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Assessment of Knowledge and Willingness to Pay for HPV Vaccine among Women of Known HIV Status in Oyo State

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Abstract: This research examined the awareness and financial readiness of women with confirmed HIV status in Oyo State regarding the HPV vaccine. The findings revealed that the inclination to invest in HPV vaccines was limited among women with known HIV status in the surveyed region. The study employed the Health Promotion Model as its framework. A descriptive cross-sectional research approach was employed, involving a multi-stage sampling method to choose 397 women who were living with HIV within the study area. Data collection was carried out through the utilization of a pretested self-structured questionnaire. The gathered data was subsequently coded and entered into SPSS version 23.0 for analysis. The analysis encompassed both descriptive and inferential statistical techniques, with significance levels set at $p \leq 0.05$.

Mean age of the respondents was 44.18 ± 9.54 years, and 45.1% had secondary education as their highest educational qualifications. Also, 15.9% and 53.4% had good knowledge of HPV and cervical cancer respectively. About 17.1% had good knowledge of HPV vaccine; while 16.1% were willing to pay for HPV vaccine. In addition to this, 58.9% were willing to get their daughters vaccinated. More so, 55.4% acknowledged that they would be willing to pay for their daughter's vaccine. Hypothetically, educational status was significantly associated with women's knowledge of HPV ($p<0.05$). Furthermore, age and marital status were significantly associated with women's knowledge of cervical cancer ($p<0.05$).

Keywords: Knowledge, willingness to pay, HPV vaccine, women of known HIV status.

Based on the findings of the study, it is clear that women's awareness of HPV, cervical cancer, and the HPV vaccine was lacking. Additionally, only a small proportion of women expressed a willingness to cover the cost of the HPV vaccine, and just slightly more than half were open to having their daughters vaccinated. Consequently, there is an imperative to enhance women's understanding and furnish women with confirmed HIV status with comprehensive medical education about HPV, as it plays a crucial role in preventing cervical cancer.

Background to the Study

Human papillomavirus (HPV) is a DNA virus belonging to the Papillomaviridae family and is the primary cause of conditions such as cervical cancer, genital warts, and laryngeal papillomatosis. HPV is typically transmitted through sexual contact and infects nearly every individual at some point in their lives. Both HPV infection and cervical cancer are fundamentally sexually transmitted infections. In both developing and developed nations, cervical cancer is prevalent among women, making it one of the most common cancers, particularly in developing countries[1].

On a worldwide scale, the prevalence of HPV is approximately 11–12%, with regional variations that range from 16% to 24% among women. In the Americas, the estimated HPV prevalence in women was 11.5%, while in Europe, it was 14.2%, in Asia, it stood at 9.4%, and in Africa, it was notably higher at 21.1%[4]. The prevalence of infections caused by genital human papillomavirus was estimated to be highest 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.

Broad Objective

The aim of this study is to assess knowledge and willingness to pay for HPV vaccine among women of known HIV status in Oyo State.

The objectives are to:

1. assess the level of knowledge of HPV, HPV vaccine and cervical cancer among women of known HIV status in Oyo State, Nigeria.
2. examine the willingness to pay for HPV vaccine among women in Oyo State, Nigeria.
3. evaluate women's willingness to vaccinate their daughters against HPV in Oyo State, Nigeria.

Research Questions

1. What is the level of knowledge of HPV, HPV vaccine and cervical cancer among women of known HIV status in Oyo State, Nigeria?
2. Are HIV-positive women willing to pay for the HPV vaccine?
3. 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

Research 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 Settings

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..

Oranyan Primary Health Center was established in 1926 as a dispensary by the colonial masters. It is located in Ibadan South East Local Government. It has the following departments: Laboratory, disease surveillance, Child welfare clinic, family planning, medical records, immunization, HIV, antenatal clinic, tuberculosis and leprosy, treatment of common ailments. The head of this facility is matron Aremu. She is a chief nursing officer. The hospital staff strength is 49 members, out of which 16 are staff, 18 are adhoc staff, and 15 are volunteers. Oranyan Primary Health Center, Ibadan draws its clients from within and outside Ibadan South East Local Government and the catchment states of the western region of Nigeria. The services being provided at Oranyan Primary Health Center, Ibadan are organized and distributed for each working day of the week.

