AJPMHS
GLOBAL RESEARCH NETWORK

AMERICAN Journal of Pediatric Medicine and Health Sciences
Volume 01, Issue 09, 2023 ISSN (E): 2993-2149

EVALUATION OF AWARENESS AND READINESS TO INVEST IN HPV VACCINE AMONG WOMEN WITH DOCUMENTED HIV STATUS IN OYO STATE

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Abstract

This study investigated the level of awareness and financial preparedness of women with confirmed HIV status in Oyo State regarding the HPV vaccine. The results indicated a limited inclination among these women to invest in HPV vaccines in the surveyed region. The Health Promotion Model served as the framework for the study, utilizing a descriptive cross-sectional research approach. A multi-stage sampling method was employed to select 397 women living with HIV in the study area, and data were collected through a pretested self-structured questionnaire. The collected data were coded and entered into SPSS version 23.0 for analysis, employing both descriptive and inferential statistical techniques with significance levels set at $p \leq 0.05$.

The mean age of the respondents was 44.18 ± 9.54 years, with 45.1% having secondary education as their highest educational qualifications. Knowledge levels were observed, with 15.9% and 53.4% having good knowledge of HPV and cervical cancer, respectively. Only 17.1% demonstrated good knowledge of the HPV vaccine, while 16.1% expressed a willingness to pay for it. Additionally, 58.9% were willing to have their daughters vaccinated, and 55.4% acknowledged a willingness to cover the cost of their daughters' vaccine. Education status was found to be significantly associated with women's knowledge of HPV ($p<0.05$), and age and marital status were significantly associated with knowledge of cervical cancer ($p<0.05$).

The study's findings indicate a lack of awareness among women with confirmed HIV status regarding HPV, cervical cancer, and the HPV vaccine. Moreover, only a small percentage of women showed a readiness to bear the cost of the HPV vaccine, and slightly more than half were open to having their daughters vaccinated. Thus, there is a critical need to enhance awareness and provide comprehensive medical education to women with confirmed HIV status regarding HPV, given its crucial role in preventing cervical cancer.

Key words: *Knowledge, HPV vaccine, women of known HIV status.*

Background to the Study

Human papillomavirus (HPV) is a DNA virus that falls under the Papillomaviridae family and serves as the main culprit behind conditions such as cervical cancer, genital warts, and laryngeal papillomatosis. Transmission of HPV commonly occurs through sexual contact, leading to infection in nearly every individual at some stage of their lives. Both HPV infection and cervical cancer are fundamentally linked to sexual transmission. The prevalence of cervical cancer among women is noteworthy in both developing and developed nations, establishing it as one of the most widespread cancers, especially in developing countries[1].

Globally, the prevalence of HPV is around 11–12%, with regional disparities ranging from 16% to 24% among women. In the Americas, the estimated prevalence of HPV in women was 11.5%, in Europe it was 14.2%, in Asia it stood at 9.4%, and notably higher in Africa at 21.1%. The highest estimated prevalence of infections attributed to genital human papillomavirus was observed in sub-Saharan Africa.[3]. In sub-Saharan Africa (SSA), the HPV prevalence was estimated to be 24.0%[4]. In Nigeria, different HPV prevalence has been reported. A study conducted in Port Harcourt revealed a prevalence of 10%[5]; another study conducted in Abuja revealed a prevalence of 37%[6], while a recent study conducted in Maiduguri by Kabir (2019) reported the prevalence of human papillomavirus genotypes in cervical cancer to be as high as 69.8%[7]. Also, a study conducted among women in Southwest Nigeria revealed the prevalence of genital HPV infection is 18.6% [8].

Women living with HIV/AIDS are at increased risk of HPV infection compared to women without HIV, and an estimated 5% of all cervical cancer cases are attributable to HIV/AIDS [9,10]. Globally, in the year 2018, 5.8% of the new cases of cervical cancer (33 000 new cases) were diagnosed in women living with HIV, and 4.9% of new cases (28 000 new cases) were attributable to HIV infection[11].

In sub-Saharan Africa (SSA), invasive cancer of the cervix has been known to be an illness aided by HIV-AIDS with significant implications for women. In most developing countries, the rate of cervical cancer high and second to breast cancer among reproductive age women. There

is high rate of illnesses aided by HIV/AIDS and human papilloma virus in people living with HIV (PLWH), even though the national HIV infection rate in developing countries has estimated that the rate of HIV/AIDS has decreased in 1995 from 12% to 4.5% in 2014[12]. This might be attributed to the fact that the epidemiology of human papilloma virus which causes cervical cancer in women has a longer survival rates in PLWH [13].

In most developing countries in Africa, HPV screening test implementation is not easy, cost effective and simple. Also, most of these developing countries will not neglect and ignore the screening methods introduced to them and their national cervical cancer screening programmes[14].

HPV vaccine has been proven to be very effective and efficient in preventing Human papillomavirus, the main cause of cervical cancer. Vaccinating girls and young females of aged 9-26 years for prevention was necessary and recommended [15]. Many developing countries cannot afford HPV vaccines but some of these countries receive assistance. For example, in year 2000, the Global Alliance for Vaccines and Immunization (GAVI) rendered assistance which aimed to support the vaccination of about 30million girls in over 40 developing countries [16].

In Nigeria, Cervarix and Gardasil were the most common and recognized HPV vaccines available for the primary prevention of HPV strains associated with cervical cancer. Though screening is still not popular in Nigeria, yet the HPV vaccines that are purchased are not part of the routine vaccines under the national immunization program (NIP). Few women that purchased the vaccine do so with huge amount of money, and they purchase out-of-pocket [17].

The knowledge of HPV infections and HPV vaccines, among people in Nigeria, especially women are poor and inadequate. The cost of HPV vaccination per person is beyond what an average Nigerian can afford. Good knowledge and awareness of the infections and the vaccines would stimulate demand and uptake of the vaccines. Increasing demand may drive the introduction of the vaccine into the national immunization schedule thereby making the vaccine more affordable and accessible[72]. Most HIV-positive women had little knowledge about preventing cervical cancer and HPV transmission. The majority of these ladies were unaware of HPV and how it is spread[73]. Additionally, the majority of women with HIV were not aware of the risk of cervical cancer, how to avoid it, or how HIV status raises the risk of HPV and cervical cancer. Low levels of perceived susceptibility and low uptake of preventative interventions may be caused by inadequate understanding, a lack of awareness, as well as persistent misconceptions about HPV infection[89].

In most developing nations, for women of known HIV status to willingly accept the screening HPV is among the major obstacles and barriers to reducing the mortality and morbidity associated with cervical cancer [18]. Record has it that about 19.7% of women who are above 18 years has ever been tested and screened for cervical cancer and HPV [19]. Most women may not be willing to pay for HPV vaccine. Also, they may refuse to pay and not comply with HPV screening guidelines due to discomfort and anxiety associated with screening procedure, fear of HPV status after screening, money involved and cost of the screening, and cost of transportation to the screening centre [20]. In order to address this rate of unwillingness, the option to HPV self-sampling awareness among women is introduced and promoted to enhance its willingness and acceptability in screening centers in developing nations [21].

Before introducing a new HPV screening method among women of known HIV status, sufficient and evidence-based research to evaluate if this method of screening is acceptable for the general public should be conducted. Up till date, studies on knowledge and willingness to pay for HPV vaccine among women of known HIV status is scarce and rare in developing

countries [13]. Also, little is known about HPV infection that causes cervical cancer and genital warts among women in Sub-Saharan Africa (SSA) [26]. More so, many developing countries lack national screening programs due to the fact that the governments have not programmed it as a worthwhile investment. Also, there is inadequate manpower for screening and management of premalignant and full blown cervical cancer cases, poor funding, weak health system and poor health seeking behaviour are factors that militate against the knowledge, acceptability and willingness to pay for HPV vaccines. In addition to this, in Nigeria, there is unavailability of reports of HPV vaccination as well as that of cervical cancer screening, but a study conducted in Ilorin revealed that less than 14% of young girls had taken HPV vaccine, and very few (10%) of women had gone for cervical cancer testing and screenings [27]. In order to address this gap, this study will be conducted with the aim to assess the knowledge and willingness to pay for HPV vaccine among women of known HIV status in Oyo State. Therefore, the study assesses the knowledge and willingness to pay for the HPV vaccine among women of known HIV status in Oyo State.

