# KNOWLEDGE, UPTAKE, BARRIERS, AND MEASURES THAT PROMOTE HUMAN PAPILLOMAVIRUS (HPV) VACCINATION AMONG UNDERGRADUATES IN UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA.

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**BENIN CITY, EDO STATE.**


**SEPTEMBER, 2024.**

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**A ONE YEAR PROJECT PRESENTED TO THE DEPARTMENT OF COMMUNITY HEALTH IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF A BACHELOR OF MEDICINE AND BACHELOR OF SURGERY (MBBS) DEGREE.**

**SEPTEMBER 2024.**

TABLE OF CONTENTS

## DECLARATION

We hereby declare that this project work titled, "**KNOWLEDGE, UPTAKE, BARRIERS AND MEASURES THAT PROMOTE HUMAN PAPILLOMAVIRUS (HPV) VACCINATION AMONG UNDERGRADUATES IN UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA**" was conducted under supervision and has neither been presented nor published anywhere else in part or in full for any other purpose.


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## CERTIFICATION

We certify that this research was carried out in the Department of Public Health and Community Medicine, School of Medicine, College of Medical Sciences, University of Benin, Benin City, and was supervised by Prof. A.N. Ofili and co-supervised by Dr. O.H.N Okwara.


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## DEDICATION

This work is dedicated to God, whose grace, mercy, and strength sustained us during the completion of this project. Also, to our families and friends for their unwavering financial and moral support. Our heartfelt gratitude also goes to our teachers for their invaluable guidance and mentorship throughout the course of this project.

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First and foremost, we are eternally grateful to God Almighty for granting the strength, wisdom and perseverance to complete this project work.

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A special word of thanks goes to the respondents who participated in this study, whose cooperation was crucial to the success of our data collection.

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Last but certainly not least, I want to extend my sincere appreciation to all my friends for their moral support throughout this project work.

**LIST OF TABLES**

**LIST OF FIGURES**

## LIST OF ABBREVIATIONS

**CDC:** Center for Disease Control

**HPV:** Human Papillomavirus

**Hr-HPV:** High-risk Human Papillomavirus

**IARC:** International Agency for Research on Cancer

**LASPOTECH:** Lagos State Polytechnic

**Lr-HPV:** Low-risk Human Papillomavirus

**PATH:** Programme for Appropriate Technology in Health

**SPSS:** Statistical Package for Scientific Solutions

**STI:** Sexually Transmitted Infection

**Ur-HPV:** Undetermined-risk Human Papillomavirus

## DEFINITION OF TERMS

**Carcinogenicity:** The ability or capacity of a substance to cause cancer.

**High-risk:** Situations, behaviors, or substances with a high likelihood of causing harm or adverse effects.

**Immunocompromised:** Having an impaired or weakened immune system, making individuals more susceptible to infections and diseases.

**Low-risk:** Situations, behaviors, or substances with a low likelihood of causing harm or adverse effects.

**Phylogenic:** Relating to the evolutionary development or diversification of a species or group of organisms.

**Undetermined-risk:** Situations, behaviors, or substances where the level of risk or potential harm is not clearly established or known.

**Vaccination Hesitancy:** The delay in acceptance or refusal of vaccines despite the availability of vaccination services.

**Vaccination:** The administration of a vaccine to stimulate the immune system and provide immunity against a specific infectious disease.

**Vaccination Intent:** The intention or willingness of individuals or communities to receive a vaccine.

**Vaccine:** A biological preparation that provides active acquired immunity to a particular infectious disease by stimulating the immune system to recognize and respond to specific pathogens.

**Vaccine Coverage:** The proportion of a population that has received a particular vaccine, typically expressed as a percentage.

**Vaccine Efficacy:** The ability of a vaccine to prevent disease under ideal and controlled conditions, typically measured in clinical trials.

**Vaccine Safety:** The evaluation and assurance of the safety of vaccines, including monitoring for adverse effects and side effects.

## ABSTRACT

**BACKGROUND**: Human Papillomavirus (HPV) is a prevalent sexually transmitted infection with specific high-risk strains associated with cervical cancer, which is the second most common cancer among women in Nigeria. Despite the availability of vaccines like Gardasil and Cervarix, HPV vaccination has yet to be fully integrated into the National Immunization Schedule. Expanding access and coverage is crucial to reducing HPV-related disease burden. This research work gives insight into the importance of HPV vaccination, improving HPV vaccination uptake and its potential impact on public health.

**OBJECTIVES**: This research work assessed the knowledge, uptake, barriers and measures that promote HPV vaccination among undergraduates in the University of Benin.

**METHODOLOGY**: A descriptive cross-sectional study was carried out among 569 respondents from the School of Medicine, University of Benin using stratified sampling technique. Relevant data were collected using self-administered questionnaires. The collected data were analysed using IBM SPSS version 26, with level of significance set at $p < 0.05$.

**RESULTS**: The mean age in this study was 21.29 ± 2.6, with more females 288(50.6%) than males 281(49.4%). Majority (76.8%) had heard of HPV, 69.8% had heard of the HPV vaccine, but only 5% had received it. Significant factors associated with knowledge of the HPV vaccine were gender and academic level, with females ($p=0.001$), and 200-level students ($p<0.001$) demonstrating greater awareness. Regarding uptake, age was a significant factor, with respondents aged 16-19 showing better uptake than those aged 20-26 ($p=0.005$). Key barriers to vaccine uptake were lack of awareness (31.3%), sexual inactivity (20.4%), and logistical issues like inaccessibility of the vaccine (27.4%) and cost (12.5%). Promoting vaccination could be achieved through increased access to vaccines via university health centers (90.7%), incentives (90.0%), and student-led campaigns (84.5%).

**CONCLUSION**: While knowledge of HPV is relatively high, actual vaccine uptake remains very low among undergraduates due to misconception, cost and logistical challenges. Improving vaccination rates require education, logistical support and incentives. Enhanced health campaigns and university-based programs can greatly increase vaccine uptake.



**Keywords**: Human Papillomavirus, HPV vaccine, knowledge, barriers, undergraduates, vaccine uptake.

# CHAPTER ONE

# INTRODUCTION

## 1.1 BACKGROUND

Human Papillomavirus (HPV) is a family of small, double-stranded DNA viruses from the Papillomaviridae family, which includes five main phylogenic genera: Alpha, Beta, Gamma, Mu Nu.[1,2] The Alpha genus is primarily associated with genital HPV infections. HPV is the most common sexually transmitted infection (STI) affecting regions such as the lower genital tract, head & neck, and esophagus.[2] HPV types are categorised into low-risk HPV (Lr-HPV) and high-risk HPV (Hr-HPV) strains.[3]

According to the International Agency for Research on Cancer (IARC) 2007 report, low-risk types such as 2, 3, 6, 11, 13, 32, and others are linked to anogenital warts and benign epithelial lesions. In contrast, high-risk types like HPV 16, 18, 31, 33, 45, 52, 58, amongst others are associated with cancer, with HPV 16 and HPV 18 being the leading causes of HPV-related cancers.[2,4] Additionally, HPV 77, 97, 102, 106, 114, 117, 125, 160, and 117 have been classified as undetermined-risk HPV (Ur-HPV) types due to limited data on their carcinogenic potential.[2]

HPV is a virus that affects both men and women and is one of the most common sexually transmitted infections globally, with a high prevalence among sexually active individuals.[5] It can be transmitted through skin, mouth, and genital contact.[5] While most HPV infections resolve on their own without causing any symptoms or long-term consequences, persistent infection with certain high-risk strains can cause cancers of the cervix, anus, penis, vagina, vulva, and

oropharynx. Cervical cancer, in particular, is a leading cause of cancer-related deaths among women worldwide.

