deviation were used to summarize the scores for each item. The chi-squared test was used to compare cervical cancer knowledge and screening practices stratified by HIV status.

Ethical consideration

The study received ethical approval from the Bingham University Teaching Hospital Ethical Committee (ethical approval ID: **NHREC/21/05/2005/00768**. Permission was obtained from the office of the BHUTH's Chief Medical Director. All the study participants provided written informed consent. Respondents could opt out at any time during the study if desired. Participants were assured that their information would be treated confidentially. This study was conducted by the principles of the Declaration of Helsinki.

Results

One hundred (100) and twenty-four (24) respondents were interviewed in both HIV-infected and uninfected groups respectively and the age range of the respondents in this study was 15 -49 years and age was statistically significant with p=0.001. Most of the HIV-infected respondents had 45(66.2%) secondary education, while most had tertiary education among HIV-uninfected respondents 88 (69.3%), which was statistically significant (p = 0.001). The majority of both groups were married: the HIV-infected group 67(37.6%) and the uninfected group 111(62.4%), and the marital status was significant (p=0.001). Most of the respondents in both HIV-infected 112(48.7) and uninfected groups 118(51.3) had a parity of 1-3 children which was comparable (p = 0.220). The majority of the respondents in the HIV-infected group 37(64.9) reported having multiple sexual partners compared to uninfected respondents 20(35.1). Christianity was the predominant religion among the respondents in this study, with 139 (78.1%) in the HIV-infected group and 134(75.3%) in the non-HIV-infected group. In both the HIV-infected and uninfected groups, the majority of the respondents were unemployed (97(51.3%) and 92(48.7%), respectively) (Table 1).

Table 1: Sociodemographic characteristics of HIV-infected and Uninfected women respondents

Variables	HIV status		p-value
	Infected (n=124) Freq (%)	Uninfected (n=124) Freq (%)	
Age group (yrs)			
15-24	20(29.4)	48(70.6)	0.001*
25-34	38(36.2)	67(63.8)	
35-44	41(83.7)	8(16.3)	
≥45	25(96.2)	1(3.8)	
Educational level			
No education	10(83.3)	2(16.7)	0.001*
Primary	30(73.2)	11(26.8)	
Secondary	45(66.2)	23(33.8)	
Tertiary	39(30.7)	88(69.3)	
Marital status			
Single	30(76.9)	9(23.1)	0.001*
Married	67(37.6)	111(62.4)	
Separated	12(75.0)	4(25.0)	
Widow	15(100.0)	0(0.0)	
Parity			
1-3	112(48.7)	118(51.3)	0.220
≥4	12(66.7)	6(33.3)	
Number of sexual partners			

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1	87(45.5)	104(54.5)	0.30
≥2	37(64.9)	20(35.1)	
Religion			
Christian	107(50.0)	107(50.0)	1.000
Islam	17(50.0)	17(50.0)	
Ethnicity			
Plateau ethnicity	57(53.3)	50(46.7)	0.370†
Non-Plateau ethnicity	68(48.0)	74(52.0)	
Employment status			
Employed	27(45.8)	32(54.2)	0.551
Unemployed	97(51.3)	92(48.7)	

**Statistically significant.* *† Fisher's exact test.*

Table 2: Knowledge of Cervical cancer among HIV-infected and HIV-uninfected women respondents