Research Questions

i). What is the level of knowledge of HPV, HPV vaccine and cervical cancer among women of known HIV status in Oyo State, Nigeria?

ii). Are HIV-positive women willing to pay for the HPV vaccine?

iii). Are women living with HIV willing to vaccinate their daughters against HPV?

Hypotheses

In this study, three null hypotheses were generated and tested at 0.05 level of significance. These include:

1) H_O: There is no significant association between selected socio-demographic characteristics (such as age, marital status and educational status) and women's knowledge of HPV.

2) H_O: Selected sociodemographic factors including age, marital status, and level of education, do not significantly affect women's knowledge of cervical cancer.

3) H_O: Selected sociodemographic factors, including age, marital status, and level of education, do not significantly affect women's knowledge of the HPV vaccine.

MATERIALS AND METHODS

Study Design

A descriptive cross-sectional survey design was used to assess the knowledge and willingness to pay for HPV vaccine among women of known HIV status in Oyo State. A descriptive study is one in which information is collected without manipulating the environment.

Research Area

The study was conducted in President's Emergency Plan for AIDS Relief (PEPFAR) supported-clinic of University College Hospital (UCH), HIV/AIDS clinic of Adeoyo Maternity Teaching Hospital, Yemetu and Primary Health Centre, Oranyan, all in Ibadan metropolis. The University College hospital (UCH), Ibadan is a premier tertiary health institutions in Nigeria. It is located at the heart of Ibadan (the largest indigenous city in West Africa and capital of Oyo State, Nigeria). The University College Hospital started from Adeoyo State Hospital Yemetu, Ibadan in 1948 when the hospital was an appendage of University of London. In the present site of University College Hospital (UCH), Ibadan, the development of its physical structures started

in 1953, and it was completed and commissioned in 20th November, 1957. This hospital has impacted knowledge to many people. It has also trained over 4,513 Nurses, 6,000 Doctors, 2307 Midwives, 501 Dentists, 471 Peri-Operative nurses, 1062 Laboratory Scientist, 451 nurse/midwives/Public health educators, 576 Environmental Health officers Tutors, 326 Primary Health Care Tutors, 640 Physiotherapists, 590 Community Health Officers, and 551 Medical Records Officers since its inception. The University College Hospital (UCH), Ibadan also has Presidents' Emergency Plan for AIDS Relief (PEPFAR) clinic where people with HIV/AIDS are being managed and treated.

The President's Emergency Plan for AIDS Relief (PEPFAR) clinic provides comprehensive Antiretroviral Therapy (ART) services and these services are provided by an integrated multidisciplinary team drawn from Medicine, Hematology, Community Medicine, Obstetrics and Gynecology, Counselors, Social Welfare, Nursing, Pharmacy and Laboratory services. The center was one of the first ART sites established by Federal Government of Nigeria in mid-2002. Being one of the first ART center in south west Nigeria, it receives clients from Oyo State and other adjoining states. Experts in HIV/AIDS management, modern facilities for diagnosis and treatment such as Antiretroviral Therapy (ART) and medication are available and operational in the hospital for people living with HIV/AIDS (PLWHA). It accepts all types of sick patients (both those who have been referred and those who have not), and frequently offers extra options for managing and treating HIV/AIDS patients. In addition, patients from other parts of the country and beyond who often visit the state for business activities also utilize the ART services.

The Adeoyo Maternity Teaching Hospital (AMTH), Yemetu is situated between Total Garden and Agbadagbudu Road in the Yemetu neighborhood. The hospital was founded in 1927 by the Colonial Master and is currently run by the Oyo State Hospital Management Board, which is led by the state's commissioner of health. It draws its clientele from both inside and outside the hospital, as well as the states that make up its catchment area in western Nigeria. One of the 13 departments in the hospital's facilities is the nursing department. Adeoyo Maternity Teaching Hospital typically has six wards, including the labor ward, two lying-in wards, gynecological ward, children's ward, premature unit (special care baby unit), antenatal ward, antenatal clinic, Immunization clinic, Children's outpatient Clinic, Family Planning Clinic, Laboratory Section, Awo theatres (one main and other mini theatre), Sexually Transmitted Infections/PEPFAR Clinic, Casualty The hospital employs 567 people, 208 of them are trained female healthcare professionals..

Sampling Technique

The study adopted multi-stage sampling techniques.

Method of Data Analysis

The statistical software for the social sciences (SPSS) version 23 was used to evaluate all of the obtained data after they had been entered into a computer. The data underwent statistical processing that was both descriptive (frequency tables, percentages and proportions, bar charts, pie charts, mean and standard deviations), as well as inferential (Chi-square test). While the Chi-square test was used to look for relationships between categorical variables and test for hypotheses, descriptive statistics were utilized to describe the characteristics of the study participants and the study variables. For all analyses in this study, the level of statistical significance was fixed at 0.05, or 5%. Where necessary, appropriate scoring was also conducted. Tables and percentages were used to present the results.

Ethical Approval

Before embarking on this research involving human subjects, ethical approval was obtained from the Ethical Review Committee of University College Hospital (UCH), Ibadan, and the Ethical Review Committee of the Oyo State Ministry of Health, Secretariat, Ibadan, Oyo State. This ethical approval was sought to ensure that the study adheres to universally recognized scientific norms and complies with global ethical standards essential for research involving human subjects. The participants provided informed consent, and the confidentiality of the collected data was guaranteed. The research posed no perceived risks. No financial compensation was offered, requested, or expected by the researcher or her assistants in exchange for participants' involvement. Individuals had full autonomy in deciding whether or not to participate in the study. The questionnaire did not inquire about participants' names, and the gathered information was solely used for research purposes.

Results

Demographic Data Analysis

Table 4.1 below revealed the mean age of the women to be 44.18 ± 9.54 years, and majority (40.6%) were in the age group of 41-50 years. This might be attributed to the fact that majority of the respondents were adults in their 40s. Over three-quarter (87.4%) of the respondents were Yoruba, in which almost half (45.1%) had secondary education as their highest educational qualifications. Interestingly, vast majority (92.2%) of them were working, while 7.6% were not working. Concerning the respondents' profession, 79.3% were self-employed, followed by professional (8.1%) and unemployed (7.1%) respectively. Also, 78.6% of them identified wages as their sources of income, salary accounted for 15.6% and family accounted for 5.8% respectively. About 59.4% were married, and half (49.9%) reported <N18,000 Naira as their average monthly income. Over half (72.5%) had only sexual partner, and 71.5% had been on HIV for over 5 years. The analysis further revealed that over three-quarter (83.9%) of the respondents don't know their CD4 count. More so, 95.7% were on Antiretroviral drugs, while 5.0% were not on Antiretroviral drugs. Furthermore, 90.4% of th Table 4.1 presents the mean age of the women as 44.18 ± 9.54 years, with a significant proportion (40.6%) falling within the 41-50 age group. This observation can be attributed to the predominant presence of respondents in their 40s. A majority of the participants (87.4%) identified as Yoruba, and nearly half (45.1%) had completed secondary education as their highest educational attainment. Notably, a significant majority (92.2%) were employed, while 7.6% were unemployed. In terms of profession, 79.3% were self-employed, followed by professionals (8.1%), and the unemployed (7.1%). Additionally, 78.6% cited wages as their primary source of income, while 15.6% received a salary, and 5.8% relied on family support. Approximately 59.4% were married, with half (49.9%) reporting an average monthly income of less than N18,000 Naira. More than half (72.5%) reported having only one sexual partner, and the majority (71.5%) had been on HIV treatment for over 5 years.

The analysis further revealed that a significant majority (83.9%) of the respondents were unaware of their CD4 count. Moreover, 95.7% were on Antiretroviral drugs, while 5.0% were not. Additionally, 90.4% of the respondents' viral loads were unknown, 6.0% were detected, and 3.5% were undetected, respectively.e respondents' viral loads were not known, 6.0% were detected, while 3.5% were undetected respectively.