Human Papillomavirus (HPV) vaccination plays a vital role in public health by preventing infections caused by various strains of HPV, some of which can lead to cervical cancer and other types of cancer. The development of HPV vaccines marks significant advancement in preventive medicine. These vaccines work by stimulating the immune system to produce antibodies that protect against HPV infection. However, HPV vaccination is not currently included in the National Programme for Immunization.[6]

Cervical cancer, closely linked to oncogenic HPV types, is the third most common cancer in women and the second leading cause of cancer-related deaths globally.[7] In Nigeria, it is currently the second most prevalent cancer in women, with about 12,075 new cases and 7968 deaths each year.[7] Sub-Saharan Africa has the highest cervical cancer rates globally and it is the leading cause of death among women in 21 of the 48 countries in the region.[7]

The introduction of HPV vaccines has revolutionized the prevention of HPV-related diseases. The first vaccine, Gardasil, was approved in 2006, followed by Cervarix in 2009 and Gardasil 9 in 2014. These vaccines protect against the most common high-risk HPV strains associated with cancer, as well as some low-risk strains that cause genital warts. Currently, three commercial HPV vaccines are available: bivalent Cervarix, (2vHPV for types 16 & 18), quadrivalent Gardasil (4vHPV for types 16, 18, 6, 11) and nine-valent Gardasil-9 (9vHPV for HPV types 16, 18, 6, 11, 31, 33, 45, 52, 58).[8,9]

HPV vaccination is recommended for both males and females aged 9 to 26.[5] It is typically given in two or three doses over several months, depending on the individual's age at the start of

vaccination and the specific vaccine used. Ideally, vaccination should occur before the onset of sexual activity to ensure maximum effectiveness,[10] as the vaccines are most effective when given to individuals who have not yet been exposed to HPV.[11]

According to the Centers for Disease Control and Prevention (CDC), recommends a two-dose series (at 0 and 6-12 months) for those who begin vaccination between ages 9 and 14, except for immunocompromised individuals. For those starting vaccination between ages 15 and 26, as well as immunocompromised individuals aged 9 to 26, a three-dose series (at 0, 1-2 months and 6 months) is recommended.[12] The three-dose schedule also applies to adults beginning vaccination betweeen ages 27 and 45.[12]

Despite the proven safety and efficacy of HPV vaccines, their uptake varies across different regions and populations. Factors such as lack of awareness, misconceptions about HPV and the vaccine, concerns about safety and side effects, and barriers to access, all contribute to this variability.[13] Efforts to boost HPV vaccination rates include; education campaigns aimed at healthcare providers, parents and adolescents, as well as initiatives to improve access to vaccines.[13]

In Nigeria, there is a strong need to integrate HPV vaccination into the National Immunization Schedule and to provide it at low cost or even free, to increase its availability, coverage and uptake, ensuring better protection against HPV.[14]

In conclusion, HPV vaccination is crucial in preventing HPV-related diseases, including cervical cancer. By raising awareness, addressing concerns, and improving vaccine accessibility, we can maximize the public health benefits of HPV vaccines and reduce the global burden of HPV-related diseases.

## 1.2 STATEMENT OF PROBLEM

Despite the widespread availability of the Human Papillomavirus (HPV) vaccine and concerted efforts to increase awareness about its importance, a comprehensive understanding regarding the knowledge of HPV vaccination among undergraduates of the University of Benin remains elusive.[15] While some studies conducted outside Nigeria; particularly the United States and Hong Kong, have provided valuable insight into factors influencing HPV vaccination behavior among young adults,[16,17] the applicability of these findings to the Nigerian context, particularly among undergraduates in the University of Benin, remains unclear. Moreover, existing research has linked good knowledge levels with high receptivity and uptake of the HPV vaccine.[18] This underscores the urgent need to conduct a comprehensive study addressing the knowledge of HPV vaccination among undergraduates in Nigeria, particularly in light of the alarmingly low uptake levels documented in prior studies.[19] This study would be crucial to elucidate the knowledge gaps and address the barriers that hinder vaccine acceptance, thereby fostering improved public health outcomes in this demographic.

Vaccine uptake among medical students is notably low and there are identifiable barriers to receiving the vaccine. Urgent intervention in the form of an information session is strongly advised, specifically aimed at medical students to address these barriers to Human Papillomavirus vaccination.[20] In a study carried out among female undergraduate students of Ambrose Alli University, Ekpoma, Nigeria showed low HPV vaccination among female undergraduates.[21] A study carried out among students of a tertiary institution in Gombe State showed that uptake of HPV vaccine has been consistently low due to low level of awareness,

cost of the vaccine, uncertainty over side effects, and parental beliefs and attitudes.[22] Another barrier to the uptake of the HPV vaccine is a misconception about the safety of the vaccine among well-aware gynecologists, pediatricians, and medical students.[20] The results of PATH (a non-governmental organization) study of a five-year demonstration of HPV vaccination among 23,000 vaccinated girls showed seven non-vaccine-related deaths.[20] This has been wrongly attributed to the effects of the vaccine deterring its popularity among healthcare workers.[20] In a study carried out among undergraduate medical, dental, and nursing students in South India, barriers to the implementation of the HPV vaccine program in India are the vaccine costs, health prioritization, variable epidemiologic surveillance data on HPV-related cancer burden, lack of awareness of HPV, vaccine safety, societal and cultural barriers.[23]

A study amongst Brazilian medical students indicated that vaccine hesitancy is the primary factor contributing to the low HPV vaccination rate.[24] It is important to prioritise addressing HPV vaccine hesitancy, especially among medical students and medical staff. These people are not only HPV vaccine recipients but also a key force in promoting HPV vaccine coverage.[24] Regarding the HPV vaccine specifically, vaccine hesitancy has led to low HPV vaccine acceptance in certain countries such as Japan, Denmark, Ireland, Colombia, the USA, India, and France.[25] These concerns often center around safety and women's fertility, the latter perhaps being due to the age the vaccine is currently provided (normally adolescence) and its link to sexual health.[25] Ignorance of where to obtain the HPV vaccine in Nigeria, high vaccine cost, fear of being tagged as being promiscuous, and low-risk perception were the main reasons for lack of vaccination among the unvaccinated respondents.[14] The high cost of

vaccination was the reason 48.5% of medical and paramedical students in India were hesitant to get vaccinated.[26]

While the Human Papillomavirus (HPV) vaccine is readily available, its uptake among young adults remains suboptimal, posing significant public health concerns. This may be due to limited awareness and misconceptions about the HPV vaccination.[27] Despite efforts to promote vaccination awareness, there is a need to explore alternative approaches to enhance HPV vaccine uptake among this demographic. Factors contributing to low uptake rates may include not only a lack of awareness and misconceptions but also socio-cultural factors, and structural barriers such as limited access to healthcare services, cost implications, and logistical challenges.[28,29,30] These factors may influence vaccine decision-making among undergraduates, further impacting uptake rates.[31] Furthermore, adolescents and young adults, who form a significant portion of university populations, are considered a high-risk group for HPV infections.[32] This presumption stems from data revealing an increasing proportion of Nigerian women experiencing sexual debut before adolescence,[33] alongside rising rates of risky sexual behavior (such as unprotected oral, vaginal, and anal sexual intercourse) and a lack of HPV vaccination history.[34,35] The unwillingness of this high-risk group to take the HPV vaccine consequently increases their susceptibility to infection and transmission rates, thereby contributing to the national burden of HPV-related diseases.

Moreover, the broader context of HPV vaccine access in low-income countries like Nigeria exacerbates the problem. Only a small number of low-income countries have incorporated the HPV vaccine into their national immunization programs[36], and Nigeria is not one of them.

Despite the high prevalence of HPV-related cancers, the HPV vaccine remains absent from Nigeria's national immunization program[37], contributing to the continued burden of preventable diseases. This lack of national policy support adds an additional layer of complexity to the issue, making it even more challenging to promote vaccine uptake at the individual level. Understanding the multifaceted nature of barriers to HPV vaccine uptake among undergraduates is pivotal for developing comprehensive strategies that address both individual-level and systemic challenges. Therefore, this study aims to investigate the various factors contributing to low HPV vaccine uptake among undergraduates of the University of Benin and propose evidence-based interventions to promote vaccination acceptance within this population.

## 1.3 JUSTIFICATION OF STUDY

Human Papillomavirus (HPV) is a major public health concern, especially in low- and middle-income countries like Nigeria, where HPV-related diseases, including cervical cancer, are prevalent. Nigeria, despite its high burden of HPV-related diseases, has yet to include the HPV vaccine in its routine national immunization programs. This lack of inclusion creates significant disparities in vaccine coverage, particularly for marginalised populations, such as those from lower socioeconomic backgrounds or rural areas.

