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

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Certification

This is to certify that Mojibola A, Babalola with Matriculation Number LCU/PG/001499 carried out this research work titled "Assessment of Knowledge and willingness to pay for HPV vaccine among women of known HIV status in Oyo State" in the Department of Public Health, Faculty of Basic Medical and Applied Sciences, Lead City University, Ibadan, Oyo State, for the award of Master Degree in Public Health and that this has not been previously submitted.

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Dedication

This Research work is dedicated to God Almighty.

Acknowledgement

To you alone my praises Oh God. I honour you, my all-knowing God, the beginning and the ending. Thank you Jesus for the grace and the enablement from the unset of this program to the end. Thank you Jesus.

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Abstract

This study assessed the knowledge and willingness to pay for HPV vaccine among women of known HIV status in Oyo State. This study discovered that willingness to pay for HPV vaccines among women of known HIV status was low in the study area. The study applied health promotion model.

A descriptive cross-sectional study design that used a multi-stage sampling technique was used to select 397 women living with HIV from the study setting. A pretested self-structured questionnaire was used for data collection. The data collected was coded and entered into SPSS windows, version 23.0. It was further analyzed using descriptive and inferential statistics 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 ($p<0.05$).

From the foregoing study, it is evident that women's knowledge of HPV, cervical cancer and HPV vaccine were poor. Also, very few women were willing to pay for 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.

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

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Human papillomavirus (HPV) is a DNA virus from the Papillomaviridae family and the main cause of cervical cancer, laryngeal papillomatosis and genital warts and laryngeal papillomatosis[1]. The infection caused by HPV is a sexually transmitted infection and HPV is infected in every individual at some point in individual's lives[2]. Infection caused by HPV infection and cervical cancer are sexually transmitted infections by origin[3]. In the developing countries, cancer of the cervix is among the most common cancer in women both in developing and in the developed countries[3].

Globally, HPV has a prevalence of about 11–12%, which range from 16% to 24% among women[4]. In America, the HPV prevalence in women was estimated to be 11.5%, Europe (14.2%), Asia (9.4%) and Africa (21.1%) respectively[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.

1.2 Statement of the Problem

In developing countries, cancer of the cervix continues to lead among all cancer-related deaths in women living with HIV[28]. This condition is brought on by the persistence of high-risk oncogenic

HPV in the cervix, and it affects women with HIV more frequently due to repeated HPV infections and reduced HPV clearance. These are to blame for HPV's prolonged persistence[29].

Despite the high prevalence of infections caused by Human Papilloma Virus (HPV) and cancer of the cervix in Nigeria, utilization and uptake of the HPV vaccine which is very effective and efficient in prevention of HPV that causes cervical cancer remains low. There is also a report that among the Nigerian population, the knowledge of infections caused by HPV and HPV vaccines are low and inadequate. The cost of vaccinating a woman against HPV is beyond what an ordinary person in Nigeria can afford [30].

The increased and persistent problem associated with cervical cancer has been a great problem to Nigeria society and the world at large. This has led to increase medical technology intervention including the invention of the Human papilloma virus vaccine as preventive measure in other to reduce the mortality and morbidity rate of the above mentioned disease. The vaccine was licensed and introduced to Nigeria in the year 2009 for sexually active women, but it was discovered that despite the availability and the health benefit of this vaccine, only very few women and girls have been immunized since the introduction. This has created a lot of concern for the researcher because though vaccines are available, yet only very few women have been immunized. Additionally, the Nigerian vaccination program has not yet included the HPV vaccination of women. So, vaccinating a woman against HPV is based on personal arrangements. Thus, vaccinating girls against HPV are usually on private basis[31].

Globally, HPV has imposed an enormous burden on the healthcare system. Annually, 630,000 cancer cases (4.5% of all cancer cases) can be attributed to HPV, of which 83.0% are cervical cancer. Although several million of women die from cervical cancer each year in developing countries, yet HPV vaccine has not been included in the National Immunization Programmes

(NIP) in these countries. People can only be vaccinated at their own expense. Coupled with the lack of vaccination awareness, knowledge and the high price of HPV vaccine. Despite the fact that HPV is one of the most common STDs worldwide, and most sexually active women are exposed to it during their lifetime, yet HPV vaccination coverage is still low and inadequate [32].

The incidence of HPV-related cancers and genital warts is higher among women living with HIV as compared to the general population[33]. There have not been any organized, national or local initiatives to vaccinate women against HPV 6 and 11, which can lessen the prevalence of genital warts and cervical cancer[34].

1.3 Justification of the Study

To date, there is little research that assesses the knowledge and willingness to pay for the HPV vaccine among women of known HIV status in Nigeria especially in the South-western part of the country. Also, there is a lack of public health initiatives to improve education among women of known HIV status about HPV symptoms, causes and prevention. Social medias such as internet and some online blogs might have served as the main source of information about HPV among women of known HIV status, but there is little or no exposure at all to such things.

Furthermore, in Nigeria, there are limited facilities where the HPV vaccines can be available especially to those who are living in the rural area in the south-western part, and even when the vaccines are made available, the cost of getting the required dosage is high and unaffordable.

Although there are very few related recent reports from Nigeria on acceptability and willingness to pay for HPV vaccine among women of known HIV status, there is still need for more data on this subject in order to know the percentage of women of known HIV status who have the knowledge, and who are willing to pay for HPV vaccine.

It has also come to notice that despite the valuable health benefits of taking HPV vaccine, in Nigeria, most women give little or no attention to the programme. Some of the likely issues have been ascertained to be the poor involvement of the women in taking active part in public awareness or enlightenment. Others can be attributed to the lack of interest on the part of the government to provide necessary aids that will assist the sustainability of the HPV vaccine programme in the available health facilities.

A casual interaction of the researcher with many women of known HIV status in President's Emergency Plan for AIDS Relief (PEPFAR) clinic of University College Hospital (UCH), HIV/AIDS clinic of Adeoyo Maternity Teaching Hospital, Yemetu and Primary Health Centre, Oranyan, Ibadan revealed that they seem not to have enough knowledge and understanding about HPV. In light of this, the researcher decided to conduct this study. Therefore, the study assesses the knowledge and willingness to pay for the HPV vaccine among women of known HIV status in Oyo State.

1.4 Aim and Objectives of the Study

1.4.1 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.

1.4.2 The objectives are to:

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

ii). examine the willingness to pay for HPV vaccine among women in Oyo State, Nigeria.

iii). evaluate women's willingness to vaccinate their daughters against HPV in Oyo State, Nigeria.

1.5 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?

1.6 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.

1.7 Significance of the Study

The results of this study and further studies would provide more detailed information about HPV and might contribute significantly to the prevention of cervical cancer through primary high-risk HPV testing and HPV vaccination against the oncogenic viruses.

The results from the present study are expected to provide the baseline knowledge, awareness and understanding for women of known HIV status, who might be at risk of HPV, in order for them to pass the knowledge down to their female children.

The research findings could also be significant to the government to turn a new leaf in areas where they are failing towards the provision of HPV vaccine to women in the society.

The outcome of this study would increase widespread availability and utilization of HPV screening which will reduce the incidence and mortality of cervical cancer.

Designing appropriate HPV-based screening treatments for people, especially women living with HIV in the study environment, requires knowledge collected from the study.

The results may be related to recent initiatives by the President's Emergency Plan for AIDS Relief (PEPFAR) program in Nigeria to encourage condom usage among sexually active HIV positive people, particularly women, in order to lower the risk of HIV and other sexually transmitted illnesses (STI).

1.8 Scope/Delimitation of the Study

This study is delimited to women of known HIV status in President’s Emergency Plan for AIDS Relief (PEPFAR) clinic of University College Hospital (UCH), HIV/AIDS clinic of Adeoyo Maternity Teaching Hospital, Yemetu and Primary Health Centre, Oranyan Ibadan, Oyo State, Nigeria.

1.9 Limitation of the Study

The following constraints were encountered throughout the study:

1. The study is limited by its being hospital based and might have therefore underestimated the knowledge and willingness to pay for HPV vaccine among women of known HIV status. It might have also excluded some women of known HIV status who did not visit the selected hospitals during the period of the study. Nevertheless, in the data-poor setting of the study, hospital-based studies are commonly the most reliable, and sometimes, the only source of realistic data.
2. Social desirability and recall biases of women of known HIV status might affect the reliability of the data with respect to knowledge and willingness to pay for HPV vaccine.
3. The study was limited by negative attitudes of respondents to research data gathering which were also serious challenges.
4. It was not easy obtaining the ethical approval from the Lead City University-Health Research Ethics Committee (LCU-HREC) and social approval from Ethical Review Committee of Oyo State. Therefore, the researcher was constrained to wait and consistently get in touch with workers in the committee's office until final approval was secured.
5. Women of known HIV status can only be centrally located at the selected hospitals on their clinic days during their treatment. Therefore, effort was intensified to be in the selected hospitals for some weeks so that appreciable and required sample size could be obtained.
6. Only the women of known HIV status in the selected three hospitals (PEPFAR clinic of University College Hospital (UCH), Adeoyo Maternity Teaching Hospital and Oranyan

Primary Healthcare Center, Ibadan) were used for the study thus the result cannot be generalized.

7. Only three facilities were employed in this study, which resulted in a small sample size of 397 participants; as a result, the findings cannot be generalized.
8. Time and insufficient funds were also the major limiting factors to the study.

1.10 Operational Definition of Terms

Assessment: It is the action of assessing level of knowledge and willingness to pay for HPV vaccine among women of known HIV status in selected hospitals (PEPFAR clinic of University College Hospital (UCH), HIV/AIDS clinic of Adeoyo Maternity Teaching Hospital, Yemetu and Primary Health Centre, Oranyan Ibadan) in Ibadan, Oyo State.

Knowledge: Ability to identify the prevalence, causes, predisposing factors, signs and symptoms, complications and prevention of HPV among women of known HIV status who are receiving treatment in President's Emergency Plan for AIDS Relief (PEPFAR) clinic of University College Hospital (UCH), HIV/AIDS clinic of Adeoyo Maternity Teaching Hospital, Yemetu and Primary Health Centre, Oranyan Ibadan, Oyo State.

HIV: This is an infection or virus that attacks the women's body immune system, specifically their white blood cells called CD4 cells. If HIV is not treated, it can lead to AIDS (acquired immunodeficiency syndrome).

Human papilloma virus (HPV): This is a virus that causes diseases in women of known HIV status ranging from common wart to cervical cancer.

Human papilloma virus vaccine: These are vaccines that prevent infection by certain types of human papilloma virus among women of known HIV status in Ibadan, Oyo State.

Willingness: The quality or state of women of known HIV status in Ibadan, Oyo State being prepared or readiness to pay for HPV vaccine.

Women: These are adult female person of known HIV status who are receiving treatment in President's Emergency Plan for AIDS Relief (PEPFAR) clinic of University College Hospital (UCH), HIV/AIDS clinic of Adeoyo Maternity Teaching Hospital, Yemetu and Primary Health Centre, Oranyan Ibadan, Oyo State.

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CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The assessment of knowledge and willingness to pay for the HPV vaccine among women with known HIV status is covered in this chapter. Additionally, the main purpose of examining the literature that was pertinent to this study was to better comprehend the data on assessments of knowledge and willingness to pay for HPV vaccination among women with known HIV status. Websites (online) and peer-reviewed journal papers were used to find the theoretical framework and examined documents on the evaluation of knowledge and willingness to pay for HPV vaccination among women with known HIV status.

2.1 Conceptual Review

2.1.1 Overview of Human Papillomavirus (HPV)

A condition known as human papillomavirus infection is brought on by the virus (HPV). Some HPV infections have no visible signs and go away on their own. Some people get warts or precancerous lesions as a result of their HPV infection, which raises their chance of developing cancer of the cervix, vagina, vulva, anus, throat, penis, or anus[1]. The majority of cervical cancer cases (70%) are caused by two strains of HPV: HPV16 and HPV18. HPV is also a factor in 60% to 90% of the other malignancies indicated above. Additionally, laryngeal papillomatosis2 and genital warts caused by HPV6 and HPV11 are common[2].

A DNA virus with over 170 identified forms, the human papillomavirus is a member of the HPV family. Sexual intercourse can spread more than 40 different types, which infect the genitalia and anus. Early initial sexual contact, having several partners, smoking, and a weakened immune system are risk factors for persistent HPV infections. The most frequent ways of HPV

transmission are vaginal and anal intercourse, which involve persistent direct skin-to-skin contact. Rarely, HPV can pass from a pregnant woman to her unborn child, but it cannot be transmitted through everyday objects like toilet seats. Only humans are affected by HPV, and other types of infection are possible[3].

Human papilloma virus (HPV) vaccines can be used to prevent the majority of common types of infection, but for them to be highly successful, they must be given before an infection takes place. Between the ages of 9 and 13, they are advised. Early cancer or abnormal cells that may grow into cancer can be found with cervical cancer screening (such as with the Papanicolaou test (pap) or by examining the cervix after applying acetic acid), which enables early treatment with better outcomes. Through screening, the number of cervical cancer-related fatalities has decreased in developed nations[4,5].

Every individual contracts HPV at some point in their lives, and it is still one of the most common STDs (STIs) 6. In 2018, 311,000 people died worldwide from cervical cancer, with an estimated 569,000 new cases. About 85% of these cervical cancers occurred in meddle and low income countries. In the United States, about 30,700 cases of cancer due to HPV occur each year. About 1% of sexually active adults have genital warts[6,7].

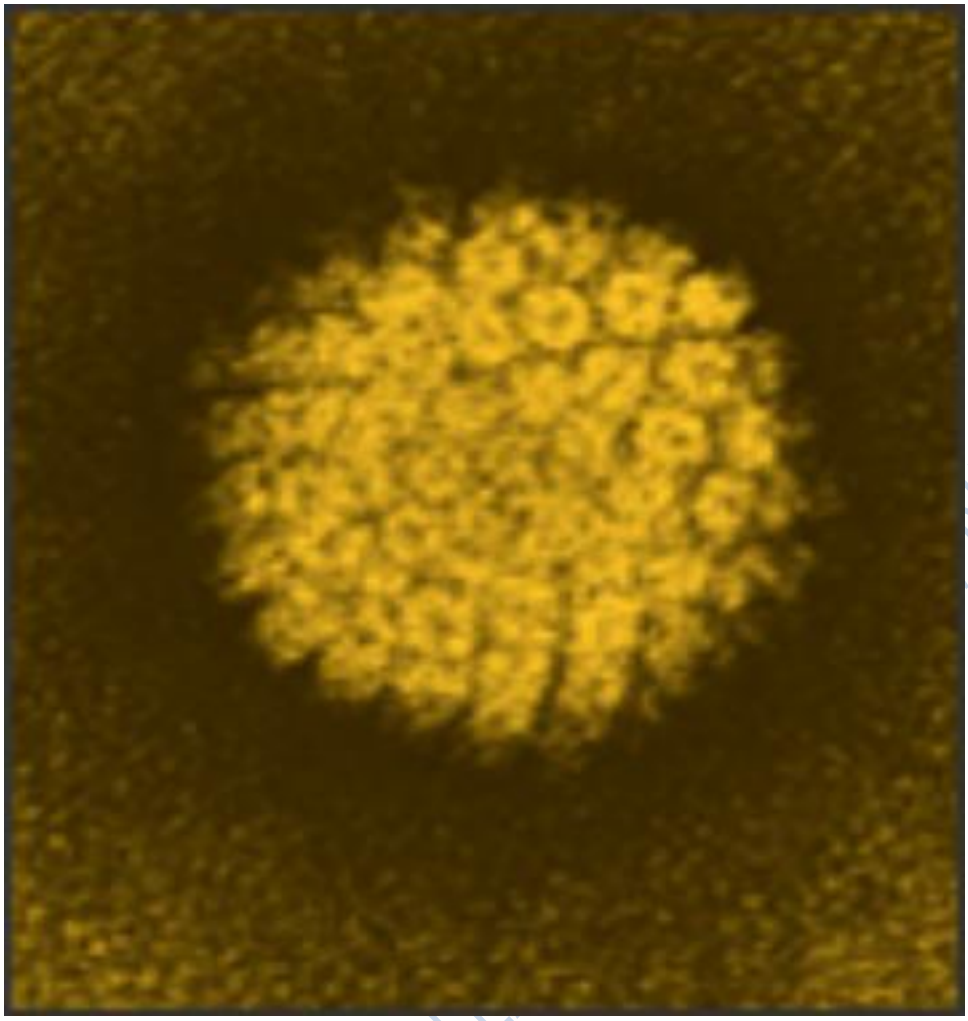


Figure 2.1: Diagram of Human Papilloma Virus (HPV)

2.1.2 Types of Infections Caused by HPV

World Health Organization[8] listed the types of infections caused by HPV as follows:

Warts: HPV and other skin infections are among the causes of noncancerous skin growths known as warts (verrucae). On the outer layer of the skin, a rapid growth of cells in the skin causes these warts. The majority of warts on the skin occur during childhood and usually develop and disappear on their own over a period of weeks to months. In 10% of adults, skin warts come back again and again. All HPVs can also establish and cause long-term infections called latent

infections in the stem cells of the skin. Report has it that these latent infections cannot be totally wiped out. Immunological control, however, aids in the eradication of the symptoms and indicators. Due to the likelihood that those using this immunological control may develop resistance to one form of HPV while remaining susceptible to other types, it is HPV type-specific[9].