Table 4.1: Socio-Demographic Data of Participants

Socio-demographic (N=397)	Number (N)	Percentage (%)
Age group		
≤30	40	10.1
31-40	108	27.2
41-50	161	40.6
51-60	71	17.9
>60	17	4.3
Age (Mean ± SD) 44.18 ± 9.54		
Ethnicity		
Igbo	21	5.3
Yoruba	347	87.4
Hausa	11	2.8
Others	18	4.5
Education		
no education	15	3.8
primary	99	24.9
secondary	179	45.1
tertiary	104	26.2
Working status		
Not working	30	7.6
Working	366	92.2
Profession		
Unemployed	28	7.1
self-employed	315	79.3
Professional	32	8.1
civil servant	22	5.5
Source of Income		
Family	23	5.8
Wages	312	78.6
Salary	62	15.6
Marital status		
Single	24	6.0
married	236	59.4
co-habiting	1	.3
seperated	47	11.8

divorced	6	1.5
widowed	83	20.9
Income(N)		
<18000	198	49.9
18000-35000	146	36.8
>100000	9	2.3
36000-50000	25	6.3
51000-70000	9	2.3
71000-100000	10	2.5
Number of sexual partners		
no sexual partner	86	21.7
<3 sexual partner	21	5.3
1 sexual partner	288	72.5
>3 sexual partner	2	.5
HIV status		
Negative	5	1.3
Positive	392	98.7
Years with HIV		
<1	17	4.3
1-5	96	24.2
>5	284	71.5
CD4 count		
Don't know	333	83.9
<350	54	13.6
>350	10	2.5
ARV	377	95.0
No	20	5.0
Yes		
Viral load	14	3.5
Undetected	24	6.0
Detected	359	90.4
Don't know		

Research Questions

Research Question 1: What is the level of knowledge of HPV, HPV vaccine and cervical cancer among women of known HIV status in Oyo State, Nigeria?

A mere 37.5% of the respondents had prior knowledge of HPV, while a substantial 94.7% recognized the association between smoking and HPV. A minority (16.9%) affirmed that HPV can lead to genital warts, and 29.0% acknowledged that HPV can be transmitted through sexual intercourse. Additionally, 42.8% acknowledged that individuals can harbor an HPV infection for an extended period without being aware, with only 13.0% having undergone HPV testing. Around 34.3% affirmed that screening for cervical cancer in women with HIV can help prevent the development of cancer, while 21.7% claimed that a negative HPV result indicates a woman has a low risk of developing cervical cancer.

Table 4.2 showing Knowledge of Human Papilloma Virus (HPV) Among Participants

Knowledge/belief	**No N(%)**	**Yes N(%)**
Have you ever heard of HPV	248 (62.5)	149 (37.5)
Smoking can be related to HPV	21 (5.3)	376 (94.7)
HPV can cause genital warts	330(83.1)	67(16.9)
HPV can be transmitted during sexual intercourse	282(71.0)	115(29.0)
People can get HPV infection for a long time without knowing	227(57.2)	170(42.8)
Have you been tested for HPV	274(69.0)	123(13.0)
Screening for cervical cancer in women with HIV can prevent developing cancer	261(65.7)	136(34.3)
Does a negative HPV result depict that a woman has a low chance of cervical cancers	311(78.3)	86(21.7)

Figure 4.1 showing the respondents' sources of information about HPV

Majority 245(61.7%) of the respondents did not indicate their sources of information about HPV. About 136 women (34.3%) said they learned about HPV via health professionals, followed by TV/radio 12 (3%), and social media 2 (0.5%).

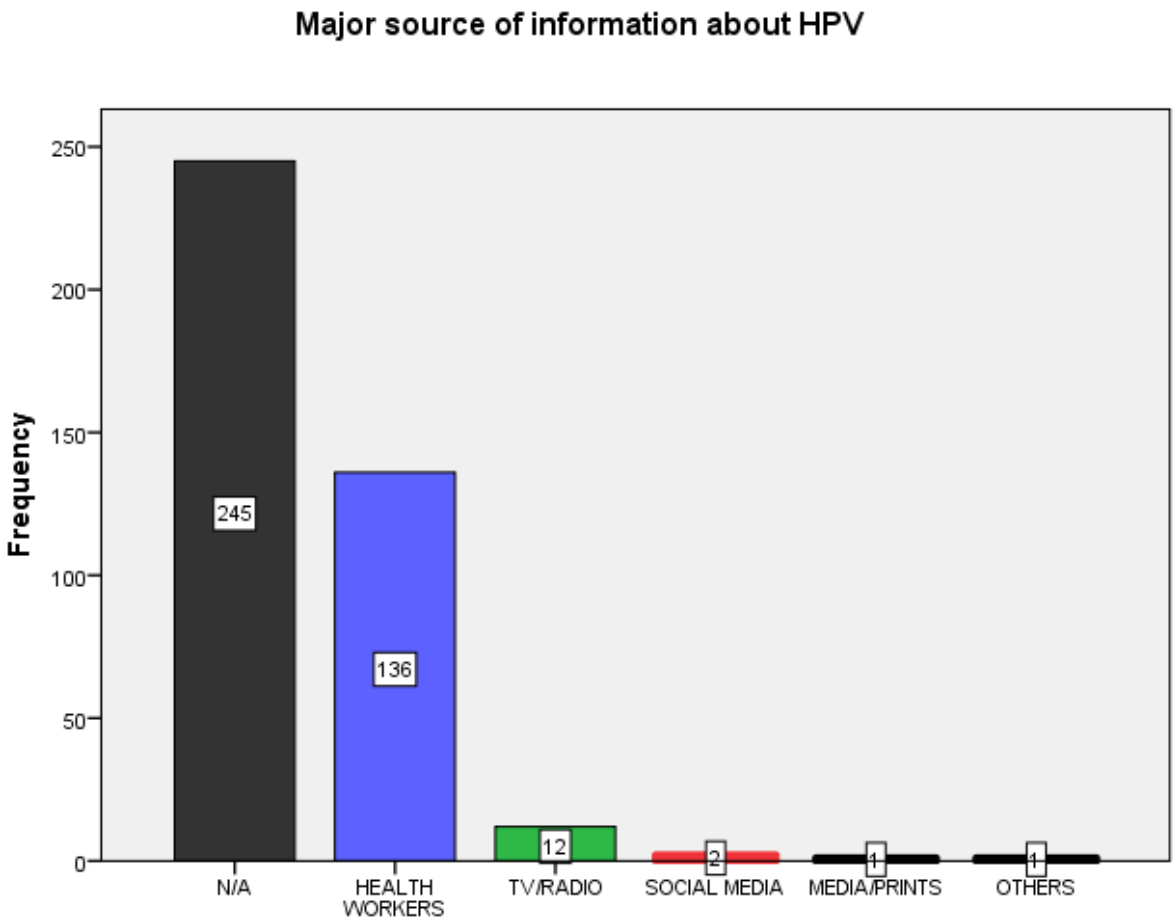


Figure 4.2 showing the overall knowledge of Human Papilloma Virus (HPV) among participants

The figure below showed that the respondents with good knowledge of Human Papilloma Virus were 15.9%, as against 84.1% that had little knowledge of Human Papilloma Virus.

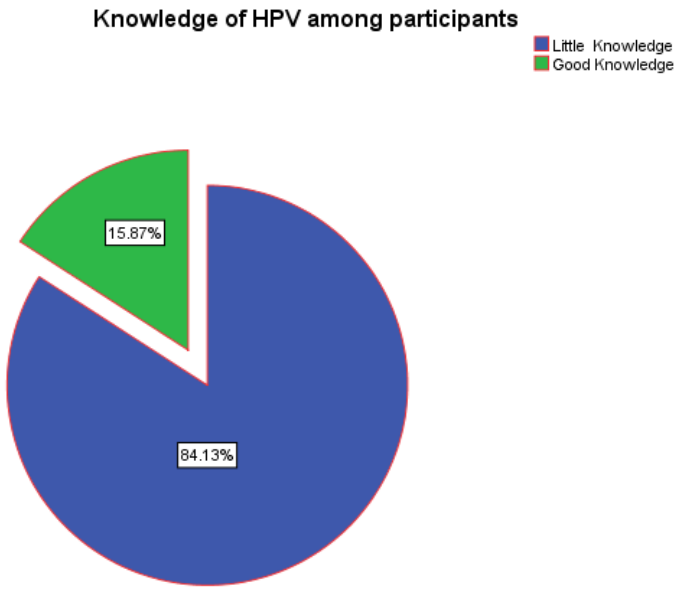


Table 4.3 Knowledge of HPV vaccine

The findings indicated that 17.9% of the respondents were familiar with the HPV vaccine, and a significant 91.2% believed that the HPV vaccine can cure cancer. However, only 18.1% of women expressed the need for routine cancer screenings even after receiving an HPV vaccine, while 15.6% stated that the vaccine is very effective in preventing HPV. Additionally, 13.6% acknowledged that HPV vaccines are highly effective in preventing cervical cancer.