Undergraduates are particularly vulnerable to HPV infections due to factors such as early sexual activity and risky behaviours like unprotected sex. Many students have little to no history of HPV vaccination and their willingly to receive the vaccine often depends on how much they know about its safety, benefits and accessibility. By studying their knowledge and attitudes toward HPV vaccination, we can identify gaps in vaccine uptake and address barriers that prevent students from getting vaccinated. This will help ensure broader access to HPV prevention methods and reduce the risk of HPV-related diseases.

Although some studies in Nigeria have explored HPV vaccination, there is limited research on HPV vaccination among university students. Common issues like cultural beliefs, vaccine hesitancy and logistical challenges have been noted, but more research is needed to understand these factors among young people. This study will help bridge this knowledge gap and provide valuable insights into the determinants of HPV vaccination among Nigerian youth.

The findings from this research will assist the Nigerian government and public health stakeholders in formulating and implementing evidence-based policies and programs aimed at

increasing HPV vaccine uptake. This, in turn, will reduce the spread of HPV and the impact of HPV-related diseases among this high-risk population.

## 1.4 RESEARCH QUESTIONS

1. What is the knowledge of HPV vaccination among undergraduates at the University of Benin?
2. What is the level of uptake of HPV vaccination among undergraduates at the University of Benin?
3. What are the barriers to HPV vaccination among undergraduates at the University of Benin?
4. What are the measures that help promote the uptake of HPV vaccination among undergraduates at the University of Benin?

## 1.5 OBJECTIVES

### GENERAL OBJECTIVE

To assess the knowledge, uptake, barriers, and measures that promote HPV vaccination among undergraduates in the University of Benin with a view to creating awareness and increasing uptake of HPV vaccination among the university population.

### SPECIFIC OBJECTIVES

1. To assess the knowledge of HPV vaccination among undergraduates of the University of Benin.
2. To assess the uptake of HPV vaccination among undergraduates of the University of Benin.
3. To determine the barriers to HPV vaccination among undergraduates of the University of Benin.
4. To assess the measures that help promote the uptake of HPV vaccination among undergraduates of the University of Benin.

# CHAPTER TWO

# LITERATURE REVIEW

Human Papillomavirus (HPV) vaccination represents a pivotal advancement in public health, aimed at reducing the incidence of HPV-related diseases including cervical cancer, genital warts and other malignancies.[5] Despite the availability and proven efficacy of the HPV vaccine, its uptake remains suboptimal in many regions, including Nigeria. This chapter examines the current research on HPV vaccination, focusing on the knowledge, uptake, and barriers to HPV vaccination among undergraduates. It also examines strategies that have been implemented to enhance vaccination rates among undergraduates.

## 2.1 KNOWLEDGE OF HUMAN PAPILLOMA VIRUS VACCINATION AMONG UNDERGRADUATES

Numerous studies have examined the level of knowledge about HPV and its vaccination among young adults worldwide. Generally, these studies indicate a significant knowledge gap. For instance, a descriptive cross-sectional study conducted among undergraduate women of Penn State University in the United States to assess the knowledge of HPV in a sample of US female college students found that while awareness of HPV was relatively high, detailed knowledge about the vaccine and its benefits was limited among college students [38]. Similarly, a descriptive cross-sectional study done in 2021 to assess the knowledge of HPV and HPV vaccination among medical students in Alabama, reported that although most students had heard of HPV, there were knowledge gaps concerning its link to cervical cancer or the importance of vaccination.[39]

In Africa, the level of awareness and knowledge about HPV and its vaccination is notably lower compared to Western countries. A descriptive cross-sectional study carried out in 2016 in South-West Ethiopia among undergraduate medical students to assess the knowledge and acceptability of HPV vaccine, revealed that over half of the surveyed university students had poor knowledge of HPV and its vaccine.[40] Similar findings were seen in a descriptive cross-sectional study done in 2021, in South Africa, to assess the knowledge of HPV and HPV vaccines among female undergraduates, where knowledge regarding HPV and its vaccines was also found to be insufficient.[41]

Within Nigeria, studies have indicated a substantial lack of knowledge about HPV and its vaccination among university students. Recent studies have explored various factors influencing the knowledge of HPV vaccination among young adults, including undergraduates.[42] A descriptive cross-sectional survey conducted in 2019 to assess the knowledge and attitude of HPV vaccination among female undergraduates in Lagos State, Nigeria, found that only 3% of female undergraduates had good knowledge about HPV and the vaccine.[15] Similarly, another descriptive cross-sectional study carried out in the same year to assess the awareness and attitude towards HPV vaccine among female undergraduates at the University of Ibadan, Nigeria, reported that 13.5% of respondents were aware of HPV vaccination and its importance in preventing cervical cancer.[43]

Additionally, a descriptive cross-sectional study was conducted in 2015 to assess the knowledge of cervical cancer and HPV vaccine and its acceptance among medical students in Southwest Nigeria, revealing varying levels of knowledge influenced by factors such as age and levels of study.[44] Similarly, in 2024 another cross-sectional study done to assess the knowledge and willingness to pay for HPV vaccination among students of a tertiary institution in North Central

Nigeria, found that insufficient health education programmes on HPV and HPV vaccination, cultural or social stigmas around accessing STI prevention interventions, financial constraints, and limited accessibility to healthcare services vaccination knowledge among undergraduates.[27] Another study done in 2020 among students of a tertiary institution in Southern Nigeria, showed that while some undergraduates had a basic understanding of HPV and its association with cervical cancer, about 35.1% were not aware of HPV vaccination. Additionally, only about one-fifth of the respondents were aware of the currently recommended age for vaccination. [45]

In 2022, a cross-sectional survey done to assess the knowledge and perceptions associated with HPV vaccination among female university students revealed low awareness levels and low perception of susceptibility to HPV infection among female undergraduates.[46] Similarly, other findings also showed low awareness and an underestimation of risk as reasons for poor knowledge levels among male undergraduates.[47] Misinformation from peers and social media, alongside the influence of cultural taboos and stigmatization were also highlighted as significant barriers to knowledge acquisition of HPV vaccination in separate studies conducted locally.[48]

## 2.2 UPTAKE OF HUMAN PAPILLOMA VIRUS VACCINATION AMONG UNDERGRADUATES

A precaution adoption process model-based survey, in-person education session, and post-education survey were administered to college students in a Midwestern university to measure perceptions of HPV and HPV vaccination as well as to identify barriers to HPV vaccination. Between the pre-education and post-education survey, the number of correct responses increased, while barriers and misconceptions about HPV and the HPV vaccine decreased,demonstrating the success of the education. The intent to receive the HPV vaccine, defined as students indicating

they were “likely” or “very likely” to get vaccinated, rose from 28.0% to 90.7% among the participating college students.[49]

A cross-sectional study was conducted among 383 undergraduates from a public university in Mississippi. The survey was emailed to undergraduate students at a public university in Mississippi and remained opened for about one month. Analyses were conducted using SPSS (version 22.0). Descriptive statistics, chi-square tests, and independent *t*-tests ($p < .05$) were used to describe the sample and compare responses between female and male participants. A large majority of males (90%) reported that they had never seriously thought about getting the HPV vaccine, with a notable proportion of females (62.9%) reporting same. Overall, females were further along in the stages of consideration compared to males ($X^2 = 21.78(4)$; $p < .001$). Unvaccinated participants were also asked how likely they were to get the HPV vaccine in the next six months with low intentions: 51.7% of females and 52.5% of males indicated they were “very unlikely” or “unlikely” to get vaccinated.[50]

A descriptive and cross-sectional study was conducted among 1563 female and male university students, revealing 16.8% of students had heard of HPV. There was a statistically significant relationship between awareness of HPV and factors such as age, gender, marital status, family history of cancer, and discussions about sexual matters ($P < 0.01$). Awareness increased with age, though only 1.5% of students had received the HPV vaccine.[51] Another descriptive cross-sectional survey was conducted in August 2018 among 400 female undergraduates of Lagos State Polytechnic (LASPOTECH) using a multi-stage sampling technique and data was collected using a pretested, self-administered, semi-structured questionnaire. Univariate and bivariate analyses were performed using IBM SPSS version 20. The significance level was set at $P \leq 0.05$

and most commonly reported reason for not receiving the HPV vaccine was lack of information.[52]