Types of warts include:

Common warts: Although they frequently affect the hands and feet, they can also affect the elbows or knees. Common warts are often somewhat elevated above the surrounding skin and have a distinctive cauliflower-like appearance.

Plantar warts: They develop inward and are located on the bottoms of the feet; they typically hurt as one walks.

Subungual or periungual warts: They can develop on the cuticle, around the fingernail, or under the nail (subungual) (periungual). Compared to warts in other places, they are more challenging to treat.

Flat warts: The arms, face, or forehead are the most typical locations for flat warts. Similar to typical warts, flat warts mostly affect kids and teenagers. Flat warts do not occur as a result of cancer in individuals whose immune function are normal [10].

Genital warts: The most prevalent sexually transmitted infection in the world is an infection of the skin in the genital region called HPV. The most obvious symptom of genital HPV infection is genital or anal warts (medically termed as condylomatacuminata or venereal warts), which are connected with these infections[11]. The HPV strains that can result in genital warts are entirely distinct from those that might result in warts on other body regions, like the hands, foot, or even

the inner thighs. Genital warts can be brought on by a variety of HPV strains, although types 6 and 11 together account for around 90% of occurrences. However, more than 40 different strains of HPV can infect the skin of both men and women and are spread during intercourse. Such infections can cause genital warts, which may also remain asymptomatic[12].

Most genital HPV infections don't manifest any overt symptoms and are quickly healed by the immune system. Moreover, even if people do have symptoms of this infection, yet they can still be infected. Some people can have HPV infections of the genitals at some point during their lives. Report also has it that 10% of women infected with HPV presently. When people reach age of being sexually active, it is also reported that the incidence of HPV infection in the genitalia area increases. Just like cutaneous HPVs, immunity to HPV in the genital area is always specific to a particular strain of HPV[13,14].

Figure 2.2: Diagram of Genital warts

Laryngeal papillomatosis: Infections caused by HPV types 6 and 11 can also result to other rare condition commonly called recurrent laryngeal papillomatosis. When warts start to develop on the larynx or other areas of the respiratory tract, this syndrome develops. These warts can reoccur regularly and interfere with breathing normally. These warts have a very little chance of causing malignancy. So it is advisable to go for surgery in order to remove these type of warts[15].

Cancer:

Many HPV subtypes, including types 16, 18, 31, and 45 are known to cause persistent infections which is associated with cancers of the larynx, oropharynx, vagina, cervix, vulva, penis, anus and among others. These forms of malignancies are frequently connected to STIs and HPV to the stratified epithelium tissue in sex-transmitted diseases. People who have HPV infections, as well as HIV are at high risk of having cancer of the cervix and anus [16,17].

Globally, about 561,200 new cancer cases (5.2% of all new cancers) were attributable to HPV in 2002, making HPV the most important infection that causes cancer. An estimated half a million instances of cancer are thought to be caused by HPV each year, which accounts for 5% of all diagnosed and reported cases worldwide. Cancer diagnoses are particularly common in low- and middle-income nations. Each year, HPV causes roughly 30,700 instances of cancer in the United States[18].

Some individuals with HPV infection may experience immune system failure, which can result in persistent infection with high-risk HPV types such types 16, 18, 31, and 45, which favors the occurrence of cancer. These HPV-related cancers can also be made more likely by additional variables like drinking alcohol, using tobacco products, or smoking cigarettes, among others[19].

2.1.3 How human papillomavirus cause cancer.

Report has it that cervical cancer is caused by HPV when the latter forms part of the DNA. Most of the early genes carried by the HPV virus (genes 6 and E7) function as oncogenes, causing malignant transformation and tumor growth[20]. In addition to these, HPV can induce a tumorigenic process by integrating into a host genome, and this is associated with alterations in DNA copy number. E6 produces a protein that binds to and inactivates a protein in the host cell

called p53. Normally, p53 acts to prevent cell growth, and promotes cell death in the presence of DNA damage. p53 also up regulates the p21 protein, which blocks the formation of the cyclin D/Cdk4 complex, thereby preventing the phosphorylation of RB, and in turn, halting cell cycle progression by preventing the activation of E2F. Hence, p53 is a tumor-suppressor protein that arrests the cell cycle and prevents cell growth and survival when DNA damage occurs. More so, inactivation of p53 by E6 can promote unregulated cell division, cell growth, and cell survival which are among the major signs and symptoms of cancer[21].

Knowing that both E6 and the cellular protein E6-associated protein (E6-AP) are forms of the protein-degrading ubiquitin ligase pathway, they have a strong association. Additionally, the E6-AP binds to the ubiquitin to create the p53 protein, which results in proteosomal destruction[22].

2.1.4 Diagnosis of HPV

Colposcopy and the acetic acid test, biopsies, DNA tests (PCR, Southern Blot Hybridization, In Situ Hybridization), and Pap tests are essential ways to determine HPV infections[22].

Colposcopy and acetic acid test: Colposcopy is an outpatient treatment carried out by specially trained healthcare professionals utilizing a colposcope, a low-powered microscope. Colposcopy is the examination of the cervix, vagina, and occasionally the vulva after the application of an acetic acid solution, along with the taking of colposcopically guided biopsies of all lesions thought to be neoplastic. The degree of acetowhite lesion, surface contour, mosaic pattern, and punctuation are used to score the colposcopic findings. The severity of the lesions is correlated with greater abnormalities of these measures[23,24].

Acetic acid test: This includes soaking suspicious lesions in acetic acid, which might raise suspicion for lesions without typical signs. The procedure is dabbing a 3-5% acetic acid-soaked gauze pad on suspicious lesions of the penis, cervix, labia, or perianal region for 5–10 minutes.

Lesions on the genitalia that are flat and unobtrusive that may be challenging to diagnose become apparent. Whitening of genital warts, dysplastic, and malignant tissues (acetowhite). False-positive findings are frequent and can be caused by anything that results in parakeratosis (e.g., candidiasis, psoriasis, lichen planus, healing epithelium, sebaceous glands). It is not recommended to use the acetic acid test for regular screening[25].

Biopsy: Colposcopy enables targeted tissue sampling (biopsy) at the aberrant locations. Colposcopy requires a biopsy of any abnormal areas since the severity of the abnormality will determine how it will be treated. Treatment will be suggested if the biopsy reveals pre-cancer (dysplasia) or malignancy. Dysplasia can range from minor to severe. When a lesion spreads into the canal, when low grade colposcopic alteration is linked to severe dyskaryosis or worse, or when colposcopic appearances point to high grade abnormalities, excisional biopsy is typically advised[26].

Koilocytes, mature squamous cells with a distinct perinuclear zone, are the most distinctive feature of genital warts. Koilocytes' nuclei can become larger and hyperchromatic; duplicate nuclei are also frequently seen[26,27].

DNA techniques: The first techniques for HPV detection were based on direct probe hybridization, such as dot blot and Southern blot. This method has some drawbacks, including the need for large amounts of DNA in clinical samples, low sensitivity, and the fact that it has mostly been replaced by amplification technology, which has made it possible to detect low levels of virus copy numbers in clinical samples[28]. The hybridization of viral nucleic acids is a well-established common technique for viral detection. The two main techniques are:

Hybrid capture HPV DNA Test 2 (hc2): The FDA has now given its approval for the use of HC2 and Pap tests together. The FDA-approved Hybrid Capture 2 test's sensitivity and

specificity are almost on par with PCR-based detection techniques because it can identify HPV DNA as little as 1 pg/ml. The Hybrid Capture 2 test has the best standardized HPV detection method due to its relatively simple handling and good consistency of results. The "low-risk" and "high-risk" HPV genotype groups (HR HPV and LR HPV) are established, notwithstanding the inability to identify the precise HPV type[29,30].

PAP smear or PAP test: It is a screening test that Papanicolaou and Traut first described.

In addition to premalignant and malignant alterations, viral diseases like HPV and herpes can also be identified. Additionally, a positive test necessitates additional confirmation exams like a coloscopy, a cervical biopsy, and DNA tests like PCR[31].

Following are the steps for performing a PAP smear::

- The patient is positioned in the dorsal position, and the cervix is exposed using Cusco's speculum and Ayre's spatula while scraping the squamocolumnar junction.
- The scrapings are applied to a glass slide and fixed with fixative spray or 95% ethyl alcohol and ether (cytospray).
- Scrapings are collected from the upper lateral region of the vaginal wall for cytological examination[32].

2.1.5 Signs and symptoms of HPV infection.

According to World Health Organization[32], majority of HPV infections do not cause symptoms or disease and resolve spontaneously. But, persistent infection with specific types of HPV (most frequently types 16 and 18) can lead to precancerous lesions. These lesions can progress to cervical cancer if untreated, and this progression usually takes many years. HPV-5 can result in infections that last for the rest of a person's life without showing any overt clinical symptoms.

Common warts can be caused by HPV types 1 and 2 [33,34]. Symptoms of cervical cancer tend to appear only after the cancer has reached an advanced stage and these may include:

- Irregular, intermenstrual (between periods) or abnormal vaginal bleeding after sexual intercourse
- Back, leg or pelvic pain
- Fatigue
- Weight loss
- Loss of appetite
- Vaginal discomfort or odorous discharge; and
- A single swollen leg.

More severe symptoms may arise at advanced stages.

The following table provides a list of typical HPV infection symptoms and related HPV strains:

Disease	HPV type
Common warts	2, 7, 22
Plantar warts	1, 2, 4, 63
Flat warts	3, 10, 28
Anogenital warts	6, 11, 42, 44 and others
Anal dysplasia (lesions)	6, 16, 18, 31, 53, 58
Focal epithelial hyperplasia (mouth)	Highest risk:16, 18, 31, 45 Other high-risk: 33, 35, 39, 51, 52, 56, 58, 59 Probably high-risk: 26, 53, 66, 68, 73, 82
Epidermodysplasiaverruciformis	more than 15 types
Focal epithelial hyperplasia (mouth)	13, 32
Mouth papillomas	6, 7, 11, 16, 32
Oropharyngeal cancer	16
Verrucous cyst	60
Laryngeal papillomatosis	6, 11

Source: World Health Organization[32]

2.1.6 Risk Factors and Transmission of HPV

Having sex without barrier protection, such as a condom or dental dam; having multiple sexual partners; having sex with someone who has had other multiple sexual partners; coming into contact with warts or surfaces where HPV exposure has occurred; and not having received the HPV vaccine are all factors linked to a high risk of HPV[35]. The risk of developing cancer is also increased if a person has HPV, as well as other STDs like Chlamydia or HIV; had their first kid at a young age; had several pregnancies; smokes tobacco; or has a compromised immune system[35.36].

The CDC[37] lists many partners, smoking, immunosuppression, early onset of first sexual contact as risk factors for persistent genital HPV infections. The most prevalent way for genital HPV to be transmitted is through prolonged, direct skin-to-skin contact, primarily during vaginal and

anal sex, however oral sex can also result in transmission. HPV can still spread even after lesions are treated and managed [38].

Perinatal: Genital HPV types can be passed from mother to kid during delivery. Recurrent respiratory papillomatosis in children can also be brought on by the perinatal transfer of HPV types 6 and 11[39].

Genital infections: Studies on individual HPV strains have focused mostly on those that infect the female genital tract and cervical tissues since they are strongly linked to cervical cancer. Sexual activity is the main method of transmission for HPV infections. 51 species and three subtypes of the 120 known human papilloma viruses cause genital mucosal infection. There are 12 low-risk kinds, three likely high-risk types (16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68, 73, and 82), and 15 high-risk types (6, 11, 40, 42, 43, 44, 54, 61, 70, 72, 81, and CP6108)[40]. Furthermore, the likelihood that a woman will graduate from college infected with HPV is higher than 85% if she has at least one new partner each year for four years. Because the areas around the genitals, especially the inner thigh area, are not covered by condoms and are thus exposed to the skin of an infected individual, condoms do not totally protect against the virus.

Shared contaminated objects: Sharing of possibly contaminated objects, for example, razors may transmit HPV[41].

Blood: HPV can be transmitted via blood transfusion of unscreened blood. Most people who become infected with HPV do not know they have it. Usually, the body's immune system gets rid of the HPV infection naturally within two years. This is true of both oncogenic and non-oncogenic HPV types. At least 4 out of every 5 women will have been infected with HPV at one point in their lives at age 50. HPV is also very common in men, and often has no symptoms [42].

2.1.7 Prevention of HPV Infection.

HPV can be prevented through vaccination. People should get vaccinated with HPV vaccine. The HPV vaccine is safe and effective. It can protect against diseases (including cancers) caused by HPV when given in the recommended age groups. The CDC advises 11 to 12-year-olds to receive two doses of the HPV vaccine to guard against malignancies brought on by HPV. Every kid and girl between the ages of 11 and 12 has to get vaccinated[43].

Cervical cancer screenings for women are recommended. Cervical cancer can be prevented in women between the ages of 21 and 65 with routine screening. Additionally, those who engage in sexual activity should try to utilize latex condoms[44]. The Centers for Disease Control and Prevention reported that male condom use can reduce the risk for genital human papillomavirus (HPV) infection but provides a lesser degree of protection compared with other sexual transmitted diseases because HPV also can also be transmitted by exposure to areas (e.g., infected skin or mucosal surfaces) that are not covered or protected by the condom. Female condoms provide greater protection than male condoms, as the female condom allows for less skin contact[45].

Being in a mutually monogamous relationship or having sex solely with someone who only has sex with you can both help avoid HPV infection (i.e. having only one sex partner who is free from HPV infection)[46].

Disinfection can also stop HPV infection from occurring. The virus is resistant to several standard disinfectants and is comparatively resilient. The infection can be eliminated by exposing it to 90% of disinfectants, including ethanol for at least one minute, 2% glutaraldehyde, 30% Savlon, and/or 1% sodium hypochlorite. The virus is resistant to drying and heat, but is killed by UV light and at 100 °C (212 °F)[47].

An individual can lower their risk of contracting HPV by getting the HPV vaccine, using barrier protection each time they have sex, and limiting the number of sexual partners they have. avoid having sex if you have genital warts[48]. Additionally, to lessen the risk of warts spreading, avoid touching them unless absolutely necessary; wash your hands after touching a wart; try not to shave over a wart; If you have warts on your feet, wear shoes when you're in public places like swimming pools and locker rooms; Avoid sharing towels and other personal objects, cure warts with treatment and cover them till they go away[49].

2.1.8 HPV vaccines

HPV vaccines are vaccines that protect against infection with human papillomaviruses (HPV). The Food and Drug Administration (FDA) has approved three vaccines that prevent infection with disease-causing HPV types and they include: Gardasil, Gardasil 9, and Cervarix. All three vaccines prevent infection with HPV types 16 and 18, two high-risk HPVs that cause about 70% of cervical cancers and higher percentage of some of the other HPV-related cancers. Gardasil also prevents infection with HPV types 6 and 11, which cause 90% of genital warts. Gardasil 9 prevents infection with the same four HPV types plus five additional cancer-causing types (31, 33, 45, 52, and 58)[50].

The CDC creates guidelines for all vaccinations, including the HPV vaccine. The following are the current CDC recommendations for the Gardasil 9 vaccine:

The HPV vaccine should be administered twice, six to twelve months apart, to all children aged 11 or 12. A third shot will be required if the first two shots are administered fewer than five months apart[51]. For young women up to age 26, and for young males up to age 21, the HPV vaccine is advised. Teenagers who receive their first dose at age 15 or older also require three

vaccine doses spaced out over a six-month period. Any HPV vaccine series that has been successfully completed by a person does not require any further doses[52].

How HPV vaccines work: Similar to other vaccines that protect against viral infections, HPV vaccines cause the body to generate antibodies that, when exposed to the virus in the future, will bind to it and stop it from infecting cells. The basis for the current HPV vaccines is the formation of virus-like particles (VLPs) from HPV surface components[53]. VLPs are not contagious since the virus's DNA is missing from them. In contrast, they resemble the natural virus very much, and antibodies to the VLPs also work against the natural virus. Additionally, it has been discovered that the VLPs are highly immunogenic, which means they cause the body to produce a lot of antibodies. As a result, the vaccines are very effective. The vaccines do not prevent other STDs, and they do not treat pre-existing HPV infections or disorders caused by HPV[54].

The best defense against cervical cancer is a combination of HPV vaccination and cervical screening. Additionally, vaccination is the recognized public health measure for lowering the risk of contracting HPV-related malignancies outside of the cervix. The vaccination of as many people as possible is crucial. In addition to protecting those who have received the vaccination from infection by the HPV types targeted by the specific vaccine, vaccination of a sizable portion of the population can lower the prevalence of the vaccine-targeted HPV types in the population, providing some protection for those who have not received the vaccination (a phenomenon called herd immunity)[55].

Widespread HPV vaccination has the potential to reduce cervical cancer incidence around the world by up to 90% and the vaccines can reduce the need for screening and subsequent medical care, biopsies, and invasive procedures associated with follow-up from abnormal cervical

screening, thus helping to reduce health care costs and anxieties related to follow-up procedures[56].

How risk-free are HPV vaccinations?

The FDA must assess that a vaccination is both safe and effective before granting a license. Tens of thousands of people in the US and many other nations have undergone testing for all three HPV vaccinations. No severe side effects have been documented or proven to be brought on by the immunizations up to this point. Brief pain and other local symptoms at the injection site have been the most frequent issues. These issues are comparable to those frequently encountered with other vaccinations. Because the vaccines have not yet undergone enough testing while pregnant, pregnant women should not use them[57].