Knowledge	**No N(%)**	**Yes N(%)**
Have you heard of HPV vaccine?	326(82.1)	71(17.9)
Does HPV vaccine cure cancer?	35(8.8)	362(91.2)
Is it still necessary to regularly get screened for cancer if you've already received the HPV vaccine?	325(81.9)	72(18.1)
Are HPV vaccine highly effective in preventing HPV?	335(84.4)	62(15.6)
Are HPV vaccine highly effective in preventing cervical cancer?	343(86.4)	54(13.6)

Figure 4.3 showing the major sources of information about HPV vaccine

The figure below shows that majority 323(81.4%) of the respondents did not identify their sources of information about HPV vaccine; while 66(16.6%) identified health workers as their major sources of information about HPV vaccine.

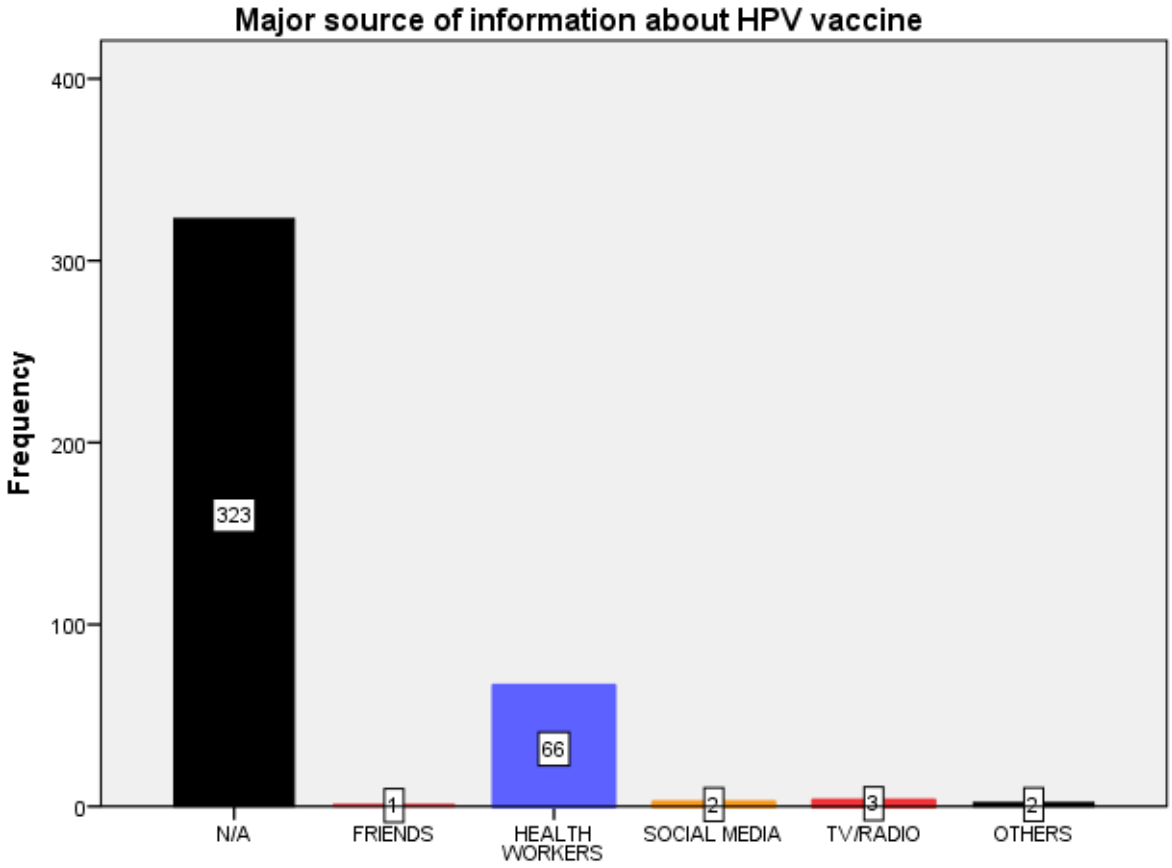


Figure 4.4 showing the overall knowledge of HPV vaccine among participants

The figure below shows that only 68(17.1%) of the respondents had good knowledge of HPV vaccine, while 329(82.9%) had little knowledge of HPV vaccine.

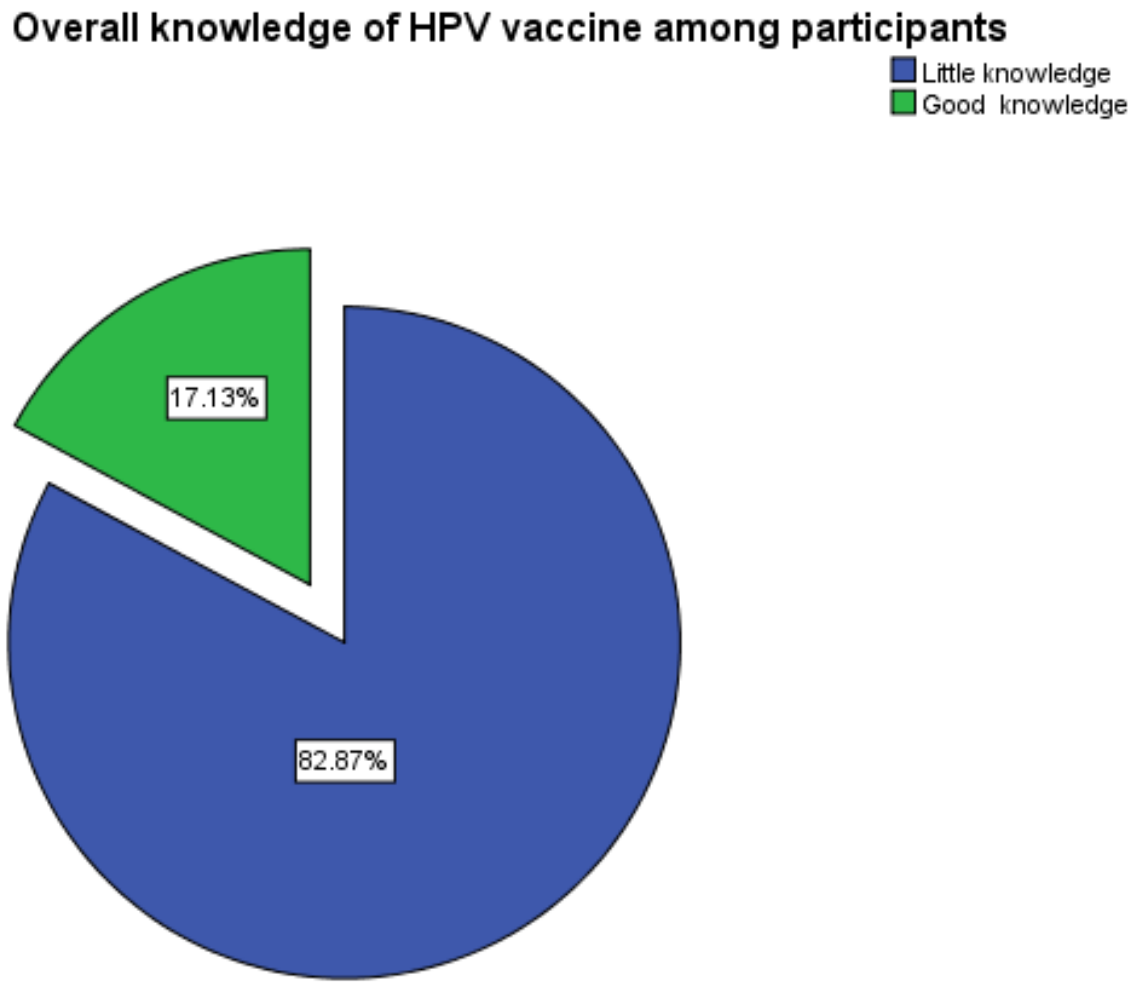


Table 4.4: Knowledge of cervical cancer

Regarding awareness of cervical cancer, 74.8% of the respondents were familiar with cervical cancer, and 68.8% had received information about it. A significant majority (91.7%) recognized that individuals who consume alcohol are more susceptible to cervical cancer, and 52.4% also acknowledged that people who smoke are at a higher risk of developing cervical cancer. However, only 18.6% acknowledged that a type of HPV is a cause of cervical cancer, and 61.0% affirmed that cervical cancer can be cured if detected early.