A cross-sectional design and convenience sampling method of young female college students were recruited from a total of 136 universities throughout eastern (78 universities), western (31 universities), and central (27 universities) regions of China using a self-administered questionnaire. A total of 463 participants (11.0%, 95% confidence interval (CI) 88.1 to 89.9) indicated that they had received the HPV vaccine, while 3,757 participants (89.0%, 95% CI 88.1 to 89.9) reported not being vaccinated. Univariate analyses revealed that several factors were associated with HPV vaccine uptake, including older age, being in a higher year of study, being born in an urban area, living in eastern China, having parents with higher education levels, possessing a greater monthly disposable income, perceived family economic status as rich or intermediate, having prior sexual experience, achieving a higher total knowledge score, and having a stronger perception of susceptibility and effectiveness regarding the HPV vaccine.[53]

## 2.3 BARRIERS TO HUMAN PAPILLOMA VIRUS VACCINATION AMONG UNDERGRADUATES

A community college in Southeast Texas conducted semi-structured qualitative interviews with students aged 18–26 from April to December 2015, focusing on the Theory of Planned Behavior. Recruitment methods included flyers, a televised advertisement system, and direct outreach on campus. Participants acknowledged the benefits of vaccines but expressed concerns about potential side effects and perceived inconvenience, indicating a lack of sufficient information to make an informed decision. While they largely distrusted peer opinions, they were interested in learning about the experiences of friends who had received the HPV vaccine.[54]

In Turkey, a cross-sectional study involving 3,958,037 male students in higher education determined a sample size of 1,067 using Epi Info 7.2 software, with a margin of error of 3% and a 95% confidence interval. An online questionnaire was distributed via social media platforms between February and April 2022, utilizing snowball sampling for broader outreach. Ultimately, 1,723 male students over 18 enrolled in undergraduate or associate programs participated, with nearly 49.5% identifying a lack of awareness about the need for vaccination as a significant barrier.[55]

A study in Nigeria assessed medical students' knowledge of cervical cancer and HPV vaccination acceptance, revealing that 128 out of 169 students (75.7%) were willing to receive the vaccine if offered for free. However, 6 students (3.6%) chose not to participate while 35 (20.7%) expressed uncertainty. The main barriers to vaccination cited included insufficient information, high costs, poor access, concerns about efficacy and safety, and religious beliefs.[44] Additional barriers to HPV vaccination among undergraduates include the absence of recommendations from healthcare providers, a lack of awareness regarding vaccine availability, and insufficient perception of personal risk.[56]

## 2.4 MEASURES THAT HELP PROMOTE THE UPTAKE OF HUMAN PAPILLOMA VIRUS VACCINATION AMONG UNDERGRADUATES

Educational campaigns are vital for enhancing HPV vaccination awareness and uptake among undergraduates. Research indicates that targeted interventions—such as online and in-person sessions, social media outreach, health education at university events, video narratives, and peer educator programs—can significantly boost knowledge and positively affect vaccination choices.[57,58] Additionally, integration of HPV vaccination education into existing health

education curricula can enhance awareness and understanding among undergraduates. Moreover, a study done in 2013 suggested the role of incorporating lecture-based education initiative into a government-sponsored or school-based program in improving HPV vaccination among undergraduates.[59]

Harnessing peer, parent and physician-led educational initiatives can be an effective strategy for promoting HPV vaccination uptake among undergraduates. A study conducted in showed about a 48% vaccination rate following physician and parent-led initiatives.[60] Ensuring access to HPV vaccination services within university health centers or through outreach programs can facilitate uptake among undergraduates. Adequate availability of vaccines and economic affordability of vaccines are essential factors influencing vaccination uptake.[61]

Tailoring vaccination promotion messages to resonate with the cultural beliefs and values of undergraduates is crucial for effective communication. Studies have shown that culturally sensitive approaches that address misconceptions enhance vaccination uptake.[62] These include vaccine hesitancy, misinformation, cultural taboos, and logistical barriers such as vaccine availability and affordability. Addressing these challenges requires a multifaceted approach that combines targeted educational interventions, improving vaccine delivery systems, and coordinated efforts across multiple sectors, including schools, healthcare professionals, and policy makers.[63]

# CHAPTER THREE

# METHODOLOGY

## 3.1 STUDY AREA

This study was conducted at the University of Benin, located in Ugbowo, Ovia North-East, Edo State. Edo State is one of the 36 States in Nigeria, its capital is Benin City, and it is located in the South-South geopolitical zone of Nigeria. The State was created in 1991 from the Northern portion of Bendel State and has a total land area of 19,559km$^2$. [64,65]

The State lies geographically between latitudes 6°23'55"N to 6°27'39"N and 5°36'18"E to 5°44'18"E and has boundaries with Ondo State to the west, Anambra State to the east, Kogi State to the north-east, Delta state to the south-east and the Niger River flows along the state's eastern boundary.[66] The state consists of some ethnic groups that are closely related which includes Bini, Esan, Etsako, Owan and other smaller tribes, as well as a pool of other tribes who reside in the State. Benin city is the state capital and largest urban centre,[69] with a projected population of 1,972,558 in 2024.[66]

The University of Benin (UNIBEN) was founded in 1970.[67] The school currently has two campuses – Ugbowo and Ekehuan.[68] with fifteen faculties including a central library called the John Harris Library.[69] The University of Benin main campus, Ugbowo lies between latitudes 6.20°N and 5.37°E.[70]

The School of Medicine was established in 1973 to run a 6-year Bachelor of Medicine and Bachelor of Surgery (MBBS) full-time degree program.[68]

### 3.2 STUDY DESIGN

A descriptive cross-sectional study design was used.

### 3.3 STUDY DURATION

This study was conducted over a period of one year; from September, 2023 to September, 2024.

The timeline was:

Table 1: A table showing the timeline of this study

| **Task** | **Timeline** |
|---|---|
| Introduction | September – October 2023 |
| Literature Review | November – December 2023 |
| Materials and Methods | January – May 2024 |
| Ethical Approval | June – July 2024 |
| Data Collection and Results | July – August 2024 |
| Discussion and Conclusion | August – September 2024 |

### 3.4 STUDY POPULATION

This study was conducted among undergraduates in the University of Benin (UNIBEN).

### 3.5 SELECTION CRITERIA

#### 3.5.1 Target Population

The target population of the study was 15 to 26 years old undergraduates in the University of Benin, Benin City, South-Southern part of Nigeria.

#### 3.5.2 Inclusion Criteria

Students who were present on the day of the survey.

Students within the age group of 15 to 26 years of age.

Students who gave their consent to participate in the study.

#### 3.5.3 Exclusion Criteria

Students who were too ill to participate in the study.

### 3.6 SAMPLE SIZE DETERMINATION

The sample size was calculated using the Cochran's formula.[71]

In a previous study in Nigeria among the similar population, the proportion of students that had a correct knowledge of HPV vaccine was 21.1%.[44] Therefore, p = 0.211

$$n = \frac{Z^2 pq}{d^2}$$

Where: n = minimum sample size

Z = standard normal deviation

p = proportion of the target population estimated to have a particular characteristic

q = 1-p

d = degree of precision desired

Imputing values:

Z = 1.96 at 95% confidence interval

p = 0.211

q = 0.789

d = 0.052

$n = 1.96^2 \times 0.211 \times 0.789/0.05^2$

n =256

Design effect of 2

256 x 2

n = 512

Taking into account a 10% non-response rate, the formula for non-response rate was used

nf = n/1-nr

nf = 512/1-0.10

$nf = 568.89 \approx 569$

The sample size was determined to be 569. Therefore, a sample size of 569 was used.

### 3.7 SAMPLING TECHNIQUE

The respondents were selected for this study using a multistage sampling technique.

**STAGE ONE:** Selection of Campuses

There are 2 University of Benin campuses in Benin City; one located at Ekehuan road, Ogogubo, Benin City and the other located at Ugbowo-Lagos Road, Uselu, Benin City. Among these two campuses, the University of Benin, Ugbowo campus, was selected via balloting.

**STAGE TWO:** Selection of Faculties

There are 16 faculties in the University of Benin, Ugbowo campus, of which the Faculty of Medicine was selected using simple random technique via balloting.

**STAGE THREE:** Selection of Respondents

Preclinical and clinical students from 100 level to 600 level in the Department of Medicine, University of Benin, were sampled.