Population of the Study.

The study population comprised of women living with HIV aged 15 years and above receiving treatment at the three selected hospitals (HIV clinic, Oranyan Primary Health Center; HIV clinic, Adeoyo Maternity Teaching Hospital, Yemetu; and PEPFAR clinic, University College Hospital, Ibadan). Also, at least 398 respondents were needed, and the study lasted for 4 months. The women were recruited after obtaining a written informed consent.

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

Prior to conducting this type of research on human subjects, ethical approval was sought 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. The purpose of the ethical approval is to make sure that this study complies with the universally recognized scientific norms and global ethical standards necessary for human subject research. The respondents provided informed consent, and the secrecy of the data gathered was ensured. There was never any risk considered. No financial compensation was offered to respondents, nor was it asked or expected by the researcher or her assistants in exchange for their participation. Respondents have complete

discretion over whether or not to engage in the study. The questionnaire did not ask participants' names, and the information gathered was exclusively utilized for study.

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 the 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		
Undetected	14	3.5
Detected	24	6.0
Don't know	359	90.4

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?

Only (37.5%) had ever heard of HPV, while 94.7% acknowledged that smoking can be related to HPV. Few (16.9%) affirmed that HPV can cause genital warts, and 29.0% reported that HPV can be transmitted during sexual intercourse. Also, 42.8% acknowledged that people can get HPV infection for a long time without knowing; in which only 13.0% have been tested for HPV. About 34.3%

affirmed that screening for cervical cancer in women with HIV can prevent developing cancer; while 21.7% claimed that a negative HPV result depict that a woman has a low chance of cervical cancers.

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%).