Knowledge	**No N(%)**	**Yes N(%)**
Have you ever heard of cervical cancer?	100(25.2)	297(74.8)
Have you ever received information about cervical cancer?	134(31.2)	273(68.8)
Are people who drink alcohol content more likely to have cervical cancer?	33(8.3)	364(91.7)
Are people who smoke more likely to have cervical cancer?	189(47.6)	208(52.4)
A type of HPV causes cervical cancer.	323(81.4)	74(18.6)
Cervical cancer is cured if detected early	151(38.0)	246(61.0)
Cervical cancer can be transmitted during sexual intercourse	392(98.7)	5(1.3)

Does having sex early in life increases the chances of having cervical cancer?	187(47.1)	210(52.9)
Early detection can increase the rate of cervical cancer	146(36.41)	251(63.2)
Women living with HIV are more likely to have cervical cancer compared to those who are HIV negative	206(51.9)	191(48.1)
Can having more sexual partners increase the rate cervical cancer?	113(28.5)	284(71.5)
Can poor diet increase the chances of having cancer of the cervix?	289(72.8)	108(27.2)
Cancer of the cervix can be prevented	152(38.3)	245(61.7)

Figure 4.5 showing the major sources of information on cervical cancer

As shown in figure 4.3 below, majority 244(61.5%) of the respondents identified health workers as their sources of information on cervical cancer. Not applicable, TV/Radio and social media were depicted by 125(31.5%), 24(6.0%) and 3(0.8%) respectively.

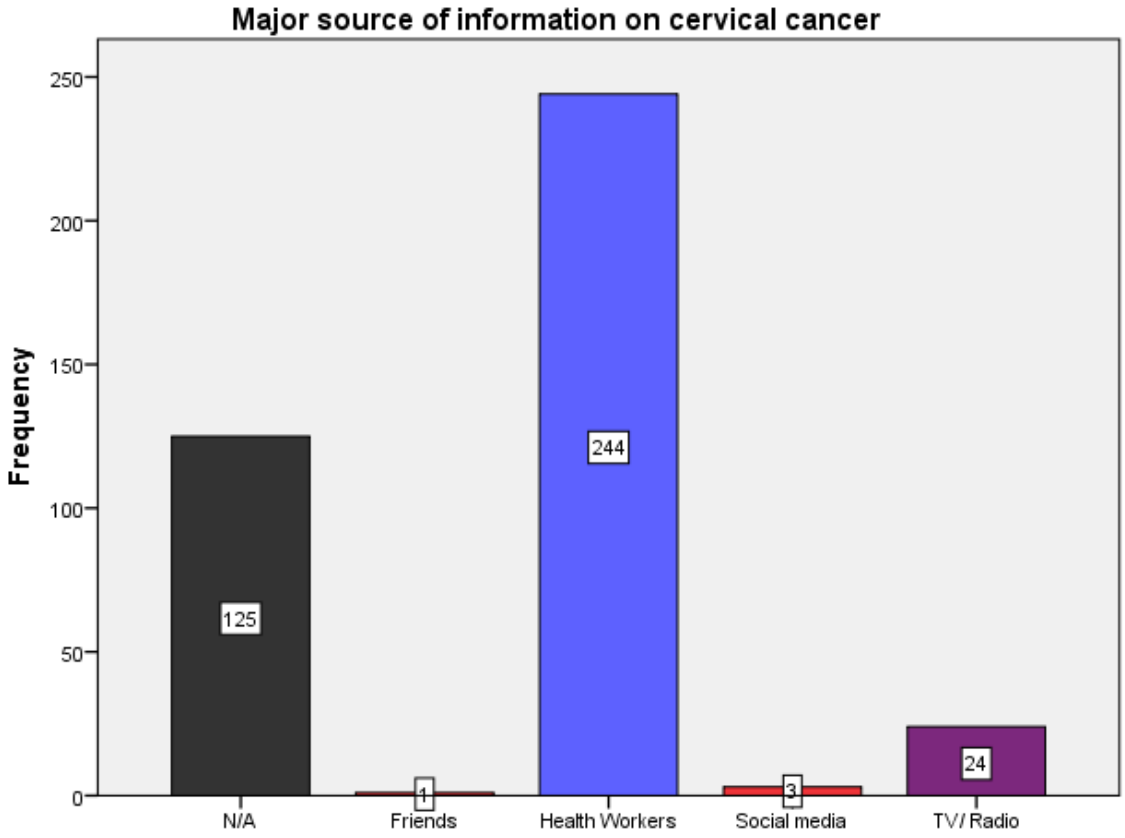
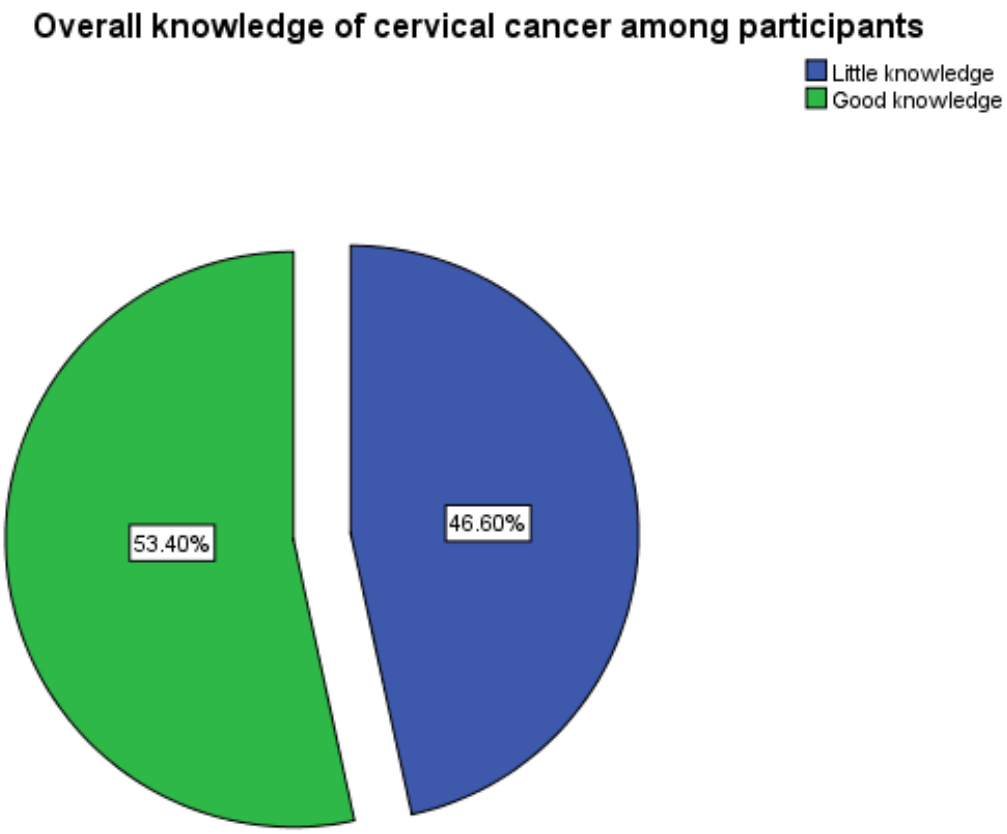


Figure 4.6 showing the overall knowledge of cervical cancer among participants

As shown in figure below, 53.4% had good knowledge of cervical cancer, while 46.6% had little knowledge of cervical cancer.