To determine the number of students who will receive questionnaires from each level (100 to 600), stratified sampling technique was used. We ensured that each stratum was proportionally represented based on its size within the total population. Given that we had a sample size of 569 medical students, the following steps were taken:

- **Definition of the population for each stratum:**

The population distribution for each level was:

100 level – 145 students

200 level – 154 students

300 level – 166 students

300 level – 154 students

400 level – 170 students

500 level – 135 students

500 level – 165 students

600 level – 129 students

The total population (N) was 1,218 students.

- **Determination of the overall sample size:**

The given sample size (n) was 569 students.

- **Calculation of proportional allocation for each stratum:**

To calculate sample fraction:

Sample fraction (Ns) = $\frac{n}{N}$

n = total sample size

N = total population size

Ns = $\frac{569}{1218} = 0.467$

To calculate proportional allocation:

$$nh = Ns\ x\ Nh$$

nh = sample size for each stratum

Ns = sample fraction

Nh = population size of each stratum

Using this formula, the sample size for each level was calculated:

- **100 level:**

n100 = $\frac{569}{1218}\ x\ 145 = 67.715\ \approx 68$

- **200 level:**

n200 = $\frac{569}{1218}\ x\ 154 = 71.918\ \approx\ 72$

- **300 level:**

n300 = $\frac{569}{1218}\ x\ 166 = 77.522\ \approx 78$

- **300 level:**

$n300 = \frac{569}{1218}\ x\ 154 = 71.918\ \approx 72$

- **400 level:**

$n400 = \frac{569}{1218}\ x\ 170 = 79.390\ \approx 79$

- **500 level**

$n500 = \frac{569}{1218}\ x\ 135 = 63.045 \approx 63$

- **500 level:**

$n500 = \frac{569}{1218}\ x\ 165 = 77.055 \approx 77$

- **600 level:**

$n600 = \frac{569}{1218}\ x\ 129 = 60.243 \approx 60$

Using stratified sampling, each level received the following number of questionnaires, proportionate to its size in the total population of 1214 students:

- **100 level = 68**
- **200 level = 72**
- **300 level = 78**
- **300 level = 72**
- **400 level = 79**

- **500 level = 63**
- **500 level = 77**
- **600 level = 60**

This approach ensured that each year was adequately represented in the study, maintaining the proportionality of the sample to the overall population distribution.

To select the respondents from each level (100 level to 600 level), simple random sampling technique was used. This was done in the various stratum until the required sample size was reached.

### 3.8 DATA MANAGEMENT

Data was obtained using a detailed structured self-administered questionnaire. The purpose of the study was explained to the respondents and verbal consent was taken from the participants in the study before the questionnaires were administered. The confidentiality of the participants was also guaranteed. The questionnaire was adapted from a similar study conducted among medical students in Lagos State, Nigeria.[44]

The questions on each section comprises of open and closed questions. The questionnaire is divided into four (4) sections including:

Section A: which contained the socio-demographic characteristics of the respondents.

Section B: Contained questions on the knowledge of HPV vaccination among the respondents.

Section C: Contained questions on the uptake and barriers to uptake of HPV vaccine among the respondents.

Section D: Contained questions on the measures to promote uptake of HPV vaccination among the respondents.

### 3.8.1 Methods of Data Collection

A quantitative method of data collection with the use of self-administered questionnaires was utilized in this study. No research assistants were utilized in this study.

### 3.8.2 Pre-testing

The questionnaire was pre-tested among medical students of Ambrose Ali University (AAU). This was used to determine the comprehensibility, validity, sensitivity, and reliability of the data tool.

### 3.8.3 Data Analysis

The filled questionnaires from AAU were reviewed to see if data was entered properly; and the questionnaires were checked for any inconsistencies. Data coding and cleaning was carried out. Data was entered and analyzed with IBM SPSS (Statistical Package for Scientific Solutions) version 26.0 software.

### 3.8.4 Scoring

A total of 6 questions were used to assess the knowledge of HPV vaccination among undergraduates. A score of 1 was given for each correct answer and a score of 0 was given to each wrong answer, making a total of 6. The scores were summed and converted to percentage,

such that scores between 0 to 49.9% were regarded as poor knowledge and scores of 50% and above were considered good knowledge.

Uptake was assessed using 2 questions. A score of 1 was given for each right response and a score of 0 would be given to each wrong response. The scores were summed and converted to percentage, such that scores between 0 to 49.9% were regarded as poor uptake and scores of 50% and above were considered good uptake.

The frequency of the variables was shown in frequency tables and assessed using univariate analysis. Categorical variables were presented in graphs, charts, and frequency tables while numerical variables were represented in means and standard deviation. These variables were assessed using univariate analysis. The relationship between the socio-demographic data and the knowledge, uptake, and attitude towards HPV vaccination among undergraduates in the University of Benin was assessed using bivariate analysis. Chi square test was used for non-parametric data. The level of significance for all statistically significant associations was set at $P < 0.05$.

### 3.9 ETHICAL CONSIDERATION

Approval to carry out the study was obtained from the Ethics and Research Committee of University of Benin Teaching Hospital (UBTH) and the study was assigned protocol number ADM/E 22/A/VOL. VII/148654841. Permission was obtained from the Dean of the Faculty of Medicine, before the study was carried out. Informed consent was taken from participants and all respondents were assured that participation is voluntary and their responses will be confidential.

## 3.10 LIMITATION OF STUDY

This study was limited by the unwillingness of some students to participate, and their refusal to answer some questions that they considered sensitive. Despite providing explanations about the purpose of the research and assurance of confidentiality, including the fact that no personal information or names were being collected, some participants remained hesitant. Even though identification cards were presented to prove credibility, these measures were not sufficient to fully overcome the reluctance of some respondents.

# CHAPTER FOUR

## RESULTS

A total of five hundred and sixty-nine (569) undergraduate students participated in this study. The results are presented in these sections, following the specific objectives.

SECTION A: Sociodemographic characteristics of respondents.

SECTION B: Knowledge of HPV vaccination among respondents.

SECTION C: Uptake and Attitude Towards HPV vaccination among respondents.

SECTION D: Barriers and Measures that promote uptake of HPV vaccination among respondents.

## SECTION A

## SOCIO-DEMOGRAPHIC CHARACTERISTICS.

**TABLE 1A: SOCIODEMOGRAPHIC CHARACTERISTICS**

| VARIABLE | FREQUENCY(n=569) | PERCENT |
|---|---|---|
| **Age** (years) | | |
| **Age Group** | | |
| 16 – 19 | 166 | 29.2 |
| 20 – 26 | 403 | 70.8 |
| **Mean+SD**=21.29±2.595 | | |
| **Sex** | | |
| Male | 281 | 49,4 |
| Female | 288 | 50.6 |
| **Marital Status** | | |
| Single | 547 | 96.1 |
| Co-habiting | 14 | 2.5 |
| Married | 8 | 1.4 |
| **Level** | | |
| 100L | 68 | 12.0 |
| 200L | 72 | 12.7 |
| 300L | 150 | 26.4 |
| 400L | 79 | 13.9 |
| 500L | 140 | 24.6 |
| 600L | 60 | 10.5 |
| **Ethnicity** | | |
| Benin | 204 | 35.9 |
| Others* | 167 | 29.3 |
| Igbo | 109 | 19.2 |
| Yoruba | 76 | 13.4 |
| Hausa | 13 | 2.3 |
| **Religion** | | |
| Christianity | 548 | 96.3 |
| Islam | 18 | 3.2 |
| African traditional religion | 2 | 0.4 |
| Others** | 1 | 0.2 |
| **LOE of Caregiver** | | |
| No formal education | 23 | 4.0 |
| Primary | 31 | 5.4 |
| Secondary | 95 | 16.7 |
| Tertiary | 420 | 73.8 |
| **Place of Residence** | | |
| School hostel | 316 | 55.5 |
| Off campus | 196 | 34.4 |
| On campus*** | 57 | 10.0 |

***Esan, Urhobo, Etsako, Owan, Isoko, Ibibio, Ijaw, Itsekiri, Kwale, Idoma, Efik, Ora**

****Eckankar**

***Junior Staff Quarters, Senior Staff Quarters, Blocks of Flats

A greater proportion, 403 (70.8%) of the respondents were within the ages of 20 - 26 years. The mean age and standard deviation was 21.29 ± 2.595. Most of the respondents, 288 (50.6%), were female and 281 (49.4%) were male. A significant majority, 547 (96.1%) of the respondents were single. A greater proportion 150 (26.4%), of the respondents were in their third year of study, with the least 60 (10.5%), being in 600 level. A greater proportion of respondents, 204 (35.9%) were Benin. Respondents were predominantly Christian, with 548 (96.3%) identifying as such, while 18 (3.2%) practiced Islam. Majority 420 (73.8%), had caregivers with tertiary level of education. Place of residence indicated 316 (55.5%) lived in school hostels, 196 (34.4%) resided off-campus and 57 (10.0%) stayed on campus.