Variable	HIV Status		X^2	p-value
	Infected (n = 124) Freq (%)	Uninfected (n = 124) Freq (%)		
Ever heard of cervical cancer				
Yes	71(46.7)	81(53.3)	1.700	0.241
No	53(55.2)	43(44.8)		
Know ways of getting Cervical cancer				
Yes				
No	12(32.4)	25(67.6)	5.369	0.031*
	112(53.1)	99(46.9)		
Know symptoms of Cervical cancer				
Yes				
No	34(40.5)	50(59.5)	4.609	0.044*
	90(54.9)	74(45.1)		
HIV infection predispose to Cervical cancer				
Yes	43(53.1)	38(46.9)	0.458	0.588
No	81(48.5)	86(51.5)		
HPV infection predispose to Cervical CA				
Yes				
No	46(46.0)	54(54.0)	1.072	0.365
	78(52.7)	70(47.3)		
STIs predispose to Cervical CA				
Yes	58(49.6)	59(50.4)	0.016	1.000
No	66(50.4)	65(49.6)		
Poor body hygiene predisposes to Cervical CA				
Yes	48(43.6)	62(56.4)	3.202	0.096
No	76(55.1)	62(44.9)		
Sharing needles predisposes to Cervical CA				
Yes	75(48.4)	80(51.6)	0.430	0.600
No	49(52.7)	44(47.3)		
Cigarette smoking predisposes to Cervical CA				
Yes	46(42.6)	62(57.4)	4.199	0.054
No	78(55.7)	62(44.3)		

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COC predisposes to Cervical CA				
Yes	42(45.2)	51(54.8)	1.394	0.294
No	82(52.9)	73(47.1)		
Having multiple full-term pregnancies predisposes to Cervical CA				
Yes	34(53.1)	30(46.9)	0.337	0.664
No	90(48.9)	94(51.1)		
Weak immunity predisposes to Cervical CA	39(37.9)	64(62.1)	10.378	0.002*
Yes	85(58.6)	60(41.4)		
No				
Family History cervical CA predisposes to Cervical CA	52(48.6)	55(51.4)	0.148	0.798
Yes	72(51.1)	69(48.9)		
No				
Alcohol consumption predisposes to Cervical CA				
Yes	40(43.5)	52(56.5)	2.488	0.148
No	84(53.8)	72(46.2)		
Multiple sexual partners predispose to Cervical CA				
Yes	82(49.7)	83(50.3)	0.018	1.000
No	42(50.6)	41(49.4)		
Have heard of pap smear				
Yes	39(63.9)	22(36.1)	6.283	0.018*
No	85(45.5)	102(54.5)		
Overall knowledge of Cervical CA				
Good	50(47.6)	69(52.4)	0.413	0.607
Poor	74(51.7)	55(48.3)		

Statistically significant.

Table 2, the majority of respondents had heard of cervical cancer, and this was lower among HIV-infected respondents compared to uninfected respondents, though this was not statistically significant. However, most of them did not know the mode of transmission of causative organisms (HIV infected 112(46.1%), uninfected 99(46.9%) (X2 = 4.609; df = 1, p = 0.044), signs of cervical cancer (HIV infected 90(54.9%), uninfected 74(45.1%), they were asked if HIV predisposed to cervical cancer. The majority did not know (p = 0.588). The majority of respondents, both HIV-infected and uninfected, were unaware of risk factors such as cigarette smoking, having many children, and having a weak immune system.

More than two-thirds of the respondents in both the HIV-infected 72(51.1%) and uninfected 69(48.9%) groups did not consider a family history of cervical cancer to be a risk factor, which was comparable. The majority of respondents were unaware that alcohol consumption was a risk factor (112 HIV-infected (46.1%), uninfected 99 (46.9%); p = 0148). However, half of the HIV-infected 82 (49.7%) and uninfected 83 (50.3%) respondents were aware of multiple sexual partners as a risk factor for cervical cancer, although this was not statistically significant (Table 2).

The majority of HIV-infected respondents 39(63.9%) had heard of pap smear as a screening technique for cervical cancer, whereas the uninfected 22(36.1%) had not, and this was not comparable between the two groups (p = 0.018). About half of the respondents in the HIV-infected group 74(51.7%) and the uninfected group 55(52.4%) had poor knowledge of cervical cancer and were not statistically significant (X2 = 0.413; df = 1, p = 0.607) (Table 2).