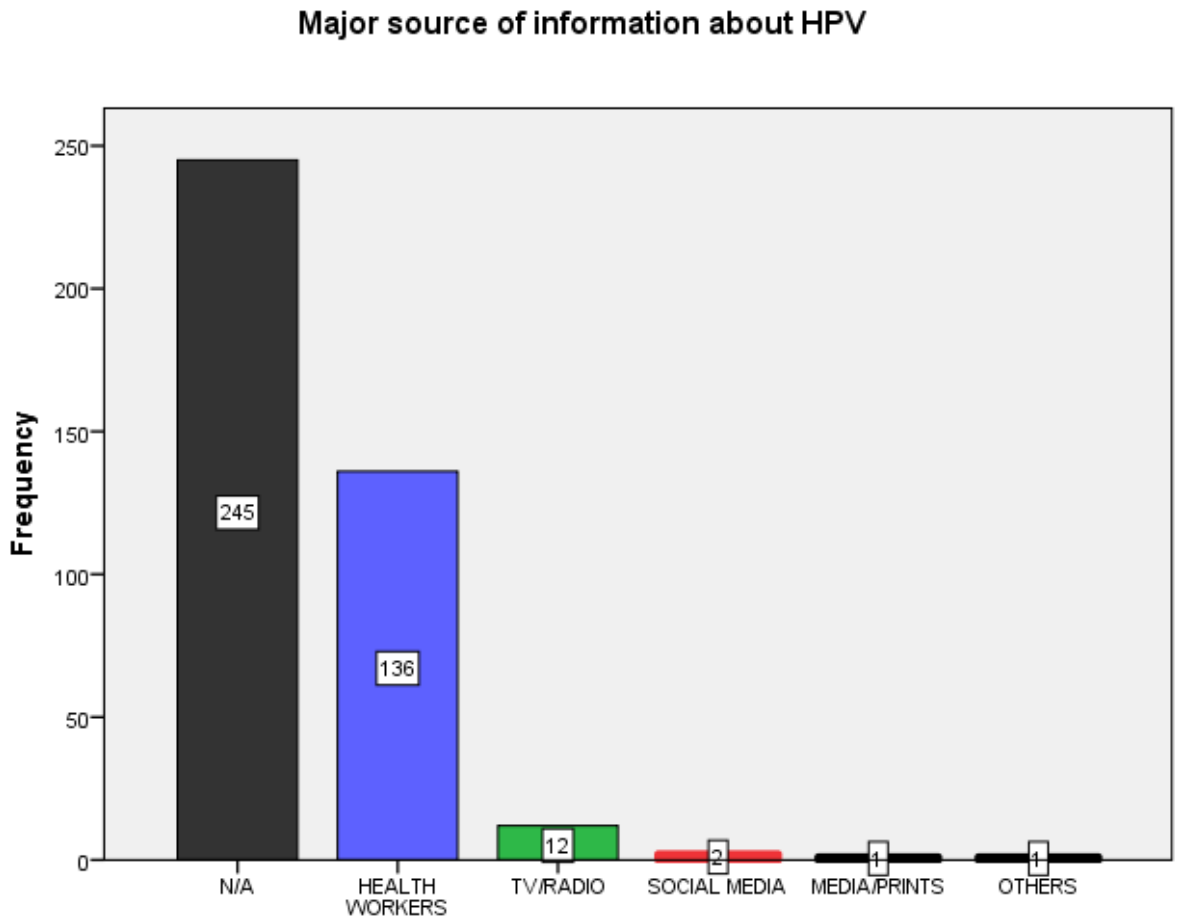


Figure 4.2. showing the overall knowledge of Human Papilloma Virus (HPV) among participants

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.

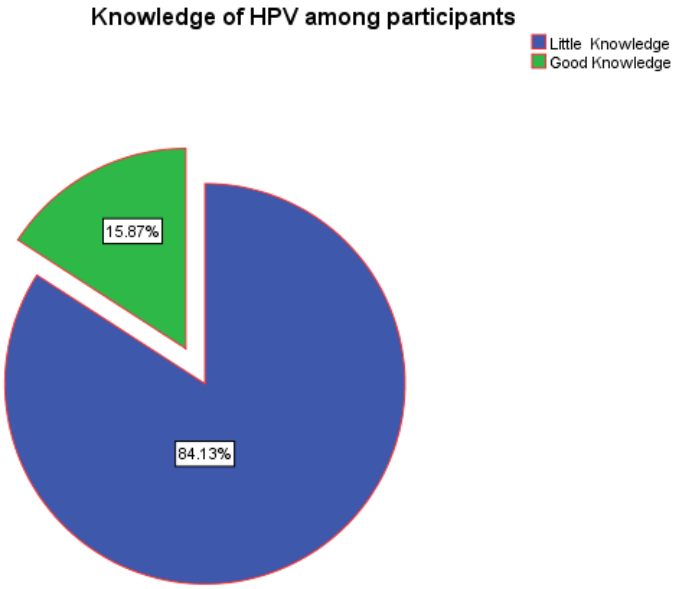


Table 4.3. Knowledge of HPV vaccine

It was revealed that 17.9% of the respondents have heard of HPV vaccine, and 91.2% claimed that HPV vaccine cure cancer. However, just 18.1% of women said they still required to have routine cancer screenings despite having received an HPV vaccine, while 15.6% said the vaccine is very efficient at preventing HPV. Also, 13.6% acknowledged that HPV vaccine 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.