**TABLE 1B: SOCIODEMOGRAPHIC CHARACTERISTICS**

| VARIABLE | FREQUENCY(n=569) | PERCENT |
|---|---|---|
| **Monthly Allowance** | | |
| <5,000 | 34 | 6.0 |
| 5,000-20,000 | 113 | 19.9 |
| 20,001-50,000 | 201 | 35.3 |
| 50,001-80,000 | 103 | 18.1 |
| 80,001-100,000 | 64 | 11.2 |
| >100,000 | 54 | 9.5 |
| **Sexual Experience** | | |
| Yes | 193 | 33.9 |
| No | 376 | 66.1 |
| **Number of Sexual Partner(s)** | | |
| 1 | 56 | 9.8 |
| 2 | 60 | 10.5 |
| 3 | 37 | 6.5 |
| >3 | 416 | 73.1 |
| **Condom Use** | | |
| Yes | 151 | 26.5 |
| No | 418 | 73.5 |

A greater proportion 201 (35.3%), of the respondents had a monthly allowance between 20,000 -50,000 and the least proportion 34 (6.0%), reporting monthly allowance less than 5,000. Majority 376 (66.1%) of respondents haven't had sexual experiences, of those who have had sexual experience, majority 416 (73.1%), had more than three sexual partners. Majority 418 ( 73.5%) of respondents report that they do not use condoms while only 151 (26.5%) indicated that they do.

**SECTION B**

**KNOWLEDGE OF HPV VACCINATION.**

**TABLE 2A: KNOWLEDGE OF HUMAN PAPILLOMA VIRUS (HPV) VACCINATION**

| VARIABLE | FREQUENCY(n=569) | PERCENT |
|---|---|---|
| **Have you heard of HPV?** | | |
| Yes | 437 | 76.8 |
| No | 132 | 23.2 |
| **Source of information on HPV*** | | |
| School | 288 | 50.6 |
| Internet | 255 | 44.8 |
| Friends/peers | 109 | 19.2 |
| Family | 48 | 8.4 |
| Health professionals | 156 | 27.4 |
| Media (TV, Newspapers, Radio) | 110 | 19.3 |
| **Knowledge of disease caused by HPV*** | | |
| Cervical cancer | 283 | 49.7 |
| Genital warts | 280 | 49.2 |
| Oral cancer | 90 | 15.8 |
| I don't know | 89 | 15.6 |
| HIV | 43 | 7.6 |
| **Methods of preventing HPV*** | | |
| HPV vaccination | 366 | 64.3 |
| Condoms | 208 | 36.6 |
| Regular HPV screening | 244 | 42.9 |
| Abstinence | 196 | 34.4 |
| I don't know | 79 | 13.9 |
| **Have you heard of HPV vaccine?** | | |
| Yes | 397 | 69.8 |
| No | 172 | 30.2 |
| **Source of information on HPV vaccine*** | | |
| School | 245 | 43.1 |
| Internet | 204 | 35.9 |
| Friends/peers | 75 | 13.2 |
| Family | 45 | 7.9 |
| Health professionals | 128 | 22.5 |
| Media (TV, Newspapers, Radio) | 72 | 12.7 |
| **Prevention offered by HPV vaccine*** | | |
| Cancer of the cervix | 304 | 53.4 |
| Cancer of the vulva | 81 | 14.2 |
| Cancer of the vagina | 88 | 15.5 |
| Cancer of the breast | 14 | 2.5 |
| Cancer of the anus | 38 | 6.7 |
| Cancer of the oropharynx | 37 | 6.5 |
| Cancer of the penis | 31 | 5.1 |
| I don't know | 163 | 28.6 |

***Multiple Response**.

Majority, 437 (76.8%), reported they had heard of HPV. About half 288 (50.6%) of respondents heard from schools. About half 283 (49.7%) knew about it association with cervical cancer. A greater proportion 366 (64.3%) of respondents knew vaccination as a method of prevention and majority 245 ( 43.1%) heard of it in school. Just over half 304 (53.4) knew about it prevention against cervical cancer.

**TABLE 2B: KNOWLEDGE OF HUMAN PAPILLOMA VIRUS (HPV) VACCINATION**

| VARIABLE | FREQUENCY(n=569) | PERCENT |
|---|---|---|
| **Route of HPV vaccine administration** | | |
| Oral drops | 21 | 3.7 |
| Tablets | 19 | 3.3 |
| Injections | 223 | 39.2 |
| Skin patches | 12 | 2.1 |
| I don't know | 272 | 47.8 |
| **Recommended doses of HPV vaccine** | | |
| 1 dose | 68 | 12.0 |
| 2 to 3 doses | 234 | 41.1 |
| 3 to 4 doses | 16 | 2.8 |
| Other* | 103 | 18.1 |
| **Timing for HPV vaccination** | | |
| Before first sexual intercourse | 228 | 40.1 |
| After first sexual intercourse | 26 | 4.6 |
| If you have more than one sexual partner | 43 | 7.6 |
| I don't know | 253 | 44.5 |
| **Target groups for HPV vaccination** | | |
| Males | 10 | 1.8 |
| Females | 162 | 28.5 |
| Both | 245 | 43.1 |
| I don't know | 133 | 23.4 |

***4 to 5, I don't know, Not sure**

A significant proportion, 272 (47.8%), reported they did not know the route of administration of the vaccine. Less than half 234 (41.1%) knew the recommended doses of hpv vaccine. Less than half 228 (40.1%) knew when the first dose should be taken. Less thank than half 245 (43.1%) knew both gender should be vaccinated.

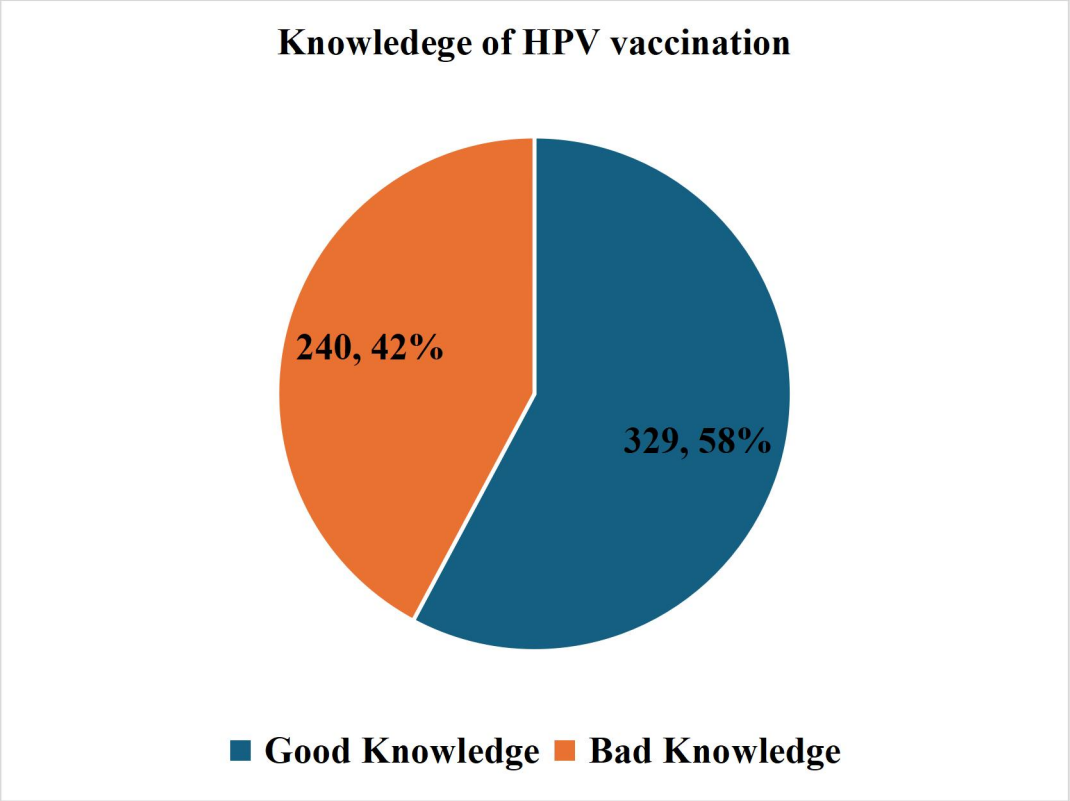


**Figure 1: Overall knowledge of HPV vaccination among respondents**

Majority of the respondents, 329 (57.8%) had an overall good knowledge of HPV infection and vaccination, while 240 (42.2%) had poor knowledge.