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Table 3: Factors affecting knowledge of cervical cancer among HIV-infected and uninfected women

	Knowledge of cervical cancer			
	HIV infected n = 124		HIV uninfected n = 124	
variables	**Good n = 50 Freq (%)**	**Poor n = 74 Freq (%)**	**Good n = 55 Freq (%)**	**Poor n= 69 Freq (%)**
Age group(yrs)				
15-24	9(45.0)	11(55.0)	21(43.8)	27(56.3)
25-34	21(55.3)	17(44.7)	28(41.8)	39(58.2)
35-44	14(34.1)	27(65.9)	6(75.0)	2(25.0)
≥44	6(24.0)	19(76.0)	0(0.0)	1(100.0)
	X^2 =7.125; df =3; p = 0.069		X^2=4.027; df =3, p = 0.254	
Educational level				
No education	0(0.0)	10(100.0)	0(0.0)	2(100.0)
Primary	7(23.3)	23(76.7)	4(36.4)	7(63.6)
Secondary	29(64.4)	16(35.6)	13(56.5)	10(43.5)
Tertiary	14(35.9)	25(64.1)	38(43.2)	50(56.8)
	X^2 =21.554; df =3, p =0.001*		X^2=3.307; df = 3; p = 0.386	
Marital status				
Single	5(16.7)	25(83.3)	8(88.9)	1(11.1)
Married	36(53.7)	31(46.3)	47(42.3)	64(57.7)
Separated	3(25.0)	9(75.0)	0(0.0)	4(100.0)
Widowed	6(40.0)	9(60.0)		
	X^2 =13.154; df =3; p = 0.003*		X^2 = 10.603; df = 2; p = 0.002 *	
Parity				
1.3	47(42.0)	65(58.0)	55(46.6)	63(53.4)
≥4	3(25.0)	9(75.0)	0(0.0)	6(100.0)
	X^2 =1.296; df =1 p =0.358		X^2=5.026, df =1; p = 0,033*	
Number of sexual partners				
1	42(48.3)	45(51.7)	52(50.0)	52(50.0)
≥2	8(21.6)	29(78.4)	3(15.0)	17(85.0)
	X^2 =7.664; df =1; p = 0.009*		X^2 = 8.325; df=1; p = 0.006*	
Religion				
Christian	45(42.1)	62(57.9)	51(47.7)	56(52.3)
Islam	5(29.4)	12(70.6)	4(23.5)	13(76.5)
	X^2 = 0.975; df = 1; p = 0.428		X^2 =3.462; df = 1; p =0.071	
Ethnicity				
Plateau ethnicity	16(28.1)	41(71.9)	33(66.0)	17(34.0)
Non-Plateau ethnicity	34(50.7)	33(49.3)	22(29.7)	52(70.3)
	X^2 = 6.581; df =1; p =0.017*		X^2 =15.904; df =1; p =0.001*	
Employment status				
Employed	10(37,0)	17(63.0)	14(43.8)	18(56.3)
Unemployed	40(41.2)	57(58.8)	41(44.6)	51(55.4)
	X^2 = 0.155; df =1; p = 0.825		X^2 =0.006; df = 1; p =1.000	

Statistically significant.

As shown in Table 5, among HIV-infected respondents, knowledge of cervical cancer was significantly associated with level of education (p = 0.001). Marital status was associated with cervical cancer knowledge in both HIV-infected (p = 0.003) and uninfected (p = 0.002) women. Parity was significantly associated with knowledge of cervical cancer among the uninfected respondents (p = 0.033). The number of sexual partners and ethnicity were significantly associated with cervical cancer knowledge in both HIV-infected and uninfected women (p < 0.05).