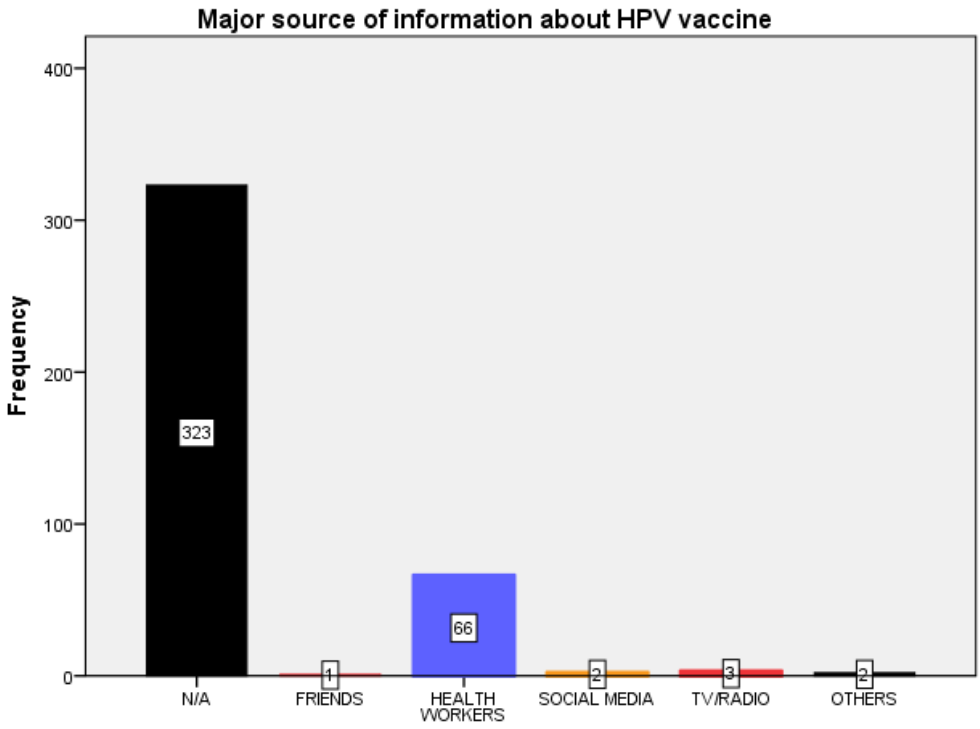


Figure 4.4. showing the overall knowledge of HPV vaccine among participants

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.