2.1.9 Factors contributing to the uptake of HPV vaccine.

The treatment for cervical cancer and human papilloma virus infection is no doubt very expensive in terms of cost, physical and psychological demands on the woman, her husband and the children[58]. The disease usually affect women who are in their reproductive years and thus have devastating effects on the well-being of their families, resulting in regular attendance and malnutrition among their children. The development of Human Papillomavirus (HPV) vaccines provides new opportunities in the fight against cervical cancer. Many acceptability studies have revealed a high interest in these vaccines, but acceptance is only a precursor of behavior, and many factors, at the personal, community and provider level, which may inhibit the translation of willingness to vaccinate into actual uptake[58].

According to a report, the acceptability of the HPV vaccine was assessed before the start of a vaccination campaign to prevent cervical cancer[59]. Only 31.1% of the women reported that their

daughter had had the vaccination at the follow-up visit, despite the fact that baseline acceptability was relatively high (88.1%). About 17.7% of people refused the vaccine, while another 51.2% desired it but were prevented from getting it by real-world obstacles like a lack of knowledge or a lack of time. Baseline acceptance and baseline knowledge of cervical cancer were connected in the bivariate analysis, although baseline acceptance and program knowledge were separately associated with vaccine uptake. Even among those who reported side effects at a follow-up, they were very concerning[60].

Theophilus, Akabueze, and Ijeoma[61] have found a number of obstacles to HPV vaccine acceptance and uptake. Among all participants (n=287), 60.3% and 27.9% answered that getting their daughter immunized was, respectively, "very probable" and "likely." About 59.4% of respondents said that a lack of knowledge may prevent them from immunizing their daughter. 38.0% of respondents voiced worries about side effects, including problems with fertility (23.7%), and nearly one in four were scared the vaccine wouldn't be given safely[62]. Additionally, more than 25% of the participants questioned the vaccine's efficacy. Not many mothers objected to the vaccination because they believed it would encourage their daughter to engage in unprotected sex (7.1%) or because she was too young (8.5%). Only a small percentage of women (1.1% and 1.8%, respectively) stated thinking that the HPV vaccine would not be welcomed by their partners. However, 11.0% of the women thought that this would be the case. Other impediments beyond those searched for with closed questions were not revealed by the open questions.

2.1.10 Treatment and management of HPV

Although many infections caused by HPV has no cure, but many of these HPV infections go away and disappears on their own. According to reports, the immune system effectively removes 70 to 90 percent of HPV-related illnesses from the body. When therapy is required, the objective is to eliminate any observable warts and abnormal cervix cells in order to relieve symptoms. Treatments could consist of[63]:

Cryosurgery: This procedure uses liquid nitrogen to freeze the warts off.

Loop electrosurgical excision procedure (LEEP): The aberrant cells are removed using the loop electrosurgical excision technique (LEEP).

Electrocautery: Using an electrical current to burn the warts off is known as electrocautery.

Laser therapy: Destroying warts and any aberrant cells with a powerful light.

Prescription cream: Simply rubbing a prescription lotion onto the warts. (Do not treat genital warts with over-the-counter wart remedies.)

Sometimes no medical intervention is required. However, it's crucial to keep a close eye out for any cell changes during routine screenings, and only a small percentage of women with HPV infection will see cellular abnormalities that require treatment[63].

2.1.11 Women living with HIV

An increasing percentage of HIV cases worldwide are among women. Although Kaposi sarcoma and non-Hodgkin lymphoma prevalence and incidence have significantly decreased as a result of the widespread use of highly active antiretroviral therapy (HAART), cervical cancer rates among women with known HIV status are still high. Women with known HIV status have a higher chance of developing invasive cervical cancer than healthy women do[64]. In addition, women with known HIV status have a greater and more persistent prevalence of high risk human

papillomavirus infection. Thus, women whose HIV status is known are more symptomatic for HPV infections[65].

The risk of invasive cervical cancer is higher among women living with HIV than HIV-negative women. In addition, high risk human papillomavirus infection occurs more frequently and persists longer in women 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[66]. A long history of HIV infection and prolonged immunosuppression are associated with persistent HPV infection and invasive cervical cancer. Myriad barriers that deter women of known HIV status from accessing health care and the uptake of cancer screening. These include HIV-related stigma and discrimination within and outside of the health care system, structural racism and criminalization of HIV non-disclosure, health literacy. These indicate that initiatives are required to encourage HPV and cervical cancer screening among women with known HIV status that are socially inclusive, inventive, and pertinent[67]. HPV self-sampling is a viable tactic to successfully engage marginalized women with known HIV status, according to HIV self-testing data[68].

In comparison to physician-collected samples, HPV self-sampling provides various benefits for detecting HPV genital infection. Self-collected samples, for instance, can be more easily gathered in environments with few resources or in groups that are challenging to reach. Because self-sampling eases the financial and logistical load on women and increases their sense of privacy and autonomy, it will boost their desire to engage in cervical cancer screening programs[69]. Utilization of the HPV DNA-based test for cervical cancer screening among women grows due to self-sampling[70]. Additionally, self-sampling eliminates some of the obstacles that low socioeconomic level women, in particular, have in participating in routine screening

programs. Self-sampling also enhances the subjective experiences of women, which increases and boosts screening participation and ultimately lowers cervical cancer and HPV-related morbidity and mortality. Furthermore, the self-obtained HPV sample may affect a woman's decision to visit a clinic for a follow-up HPV diagnosis and cervical cancer care[71].

2.1.12 Knowledge of HPV infection

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].

HIV-positive women's understanding of HPV transmission and cervical cancer prevention was poor. The majority of these ladies were unaware about 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. Although some of these women were aware that having HIV and engaging in sexual activity put them at a significant risk of developing cervical cancer and that HIV-positive women should get screened for cervical cancer. Findings of the study also revealed that many were unaware of the screening recommendations for women living with HIV[74]. Additionally, a variety of social factors such as media messages, higher levels of education, prior history of cervical cancer screening, older age, being employed, and adequate and effective health information from service providers influenced the knowledge of women living with HIV regarding HPV and cervical cancer screening. More so, access to HPV screening also increases women living with HIV's knowledge[75].

The effect of two community-based educational initiatives on Nigerian adults' awareness of, desire for, and encouragement of the human papillomavirus (HPV) vaccine and cervical screenings[76]. Less than 12% of people had ever had the HPV vaccine or undergone cervical screening, and the majority (80%) had little to no knowledge about HPV at baseline. After the intervention, there was a noticeable improvement in participant awareness and intention to get an HPV vaccination and have cervical screenings (>70%). Additionally, even if the HPV vaccine and screening were pricey, more than half were willing to pay for them. Furthermore, the probabilities of having more information about HPV, cervical cancer, and cervical cancer screening were statistically significant based on the age of the individuals[77]. However, based on sex, marital status, educational attainment, and monthly income, there were no statistically significant variations in the probabilities of high knowledge of HPV, cervical cancer, and cervical cancer screening among the participants. Low-cost community-based educational initiatives that are gender-focused and context-specific are successful in promoting HPV vaccination and cervical screening in sub-Saharan Africa.

Despite the expensive price of the HPV vaccine in Nigeria right now, awareness of it was high among the populace. Additionally, the public has to receive sufficient information in order to debunk any false beliefs regarding the HPV vaccine[78].

2.1.13 Willingness of women living with HIV to pay for HPV vaccine

HPV vaccine is available in most Nigerian hospitals and pharmacy but they are very expensive and unaffordable for the common Nigerians. Although, the cost varies from one location to the other, yet it is still very expensive and cost between $18.16 to $36.26[88]. 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. Numerous interventions have been developed to increase HPV vaccination in various demographics and levels, such as health education, community outreach programs, and phone calls, yet many women are unwilling to pay for and use HPV vaccine[89].

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. For the primary prevention of HPV infections, two HPV vaccines, including Gardasil® and Cervarix®, have been available in Nigeria. Even though WHO recommends pre-adolescent HPV vaccination and those two existing vaccines are for HPV genotype 16 and 18, which are responsible for 73.8 % of invasive cervical cancers in the country, they are not yet included in Expanded Program on Immunization (EPI), which aims to make vaccines available to all children, due to economic efficiency and budget impact reasons. Though HPV screening is available 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, they purchase out-of-pocket[90].

2.1.14 Willingness of women living with HIV to do HPV self-sampling

A woman who wants to determine whether she has HPV infection uses a kit to collect a (cervicovaginal) sample, which is then sent to a lab for analysis. This technique is known as HPV self-sampling[95].

Lavage, brush, swab, and vaginal patch are some of the collection techniques. HPV self-sampling identifies those women who are at increased risk because it cannot diagnose cervical (pre-)cancer. In contrast to Pap smears, which, especially in LMICs, still have low coverage due

to limited population knowledge and lack of availability, self-privacy sampling's benefits may motivate more people to get tested. When HPV self-sampling kits are delivered directly to women's homes or are made available door-to-door by a health professional, self-sampling for HPV testing enhances women's uptake of cervical cancer screening. Additionally, HPV self-sampling test kits can boost screening and HPV vaccine uptake for early identification of cervical cancer and lower its worldwide impact. Consequently, HPV self-sampling may boost the use of cervical cancer screening[96].

Women who choose to participate in HPV self-sampling must also purchase a kit, collect their own samples, and send their specimens to a lab for testing. The lab then informs the participating women of the test results. Additionally, self-sampling can be carried out outside the healthcare system or in a hospital setting. Healthcare professionals or the ladies themselves can start it. The responsibility of and connection to the health sector, as well as the provision of high-quality test kits, equitable kit collection, and assurance of follow-up following the use of self-sampling kits, are crucial factors for the success of this self-care strategy[97]. Cervical intraepithelial neoplasia grade 2/3 can be detected using HPV testing from self-collected samples in both clinic and home settings. Cervical cancer screening coverage may be increased in low-resource settings by using HPV testing on self-collected vaginal samples, which is equally accurate as testing on samples obtained from healthcare professionals. For the majority of women, HPV self-sampling is a suitable technique for obtaining a sample for HPV typing. However, there is very little research on whether HPV self-sampling in women with known HIV status is acceptable[98].

Self-sampled HPV testing combined with visual triage was used in a study that aimed to establish and assess the viability of a novel cervical screening program in Nigeria. The study's findings showed that it was possible to screen more than 100 women per day per clinic using

self-sampling. The general acceptance of self-sampling was very high after an audiovisual presentation and in-person instructions (81.2% of women preferred self-sampling to physician collection)[99].

About 17.3% of women tested positive for HPV. The colposcopy clinic saw 85.9% attendance thanks to intensive follow-up. 8.2% of those who were referred underwent thermal ablation as their initial treatment, and 5.6% underwent extensive loop excision of the transformation zone (LLETZ). The squamocolumnar junction's full visibility, which is essential for the best visual triage and ablation, decreased from 68.5% at age 30 to 35.4% at age 49. Histology detected five malignancies, including CIN2+ and CIN3+ (CIN- Cervical intraepithelial neoplasia), in 5.9 and 3.2% of HPV-positive women, respectively (0.9 and 0.5% of the total screening population). This led to extra treatment when needed. WLWH had significantly higher rates of CIN2+ and HPV infection (40.5 and 2.5%, respectively). Compared to the histopathological reference standard, colposcopic perception resulted in over- and under-treatment[100]. Thus, a self-sampled HPV testing cervical cancer screening program with colposcopic rapid care of women positive for HPV proved practical in Nigeria. In order to increase the accuracy of the screening program, we are currently studying the use of a combination of partial HPV typing and automated visual evaluation (AVE) of cervical pictures.

A study on the acceptance of HPV self-sampling and awareness of HPV/cervical cancer among women living with HIV revealed that the majority of these women had little information about HPV transmission and cervical cancer prevention, which affected their views of risk and susceptibility. Misconceptions regarding Pap tests, anxiety over being diagnosed with a serious illness, perceived pain, humiliation, a desire to maintain one's modesty, and limited access to

female healthcare professionals were among the screening hurdles. Self-sampling is a valid and promising screening method for women with known HIV status, according to this study[73].

The majority of the women who responded to the survey had a favorable opinion of self-sampling, with 93.6% of them reporting that they did not feel embarrassed and 89.4% reporting that they felt no discomfort at all when taking a self-sample for cervical screening in a low-resource setting in South Africa[101]. The FGD participants supported this, saying that self-sampling was less uncomfortable, awkward, and difficult than clinician sampling. Despite having a favorable attitude about self-sampling, many women (64.7%) felt more confident when the sample was obtained by a physician. According to the FGD participants, this was typically the case because they believed the doctor would obtain a higher-quality sample. Despite the fact that 93.9% of the women were willing to take a self-sample, the women who participated in the focus group discussions (FGDs) preferred to do so at the health facility as opposed to at home. This was due to a variety of factors, including the price of transporting the sample back to the clinic. In addition, the multivariate analysis showed that while age is not substantially linked with women's reported sample preference, educational status, contraceptive use, and HIV status are still strongly connected with it. In this study population, opinions toward self-sample collection were favorable. Although they were eager to self-sample, the participants voiced worries about the specimen's quality and the cost of bringing it back to the clinic. Before implementing this sampling technique into screening programs, pilot implementation studies will be helpful[101].

The average age of women was 40.6 years, with a range of 16-89 years, according to a systematic analysis on the comparison and acceptability of HPV self-collected cervical cancer samples with doctor-collected samples in Africa. When comparing self-vs. clinician-collected sampling, the overall high risk (HR)-HPV detection rate was 36% (7.2% - 84.8%) and 35%

(6.8% - 87.8%), respectively. The mean variations in detection rates among sample techniques were 2.6% (SD = 1.7). Between the two sample techniques, there was a substantial HR-HPV detection rate correlation with a value of R=0.997. The weighted average of kappa agreement was moderate (0.71; range, 0.47 to 0.89)[102]. Overall, women found that self-collected sampling was easy to get (77.8%), preferred (86.3%), and enhanced uptake of cervical cancer screenings (76.7%). Self-collected CC samples for HPV testing may be a viable alternative sampling strategy and may boost use of screening programs. It is crucial to introduce standardized self-sampling methods and diagnostic assay research across Africa.

Among the 194 women who were examined, 12 (6.2%) and 19 (9.8%) had HPV on their own samples and provider-collected samples, respectively, according to a study to evaluate the degree of agreement between self-sampling for HPV DNA and samples obtained by a health practitioner. The most typical HPV type identified by both methods was HPV 58 (2.6%). In 1 (0.5%) and 5 (2.6%) of the provider- and self-collected samples, respectively, several HPV genotypes were found. When self-sampling, the rate of high risk-HPV detection was 7.2%; when provider-sampling, it was 6.8%. The correlation between the two sample methods was moderate (r = 0.47, 95% CI: 21.3 - 72.3%, $p<0.05$). As a result, this demonstrates a moderate connection between the two sample methods. To provide data that can be applied to the population of Nigeria, larger multicenter research would be required. Sample gathering, self-sampling, provider gathered, PCR, HPV DNA, Ile-Ife Nigeria, Pap smear, HPV screening, cervical cancer[103].

In comparison to controls, participants in the HPV self-sampling study showed higher screening uptake. Whether an HPV test kit was sent directly to a home, offered door-to-door, or requested on demand, the effect magnitude differed[104]. The correlation between the arms and clinical assessment/treatment did not differ in a statistically meaningful way, according to the findings.

In comparison to standard of care, HPV self-sampling can thereby enhance the uptake of cervical cancer screening while having a negligible impact on the connection to clinical assessment/treatment.

All participants agreed that self-sampling was a suitable method of specimen collection and should be provided as a choice for cervical cancer screening in an exploratory qualitative study that examined patient and community insights regarding self-collection among women living with HIV and HIV-positive women as well as the barriers and facilitators to obtaining and using self-collected specimens in cervical cancer screening programs[105]. Although the majority of women, regardless of their HIV status, preferred the option of self-collection, barriers were found, including a lack of knowledge about the procedure, discomfort, embarrassment, or pain from the procedure, fear of consequences, a perception that one is competent to self-collect, and concerns about privacy and confidentiality. Additionally, it was discovered that HIV-related stigma was a significant issue for HIV-negative women and might impede them from getting cervical cancer screenings that were part of HIV treatment settings. Therefore, educational interventions with patients and clinicians are required to raise understanding of and general readiness to use self-collection in order to promote it for cervical cancer screening. It is advised that more research be done to determine how stigma against HIV-positive women affects locations for HIV testing and treatment[105].

As an alternative to conventional speculum screening, a study was done to determine the acceptability and preferences of HPV screening with self-sampling and results delivery by mobile phone among women living with HIV (WLWH) in Botswana. Results revealed that 98 (94%) of the 104 WLWH recruited had already undergone conventional screening. Self-sampling is easy and comfortable, according to more than 90%. Ninety-five percent of

respondents said they would be open to self-sampling once more, but just 19% said they would prefer it to a speculum exam for future screening. By education level and place of residence, preferences varied, with self-sampling being preferred since it is easier, more convenient, less embarrassing, and less unpleasant. Due to women's limited self-efficacy and faith in providers' abilities, speculum exams were chosen. Nearly half (47%) preferred a mobile call to get the findings. It had no impact on preferences to know about cervical cancer. Although opinions vary, WLWH in Botswana are okay with HPV self-sampling. Although self-sampling is a valuable option to conventional speculum screening, it will be vital to address women's poor self-efficacy to self-sample appropriately through education and support[106].