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Table 4: Logistic regression showing predictors of knowledge among HIV-infected and uninfected respondents

	HIV infected			HIV uninfected		
Variable	**AOR**	**95% CI**	**p-value**	**AOR**	**95% CI**	**p-value**
Educational level						
No education						
Primary	1			1		
Secondary	0.001	0.01-1.00	0.998	0.001	0.01-1.00	0.999
Tertiary	0.231	0.05-0.96	0.044*	0.567	0.14-2.24	0.418
	8.233	2.41-28.1	0.001*	1.499	0.49-4.51	0.473
Marital status						
Single	1			1		
Married	0.056	0.01-0.35	0.002*	4.821	0.01-1.00	0.999
Separated	0.246	0.05-1.30	0.099	625.166	0.01-1.00	0.999
Widow	0.51	0.20-1.24	0.078			
Ethnicity						
Plateau ethnicity	1					
Non-Plateau ethnicity	0.023	0.08-0.83	0.249	2.921	1.25-6.83	0.013*
Number Sexual partner						
1	1					
≥2	0.236					
		0.07-0.80	0.020*	0.350	0.09-1.43	0.144

Statistically significant.** **† Fisher's exact test.

The results in Table 6 show that respondents with a tertiary level of education had eight times the odds of having good knowledge of cervical cancer compared to those with no education in the HIV-infected group, which was statistically significant (AOR = 8.23, CI 2.41- 28.13, p = 0.001). Among HIV-infected respondents, those who were married were 44% less likely to have good knowledge of cervical cancer than those who were single (AOR = 0.056, CI 0.01-0.35, p = 0.002). Non-Plateau ethnic groups had roughly three times the odds of having good knowledge of cervical cancer compared to Plateau ethnic groups, and this was statistically significant (AOR = 2.92, 1.25-6.83, p = 0.013), and having more than one sexual partner among HIV-infected women (AOR = 0.024, CI 0.07-0.80, p = 0.020) had greater odds of having good knowledge of cervical cancer than those with only one sexual partner.

Discussion

Cervical cancer knowledge was low among both HIV-infected (40.3%) and uninfected (44.4%) respondents in this study. A similar finding was reported in studies conducted in Ogun, Edo, Ibadan, and Lagos. [36] [37] [38][39] However, this contrasted with findings from a study of Nigerian university students and female health workers in south-south Nigeria. [40] [14][18] A study was conducted among female Jos University Teaching Hospital employees who also reported a high level of knowledge about cervical cancer. [21] The difference may be because university students and healthcare workers have a higher educational level, which is associated with greater awareness of cervical cancer, compared to this study population, which has a lower educational attainment. A more intriguing finding was that only about one-third of the study participants in both HIV-infected and uninfected groups correctly identified human papillomavirus as the causative agent responsible for cervical cancer and sex as the route of transmission.

This study discovered that educational level (X2= 21.554, p = 0.001) was associated with knowledge of cervical cancer among HIV-infected respondents but not with knowledge of cervical cancer among HIV-uninfected respondents. This study also found that HIV-infected respondents' educational status significantly predicted their knowledge of cervical cancer, with those with a tertiary level of education being eight times (AOR = 8.233, 95% CI: 2.41 – 28.1, p = 0.001) more likely to have good knowledge of cervical cancer than those with no formal education. This finding emphasizes the critical role that education can play in improving the knowledge of health interventions.

There was a significant association between marital status and knowledge of cervical cancer among both the HIV-infected (X2= 13.145, p = 0.003) and uninfected respondents (X2 = 10.603, p = 0.002). A similar finding was reported by a study conducted in Australia. However, this was not consistent with a study conducted in North Central Nigeria, which reported no association between marital status and cervical cancer knowledge. [41] Another study conducted in Jos also reported no

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significant influence of marital status on knowledge of cervical cancer. [42] This may be because the majority of the respondents were married, which may have nullified marital status as a confounding determinant of the awareness of cervical cancer. The finding in this study may be because married respondents would have had several encounters with health facilities and are likely to have some form of awareness in the course of antenatal visits, postnatal visits, and immunization.