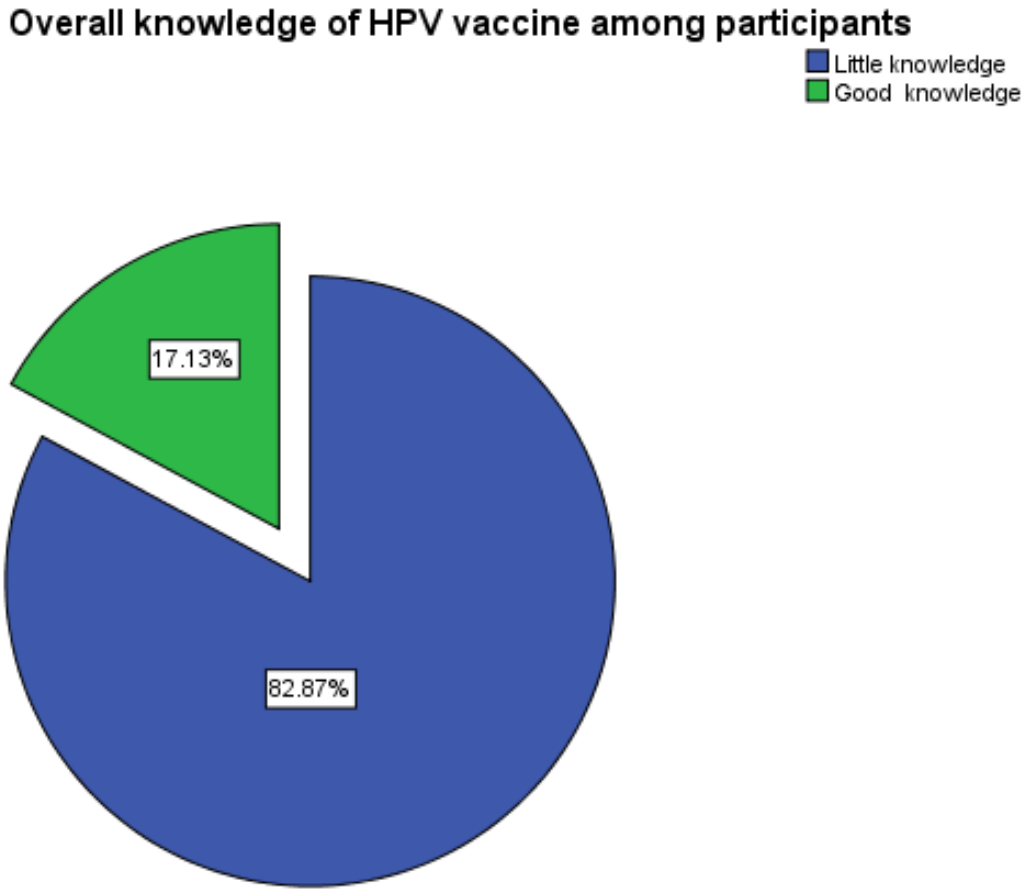


Table 4.4: Knowledge of cervical cancer

Concerning the knowledge of cervical cancer, three-quarter (74.8%) of the respondents have heard of cervical cancer; and 68.8% have received information about cervical cancer. Majority (91.7%) acknowledged that people who drink alcohol content are more likely to have cervical cancer; and 52.4% also acknowledged that people who smoke are more likely to have cervical cancer. Only 18.6% acknowledged that cervical cancer is caused by a type of HPV; 61.0% affirmed that cervical cancer can be cured if detected early. See table 4.3 for details.

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.

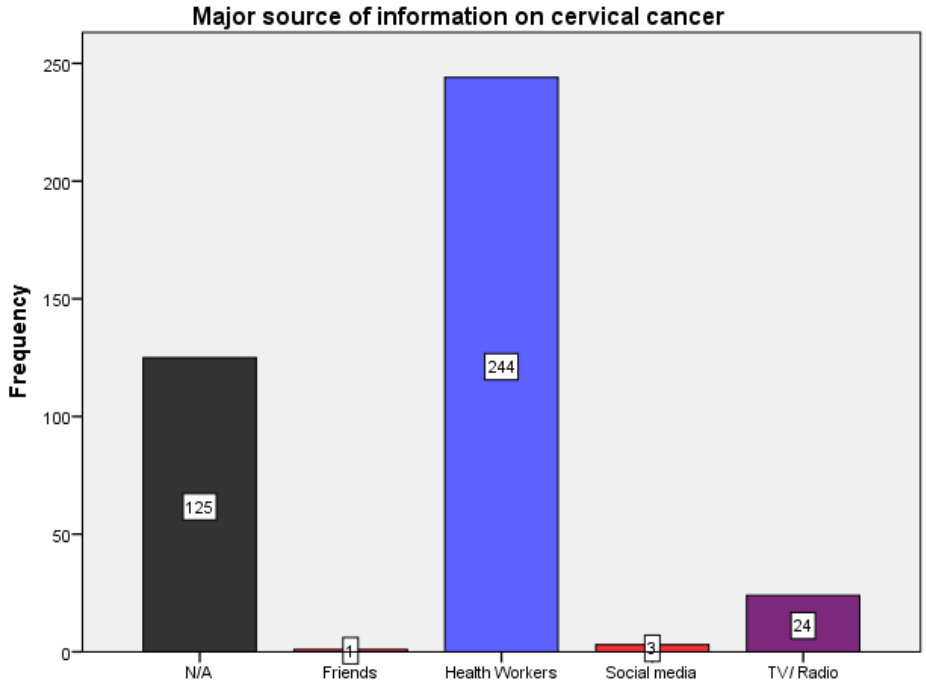
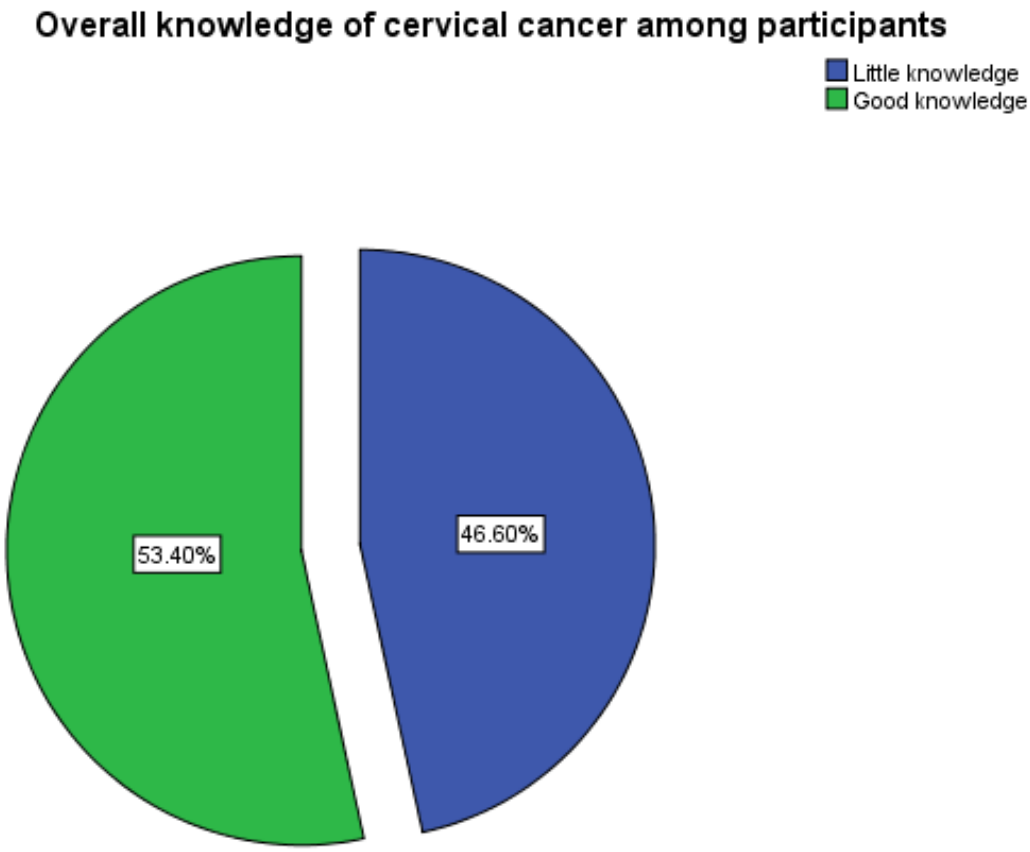