Results of a study on the acceptability of HPV screening among HIV-positive women visiting an HIV-specific clinic in Abidjan, Côte d'Ivoire, showed that screening acceptability depends on women's perceptions of cervical cancer. The dread of a diagnosis and the stigma that goes along with it, disrespect for HIV-related health concerns, a lack of screening expertise, and a lack of funding for treatment were all barriers. It was discovered that fee elimination, increased knowledge of cervical cancer, and the significance of HIV status in malignancy all facilitated screening. By building trusting relationships with women and assisting them in navigating the healthcare system, healthcare professionals remove obstacles. Self-sampling has low self-confidence. Therefore, HPV screening will be encouraged by free access to cervical screening, communication tactics that increase knowledge of cervical cancer, and cooperation from healthcare providers. Designing suitable HPV-based screening programs for women living with HIV in this scenario requires knowledge gained through this research[107].

2.2 Theoretical Framework

2.2.1 Health Promotion Model

The theory that will be used for this study will be the health belief model. The theory was propanded by Dr. Nola Pender who was born in 1941 in Lansing, Michigan. The theory encourages health professionals to provide positive resources to help patients achieve behaviour, but to look at ways in which a person can pursue better health or ideal health[108, 109].

Health promotion can be defined as the process of empowering people to make healthy lifestyle choice and motivating them to become better self-managers. To accomplish this, health promotion strategies should focus on patient education, counseling and support, which include education and counseling programs that promote physical activity, improve nutrition, or reduce the use of tobacco, alcohol and drinks.

Instead of defining health as only the absence of sickness, the idea views it as a positive, dynamic state. The goal of health promotion is to raise a patient's level of wellbeing. The multidimensional nature of people as they interact with their surroundings to pursue health is described by the health promotion model. Pender's approach focuses on three areas: individual traits and experiences, cognitions and emotions related to certain behaviors, and behavioral outcomes. According to the hypothesis, every person has particular personality traits and life experiences that have an impact on their actions. The group of variables for knowledge and affect related to specific behaviors have significant motivational relevance.

The variables can be changed through nursing interventions. The Health Promotion Model's culmination is the targeted behavioral outcome, which is the adoption of behaviors that promote health. At all stages of development, these behaviors ought to lead to greater health, increased functional capacity, and better quality of life. The immediate Competing demand and preferences

have an impact on the final behavioral demand as well, which can sabotage intended efforts for health promotion.

The Health Promotion Model is predicated on four tenets:

1. People try to actively control their own behavior.
2. People interact with the environment in all of their biopsychosocial complexity, gradually changing both the environment and themselves through time.
3. The interpersonal environment, which has an impact on people throughout their lives, includes health professionals like nurses.
4. Changing behavior requires self-initiated reconfiguration of the interactions between a person and their environment.

Part of the health promotion model

Thirteen theoretical claims are derived from the model. They serve as a foundation for research on health behaviors. These are the claims:

1. Beliefs, feelings, and the execution of behaviors that promote health are influenced by prior behavior as well as inherited and acquired features.

2. Individuals commit to actions from which they believe they will derive personally valuable rewards.

3. Perceived obstacles might prevent individuals from taking action, which influences both intended and unintended behavior.

4. The likelihood of commitment to action and actual performance of the behavior improves with perceived skill or self-efficacy to carry out a specific behavior.

5. Less perceived opposition to a particular health behavior is associated with higher reported self-efficacy.

6. Higher perceived self-efficacy can lead to increased positive affect via increasing positive affect toward a behavior. The likelihood of commitment and action is raised when favorable feelings or affect are linked to a behavior.

7. People are more likely to commit to and engage in health-promoting behaviors when important others set an example, anticipate the behavior, and offer help and support to make it possible.

8. Relational factors that might boost or diminish commitment to and engagement in behaviors that promote health include families, peers, friends, and health care professionals.

9. Situational factors in the outside world can boost or stifle commitment to or involvement in behaviors that promote health.

10. The likelihood that health-promoting behaviors will be sustained over time increases with the level of commitment to a certain plan of action.

11. When conflicting demands that people have little control over must be attended to right away, commitment to a plan of action is less likely to provide the intended behavior.

12. People may alter their cognitions, their emotions, and their social and physical environments to encourage healthy behavior.

13. The individual qualities and experiences, prior behavior, and the frequency of comparable behavior in the past are the main concepts of the health promotion model. Effects both direct and indirect on the chance of engaging in behaviors that promote health.

- The three types of personal elements are biological, psychological, and socio-cultural.

These variables affect a particular behavior and are influenced by the characteristics of the target behavior under consideration. Age and marital status are examples of biological personal factors. Psychological personal factors include elements including perceived health status, definition of health, self-esteem, self-motivation, and personal competence.

- Personal socio-cultural characteristics include elements like ethnicity, acculturation, level of education, and social standing.
- • Perceived benefits of action are the expected advantages of engaging in healthy behavior.
- The perceived costs and obstacles of understanding a particular behavior are real, imagined, or projected barriers to action.
- Perceived self-efficacy is the belief in one's own ability to plan and carry out a behavior that promotes health.
- Perceived self-efficacy affects how obstacles to action are seen, so greater efficacy results in less obstacles seen to behavior performance.
- Activity-related affect is defined as the irrational emotion experienced as a result of the stimulus characteristics of the behavior itself. They have an impact on self-efficacy, therefore the more optimistic the subjective feeling, the more confident the efficacy feeling. Increased efficacy feelings in turn can have additional positive effects.
- Interpersonal influences are those that are cognition-related to other people's actions, opinions, or attitudes. Norms (expectations of close friends and family), social support (instrumental and emotional encouragement), and modeling are examples of interpersonal influences (vicarious learning through observing others engaged in a particular

behaviour). Families, friends, and healthcare professionals are the main sources of interpersonal impacts.

- Situational influences are individual perceptions and beliefs that can either support or contradict conduct. They consist of:

perceptions of the available options, demand traits, and aesthetically pleasing aspects of the locat ion where a certain health promotion is intended to take place. Situational factors may affect health behavior directly or indirectly.

A commitment to a plan of action, which is the idea of intention and identification of a planned strategy that results in the adoption of health behavior, is included in the behavioral outcome. Competing demands are those alternative behaviors over which people have little control due to outside influences like work or family obligations. Alternative behaviors with relatively great individual control are competing desires. The goal or action result of a behavior that promotes health is the achievement of a favorable health outcome, such as optimal well-being, personal fulfillment, and productive living.

2.2.1 Application of the Theory to the Study

Using the Pender's model, in this study, to ensure the willingness and acceptance to pay for HPV vaccine among women of known HIV status, there must be a belief that the utilization of HPV vaccine by women contributes greatly to the prevention of Human papilloma virus infection, genital warts and cervical cancer. Women's own perception of health and the need to willingly utilize HPV vaccine is very important. Their belief, perception and values affect their health-seeking behaviour. For example, if a woman's knowledge of HPV is good, it becomes easy for her to willingly utilize HPV vaccine, thus promoting her own health.

Also, the second assumption offers an enlightenment that man is usually a product of his environment. The influence of culture, peers, family, and friends on the health seeking behaviour of an individual cannot be overemphasized. Usually in a setting like Africa, bulk of the decision that people living in a society make is influenced by their culture and tradition.

It is also important to note that the behaviour and influence of women in the community can motivate them (women of known HIV status) to willingly utilize HPV vaccine. These women are saddled with the responsibility of educating the populace in order to create awareness and knowledge on the need to willingly to pay for HPV vaccine. As shown in this study, it is important for women to be aware and knowledgeable that the utilization of HPV vaccine promotes good health and increases the quality of life. Therefore, it is imperative for women especially the ones with known HIV status to show good health seeking behaviours while attending to the health facilities for treatments and care.

2.3 Review of Empirical Studies

Scholars in this field have investigated factors that influence people's knowledge of HPV infection and HPV vaccine. These studies are discussed empirically.

2.3.1 Knowledge of HPV infection and HPV Vaccine Among Women of Known HIV Status

Results of a cross-sectional descriptive study to assess the awareness and attitudes of caregivers to HPV infections and the factors that determine acceptance of an HPV vaccine for their pre-adolescent girls revealed that 30 people (5.9%) had no formal education, while 347 (68.3%) had completed their university education. A total of 330 caregivers (or 65%) were married. Furthermore, just 43.5 percent of the caregivers—221—knew anything about HPV, and only 163

of them understood how the virus spread. The notion that an HPV infection is a significant risk factor for cervical cancer is only known by 12 (2.4%) of the caregivers. 132 people (59.7%) of the 221 individuals who knew what HPV were aware of an HPV vaccination. Only 26 people (19.7%) who knew about the vaccine were in agreement that it can successfully prevent cervical cancer. The main explanations cited by parents for why their female child has not received the immunization are lack of knowledge about the vaccine and accessibility. The knowledge about HPV, the HPV vaccine, and the risks for cervical cancer among caregivers in Enugu, southeast Nigeria, is still inadequate despite high levels of education. The main factors influencing the caregivers' uptake of the HPV vaccine were awareness and accessibility. To enhance HPV vaccination uptake in Nigeria, there is a need for widespread and ongoing awareness-raising[81].

In a recent study on increasing Human Papillomavirus Vaccination and Cervical Cancer Screening in Nigeria: An Assessment of Community-Based Educational Interventions; the findings showed that less than 12% of the population had ever received the HPV vaccine or undergone cervical screening, and 80% of people had little to no knowledge of HPV at the time of the baseline survey. After the intervention, there was a considerable improvement (>70%) in participant awareness and intention to get an HPV vaccination and have cervical screenings, according to research82. More than half of respondents said they would pay even if the HPV vaccine and screening were pricey. Low-cost community-based educational initiatives that are gender-focused and context-specific are successful in promoting HPV vaccination and cervical screening in sub-Saharan Africa.

In a study titled the prevalence of HPV infection in HIV-positive women and the variables associated with infection, results from the study showed an overall HPV prevalence of 36%[83]. Results also showed that 88% (n = 23) and 96% (n = 25)of typed viruses (total of typed viruses n

= 26) were included in 4vHPV and 9vHPV (nonavalent HPV),respectively. In univariate analysis, age less than 45 years, a high number of sexual partners, and HIV-viral load were risk factors for infection. However, a CD4 indicator was associated with protection. Although HIV infection is generally related to multiple and rare types of HPV, this study showed that a vast majority of the HPV types found are included in 4vHPV. Considering that age less than 45 years is a risk factor, the use of 4vHPV in Brazil should be extended in the public vaccination program to HIV seropositive women up to age 45 years[84].

A study was conducted on prevalence and risk factors for genital Human Papillomavirus Infections among women in Southwest Nigeria. Results revealed that the age range of the participants in this study was 23 to 77 years, with a mean age of 42.5±11.5. The majority of participants (84.7%) were married, and 76.3 % of those marriages were monogamous85. Only 8.8% of participants lack a formal education, while the majority (60.3%) have completed their postsecondary degree. Even though 93.9% of people were working, including those who were self-employed, more over half (55.6%) made an average wage. Eighty-seven percent of the participants were Yoruba, and 51.2% of them (51.2%) were residents of Oyo state. Participants' ages at first sexual encounters ranged from 9 to 51 years, with a mean of 23.7±8.6 years. About 91.2 percent of them have at least one child, and 27. percent of them are post-menopausal. Additionally, the results showed that fifty-five samples tested positive for HPV DNA, translating to an 18.6% prevalence. HPV infection was substantially correlated with risk factors such lack of formal education, divorce, polygamy, unemployment, poor income, younger age (18 years) at sexual debut, and passive smoking. This study's high HPV incidence and related risk factors demonstrate the virus' ongoing spread in Southwest Nigeria. There is therefore an urgent need

for expanded monitoring, which includes increased public awareness and cervical cancer screening, for preventative and control initiatives[85].

Finding in a study[86] showed that the median age of the respondents was 29 years, and 14% of the respondents had ever had a Pap smear test. Majority (67%) of the respondents were HIV positive. About 18% had ever heard of HPV. Over half (69%) knew that Pap smears detect cervical cancer, few (18%) knew that routine Pap screening is the main way to prevent cervical cancer. A high level of cultural acceptability for Pap smear screening was reported by majority of the respondents. In addition, over three-quarter (82%) acknowledged that they would feel comfortable using a self-sampling device. Also, (84%) would prefer at-home sample collection. Nearly all women (94%) were willing to be vaccinated in order to prevent cervical cancer if the HPV vaccine would be offered at subsidize rate (no or low cost). These findings highlight the need to educate and enlighten women on the need of Pap smears screening in the prevention of cervical cancer. It also demonstrates that HPV vaccination would be accepted by most women as part of the screening procedure in the prevention of cervical cancer[86].

A cross-sectional research on Ambrose Alli University's female undergraduate students in Ekpoma, Nigeria, was conducted on the campus of the institution; [87] results showed that just 5.2% of the students had sufficient understanding of HPV and that 17.0% knew that HPV vaccinations were available. The level of education and respondent age were statistically substantially correlated with knowledge about HPV. Only 0.44 percent of those surveyed had received the vaccination. 10.8% of people between the ages of 10 and 14 had their first sexual experience, while 12.1% had many partners (more than five). Even more so, 23.4% never used a condom during sex. As a result, there was little and insufficient knowledge of HPV infection. In this study, there was also a low uptake of the HPV vaccine. Therefore, health officials should

make a determined effort to educate university students about HPV infection and its vaccine. This will increase the effectiveness of the HPV vaccine, guard against HPV-related illnesses, and lower the incidence of cervix cancer[87].

Findings from a cross-sectional survey showed that the respondents' mean age was 16.4 (±2.0) years, 56.0% were male in which 34.9% were Yoruba[87]. About 23.0% and 18.3% of the respondents were aware of HPV and HPV vaccine, respectively. Majority (78.2%) of the respondents had inadequate knowledge of HPV. This study concluded that among the secondary school students in Nigeria, there was poor level of knowledge of HPV and HPV vaccine. Hence, the recommended that there is a need for health education programs and awareness on HPV and HPV vaccines in Nigerian secondary schools [87].

Study on Nigeria's women perceptions about the HPV vaccine, cervical cancer, and the human papilloma virus[110] revealed that only 136 (18.5%) of the respondents knew that HPV causes cervical cancer, compared to 176 (23.9%) who knew about HPV and 474 (64.3%) who knew about cervical cancer. 300 people (40.7%) knew about Pap smear tests, while 200 (27.1%) were aware that there is an HPV vaccine. Despite the fact that 260 respondents (35.3%) are aware that early HPV identification helps prevent cervical cancer, just 110 have ever had a Pap smear test, and 151 respondents (20.5%) are completely unwilling to undergo one. Therefore, there is a need to properly raise public knowledge about HPV and its potential link to cervical cancer[110].

Results of a study conducted by Rančić et al.,[111] revealed that the average knowledge score for cervical cancer was 16.35 7.92 (min 0, max 30), with the education level of the parents, place of residence, and relationship status having a significant impact on the score. Only 14.2% of students had heard of HPV and its vaccine, indicating a low level of awareness about the disease. The media were the most often cited sources of information, although organized health education

was the most reliable. In order to lower the prevalence of cervical cancer, health promotion efforts and educational initiatives are required. These initiatives should be targeted in particular at individuals who have shown a lack of understanding about cervical cancer and a lack of awareness of HPV and its vaccine[111].

Findings from a study conducted by Thompson et al.,[112] showed the majority of participants (72.9%) and HPV vaccination (67.1%) knowledge. If a respondent was female, had a greater level of education, and had previously sought out cancer information, they were more likely to be aware of HPV and the HPV vaccine. While knowledge of HPV as a cause of non-cervical malignancies was reported by a smaller percentage of respondents (36.1%), knowledge of HPV as a cause of cervical cancer was widely known (79.6%). Knowledge of cervical cancer was strongly correlated with college education; however, no significant associations for knowledge of non-cervical HPV associated cancer were found. While more than half of adults between the ages of 27 and 45 are aware of HPV and the HPV vaccine, there are opportunities to increase awareness and knowledge, particularly with regard to non-cervical cancers, as these are crucial first steps toward shared decision-making for the mid-adult HPV vaccination[112].

Findings of McBride et al.,[113] revealed significant gender inequalities which were found in the knowledge and awareness of HPV and the HPV vaccine. The majority of individuals (> 70%) were aware that HPV might result in cervical cancer, whereas fewer (14.9% to 31.5%) were aware that HPV could result in "other" malignancies. Women were more likely than males to report that a doctor had advised immunization. Gender, education, income, race, and other sociodemographic factors were all significant predictors of general HPV and HPV vaccine awareness. Knowledge of cervical cancer was predicted by age and income. Having a kid under the age of 18 in the home and being in a relationship were predictors of knowledge of "other"

HPV-associated malignancies. Knowledge of HPV seems to follow social patterns. Men and some racial minorities had lower HPV knowledge, which points to the need for more intervention. Health education should emphasize the dangers of malignancies linked to non-cervical HPV. Communication between the patient and the clinician that includes instruction, guidance, and unambiguous recommendations in favor of immunization may increase uptake[113].

2.3.2 Willingness to pay for HPV vaccine and HPV Vaccine Among Women of Known HIV Status

A study conducted on acceptance of the HPV vaccine in Mexico among mothers of adolescent girls and in small samples of adult women and men revealed that the level of acceptance has been high, including high rates of acceptance in adults living with HIV[91]. According to the results of a recent study, respondents' intentions to get the HPV vaccine increased to almost 70% at the post-intervention stage and their willingness to urge a friend or family member to get the vaccine increased to almost 86%. Likely increases in intention to receive the HPV vaccine and desire to advise a family member to have HPV screening were seen in both groups' posttest results, according to those data[82].