**TABLE 3A: SOCIO-DEMOGRAPHIC CHARACTERISTICS AND KNOWLEDGE OF HUMAN PAPILLOMA VIRUS (HPV) INFECTION AND VACCINATION**

| Variable | Knowledge(%) | | Test statistic | p-value |
|---|---|---|---|---|
| | Good (n=329) | Poor (n=240) | | |
| **Age Group** | | | | |
| 16 – 19 | 104 (62.7%) | 62 (37.3%) | $\chi^2$=2.242 | 0.134 |
| 20 – 26 | 225 (55.8%) | 178 (44.2%) | | |
| **Sex** | | | | |
| Male | 142 (50.5%) | 139 (49.5%) | $\chi^2$=12.087 | 0.001 |
| Female | 187 (64.9%) | 101 (35.1%) | | |
| **Marital Status** | | | | |
| Single | 314 (57.4%) | 233 (42.6%) | $\chi^2$=1.292 | 0.731 |
| Co-habiting | 9 (64.3%) | 5 (35.7%) | | |
| Married | 6 (75.0%) | 2 (25.0%) | | |
| **Level** | | | | |
| 100L | 38 (55.9%) | 30 (44.1%) | $\chi^2$=79.507 | <0.001 |
| 200L | 62 (86.1%) | 10 (13.9%) | | |
| 300L | 75 (50.0%) | 75 (50.0%) | | |
| 400L | 18 (22.8%) | 61 (77.2%) | | |
| 500L | 100 (71.4%) | 40 (28.6%) | | |
| 600L | 36 (60.0%) | 24 (40.0%) | | |
| **Ethnicity** | | | | |
| Bini | 115 (56.4%) | 89 (43.6%) | $\chi^2$=0.466 | 0.977 |
| Others | 99 (59.3%) | 68 (40.7%) | | |
| Igbo | 63 (57.8%) | 46 (42.2%) | | |
| Yoruba | 45 (59.2%) | 31 (40.8%) | | |
| Hausa | 7 (53.8%) | 6 (46.2%) | | |
| **Religion** | | | | |
| Christianity | 314 (57.3%) | 234 (42.7%) | $\chi^2$=4.422 | 0.219 |
| Islam | 13 (72.2%) | 5 (27.8%) | | |
| African traditional religion | 2 (100.0%) | 0 (0.0%) | | |
| Others* | 0 (0.0%) | 1 (100.0%) | | |
| **LOE of Caregiver** | | | | |
| No formal education | 15 (65.2%) | 8 (34.8%) | $\chi^2$=6.954 | 0.073 |
| Primary | 24 (77.4%) | 7 (22.6%) | | |
| Secondary | 58 (61.1%) | 37 (38.9%) | | |
| Tertiary | 232 (55.2%) | 188 (44.8%) | | |
| **Place of Residence** | | | | |
| School hostel | 29 (50.9%) | 28 (49.1%) | $\chi^2$=1.276 | 0.528 |
| Off campus | 114 (58.2%) | 82 (41.8%) | | |
| On campus (junior staff quarters, senior staff quarters, blocks of flats) | 29 (50.9%) | 28 (49.1%) | | |
| **Monthly Allowance** | | | | |
| <5,000 | 18 (52.9%) | 16 (47.1%) | $\chi^2$=5.383 | 0.371 |
| 5,000-20,000 | 72 (63.7%) | 41 (36.3%) | | |
| 20,001-50,000 | 111 (55.2%) | 90 (44.8%) | | |
| 50,001-80,000 | 62 (60.2%) | 41 (39.8%) | | |
| 80,001-100,000 | 40 (62.5%) | 24 (37.5%) | | |
| >100,000 | 26 (48.1%) | 28 (51.9%) | | |
| **Sexual Experience** | | | | |
| Yes | 114 (59.1%) | 79 (40.9%) | $\chi^2$=0.186 | 0.666 |

| | | |
|---|---|---|
| No | 215 (57.2%) | 161 (42.8%) |

***Eckankar**

The table above illustrates the association between sociodemographic characteristics and knowledge of HPV infection and vaccination. Respondents aged 20 and above had more knowledge about HPV infection and vaccination with 225 (55.8%) compared to those of other age groups. The association between age group and knowledge about HPV infection and vaccination was statistically significant ($\chi^2$=2.242; p-value 0.134).

A relatively higher proportion 187 (64.9%) of the female respondents had good knowledge about HPV infection and vaccination compared to the male respondents, 142 (50.5%). The association between sex and knowledge was statistically significant ($\chi^2$=12.087; p-value=0.001).

A greater proportion 62 (86.1%) of respondents in 200 Level had good knowledge compared to respondents in other levels. The association between class and knowledge was statistically significant ($\chi^2$=79.507; p-value <0.001).

A greater proportion 114 (58.2%) of respondents who stayed off campus had good knowledge about HPV infection and vaccination compared to those who stayed at home and in campus. The association was not statistically significant. ($\chi^2$=1.276; p-value 0.528).

Respondents, 72 (63.7%), who receive between 5,000 and 20,000 naira monthly allowance had good knowledge about HPV infection and vaccination compared to others. The association between monthly allowance and knowledge was not statistically significant ($\chi^2$=5.383; p-value 0.371).

A greater proportion 114(59.1%) of respondents with sexual experience had good knowledge about HPV infection and vaccination compared to those that do not. The association between sexual experience and knowledge was not statistically significant ($\chi^2$=0 186; p-value 0.666).

**TABLE 3B: SOCIO-DEMOGRAPHIC CHARACTERISTICS AND KNOWLEDGE OF HUMAN PAPILLOMA VIRUS (HPV) VACCINATION**

| Variable | Knowledge(%) | | Test statistic | p-value |
|---|---|---|---|---|
| | Good (n=329) | Poor (n=240) | | |
| **Number of sexual partner(s)** | | | | |
| 1 | 37 (66.1%) | 19 (33.9%) | $\chi^2$=7.199 | 0.066 |
| 2 | 40 (66.7%) | 20 (33.3%) | | |
| 3 | 21 (56.8%) | 16 (43.2%) | | |
| >3 | 17 (42.5%) | 23 (57.5%) | | |
| **Condom Use** | | | | |
| Yes | 86 (57.0%) | 65 (43.0%) | $\chi^2$=0.393 | 0.531 |
| No | 31 (62.0%) | 19 (38.0%) | | |

The table above explores the relationship between the number of sexual partners, condom use and knowledge of HPV infection and vaccination. Among respondents with one sexual partner, 66.1% exhibited good knowledge. Similarly, 66.7% of those with two sexual partners had good knowledge. The association between sexual partners and knowledge was not statistically significant ($\chi^2$=7.199; p-value 0.666).

Respondents that do not use condoms had better knowledge compared to those that do, 31 (62.0%). The association of condom use and HPV infection and vaccination is not statistically significant ($\chi^2$=0.393; p-value 0.531).

## SECTION C

## UPTAKE AND ATTITUDE TOWARDS HPV VACCINATION

**TABLE 4: UPTAKE OF HPV VACCINATION**

| VARIABLE | FREQUENCY(n=569) | PERCENT |
|---|---|---|
| **HPV vaccination status** | | |
| Yes | 31 | 5 |
| No | 538 | 95 |
| **Place of vaccine administration** | | |
| University health services | 10 | 32.2 |
| Private clinic | 10 | 32.2 |
| Public hospital | 10 | 32.2 |
| Health campaign | 1 | 3.2 |
| **Doses of HPV vaccine received** | | |
| 1 dose | 13 | 41.9 |
| 2 doses | 12 | 38.7 |
| 3 doses | 6 | 19.4 |

University health services, public hospital and private clinic, 10, 32.2%, were the most frequently visited place for receiving vaccine

Respondents who received 1 dose of vaccine, 13 (41.9%), were the most frequent, while those who received 3 doses, 6 (19.4%), were the least.