Figure 4.6. showing the overall knowledge of cervical cancer among participants

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.

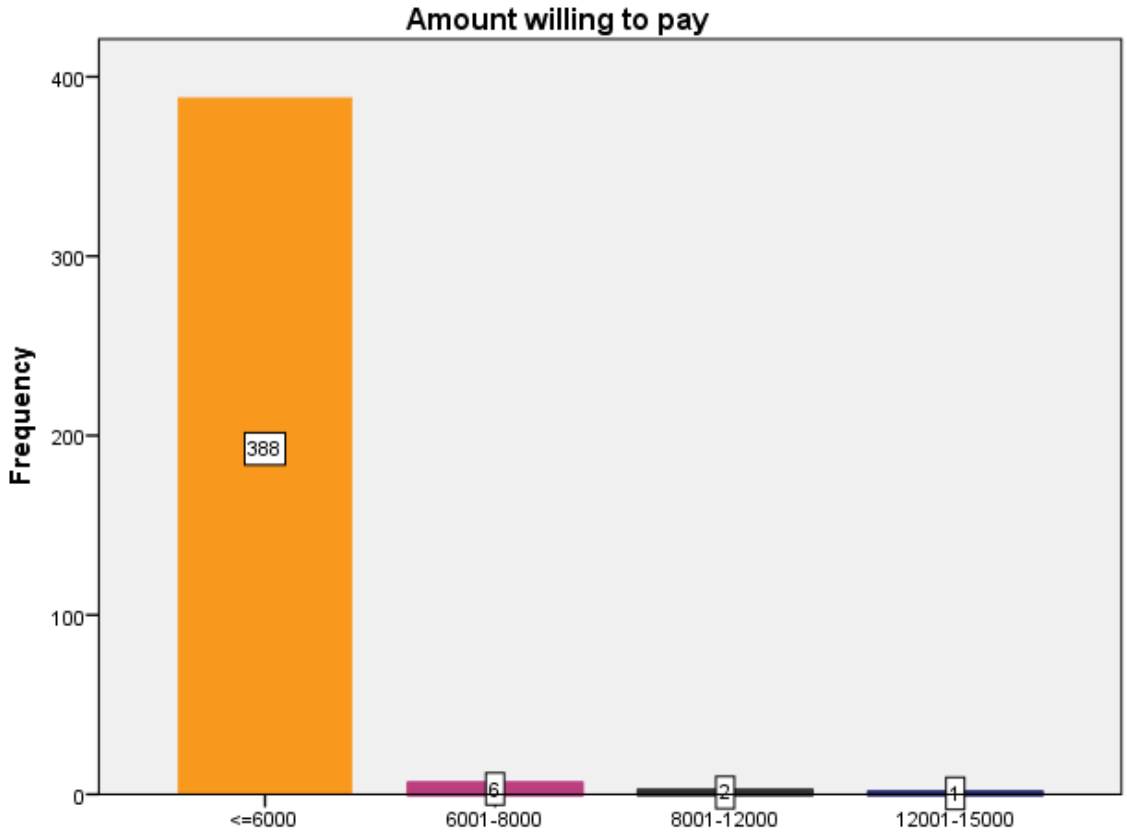
Table 4.6: Respondents' willingness to vaccinate their daughters against HPV