Findings from another study which examined parents' preferences and willingness-to-pay for HPV vaccines in Thailand revealed that parents preferred higher risk reductions for cervical cancer and genital warts, and lower common side effects[92]. They valued the quadrivalent and bivalent HPV vaccines at 21,189.9 and 10,479.9 Baht, respectively. Results also showed that mothers valued both vaccines more than fathers did. Thus, parents valued net benefits for both quadrivalent and bivalent HPV vaccines, but they were willing to pay for the quadrivalent vaccine more than for the bivalent vaccine.

Results of a study conducted among women of known HIV status in Abidjan revealed that women's perceptions of cervical cancer influence the acceptance of HPV screening. Adequate knowledge of cervical cancer and that of HIV in people with cancer were found to facilitate screening. The study concluded that healthcare workers, especially nurses should remove obstacles and barriers from their patients through mutual and trusting relationship with these patients. They also help their patients navigate through the healthcare system. The study came to the additional conclusion that the self-sampling method had a poor level of trust. Free cervical screenings and effective communication techniques are thought to raise women's awareness of cervical cancer. The involvement of healthcare professionals will also make HPV screening easier. The information learned from this study will be essential for creating effective HPV-based screening strategies for women with HIV[93].

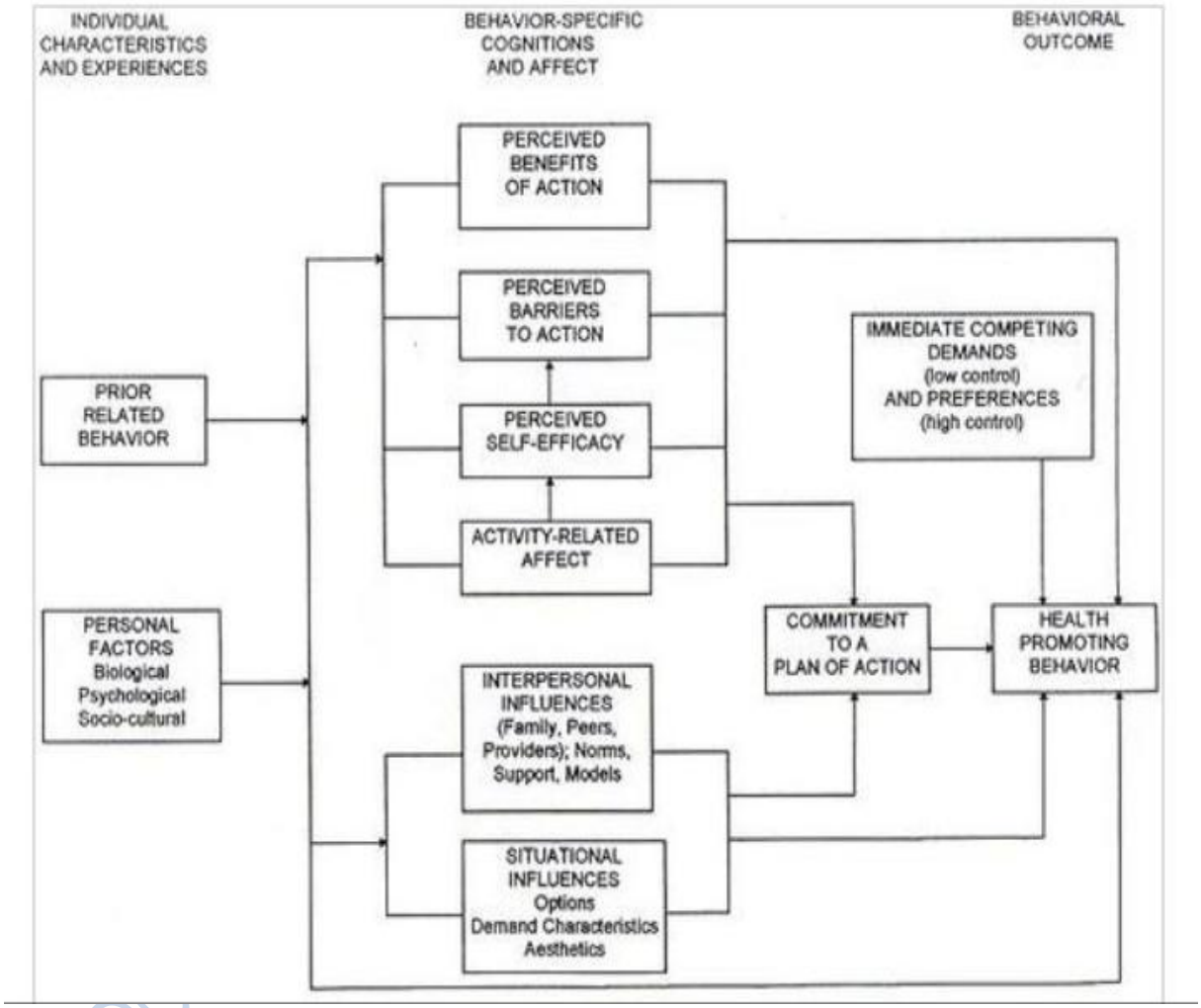
In a study whose aim was to understand Human Papillomavirus (HPV) vaccine acceptability and willingness among adults population living with or without HIV in Mexico.; results revealed that 91.5% and 87% of men and transwomen up took the HPV vaccine respectively, more than cisgender women (81.8%). Also, cisgender women were less willingly to uptake HPV vaccine than their male counterpart. People who are single were more likely and willingly to accept HPV vaccine more than married or partnered people. Findings also revealed that people who are HIV positive were not more likely to accept HPV vaccine. The study concludes that there is high level of willingness and acceptability of HPV vaccine among adult population in Mexico. Besides, this might be higher than other adults Mexican population because some of these peoples are engaged in care. Thus, modifications will be needed in national and international recommendations on HPV vaccination in adults if healthcare personnel are to recommend the vaccine to the population groups studied[94].

A study on the acceptance of HPV self-sampling and awareness of HPV/cervical cancer among women living with HIV revealed that the majority of these women had little information about HPV transmission and cervical cancer prevention, which affected their views of risk and susceptibility. Misconceptions regarding Pap tests, anxiety over being diagnosed with a serious illness, perceived pain, humiliation, a desire to maintain one's modesty, and limited access to female healthcare professionals were among the screening hurdles. Self-sampling is a valid and promising screening method for women with known HIV status, according to this study[73].

The majority of the women who responded to the survey had a favorable opinion of self-sampling, with 93.6% of them reporting that they did not feel embarrassed and 89.4% reporting that they felt no discomfort at all when taking a self-sample for cervical screening in a low-resource setting in South Africa[101]. The FGD participants supported this, saying that self-sampling was less uncomfortable, awkward, and difficult than clinician sampling. Despite having a favorable attitude about self-sampling, many women (64.7%) felt more confident when the sample was obtained by a physician. According to the FGD participants, this was typically the case because they believed the doctor would obtain a higher-quality sample. Despite the fact that 93.9% of the women were willing to take a self-sample, the women who participated in the focus group discussions (FGDs) preferred to do so at the health facility as opposed to at home. This was due to a variety of factors, including the price of transporting the sample back to the clinic. In addition, the multivariate analysis showed that while age is not substantially linked with women's reported sample preference, educational status, contraceptive use, and HIV status are still strongly connected with it. In this study population, opinions toward self-sample collection were favorable. Although they were eager to self-sample, the participants voiced worries about

the specimen's quality and the cost of bringing it back to the clinic. Before implementing this sampling technique into screening programs, pilot implementation studies will be helpful[101].

2.4. Conceptual Framework



Nola Pender Health Promotion Model adapted

Source: Pender, Murdaugh & Parsons (2010)

INDIVIDUAL CHARACTERISTICS	BEHAVIOUR-SPECIFIC COGNITIONS AND AFFECT	BEHAVIORAL OUTCOME
PRIOR RELATED BEHAVIOUR (Adequate knowledge about HPV, HPV vaccine and cervical cancer)	PERCEIVED BENEFITS (evaluation of benefit to willingly pay and utilize HPV vaccine which will aid in prevention of Human papilloma virus infection, genital warts and cervical cancer.	High levels of willingness and acceptability to pay for and use the HPV vaccine, good information.
PERSONAL FACTORS BIOLOGICAL-(age, gender, marital status) PSYCHOSOCIAL-(self-esteem, perceived health status) SOCIAL-CULTURAL- ethnicity, educational status and socio economic status	PERCEIVED SELF-EFFICACY (self confidence in utilization of HPV vaccine	
	ACTIVITY RELATED AFFECT(time involved in visiting HPV screening centres and attitude of health workers during the visit)	
	INTERPERSONAL INFLUENCES (peers, family, beliefs, norms)	
	SITUATIONAL INFLUENCES (knowledge, support, options, demand, etc)	
	COMMITMENT TO A PLAN OF ACTION (intention or willingness to pay for HPV vaccine)	

2.4.1 A diagram to show how Pender's Model is conceptualized to this study

Individual Characteristics & Behaviour-Specific Cognitions & Affect Behaviour Outcome & Experiences

2.5 Summary of Gaps in Literature

Previous studies have extensively contributed to the knowledge of HPV infection and the factors influencing the acceptance of HPV vaccine. A study assessed the awareness and attitudes of caregivers to HPV infections and the factors that determine acceptance of HPV vaccine for their pre-adolescent girls.[81] This study created a gap of not assessing the influence of knowledge and willingness to pay for HPV vaccine. However, accessibility and awareness were reported to be the factors that influence people to accept HPV vaccine. In this current study knowledge and willingness to pay for HPV vaccine are considered among women of known HIV status.

In another study on increasing Human Papillomavirus and Cervical Cancer Screening in Nigeria: An Assessment of Community-Based Educational Interventions. This study failed to cover the influence of community willingness to pay HVP vaccine. Although, the study reported that knowledge of HPV infection drastically reduced the prevalence of the virus, and improve the management of HPV infection among participant.

Studies also investigated knowledge, awareness and prevalence of HPV infection and the factors that influence the acceptance of the vaccine. These studies reported education on HPV, intension,

age, and religion as factors that influence the acceptance of HPV vaccine.[82, 85, 86] The findings of these studies did not cover people willingness to pay for HPV vaccine, which created a gap to fill in this current study. Nigeria's women perceptions about the HPV vaccine, cervical cancer, and the human papilloma virus were examined. The studies reported awareness[111], knowledge[112], [113] as determinants of HPV vaccine.

A similar study with this study examined parents' preferences and willingness-to-pay for HPV vaccines in Thailand[92]. The study revealed that higher risk reduction, and lower common side effects as major determinants of willingness to pay for HPV vaccines. However, this study was limited to parents. Thus, it created a gap of knowledge of HPV infection and vaccines, and women of known HIV status are considered in the current study. A similar study conducted on women of known HIV status in Abidjan failed to capture willingness to pay for HPV vaccine. Hence, this current study intended to investigate assessment of knowledge and willingness to pay for HPV vaccine among women of known HIV status in Oyo State.

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CHAPTER THREE

METHODOLOGY

3.1 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.

3.2 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.

3.3 Sample and Sampling Technique

Sampling Technique

The study adopted multi-stage sampling techniques. This was done in stages using cluster, stratified, simple random and purposive sampling method.

Stage One: Stratification of 11 Local Governments in Ibadan, Oyo State, in which Ibadan South East and Ibadan North Local Governments were purposively selected.

Stage Two: From the Ibadan South East Local Government, Oranyan Primary Health Centre was purposively selected; while from the Ibadan North Local Government, Adeoyo Maternity Teaching Hospital and University College Hospital were also purposively selected, so as to have tertiary, comprehensive and primary health centre.

Stage Three: The number of respondents (women of known HIV status) selected per hospital was proportionate to their population sizes using the formula: Number of women of known HIV status in a hospital divided by total number of women of known HIV status in the selected 3hospitals (26 + 400 + 1000 = 1426), multiplied by 398.This technique was used because it gives every woman of known HIV status in the three selected hospitals equal chances of participating in the study.

Table 3.1: Names of selected hospitals in both Ibadan South East and Ibadan North Local Government Areas.

S/N	Names of selected hospitals in the two LGAs	Total Number of women of known HIV status	Proportional Allocation	Number of women of known HIV status to be sampled from each hospital
	Ibadan South East LGA			
1.	Oranyan Primary Health Center	26	26/1426 x 398	7.3≈ 7
	Ibadan North LGA			
2.	Adeoyo Maternity Teaching Hospital (AMTH), Yemetu	400	400/1426 x 398	111.6≈ 112
3.	University College Hospital (UCH), Ibadan	1,000	1000/1426 x 398	279.1≈ 279
	Total	**1426**		**Total = 398**

Criteria for Inclusion and Exclusion

Women with HIV who matched the inclusion requirements below were enlisted for the study.

The following criteria must be met in order to be included in the study:

- All consenting HIV/AIDS patients attending PEPFAR/HIV clinic of the three selected hospitals in Ibadan.
- Women who are 15 years & above.
- HIV/AIDS patients who are currently attending PEPFAR/HIV clinic of the three selected hospitals in Ibadan, during the study period.

Exclusion Criteria: HIV/AIDS patients in the study area were not permitted to take part in the study if any of the following conditions were not satisfied:

- A person who is not a female patient with HIV/AIDS (Non-reactive).
- HIV/AIDS patients who declined to volunteer for the study were also not allowed to take part in it.
- HIV/AIDS patients who are not currently attending PEPFAR/HIV clinic in the selected three hospitals in Ibadan, during the study period.
- Female HIV/AIDS patients who are critically ill and thus unable to respond.
- HIV/AIDS patients who are currently pregnant.

Sample Size Determination

Utilizing Cochran's (1977) calculation, the minimal sample size (n) was determined. The prevalence of HPV among women in Abuja, Nigeria is 37%.

$$n = \frac{Z^2\ p\ q}{d^2}$$

where;

n = The needed minimum sample size is n.

Z is the standard normal deviation, which has been chosen at 1.96 to represent a 95% confidence level.

P = 37% of Abuja, Nigerian women had HPV, which is 0.37.

q = 1-0.37 which equals 0.63; and d = 0.05 for the desired level of significance.

Consequently, the number of respondents (n) is calculated as follows:

$$n = \frac{1.96^2 \times 0.37 \times 0.63}{0.05^2}$$

$$= \frac{3.8416 \times 0.37 \times 0.63}{0.05^2}$$

$$= \frac{0.89547696}{0.0025}$$

$$= 358.2$$

≈ 358 respondents (approximately)

A sample size of 358 responses was the bare minimum permitted (women of known HIV status).

When the sample is adjusted for the 10% non-response rate,

$$nf = \frac{n}{1 - 10\%}$$

$$nf = \frac{358}{1 - 0.01}$$

$$nf = 397.9$$

nf ≈ 398 participants (Approximately)

3.4 Description of the Research Instrument

For this investigation, a self-structured questionnaire was created as the research tool. This questionnaire contained questions to assess demographic characteristics, knowledge of HPV and

cervical cancer, knowledge and willingness to pay for the HPV vaccine/get vaccinated which were administered to the participants. The questionnaire was prepared from a review of relevant literature, and reviewed by the supervisor to ensure validity. The questionnaire was administered to each participant and also interpreting the contents to participants who could not read and who do not understand English. The purpose of the study was introduced to the participants and informed consents were obtained from each of the participants prior to the distribution of the questionnaire. The questionnaire was divided into five sections, and these five sections were structured to answer the research questions previously stated.

Section A: Socio-demographic characteristics of the respondents, and it has 14 items.

Section B: Knowledge of HPV, and it has 13 items.

Section C: Knowledge of cervical cancer, and it has 15 items.

Section D: Knowledge and willingness to pay for the HPV vaccine/get vaccinated, and it has 16 items.

Section E: Willingness to pay for their daughter's HPV vaccine, and it has 5 items.

3.5 Validity of Research Instrument

A thorough analysis of pertinent literature was done. In-depth information about the awareness and willingness to pay for the HPV vaccine among women with known HIV status was culled from the literature. This served as a reference for developing the objectives and research questions that were utilized to create the study's questionnaire. Additionally, variables from the conceptual framework were incorporated into the creation of the hypotheses.

The supervisor carefully reviewed and validated the instrument, and any necessary changes were made for both face and content validity. This made it possible for experts to comment on the

correct way the instrument was set. My supervisor also reviewed and approved the modifications after inspecting the instrument. General feedback from the supervisor was used to improve the instrument even more. Additionally, the questionnaire was created in the English language.

3.6 Reliability of the Research Instrument

The instrument's dependability was assessed using 40 questionnaires, or 10% of the sample size, which were given to women at Jericho Specialist Hospital who are currently getting treatment for HIV. Oyo State's Ibadan. Before the final instrument was delivered to 40 randomly chosen women with known HIV status, necessary adjustments were performed. The Cronbach's Alpha test was used to assess the pre-test reliability of the questionnaire, and it revealed a reliability coefficient of 0.703, which was considered to be high. This demonstrates the instrument's dependability.

3.7 Data Collection

My supervisor gave the heads of the three hospitals we had chosen (Oranyan Primary Health Centre, Adeoyo Maternity Teaching Hospital Yemetu, and University College Hospital, Ibadan, Oyo State) a letter introducing me and giving me permission to distribute questionnaires to women with known HIV status in the hospital. The aim of the researcher for the conduct of the research was communicated to them and they were assured of their anonymity and confidentiality. The participants were then given the questionnaires, which took about 10 minutes to fill out and submit. The respondents signed in a column to indicate their agreement to participate in the survey. With the aid of two hired and qualified research assistants, the researcher collected the questionnaire as soon as it was finished. The data gathering process took at least three weeks.