Multiple sexual partners were associated with knowledge of cervical cancer in both HIV-infected (X2 = 7.664, p = 0.009) and uninfected respondents (X2 = 8.325, p = 0.006). Multiple sexual partners predicted cervical cancer knowledge among HIV-infected respondents but not among uninfected respondents. Those who had multiple sexual partners were less likely (AOR = 0.236, 95%CI: 0.07 – 0.80, p = 0.020) to have good knowledge of cervical cancer than those with one sexual partner. Multiple sexual partners increase the risk of STIs linked to cervical cancer in young women. [43] Respondents with multiple sexual partners are expected to be more aware of cervical cancer. Poor knowledge among respondents with multiple sexual partners may explain the reasons for risky behavior and, as a result, poor utilization of cervical cancer prevention services. According to the findings of this study, the respondents had a general lack of knowledge about the disease. Most respondents were unaware of the cause, symptoms, and mode of transmission of the organism linked to cervical cancer. Another indicator of poor knowledge was the lack of gynecological examination practices. It is possible that the methods used to educate the public about cervical cancer are ineffective or that health education on cervical cancer was neglected, which hurts cervical cancer control in Nigeria.

Ethnicity was associated with cervical cancer knowledge among HIV-infected (X2 = 6.581, p = 0.017) HIV-uninfected respondents (X2 = 15.904, p = 0.001). Those of non-plateau indigenous ethnicity have more knowledge (AOR = 2.921, 95% CI: 1.25 – 6.83, p = 0.013) than those of plateau ethnicity in the HIV-uninfected group. This could be because Jos, the capital of the Plateau State, is a cosmopolitan city; the majority of non-plateau indigenous ethnicities are civil servants with a high level of education, or they are business people who can afford screening services.

There was a significant difference (X2 = 6.283, p = 0.018) in screening practices between the HIV-infected and uninfected respondents in this study. This could be because women with HIV infection may have had greater access to screening programs driven by HIV treatment, care, and support. However, a cervical cancer screening program is not available in all facilities. It is frequently captured under donor-funded free HIV treatment. On the other hand, lack of funding is a major barrier to increasing cervical cancer screening in Nigeria. The government's lack of funding for cervical cancer screening in Nigeria raises concerns about the future sustainability and control of cervical cancer given donor fatigue and withdrawal.

The findings in the study cannot be generalized in the population of women of reproductive age group in Jos, Plateau state due to the unrepresented sample size and the fact that a non-probability (convenience) sampling technique was used. There is a need to carry out this study in the general population.

Conclusion

This study was carried out among HIV-infected and uninfected women. Both HIV-infected and uninfected women had low knowledge of screening practices for cervical cancer. Tertiary education, being married, and having multiple sexual partners predicted good knowledge of cervical cancer among HIV-infected women while ethnicity predicted good knowledge of cervical cancer among HIV-infected and uninfected women.

Study limitation

The fear of stigma and discrimination following the disclosure of status to the research team, since the team is not part of their regular care provider, was controlled through the elimination of identifiers in the questionnaire by coding each questionnaire and assuring confidentiality.

Recommendations

Interventions are required to improve the knowledge of cervical cancer among women in the Jos, Plateau state. The government should implement cervical cancer vaccinations in the national immunization program to prevent cervical cancer.

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Abbreviations

AOR	Adjusted Odds Ratio
HIV	Human Immune deficiency virus
BHUTH	Bingham University Teaching Hospital
CHBM	Champion's Health Belief Model
WHO	World Health Organization
LGA	Local Government Areas
JUTH	Jos University Teaching Hospital

Conflict of interests

Authors declare no competing interest

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Author contribution

IBK conceptualized the study; IBK, II.LNO, IJK, and HI wrote the first draft of the paper; NGB wrote the

discussion; JMA, FSR, and II wrote the abstract and introduction; and IBK, II, and LNO analyzed the data. All the authors have written and approved the final draft of the manuscript.

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