Research Question 2: Are HIV-positive women willing to pay for the HPV vaccine?

The table below showed that the respondents who were willing to pay for HPV vaccine in the prevention of cervical cancer were 16.1%, while 83.9% were not willing to pay for HPV vaccine. About 26.2% acknowledged that having the knowledge of cervical cancer, they are willing to pay for HPV vaccine; while 24.4% would be willing to purchase HPV vaccine even though it is costly. Also, 4.0% had family members or friends that had purchased HPV vaccine before; and 33.0% affirmed that if the government subsidizes HPV vaccine, they would be willing to pay.

Table 4.5: Respondents who are willing to pay for HPV vaccine

Respondents who are willing to pay for HPV vaccine	**No N(%)**	**Yes N(%)**	**Not sure N(%)**
Would you be willing to pay for HPV vaccine in the prevention of cervical cancer?	333(83.9)	64(16.1)	0(0.0)
Having the knowledge of cervical cancer among women living with HIV, are you willing to pay for HPV vaccine?	290(73.0)	104(26.2)	3(0.8)
Would you be willing to purchase HPV vaccine even though it is costly?	300(75.6)	97(24.4)	0(0.0)
Do you have a family member or friend that has purchased HPV vaccine before?	381(96.0)	16(4.0)	0(0.0)

If the government subsidizes HPV vaccine, would you be willing to pay?	266(67.0)	131(33.0)	0(0.0)

Research Question 3: Are women living with HIV willing to vaccinate their daughters against HPV?

The table below showed that 58.9% of the respondents were willing to get their daughters vaccinated. A little above half (55.4%) acknowledged that they would be willing to pay for their daughter's vaccine; and over two-third (90.2%) affirmed that if vaccination is free they would allow all females around them be vaccinated.

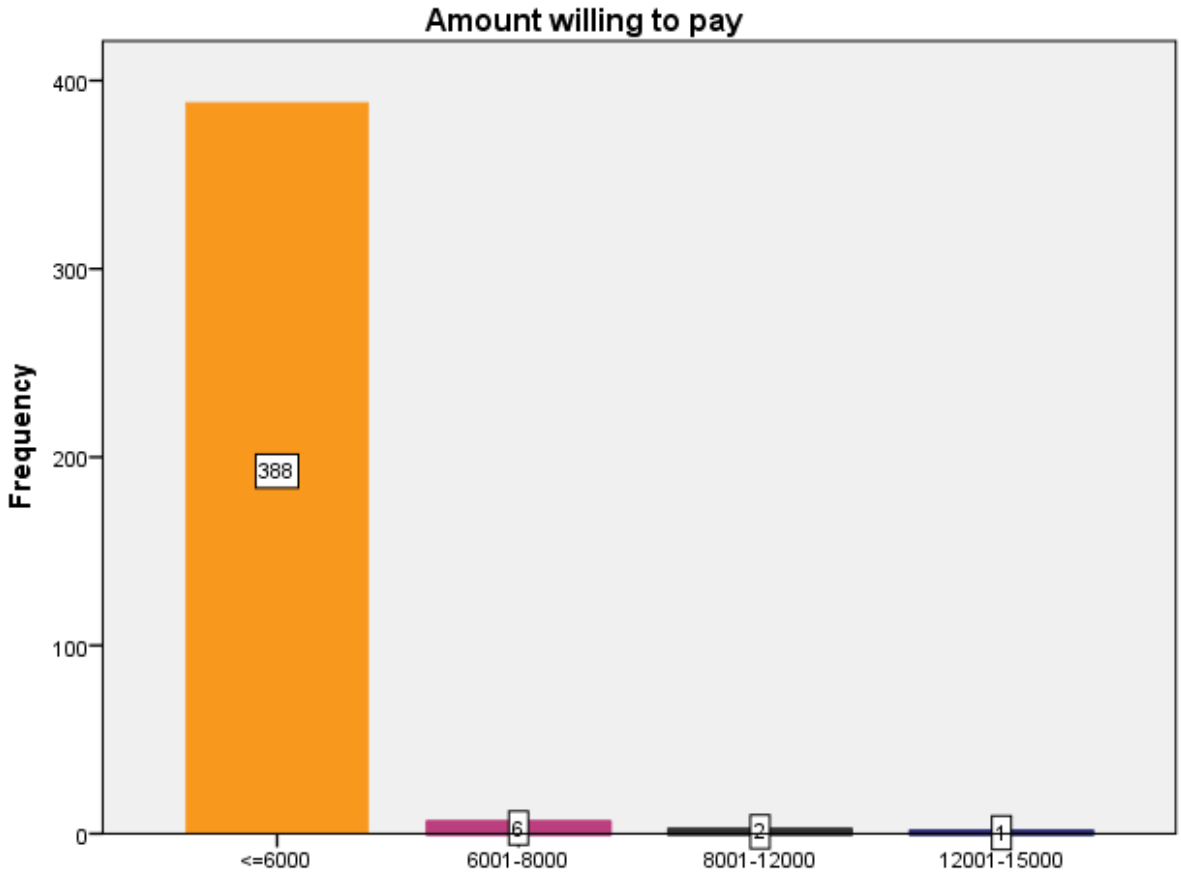
Table 4.6: Respondents' willingness to vaccinate their daughters against HPV

Respondents' willingness to vaccinate their daughters against HPV	**Frequency**	**Percent**
Are you willing to get your daughter vaccinated?		
Yes	234	58.9
No	163	41.1
Would you be willing to pay for your daughter's vaccine?		
Yes	220	55.4
No	117	44.6
If vaccination is free would you allow all females around you to be vaccinated?		
Yes	358	90.2
No	39	9.8
Total	**397**	**100.0**

SOURCE OF DATA: RESEARCHER'S FIELD WORK (2022)

Figure 4.7 showing the amount that participants are willing to pay for HPV vaccine

The figure below showed that vast majority 388(97.7%) of the respondents were willing to pay N6000 Naira or less for HPV vaccine.



Hypotheses

Hypothesis 1

Null Hypothesis (H_0): There is no significant association between selected socio-demographic characteristics (such as age, marital status and educational status) and women's knowledge of HPV.

Alternative Hypothesis (H_1): There is a significant association between selected socio-demographic characteristics (such as age, marital status and educational status) and women's knowledge of HPV.

Table 4.7: Relationship between selected socio-demographic characteristics (such as age, marital status and educational status) and women's knowledge of HPV.

Socio-demographic characteristics	Respondents' overall knowledge of HPV.		Total	Pearson chi-square	df	p-value
	Good knowledge	Little knowledge				
Age (years)				**2.182**	**4**	**0.702**
≤30	5(12.5%)	35(87.5%)	40(100%)			
31-40	15(13.9%)	93(86.1%)	108(00%)			
41-50	25(15.5%)	136(84.5%)	161(100%)			
51-60	15(21.1%)	56(78.9%)	71(100%)			
>60	3(17.6%)	14(82.4%)	17(100%)			

Marital status				**3.027**	**5**	**0.696**
Single	4(16.7%)	20(83.3%)	24(100%)			
Married	38(16.1%)	198(83.9%)	236(100%)			
Co-habiting	0(0.0%)	1(100.0%)	1(100%)			
Separated	5(10.6%)	42(89.4%)	47(100%)			
Divorced	0(0.0%)	6(100.0%)	6(100%)			
Widowed	16(19.3%)	67(80.7%)	83(100%)			
Educational status				**9.603**	**3**	**0.022***
No formal education	1(6.7%)	14(93.3%)	15(100%)			
Primary	8(8.1%)	91(91.9%)	99(100%)			
Secondary	30(16.8%)	149(83.2%)	179(100%)			
Tertiary	24(23.1%)	80(76.9%)	104(100%)			
Total	**63(15.9%)**	**334(84.1%)**	**397(100%)**			

*p<0.05 (i.e. Significant).