3.8 Data Analysis

Each questionnaire was given a unique serial number for quick identification, accurate data entry, and 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.

3.9 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.

CHAPTER FOUR

Results and Discussion of Findings

4.0 Introduction

The findings of the study on the knowledge and willingness to pay for the HPV vaccine among Oyo State women with known HIV status are presented in this chapter. A total of 398 questionnaires were given out to the chosen participants, and 397 of them were completed and returned to the researcher throughout the study's data collection phase, yielding an approximate response rate of 99.7%. Frequency tables, percentages and proportions, bar charts, and pie charts were used to provide the summary following analysis with SPSS version 23. The statistical tests of significance employed for each hypothesis are specified and assessed using chi-square test methods. A p-value of 0.05 or less was regarded as statistically significant.

4.1 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 married co-habiting seperated divorced widowed	 24 236 1 47 6 83	 6.0 59.4 .3 11.8 1.5 20.9
Income(N) <18000 18000-35000 >100000 36000-50000 51000-70000 71000-100000	 198 146 9 25 9 10	 49.9 36.8 2.3 6.3 2.3 2.5
Number of sexual partners no sexual partner <3 sexual partner 1 sexual partner >3 sexual partner	 86 21 288 2	 21.7 5.3 72.5 .5
HIV status Negative Positive	 5 392	 1.3 98.7
Years with HIV <1 1-5 >5	 17 96 284	 4.3 24.2 71.5
CD4 count Don't know <350 >350	 333 54 10	 83.9 13.6 2.5
ARV No Yes	 377 20	 95.0 5.0
Viral load Undetected Detected Don't know	 14 24 359	 3.5 6.0 90.4

4.2 Presentation of Data

4.2.1 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%).

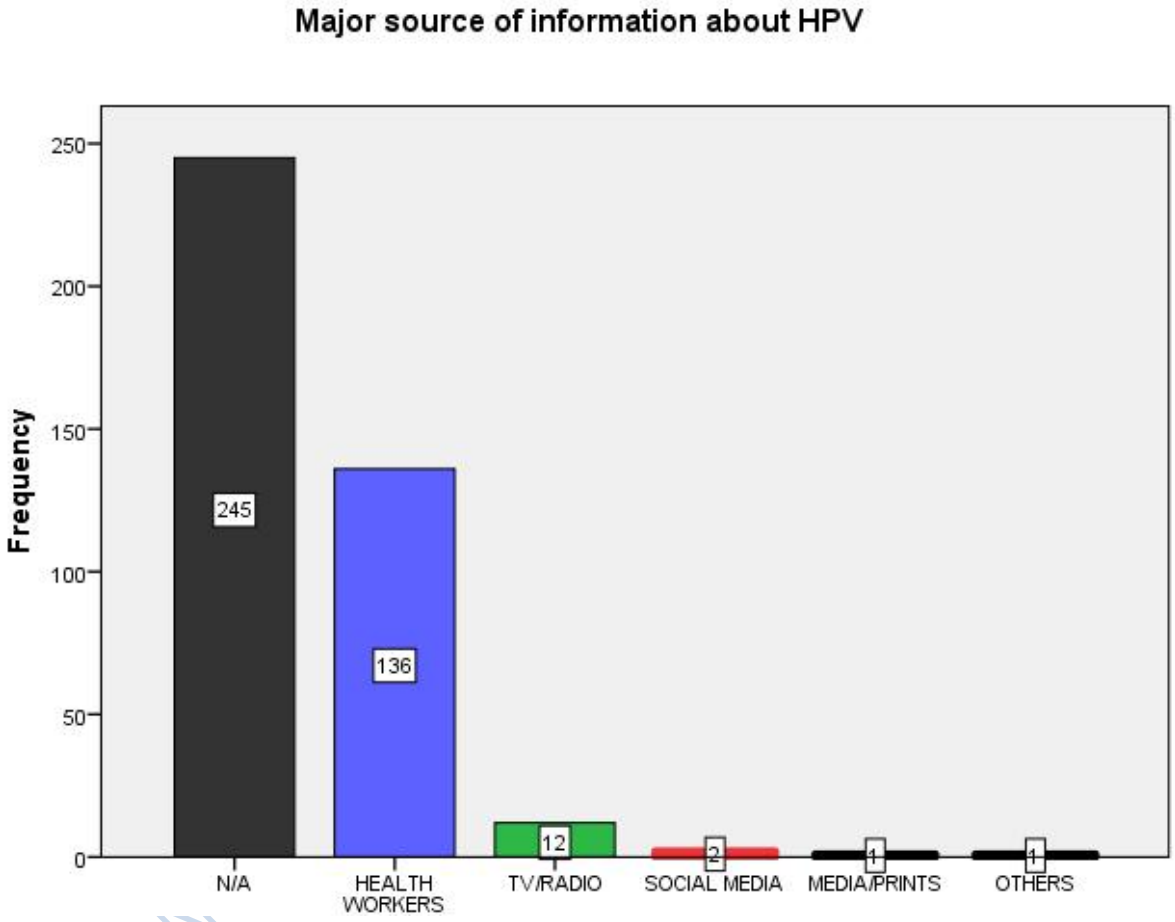


Figure 4.2 showing the overall knowledge of Human Papilloma Virus (HPV) among participants

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.

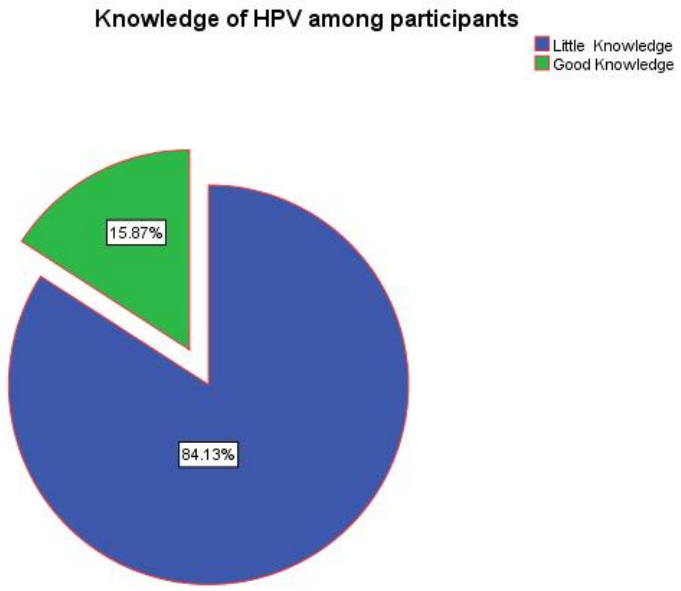


Table 4.3 Knowledge of HPV vaccine

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.

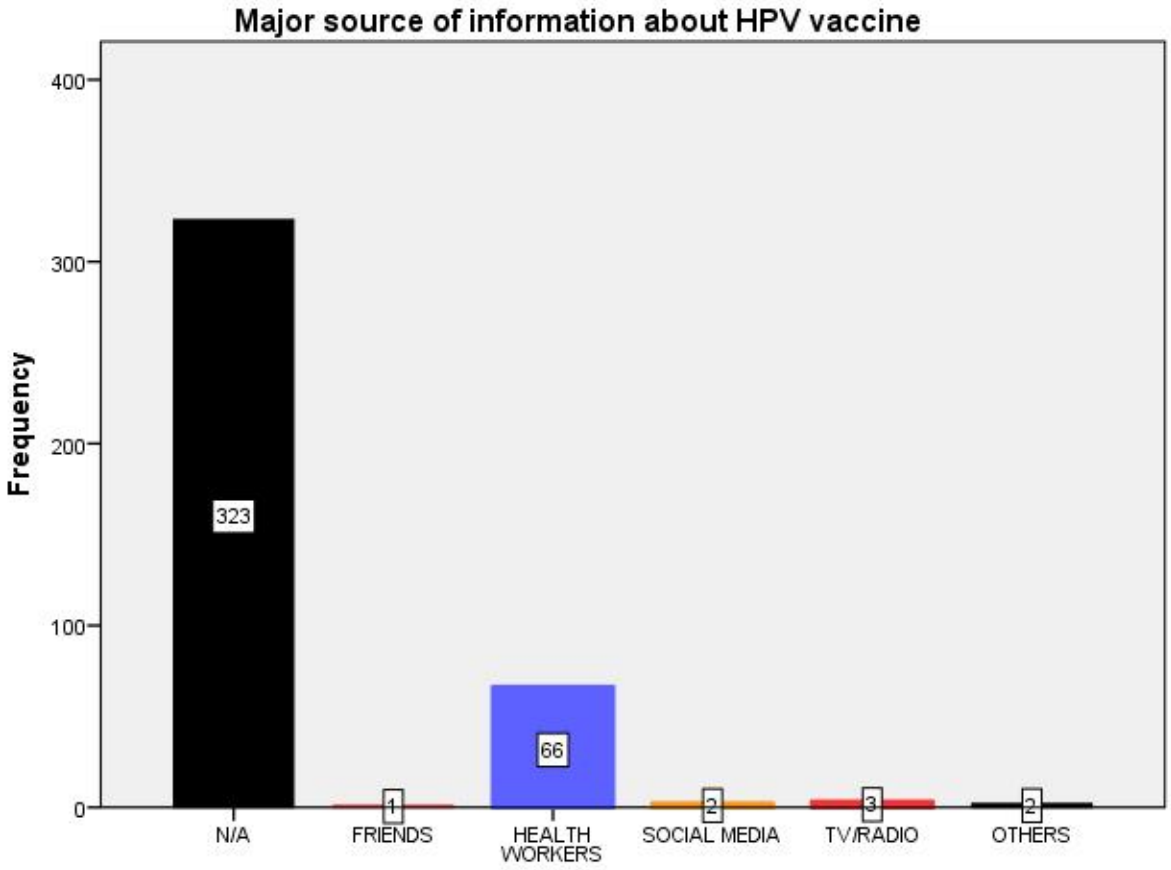


Figure 4.4 showing the overall knowledge of HPV vaccine among participants

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.

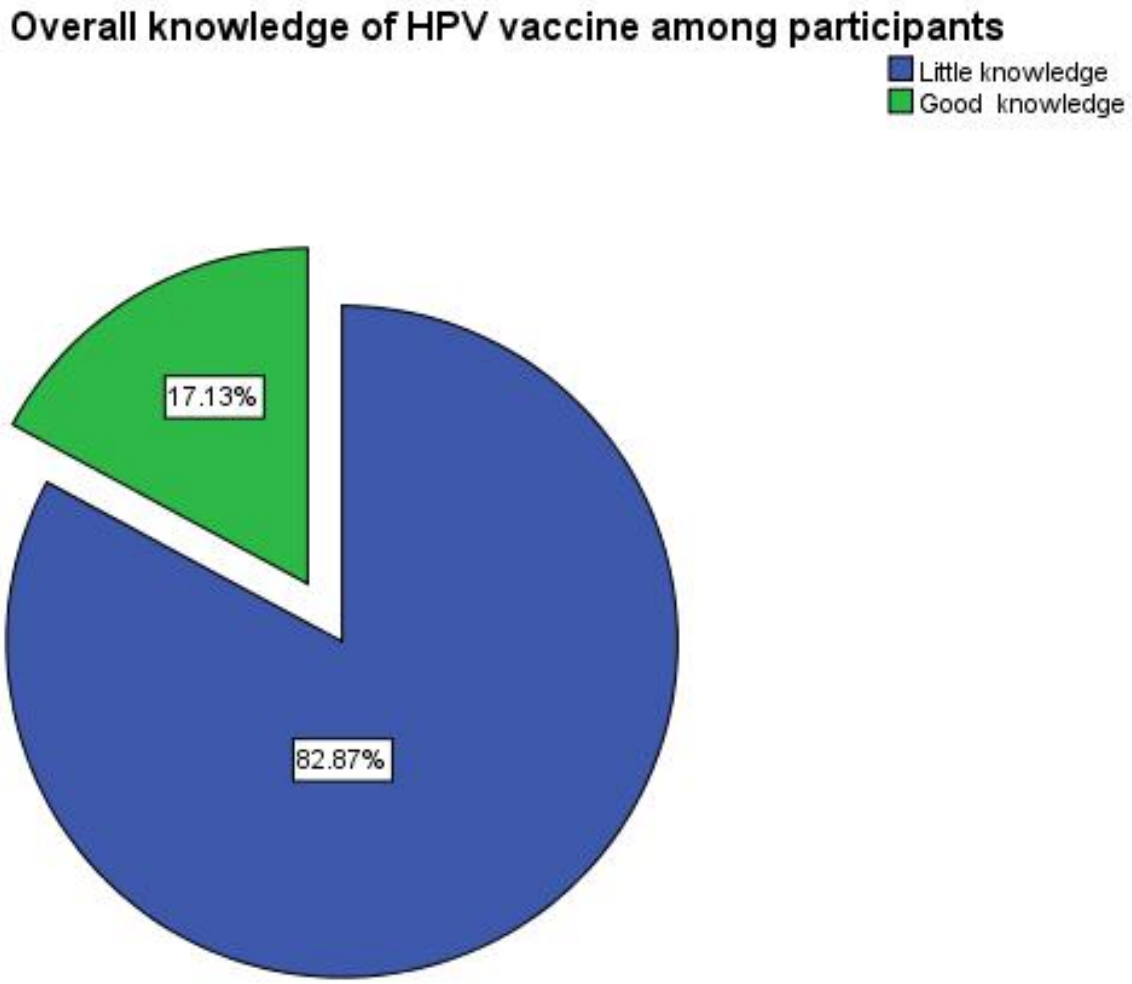


Table 4.4: Knowledge of cervical cancer

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.

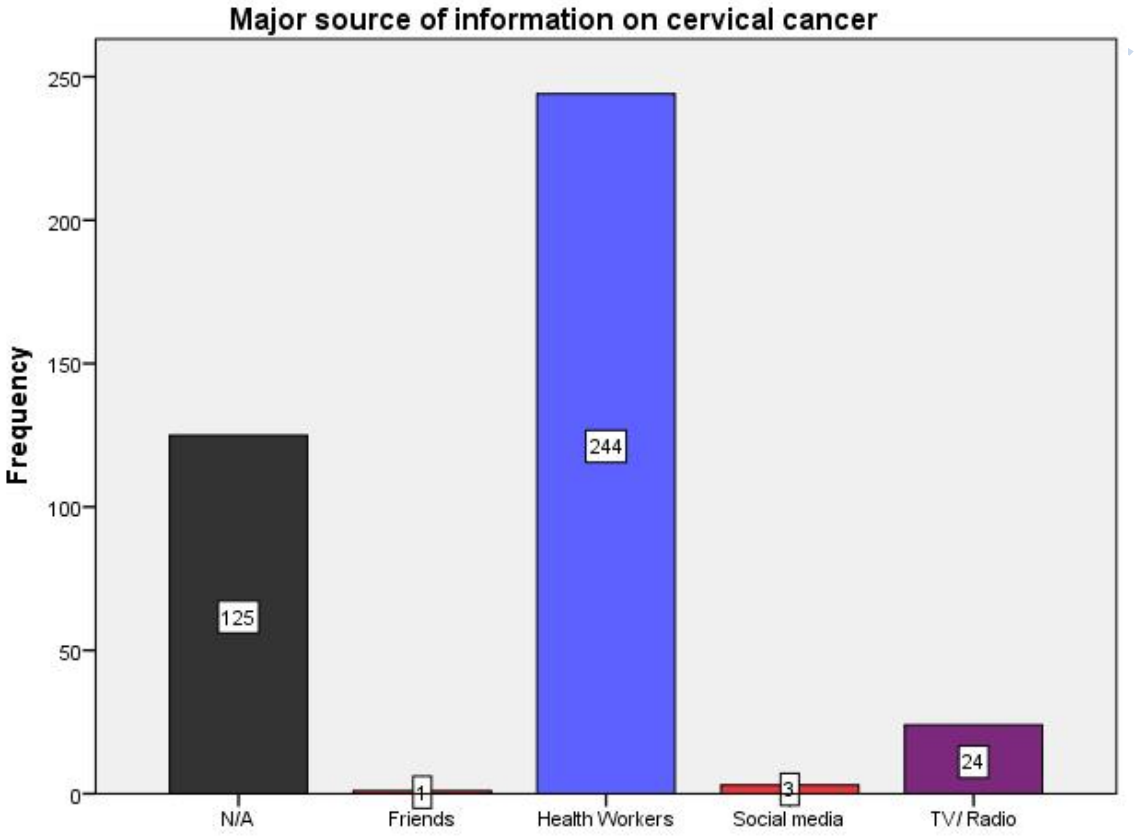
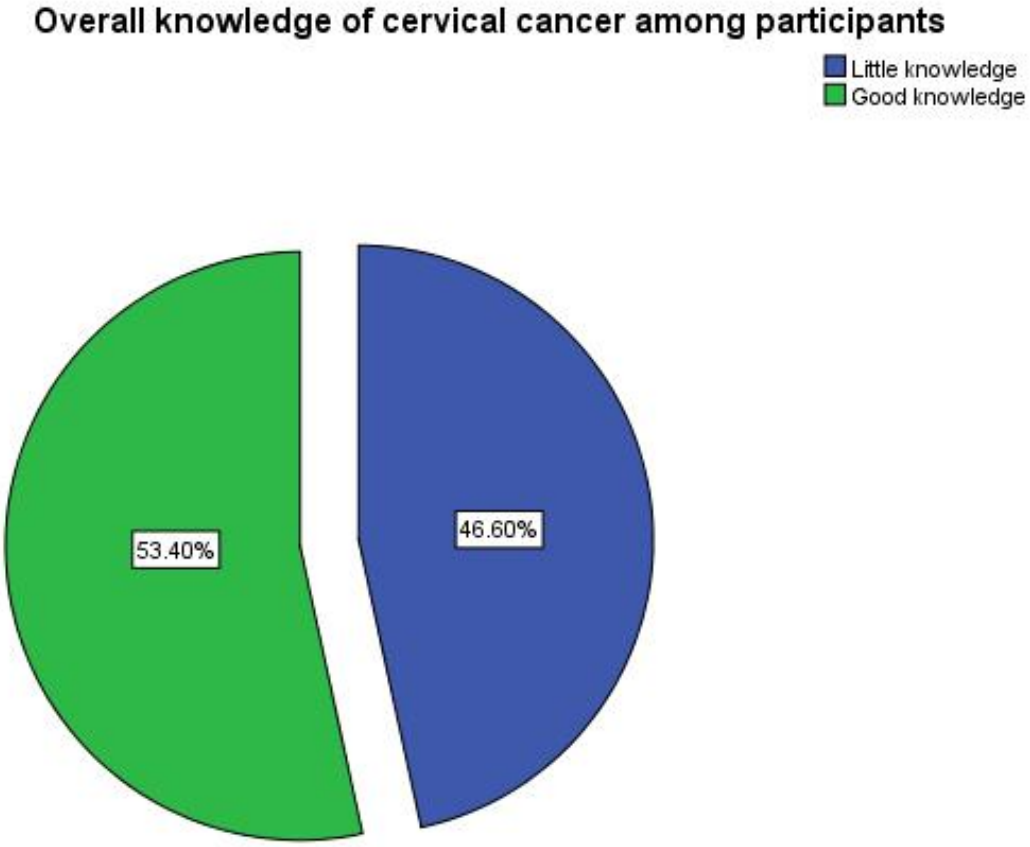


Figure 4.6 showing the overall knowledge of cervical cancer among participants

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**	**Yes**	**Not sure**
	N(%)	**N(%)**	**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)

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

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.