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

From the findings, respondents' mean age was 44.18 ± 9.54 years. This corroborates the finding of past studies [1] which reported that the participants mean age was 42.5±11.5 years[1].The present study also revealed that almost half (45.1%) had secondary education as their highest educational qualifications; but this was in variance with the finding in which majority (68.3%) of the study participants had tertiary level of education[2]. It was noted in the present study that over half of the respondents were married; and this agrees with finding who reported that about 59.4% were married[3]. A study conducted and reported that majority of participants were married (84.7%)[4]. More than three-quarter were Yoruba, and this supports the finding in which it was reported that the Yorubas (87.1%) were predominated among the participants[5].

Findings from the study revealed that the good knowledge of HPV was 15.9% among the women with known HIV status. This might be that majority of those who participated in this study had secondary education as their highest educational qualifications and are semi-illiterates. Findings from a similar study revealed that there is a limited knowledge of HPV transmission and prevention of cervical cancer among women living with HIV[6]. Finding from another similar study revealed that only 20% had good knowledge of HPV at baseline[7]. Another study also revealed that knowledgeable about HPV was good among 5.2% of the participants and 17.0% of people knew that HPV vaccinations were available[8].

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 has assessed knowledge and willingness to pay for HPV vaccine among women of known HIV status in Oyo State. Findings revealed that women's knowledge of HPV, cervical cancer and HPV vaccine were very low. Also, there were not many women with known HIV status who were willing to pay for the HPV vaccine; while a little above half were willing to get their daughters vaccinated. Thus, there is a need to improve maternal knowledge and provide medical information to women of known HIV status about HPV which helps in prevention of cervical cancer.

Recommendations

1. Women with known HIV status should be equipped with sufficient knowledge towards the causes and prevention of cervical cancer since their knowledge about cervical cancer is one of the most important factors in the prevention of the disorder.
2. It is important to promote ongoing public health awareness in order to improve the number of women who are screened for HPV and cervical cancer in all medical facilities.
3. Vaccinating girls and young females of aged 9-26 years for prevention of cervical cancer is recommended.
4. Women should be urged to get routine cervical cancer screening because it can prevent the disease in those aged 21 to 65.
5. The importance of training and retraining healthcare professionals involved in the diagnosis and management of the human papilloma virus cannot be overstated.
6. Healthcare professionals, especially public health nurses, can play a significant role in educating women through specially designed educational programs in the clinical setting and through community outreach strategies that suit our society.

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