Table 4.7 above showed that women's educational status is substantially correlated with their knowledge of HPV (p=0.022). However, neither the respondents' marital status (p=0.696) nor their age (p=0.702) were related to their knowledge of HPV.

Hypothesis 2

Null Hypothesis (H_0): Selected sociodemographic factors including age, marital status, and level of education, do not significantly affect women's knowledge of cervical cancer.

Alternative Hypothesis (H_1): Selected sociodemographic factors including age, marital status, and level of education, do significantly affect women's knowledge of cervical cancer.

Table 4.8: Relationship between selected sociodemographic factors including age, marital status and level of education) and women's knowledge of cervical cancer.

Socio-demographic characteristics	Respondents' overall knowledge of cervical cancer.		Total	Pearson chi-square	df	p-value
	Good knowledge	Little knowledge				
Age (years)				**18.321**	**4**	**0.001***
≤30	9(22.5%)	31(77.5%)	40(100%)			
31-40	57(52.8%)	51(47.2%)	108(00%)			
41-50	96(59.6%)	65(40.4%)	161(100%)			
51-60	40(56.3%)	31(43.7%)	71(100%)			
>60	10(58.8%)	7(41.2%)	17(100%)			
Marital status				**11.467**	**5**	**0.043***
Single	9(37.5%)	15(62.5%)	24(100%)			
Married	129(54.7%)	107(45.3%)	236(100%)			
Co-habiting	0(0.0%)	1(100.0%)	1(100%)			
Separated	28(59.6%)	19(40.4%)	47(100%)			
Divorced	0(0.0%)	6(100.0%)	6(100%)			
Widowed	46(55.4%)	37(44.6%)	83(100%)			

Educational status				**1.022**	**3**	**0.796**
No formal education	9(60.0%)	6(40.0%)	15(100%)			
Primary	54(54.5%)	45(45.5%)	99(100%)			
Secondary	91(50.8%)	88(49.2%)	179(100%)			
Tertiary	58(55.8%)	46(44.2%)	104(100%)			
Total	**212(53.4%)**	**185(46.6%)**	**397(100%)**			

*p<0.05 (i.e. Significant).

Table 4.8 above showed that women's age and marital status were significantly associated with their knowledge of cervical cancer (p<0.05). HIV positive women's knowledge of cervical cancer increases with an increase in age (22.5% Vs 59.6%). On the other hand, women's educational status (p=0.796) was not significantly associated with their knowledge of cervical cancer (p>0.05).

Hypothesis 3

Null Hypothesis (H_0): Selected sociodemographic factors, including age, marital status, and level of education, do not significantly affect women's knowledge of the HPV vaccine.

Alternative Hypothesis (H_1): Selected sociodemographic factors, including age, marital status, and level of education, do significantly affect women's knowledge of the HPV vaccine.

Table 4.9: Relationship between selected sociodemographic factors including age, marital status and level of education and women's knowledge of the HPV vaccine.

Socio-demographic characteristics	Respondents' overall knowledge of HPV vaccine.		Total	Pearson chi-square	df	p-value
	Good knowledge	Little knowledge				
Age (years)				**3.862**	**4**	**0.425**
≤30	4(10.0%)	36(90.0%)	40(100%)			
31-40	24(22.2%)	84(77.8%)	108(00%)			
41-50	26(16.1%)	135(83.9%)	161(100%)			
51-60	12(16.9%)	59(83.1%)	71(100%)			
>60	2(11.8%)	15(88.2%)	17(100%)			
Marital status				**2.012**	**5**	**0.848**
Single	3(12.5%)	21(87.5%)	24(100%)			
Married	43(18.2%)	193(81.8%)	236(100%)			
Co-habiting	0(0.0%)	1(100.0%)	1(100%)			
Separated	8(17.0%)	39(83.0%)	47(100%)			
Divorced	0(0.0%)	6(100.0%)	6(100%)			
Widowed	14(16.9%)	69(83.1%)	83(100%)			
Educational status				**7.022**	**3**	**0.071**
No formal education	1(6.7%)	14(93.3%)	15(100%)			
Primary	16(16.2%)	83(83.8%)	99(100%)			
Secondary	25(14.0%)	154(86.0%)	179(100%)			
Tertiary	26(25.0%)	78(75.0%)	104(100%)			
Total	**68(17.1%)**	**329(82.9%)**	**397(100%)**			

Table 4.9 above showed that women's age, marital status and educational status were not statistically significantly correlated with women's knowledge of HPV vaccine ($p>0.05$).

Discussion of Findings

Socio-demographic characteristics

According to the findings, the mean age of the respondents was 44.18 ± 9.54 years, aligning with previous studies that reported a mean age of 42.5±11.5 years. Furthermore, approximately 45.1% of the participants had secondary education as their highest educational qualification, deviating from a different study where the majority (68.3%) had tertiary education.

The study noted that over half of the respondents were married, consistent with another study reporting that about 59.4% were married. A separate study also indicated a majority of married participants (84.7%). Additionally, more than three-quarters identified as Yoruba, supporting the finding that Yorubas (87.1%) were predominant among the participants in another study.

The study's findings indicated that only 15.9% of women with known HIV status demonstrated good knowledge of HPV. This may be attributed to the majority of participants having secondary education as their highest qualification, indicating a semi-literate population. Similar studies have reported limited knowledge of HPV transmission and cervical cancer prevention among women living with HIV. In another study, only 20% had good knowledge of HPV at baseline, and a separate investigation found that 5.2% of participants had good knowledge of HPV, with 17.0% aware of the availability of HPV vaccinations. The results of the current study showed that HPV, which can spread during sexual activity, causes genital warts. This corroborates the finding of Milner (2015) in which it was reported that Human papillomavirus is the main cause of genital warts, laryngeal papillomatosis and cervical cancer [9]. People will eventually contract HPV[10], a sexually transmitted infection, at some time in their lives. Cervical cancer is now recognized as a sexually transmitted cancer by origin, and HPV infection is a sexually transmitted infection[11].

It was noted in the present study that people can get HPV infection for a long time without knowing. This might be due to the change in epidemiology of HPV in PLWH as HPV increases the risk of cancer of the cervix in women[12].

It was revealed in this study that cervical cancer is caused by a type of HPV; and this finding corresponds with the report that the main cause of cervical cancer, laryngeal papillomatosis and genital warts is HPV [13] According to the WHO, HPV types 16 and 18 cause cervical cancer and accounted for 70% of cervical cancer cases[14].

Finding revealed that women living with HIV/AIDS are at increased risk of HPV infection compared to women without HIV, and an estimated 5% of all cervical cancer cases are attributable to HIV/AIDS[15]. This finding concurs with the finding from this present study which reported that women living with HIV are more likely to have cervical cancer compared to those who are HIV negative. Finding from a study conducted revealed that the incidence of HPV-related cancers and genital warts is higher among women living with HIV as compared to the general population[16]. Rates of cervical cancer has remained high among HIV positive women[17]. Similar studies conducted also corroborated the finding of this present study[18,19].

The risk of invasive cervical cancer is higher among women living with HIV than HIV-negative women. Also, the high risk incidence of HPV infection is common in women living

with HIV. It is believed that a long history of HIV infection and prolonged immunosuppression are associated with persistent HPV infection and invasive cervical cancer[19] (Wong, et al., 2018).

The study also reflected that people who drink alcohol content and smoke are more likely to have cervical cancer. This result is consistent with that of Bzhalava et al.,[20] who stated that HPV-related chronic infections can be brought on by factors like smoking, drinking alcohol, having several partners, having a weak immune system, and having your first sexual experience at a young age. Early sexual experience, having several partners, immunosuppression, and smoking are among the risk factors for genital infections brought on by HPV, according to CDC[21].

Findings also revealed that early detection can increase the rate of cervical cancer; and this could be attributed to the fact that the development of Human Papillomavirus (HPV) vaccines provides new opportunities in the fight against cervical cancer[22].

The present study also revealed that only 17.1% of the respondents had good knowledge of HPV vaccine. This finding is similar to that of Bisi-Onyemaechi et al.,[23] who reported that among the Nigeria population, there is inadequate knowledge of HPV vaccines and infections caused by HPV. Xiang et al.,[24] explained that HPV vaccination coverage is still low and inadequate worldwide. However, finding from a study conducted by Bisi-Onyemaechi, Chikani, & Nduagubam[23] revealed that awareness of HPV vaccine is high (59.7%).