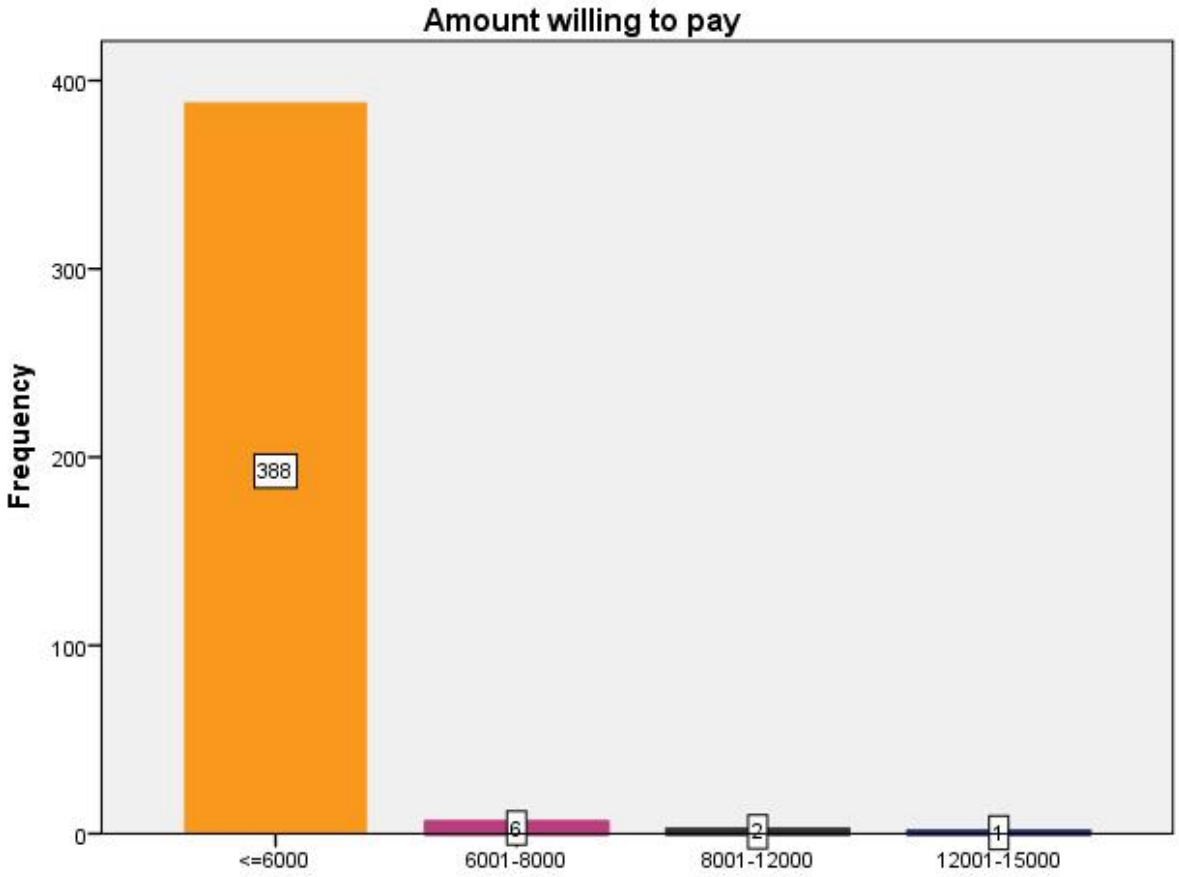
Table 4.6: Respondents' willingness to vaccinate their daughters against HPV

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.



4.2.2 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).

4.3 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%).

Discussion of hypotheses: 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.

CHAPTER FIVE

Conclusion

5.0 Introduction:

This chapter highlights the summary of findings, conclusion, recommendations, contribution to knowledge and suggested areas for further research.

5.1 Summary of Findings

The study was carried out to assess the knowledge and willingness to pay for HPV vaccine among women of known HIV status in Oyo State. A descriptive cross-sectional survey design which adopted multi-stage sampling techniques was used to select 397 women of known HIV status. A self-structured questionnaire was used as instrument for data collection. The collected data was entered into a computer and data analysis was done using SPSS windows version 23.0. Tabular forms and percentages or proportions were used to present the results of the data analysis.

Results showed that the respondents who had good knowledge of Human Papilloma Virus were 15.9%; while 53.4% had good knowledge of cervical cancer. Also, 17.1% had good knowledge of HPV vaccine. About 16.1% were willing to pay for HPV vaccine in the prevention of cervical cancer; while 26.2% acknowledged that having the knowledge of cervical cancer, they are willing to pay for HPV vaccine. Similarly, 24.4% would be willing to purchase HPV vaccine even though it is costly. In addition to these, 58.9% acknowledged that they were willing to get their daughters vaccinated. More so, 55.4% acknowledged that they would be willing to pay for their daughter's vaccine. According to the hypothesis, there is a strong correlation between women's educational status and their familiarity with HPV ($p<0.05$). Age and marital status of women were also related to their knowledge of cervical cancer ($p<0.05$).

From the foregoing study, it is evident that the respondents' knowledge of HPV and cervical cancer and HPV vaccine were poor and not good enough. Also, few respondents indicated they would 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.

Implication for Future Research

The study's conclusions have effects on healthcare professionals. The findings indicate that interventions aimed at increasing capacity are necessary to ensure that women with known HIV status have good awareness of HPV, cervical cancer, and the HPV vaccine. Giving patients and the general public health care interventions will be tremendously helped by improved knowledge combined with appropriate practices. This is due to the fact that healthcare professionals primarily deal with people's lives, and the effectiveness of their work directly affects the quality of the patients' health outcomes. Since the human papilloma virus infections can be prevented through vaccination, all efforts must be focused on ensuring optimal vaccination uptake in order to prevent cervical cancer. The findings also imply that pap smear testing should be made mandatory for all female members of society because it aids in the early identification of the human papillomavirus, which is the primary cause of cervical cancer. Therefore, it is important to promote ongoing public health awareness and education to raise women's knowledge of and desire to receive the human papillomavirus vaccine in Nigeria.

5.2 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.

5.3 Recommendations

- 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.
- 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.
- Vaccinating girls and young females of aged 9-26 years for prevention of cervical cancer is recommended.
- Women should be urged to get routine cervical cancer screening because it can prevent the disease in those aged 21 to 65.
- The importance of training and retraining healthcare professionals involved in the diagnosis and management of the human papilloma virus cannot be overstated.
- 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.

- Women of known HIV status should be encouraged through the primary health care nurses, mass media to have a pap smear test and screening done every year and should continue to do so for as long as they are in good health.
- Basic treatment of human papillomavirus (HPV) infection should be part of National Health Insurance Scheme (NHIS).

5.4 Contribution to Knowledge

i). The study has assessed the level of knowledge and willingness to pay for HPV vaccine among women of known HIV status in Oyo State.

ii). The results of this study had provided more detailed information about HPV and might contribute significantly to the prevention of cervical cancer through utilization of HPV vaccine.

iii). The results from the present study had also provided the baseline knowledge, awareness and understanding for women of known HIV status, who might be at risk of HPV, in order for them to pass the knowledge down to their female children.

5.5 Suggested Areas for Further Studies

- The researcher recommended that comparable studies on the evaluation of knowledge and willingness to pay for the HPV vaccine be carried out among women of reproductive age.
- To generalize the study's findings, additional research on the awareness and willingness to pay for the HPV vaccine among women with known HIV status needs to be conducted in other states of Nigeria.
- Due to the limited sample size utilized in this study (397), a larger sample size is advised to be used when choosing respondents in order to generalize the findings.

- Additional details ought to be provided in order to increase women with known HIV status' understanding of and willingness to pay for the HPV vaccine.

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Appendix

LEAD CITY UNIVERSITY, FACULTY OF BASIC MEDICAL AND APPLIED SCIENCES, DEPARTMENT OF PUBLIC HEALTH, IBADAN, OYO STATE

INFORMED CONSENT FORM

This informed consent form is for women living with HIV aged 15 years and above participating in the research titled "Assessment of Knowledge and Willingness to pay for HPV vaccine among women of known HIV status in Oyo State."

Names, Affiliations and Positions of the Researchers conducting the study:

a. Name: **Dr. Folahanmi Tomiwa Akinsolu**
   Affiliation: Lead City University, Ibadan, Nigeria.
   Position: Principal Investigator
b. Name: **Prof Oliver C. Ezechi**
   Affiliation: Nigerian Institute of Medical Research, Lagos
   Position: Nigerian Mentor
c. Name: **Prof Michael Chung**
   Affiliation: University of Washington, USA
   Position: US Mentor
d. Name: **Dr. Chika Onwuamah**
   Affiliation: Nigerian Institute of Medical Research, Lagos
   Position: Co-mentor
e. Name: **Mrs. Babalola Mojibola Arinola**
   Affiliation: Lead City University, Ibadan, Nigeria.
   Position: Student

You will be given a copy of the full informed consent form

PART 1: INFORMATION SHEET

My name is Babalola Mojibola Arinola and presently, I am a student with department of Public Health, Lead City University, Ibadan. I am conducting a study to examine the willingness to pay for vaccine, and to evaluate the willingness to vaccinate their daughters against HPV among women known of HIV status in Oyo State, Nigeria.

PURPOSE OF THE RESEARCH

This purpose of the study is to investigate the integration of HPV vaccination into cervical cancer preventive strategies with regards to knowledge, attitude, practice, and willingness to pay for the HPV vaccine.

PARTICIPANT SELECTION

We are inviting all women living with HIV aged 15 years and above receiving treatment at 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, Oyo State.

VOLUNTARY PARTICIPATION
Your participation in this research is entirely voluntary. It is your choice to choose whether to participate or not. Whether you choose to participate or not, all the services you receive at this clinic will continue and nothing will change. You may change your mind later and stop participating even if you agreed earlier.

DURATION
The research takes place over a period of 18 months in total. During that time, it will be necessary for you to come to the clinic for four different days (the first day your sample will be taken, 6 months later, 12 months and 18 months). At the end of 18 months, the research will be finished.

RISKS
There is no knownrisk involved in participating in this research

BENEFITS
There may not be any immediate and direct benefit for you but your participation is will help us find the answer to the research questions.

CONFIDENTIALITY
We will not be sharing the identity of participants of this research. Any information that we collect from this research project will be kept confidential. Participants information will be coded with numbers which only the researchers will have access to and it won't be shared except with necessary stakeholders.

SHARING THERESULTS
Only what is permitted by law and research ethics will be shared, participants of the research will be notified through meetings in the 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, Ibadan after which results will be published in academic journals for academics.

CONTACT INFORMATION
Who can I contact about this study? If I have questions or concerns about this research study, whom can I call?
You can call us with your questions or concerns. Our telephone numbers are listed below. Ask questions as often as you want

Babalola Mojibola Arinola
Department of Public Health,
Lead City University, Ibadan
+2349062433632
jibbab2@gmail.com

If you want to speak with someone not directly involved in this research study, please contact:
Dr Folahanmi Tomiwa Akinsolu
Department of Public Health,

Lead City University, Ibadan
+2347033171050
folahanmi.tomiwa@gmail.com

You can talk to them about:
1. Your rights as a research subject
2. Your concerns about the research
3. A complaint about the research and also, if you feel pressured to take part in this research study, or to continue with it, they want to know and can help.

When you call or write about a concern, please provide as much information as possible, including the name of the researcher, the Ethics Committee number (at the top of this form), and details about the problem. This will help Ethics Committee officials to look into your concern. When reporting a concern, you do not have to give your name unless you want to.

INFORMED CONSENT FORM FOR STUDY PARTICIPANTS ON HPV SELF SAMPLING RESEARCH

CERTIFICATE OF CONSENT

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

Name of Participant_____
Signature of Participant _____
Date _____
Day/month/year

If illiterate

A literate witness must sign (if possible, this person should be selected by the participant and should have no connection to the research team). Participants who are illiterate should include their thumb-print as well.

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Name of witness_____ AND Thumb print of participant
Signature of witness _____
Date _____
Day/month/year

Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands.

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability.

I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

A copy of this Informed Consent Form has been provided to the participant.

Print Name of Researcher/Person taking the consent_____
Signature of Researcher /Person taking the consent_____
Date _____
Day/month/year

QUESTIONNAIRE

Assessment of Knowledge and Willingness to pay for HPV vaccine among women of known HIV status in Oyo State

The study is conducted by researchers at Lead city University, Oyo State to determine the willingness to pay for HPV vaccine. All information will be treated confidentially.

SECTION A: SOCIODEMOGRAPHIC CHARACTERISTICS

1. **How old are you? _____ (years)**
2. **My ethic group is?** a. Yoruba b. Igbo c. Hausa/Fulani d. others_____
3. **What is the highest level of education you have completed?**
   a. No formal education b. Primary c. Secondary d. more than Secondary
4. **What is current work status?** a. Working b. Not working
5. **What is your profession? _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _**
6. **What is your main source of income?**
   a. Salary b. Wage c. Partner's salary d. Partner's wages e. From parent or family members f. Others
7. **What income is available to you on the average each month (in Naira)?**
   a. Less than 18,000 b. 18,000 to 35,000 c. 36,000 to 50,000 d. 51,000 to 70,000
   e. 71,000 to 100,000 f. Greater than 100,000
8. **What is your current marital Status?**
   a. Single b. Married c. Co-habiting d. Separated e. Divorced f. Widowed
9. **In the last four years, how many sexual partners do you have?**
   a. Just 1 b. Less than 3 c. More than 10
10. **What is your HIV status?** a. Positive b. Negative c. Don't know
11. **If Positive, how long ago was the HIV+ confirmed**
    a. < 1-year b. 1-2 years c. 3 – 4years d. ≥5 years
12. **If positive, recent CD4 Count (Cells/mm)**
    a. < 350 b. ≥ 350 c. missing
13. **Are you on ARV?**
    a. Yes b. No c. missing
14. **What level is your viral load?**
    a. Undetected b. Detected c. Don't know

SECTION B: KNOWLEDGE OF HUMAN PAPILOMA VIRUS (HPV)

1. **Have you heard of HPV (Human Papilloma Virus)?**
   a. No b. Yes c. Not sure
2. **If yes, from which source** _____
   a. Health workers b. Social Media c. Friends d. Media prints e. TV/Radio f. Others
3. **What behaviour or activity increase the chance of contacting HPV infections?**
   _____
4. **How old were you when you first had sexual intercourse?**
   a. ___ age in years b. Never had sexual intercourse c. Don't know
5. **Smoking can be related to HPV?**
   a. No b. Yes c. Not sure
6. **HPV can cause genital warts? (*Genital warts are fleshy growths that develop around the genitals or anus)***
   a. No b. Yes c. Not sure
7. **HPV can be transmitted during sexual intercourse?**
   a. No b. Yes c. Not sure
8. **People can get HPV infection for a long time without knowing it**
   a. No b. Yes c. Not sure
9. **Have you been tested for HPV?**
   a. No b. Yes c. Not sure
10. **If yes to Q 9, what was the result? ……**
11. **If No to Q 9, what is your reason(s)?**
    a. Don't know about the test b. Don't know where to get the test done c. Cannot afford to pay for the test d. Ashamed to do the test e. My partner will not allow me to do the test f. Others
    _ _ _ _ _ _ _ _ _
12. **Screening for cervical cancer in women with HIV can prevent developing cancer of the cervix**
    a. No b. Yes c. Not sure
13. **Does a negative HPV result depict that a woman has a low chance of cervical cancer?**
    a. No b. Yes c. Not sure

SECTION C: KNOWLEDGE OF CERVICAL CANCER

1. **Have you heard of cervical cancer?**
   a. Nob. Yes c. Not sure
2. **Have you ever received any information about cervical cancer?**
   a. No b. Yes c. Not sure
3. **If yes to Q 2, through what channel?**
   a. Health workers b. Social Media c. Friends d. Media prints e. TV/Radio f. Others
4. **Are people who drink alcohol/alcoholic content more likely to have cervical cancer?**
   a. No b. Yes c. Not sure
5. **Are people who smoke more likely to have cervical cancer?**
   a. No b. Yes c. Not sure
6. **Cervical cancer is caused by a type of human papilloma virus**
   a. No b. Yes c. Not sure
7. **Cervical cancer can be cured if detected early**
   a. No b. Yes c. Not sure
8. **The germ that causes cervical cancer can be transmitted during sexual contact**
   a. No b. Yes c. Not sure
9. **Does having sex early in life increases the chance of having cervical cancer?**
   a. No b. Yes c. Not sure
10. **Early detection of cervical cancer can increase the survival rate**
    a. No b. Yes c. Not sure
11. **Women living with HIV are more likely to have cervical cancer compared to those who are HIV negative?**
    a. No b. Yes c. Not sure
12. **Can having more than one sex partner increase the chance of having cervical cancer?**
    a. No b. Yes c. Not sure
13. **Can a poor diet increase the chance of having cervical cancer?**
    a. No b. Yes c. Not sure
14. **Can cervical cancer be prevented?**
    a. No b. Yes c. Not sure
15. **Cervical cancer is caused by?**
    a. Germs b. Bad diet c. Evil spirit d. Sex e. Too much sex f. others…….