The study found that even when women have received an HPV vaccination, routine cancer screening is still necessary. This might be attributed to the fact that self-sampling method of screening will remove most of the barriers that prevent women, especially those in low socioeconomic and minority populations, from participating in regular HPV screening programs among women of known HIV status[24].

In this present study, finding revealed that HPV vaccine are highly effective in preventing HPV. This finding corresponds with that of the WHO in which it was reported that HPV vaccine has been proven to be very effective and efficient in preventing Human papillomavirus, the main cause of cervical cancer. According to Sawaya et al.,[25], most common types of infections caused by HPV can be prevented HPV vaccine as it is highly effective and efficient. The Centers for Disease Control and Prevention reported that HPV can be prevented through vaccination[21].

Evidently from this present study, 53.4% of the respondents had good knowledge of cervical cancer. This might also be attributed to the fact that majority of those who participated in this study had secondary education as their highest educational qualifications and are semi-illiterates. Findings from a study showed that women with HIV had little understanding of HPV transmission and preventing cervical cancer[6].

The present study revealed that respondents who were willing to pay for HPV vaccine were only 16.1%. This was in contrast with the finding of Vermandere, et al (2016) who submitted that even though acceptability of vaccine was very high among the participants (88.1%), only 31.1% of the respondents were willing to pay for their daughters to be vaccinated. About 17.7% declined the vaccination, while those who wanted the vaccination but were prevented and obstructed by barriers like time constraints and lack of information were 51.2%. In a related study by Nkwonta et al.,[7] it was shown that more than half of participants were willing to pay for HPV vaccination and screening, even if it was pricey. Additionally, less than 12% of people reported having gotten the HPV vaccine, cervical screening, or both at some point in their lives. Findings of Agida et al.,[26] revealed that in Nigeria, regardless of the current cost of HPV vaccine, people who were aware of the vaccine were more willing to take the vaccine.

Finding from a study conducted by Rositch et al., [27] revealed that majority of women were willing to be vaccinated so as to prevent cervical cancer if offered at low or no cost (94%).

Evidently from the study, one-quarter of the respondents would be willing to purchase HPV vaccine even though it is costly. This was in contrast with the finding of Nkwonta et al.,[7], who reported that many people at the time of the intervention were willing to pay for the pricey but effective HPV vaccine. In a similar study conducted by Isara & Osayi, [89] it was reported that women who are not willing to utilize HPV vaccine and pay for it were many.

Finding from Nkwonta et al.,[7], also found that less than 12% of people had ever had an HPV vaccine or had a family member who had, who had paid for an HPV vaccine or cervical screening. This finding is similar to the finding of the present study in which it was revealed that women who had family members or friends that had purchased HPV vaccine before were only 4.0%.

It was noted in the present study that about 26.2% acknowledged that having the knowledge of cervical cancer, they are willing to pay for HPV vaccine. This finding was in consistence with that of Agida et al.,[26] who found that despite the vaccination's cost or lack thereof, the acceptance of the HPV vaccine in Nigeria was high among those who were aware of it. Similar finding from Isara & Osayi revealed that reduced uptake of the preventive measures of HPV infection could be caused by inadequate knowledge and lack of awareness about HPV infection[89].

Finding from a study conducted by Rositch et al., [27] revealed that majority of women were willing to be vaccinated in order to prevent cervical cancer if offered at low or no cost (94%). This finding is similar to the finding of this present study in which it was reported that 33.0% acknowledged that if the government subsidizes HPV vaccine, they would be willing to pay.

It was noted that over half of the respondents acknowledged that they were willing to get their daughters vaccinated (58.9%). A little above half acknowledged that they would be willing to pay for their daughter's vaccine (55.4%); and over two-third affirmed that if vaccination is free they would allow all females around them be vaccinated (90.2%). This was in variance with the finding of Vermandere, et al (2016) who submitted that even though the acceptability of HPV vaccine was very high among the women (88.1%), only 31.1% reported at follow-up that their daughter had been vaccinated. About 17.7% of people refused the vaccination, while 51.2% of people desired the shot but couldn't get it because of logistical issues such a lack of information or time. In a related study by Nkwonta et al.,[7] it was found that even after the intervention, more than half of the participants were still prepared to pay for the HPV vaccine and screening. Additionally, less than 12% of respondents reported having ever gotten an HPV vaccination or cervical screening or having a family member who had. Findings of Agida et al.,[26] revealed that in Nigeria, regardless of the current cost of HPV vaccine, people who were aware of the vaccine accepted it more than those who were not aware of the vaccine. Finding from a study conducted by Rositch et al., [27] revealed that over two-third of the respondents were willing to be vaccinated in order to prevent cervical cancer if offered at low or no cost (94%).

Hypothetically, findings showed that women's educational status is significantly associated with their knowledge of HPV ($p<0.05$). However, respondents' age and marital status were not associated with their knowledge of HPV ($p>0.05$). This finding corresponds with that of Wabo et al.,[28] who reported that the knowledge of women living with HIV regarding HPV and cervical cancer screening were shaped by numerous social factors such as higher levels of education and older age. Finding from a similar study conducted by Nkwonta et al.,[7] revealed that the probabilities of participants' awareness of HPV, cervical cancer, and cervical cancer screening

increasing with age were statistically significant. In another study conducted by Isara & Osayi [8], it was reported that the participants' level of study and age were significantly correlated with knowledge of HPV.

Findings also showed that women's age (p=0.001) and marital status (p=0.043) were significantly associated with their knowledge of cervical cancer. Women's knowledge of cervical cancer increases with an increase in age (22.5% Vs 59.6%). On the other hand, women's educational status (p=0.796) was not correlated with their cervical cancer knowledge. According to Wabo et al.,[28], higher levels of education, prior use of cervical cancer screening, older age, and employment are a few socioeconomic factors that have influenced the awareness of women living with HIV regarding HPV and cervical cancer screening. Age is statistically significantly connected with increased knowledge of HPV, cervical cancer, and cervical cancer screening among the participants, according to Nkwonta et al study[7], there was no significant correlation between having a high degree of knowledge about cervical cancer, HPV, and cervical cancer screening with marital status or educational attainment.

Additionally, results showed that women's age, marital status, and educational level did not substantially predict whether or not they knew about the HPV vaccine (p>0.05). Good knowledge of cervical cancer, HPV, and cervical cancer screening were statistically significantly correlated with participants' ages, according to Nkwonta et al[7]. However, there was no statistically significant correlation between the participants' awareness of HPV, cervical cancer screening, and cervical cancer and their marital status, sex, or level of education.

Conclusion

The study evaluated the awareness of HPV vaccine among women with confirmed HIV status in Oyo State. Results indicated that women had a notably low level of knowledge regarding HPV, cervical cancer, and the HPV vaccine. Additionally, a limited number of women with known HIV status expressed a willingness to cover the cost of the HPV vaccine, with just slightly over half being open to having their daughters vaccinated. Therefore, there is a critical requirement to enhance maternal knowledge and deliver comprehensive medical information to women with confirmed HIV status concerning HPV, as this is integral in the prevention of cervical cancer.

Recommendations

1. Ensuring healthcare providers are well-informed is crucial to guaranteeing the recommendation of HPV vaccination for women living with HIV.
2. Women with confirmed HIV status should possess comprehensive knowledge about the causes and prevention of cervical cancer, given that their awareness plays a pivotal role in preventing the disorder.
3. Ongoing public health awareness campaigns are essential to enhance the rate of HPV and cervical cancer screenings among women in all healthcare facilities.
4. Vaccination of girls and young females aged 9-26 is strongly advised for the prevention of cervical cancer.
5. Encouraging women to undergo regular cervical cancer screenings is vital, as it can effectively prevent the disease in individuals aged 21 to 65.
6. Underscoring the significance of training and continuous education for healthcare professionals engaged in the diagnosis and management of the human papillomavirus is paramount.

7. Healthcare professionals, particularly public health nurses, can play a pivotal role in educating women through specially tailored programs in clinical settings and community outreach initiatives aligned with societal needs.

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