SECTION D: KNOWLEDGE AND WILLINGNESS TO PAY FOR THE HPV VACCINE/GET VACCINATED

1. **Have you ever heard about HPV vaccine?**
   a. No b. Yes c. Not sure
2. **If yes, from what channel did you hear about it?**
   a. Health workers b. Social Media c. Friends d. Media prints e. TV/Radio f. Others
3. **Does HPV vaccine cure cervical cancer?**
   a. No b. Yes c. Not sure
4. **Is regular screening for cervical cancer still needed even though you have been vaccinated against HPV?**
   a. No b. Yes c. Not sure
5. **Are HPV vaccines highly effective in preventing HPV infection?**
   a. No b. Yes c. Not sure
6. **Are HPV vaccines highly effective in preventing cervical/vulvar cancer?**
   a. No b. Yes c. Not sure
7. **Have you ever been vaccinated with the HPV vaccine?**
   a. No b. Yes c. Not sure
8. **If No to question (7) above, why?**
   a. Do not have time to take HPV vaccine b. I would have severe side effects after receiving HPV vaccine c. I need to communicate with my partner before taking the HPV vaccine d. I have never heard of the vaccine e. Don't know where/how to get it f. The vaccine is expensive g. Other (Please, specify)
9. **Would you be willing to get your daughter vaccinated against HPV?**
   a. No b. Yes c. Not sure
10. **Please give reasons** _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
11. **Are you willing to pay for HPV vaccine?**
    a. No b. Not sure c. Yes
12. **Would you be willing to pay for your daughter's HPV vaccine?**
    a. No b. Yes c. Not sure
13. **At what age would you like your daughter to get the HPV vaccine?** _ _ _ _ _ _ _ _ _
    Please give reasons _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
14. **Which females around you would you be willing to pay for HPV vaccine?**
    a. Sisters b. Nieces c. House helps/Nannies/Helps d. Others (Please, specify) _ _ _ _ _ _ _
15. **If HPV vaccines are free in Nigeria, would you allow females around you get the HPV vaccine?**
    a. No b. Yes c. Not sure
16. **How much will you be willing to pay per dose for an HPV vaccine?**
    a. 6,000.00 NGN b. 8,000.00 NGN c. 12,000.00 NGN d. 15,000.00 NGN e. 20,000.00 NGN

SECTION E: WILLINGNESS TO PAY FOR HPV VACCINE

1. Would you be willing to pay for HPV vaccine in the prevention of cervical cancer?
   a. No b. Yes c. Not sure
2. Having the knowledge of cervical cancer among women living with HIV, are you willing to pay for HPV vaccine?
   a. No b. Yes c. Not sure
3. Would you be willing to purchase HPV vaccine even though it is costly?
   a. No b. Yes c. Not sure
4. Do you have a family member or friend that has purchased HPV vaccine before?
   a. No b. Yes c. Not sure
5. If the government subsidizes HPV vaccine, would you be willing to pay?
   a. No b. Yes c. Not sure

THANK YOU FOR YOUR TIME

Bio-Data

MojibolaArinola Babalola / Assistant Director of Nursing

F23, Divine Favour House, UCH Coop Estate, Apete, Adeosun, Ibadan.

jibbab2@gmail.com

Professional Profile

a committed, diligent registered nurse with extensive experience in providing holistic care to patients with complicated medical needs in order to maintain their health, safety, and growth. While collaborating with local, national, and international authorities, my decision to provide clients and patients with tailored treatment plans was assisted by my broad knowledge of illness prevention, health promotion, and suitable rehabilitation.

Possessing excellent leadership characteristics, completing patient assessments, and implementing and assessing the efficacy of nursing care. Acts honorably and in the patients' best interests while guaranteeing adherence to trust policies and regulations to advance ward effectiveness and the provision of operational excellence. Demonstrates good teamwork skills and strong leadership abilities when working with other healthcare providers.

Core Skills

- Nursing
- Medical procedures
- Interpersonal relationship
- Leadership
- Conflict resolution
- Communication skills
- Health promotion
- Patient care
- Infection control
- Disease surveillance
- Ambulance service
- Ward management

Career Summary

Nov 1995 till Oct 2000 — Tobi Medical Centre, Felele Rab Ibadan, Oyo State.

Staff Nurse/Midwife

Outline

Delivery of excellent Care for elderly, adult and children patients, managing acute to chronic health issues.

Key Responsibilities

- Ensuring patient-centred Care for out-patient and in-patient of the hospital.
- Providing high standards of patient care and focusing on specific care requirements for patients presenting with complex health problems.
- Administration of prescribed medications.
- Delivering health talk and advice to patients concerning diet and life style commitments required for recovery.
- Collaborating closely with multidisciplinary teams and promoting effective and empathetic communication with patients and relatives

Nov 2000 till Feb 2003

SOS Childrens' village, Owu Ikija, Ogun State.

Nursing sister.

Key Responsibilities

- Inspection of the enabling environment provided for the growth and development of children in the village.
- Rendering specific information for mothers in prevention, control and spread of diseases during individualised and group health talks.
- Treatment of minor ailments among the village children.
- Provision of first aid treatments for emergency cases before transfer to the nearest hospital.
- Keeping records of vital signs and other important health information of all staff and children in the village.
- Offer routine vaccination/immunization to the staff, children

and the entire community.

- Prompt referral of cases to the higher health Care facilities for better management.

March 2003 – May 2006 — Oni Memorial Children's Hospital Neonatal/ Premature baby unit. Ring Road, Ibadan. Nursing Officer.

Key Responsibilities

- Total quality care for premature babies.
- Ensuring close monitoring of premature babies inside the incubator.
- Monitor vital signs of the neonate and premature babies.
- Proper recording of vital signs and prompt reporting of notable changes in the condition of the neonates and premature babies on admission.
- Monitoring of intake and output of all the newly born, premature babies and neonates on admission.
- Working with other professionals and health care workers in achieving maximum health and development of all the babies on admission.
- Ensuring proper handling over and taking over of shifts.
- Giving of medication as prescribed by the physician.

June 2006 till date — University College Hospital Oritamefa Ibadan Oyo State, Nigeria

June 2006 – Sept 2006 — Accident and Emergency Unit Nursing Officer II

Key Responsibilities

- Carrying out prompt triage of clients and patients for prompt emergency care.
- Carrying out physical clinical assessment and checking of vital signs.
- Monitoring of intake and output of patients.
- Rendering of firstaid treatment and basic life support care for patients when necessary.
- Giving of prescribed medication appropriately and timely.
- Reporting any noticeable, observed changes in the health status of clients and patients.
- Use of resuscitation equipment in maintenance of patient airways and prevention of airways obstruction.
- Proper handling over and taking over of shifts.
- Participate in planning, implementing and evaluation of care for patients.
- Allow interdisciplinary collaboration in the interest of clients and patients.
- Carrying out of wound dressing under aseptic condition.

Oct 2006 – 2007 Medical Ward
Staff Nurse

Key Responsibilities

- Carrying out the admission process of patients into the medical ward.
- Maintenance of accurate documentation of patient's vital signs.
- Monitoring of positive or negative changes in patient's condition.
- Administering medications and treatments as prescribed by the physician.

- Development of nursing care plan in maintenance of wholistic care for patients.
- Collaborating with teams for patients' care.
- Conducting physical examination which may include checking of vital signs, reflexes and examination from head to toe.
- Provision of support and advice to patient and patients' relative whenever is necessary.
- Operating medical equipment e.g., stethoscopes, glucometers, pulse oximeters, thermometers and blood pressure.
- Prevention of nosocomial infections and pressure sores in patients.

Oct 2007 – Sept 2009

Centralized
Immunization Centre
UCH
Nursing officer I

Key Responsibilities

- Vaccination of babies with routine immunization e.g. BCG, polio vaccine, measles vaccine etc.
- Providing the entire community with information on vaccine/immunization available in prevention of diseases.
- Vaccination of staff during the pre and post-employment period, this is done to ensure that employee is fit for the job applied for and prevention of some diseases while on the job.
- Administration of vaccines during an outbreak of disease e.g. Covid-19.
- Carry out mantoux test for staff and patients in suspect of Tuberculosis.
- Carry out nutritional class for mothers in readiness for weaning period.
- Maintenance of cold-chain of all vaccines/immunizations from the manufacturers to the consumers.

- Proper recording of vaccination cards, growth monitoring charts.
- Reporting of adverse event following immunization (AEFI) to the local authority for prompt actions.
- Maintenance of good interpersonal relationship among nurses and other health care workers.
- Constantly ensuring prevention of injection abscess in babies and adults.

Oct 2009 – Oct 2010	Federal Training Centre for teachers of Health Science University College Hospital Ibadan Diploma course in education (Primary Health).
Nov 2010 – July 2018	Community Health Officers' Training Programme UCH, Ibadan. Assistant Chief Nursing Officer

Key Responsibilities

- Teaching courses like child health, referral system and outreach services.
- Served as a clinical instructor for the community health officer students.
- Supervising the research writing of community health officers' students in partial fulfilment of higher diploma of assigned CHO students.
- Participates in national examination of community health

practitioner board as chief examiner.

- Setting of examinations, marking of examination scripts are part of my job description.

3rd Aug 2018 – 3rd Aug 2020 Professor Oluwole Adebo

Continuing Education Centre, UCH, Ibadan

Chief Nursing Officer.

Key Responsibilities

- Teaching students and staff in Basic life support course.
- Fully participated in ambulance service of the hospital.
- Effectively carry out cardiopulmonary resuscitation on patients that are transferred in ambulance from university college hospital to outside facilities for investigations whenever need arise.

6th July 2020 till date Disease surveillance unit, UCH, Ibadan

Assistant Director of Nursing (Public Health)

Key Responsibilities

- Actively involved in disease surveillance.
- Collationof names and gathering of materials for Covid-19 testing.
- Preparation of results for disclosure.
- Contact tracing of positive cases of epidemic prone diseases
- Monitoring of delivery of samples to the laboratory by the health assistant
- Represents the university college hospital at the local, state government and the world health organization local office as the lead focal for disease surveillance.
- Gathering of disease surveillance data and transferring the data

to the appropriate quota to make policies.

- Writes monthly, quarterly and annual report of disease surveillance activities.
- Reporting to the University College Hospital, local, state authorities the surveillance activities in UCH.
- Participates in state environmental surveillance when need arise.
- Training of intern nurses and university students on disease surveillance.
- Ensures proper storage and carriage of samples for investigation.
- Maintaining good inter personal relationship among nurses, doctors and other health care givers in DSU.
- Member of covid -19 task force in UCH.
- Member of the University College Hospital on Response to Emergency and Outbreak of Diseases (UCHCREOD)
- Participates in quaterly community posting to Okuku UCH, Comprehensive Hospital.
- As the unit head, the smooth running of the DSU is highly maintained.

Education and Qualifications.

Certificates: -

Midwifery (1993)
General Nursing 1995)
Community Health 1999)
Higher Diploma in Public Health Nursing (2000)
Diploma in Education (Primary Health) (2010)
Bachelor of Nursing Science BNSc (2014)
Master in Public Health (2022)

Professional Registration:-

Nursing and Midwifery Council of Nigeria.

Professional Development

- The Nurse and Expectations of Health Care Delivery System (2004)
- In-service education and training [clinical nursing division] university college hospital Ibadan (2006)
- Workshop on HIV counselling and ethics (2009)
- Workshop on Global Economic Recession: Implication to Family Health (2009)
- Workshop on Health Systems Strengthening (2009)
- Learner centred education (2010)
- Primary Health Care Workers: The Mirror of Grass Root Health Care Practice and Its Implication on Community Health Education (2012)
- Use of magnesium sulphate in the treatment of severe pre-eclampsia and eclampsia for schools of health technology in Nigeria (2014)
- Integrated management of childhood illness step-down training workshop (2014)
- Occupational Health & Safety in the Healthcare Setting (2018)
- Leadership and Management in Health (2018)
- Basic Life Support Training Program (2019).
- Strengthening Clinical Nursing Management Capacity for Improved Service Delivery (2019)
- Continuing professional development programme (community/ public health nursing) module 2 (2020)
- Building Competence in Public Health Research (2021)
- Training on nOPV2 and Covid 19 vaccines Adverse Events of Special interest (AESI) Surveillance (2021)
- In-service training on Hypertensive Heart disease: Prevention and Management (2022)

- Rising incidence of Diabetic foot ulcer and amputation:
  a call for action (2022)

Hobby: Driving, Reading, Listening to music

University Compliance Certification

This is to certify that this thesis by Babalola Mojibola ARINOLA with Matric No. LCU/PG/001499 in the Department of Public Health, Faculty of Basic Medical and Applied Sciences, Lead City University, Ibadan is in full compliance with the approved university format.

Signature	**Date**

NHREC

Lead City University
Research Ethics Committee

PROJECT TITTLE: ACCEPTABILITY, WILLINGNESS TO PAY AND VALIDITY OF HPV SELF-SAMPLING AMONG WOMEN OF KNOWN HIV STATUS IN OYO STATE.

PROJECT NUMBER: LCU-HREC/22/005.

APPROVAL LETTER

The above named proposal has been adequately reviewed; the protocol and safety guidelines satisfy the conditions of *LCU-HREC* policies regarding experiments that use human subjects.

Therefore, the study under its reviewed state is hereby approved by the LCU-Health Research Ethics Committee.

Prof. Olusola Ladokun ..... 10:02:2022.....

Name of LCU-HREC Chairman *Signature of LCU-HREC Chairman and Date*

Dr. Folahanmi Akinsolu 10/02/2022

Name of LCU-HREC Secretary *Signature of LCU-HREC Secretary and Date*

This approval is given with the investigator's Declaration as stated below;

By signing below I agree/certify that:

1. I have reviewed this protocol submission in its entirety and that I am fully cognizant of, and in agreement with all submitted statements.
2. I will conduct this research study in strict accordance with all submitted statements except where a change may be necessary to eliminate apparent immediate hazard to a given research subject.
   - I will notify the HREC promptly of any change in research procedures necessitated in the interest of the safety of a given research subject.
   - I will request and obtain HREC approval of any proposed modification to the research protocol or informed consent document(s) prior to implementing such modifications.

Lagos-Ibadan Express way, Toll Gate Area.
P.O. Box 30678, Secretariat, Ibadan Oyo State Nigeria.
Lcu.hrec@lcu.edu.ng
Tel: 234 803 499 5499

TELEGRAMS..... TELEPHONE.....

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....
All communications should be addressed to the Honorable Commissioner quoting ref
Our Ref. No. AD 13/479/ 215

24th January, 2022

The Principal Investigator,
Lead City University,
Ibadan, Oyo State.
Nigeria.

Attention: Babalola Mojibola Arinola

ETHICS APPROVAL FOR THE IMPLEMENTATION
OF YOUR RESEARCH PROPOSAL IN OYO STATE

This is to acknowledge that your Research Proposal titled: "**Acceptability, Willingness to Pay and Validity of HPV Self-Sampling Among Women of known HIV Status in Oyo State**." has been reviewed by the Oyo State Ethics Review Committee.

2. The committee has noted your compliance. In the light of this, I am pleased to convey to you the full approval by the committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations, in line with this, the Committee will monitor closely and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of findings as this will help in policy making in the health sector.

Wishing you all the best.

Dr. Abbas Gbolahan
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