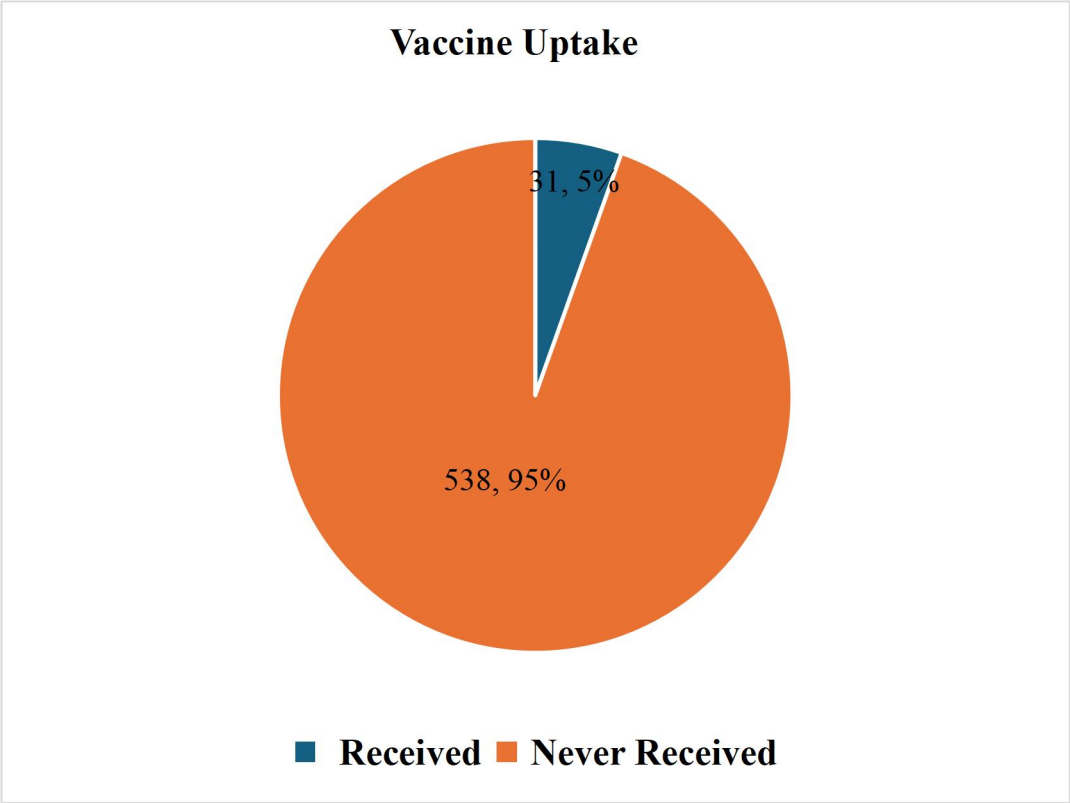


**Figure 2: Overall uptake HPV vaccination among respondents**

Majority of the respondents, 538 (95%) had never received HPV vaccination, while 31 (5%) received the vaccine

**TABLE 5A: SOCIODEMOGRAPHIC CHARACTERISTICS AND HPV VACCINATION UPTAKE**

| Variable | Uptake(%) | | Test statistic | p-value |
|---|---|---|---|---|
| | Received (n=31) | Never Received (n=538) | | |
| **Age Group** | | | | |
| 16 – 19 | 16 (9.6%) | 150 (90.4%) | $\chi^2$=7.989 | 0.005 |
| 20 – 26 | 15(3.7%) | 388 (96.3%) | | |
| **Sex** | | | | |
| Male | 15 (5.3%) | 266(94.7%) | $\chi^2$=0.009 | 0.926 |
| Female | 16(5.6%) | 272(94.4%) | | |
| **Marital Status** | | | | |
| Single | 31(5.7%) | 516(94.3%) | Fisher's exact=1.899 | 0.612 |
| Co-habiting | 0 (0.0%) | 8 (100.0%) | | |
| Married | 0 (0.0%) | 14 (100.0%) | | |
| **Level** | | | | |
| 100L | 8 (11.8%) | 60 (88.2%) | $\chi^2$=8.061 | 0.372 |
| 200L | 5 (6.9%) | 67(93.1%) | | |
| 300L | 6(4.0%) | 144 (96.0%) | | |
| 400L | 3 (3.8%) | 76 (96.2%) | | |
| 500L | 5 (3.6%) | 135 (96.4%) | | |
| 600L | 4 (6.7%) | 56 (93.3%) | | |
| **Ethnicity** | | | | |
| Bini | 15 (7.4%) | 189(92.6%) | $\chi^2$=5.972 | 0.187 |
| Others | 8 (4.8%) | 159(95.2%) | | |
| Igbo | 2 (1.9%) | 107 (98.1%) | | |
| Yoruba | 6 (7.9%) | 70 (92.1%) | | |
| Hausa | 0 (0.0%) | 13 (100%) | | |
| **Religion** | | | | |
| Christianity | 31 (5.7%) | 517 (94.3%) | Fisher's exact=2.218 | 0.691 |
| Islam | 0 (0.00%) | 18 (100.0%) | | |
| African traditional religion | 0 (0.0%) | 2 (100.0%) | | |
| Others* | 0 (0.0%) | 1 (100.0%) | | |
| **LOE of Caregiver** | | | | |
| No formal education | 1 (4.3%) | 22 (95.7%) | Fisher's exact=2.320 | 0.502 |
| Primary | 2 (6.5%) | 29(93.5%) | | |
| Secondary | 6 (6.3%) | 89 (93.7%) | | |
| Tertiary | 22 (5.2%) | 398 (93.7%) | | |
| **Place of Residence** | | | | |
| School hostel | 16 (5.1%) | 300 (94.9%) | $\chi^2$=1.359 | 0.536 |
| Off campus | 10 (5.1%) | 186 (94.9%) | | |
| On campus (junior staff quarters, senior staff quarters, blocks of flats) | 5 (8.8%) | 52 (91.2%) | | |
| **Monthly Allowance** | | | | |
| <5,000 | 2 (5.9%) | 32 (94.1%) | Fisher's exact=5.414 | 0.0347 |
| 5,000-20,000 | 12 (10.6%) | 101 (89.4%) | | |
| 20,001-50,000 | 8 (4.0%) | 193 (96.0%) | | |
| 50,001-80,000 | 2 (1..9%) | 101 (98.1%) | | |
| 80,001-100,000 | 3 (4.7%) | 61 (95.3%) | | |
| >100,000 | 4 (7.4%) | 50 (92.6%) | | |
| **Sexual Experience** | | | | |
| Yes | 8 (4.1%) | 185 (95.9%) | $\chi^2$=0.963 | 0.341 |
| No | 23 (6.1%) | 353 (93.9%) | | |

***Eckankar**

The table above shows the relationship between sociodemographic chracteristics and HPV vaccination uptake. Majority 388 (96.3%), Respondents aged 20 and above had never received HPV vaccination compared to those of other age groups. The association between age group and uptake of HPV vaccination was statistically significant ($\chi^2$=7.898; p-value 0.005).

A relatively higher proportion 266 (94.7%), of the male respondents had never received HPV vaccination compared to the female respondents, 270 (94.4%). The association between sex and knowledge was not statistically significant ($\chi^2$=0.013; p-value=0.909).

A greater proportion 75 (97.4%) of respondents in 500 Level had never received HPV vaccination compared to respondents in other levels. The association between class and attitude was not statistically significant ($\chi^2$=8.061; p-value 0.372).

A greater proportion 5 (8.8%) of respondents who stayed on campus had received HPV vaccination compared to those who stayed at home and off campus. The association was not statistically significant. ($\chi^2$=1.359; p-value 0.536).

A greater proportion 185 (95.9%) of respondents with sexual experience had never received HPV vaccination compared to those that do not. The association was not statistically significant ($\chi^2$=0.963; p-value 0.341).

**TABLE 5B: SOCIO-DEMOGRAPHIC CHARACTERISTICS AND HPV VACCINATION UPTAKE**

| Variable | Uptake(%) | | Test statistic | p-value |
|---|---|---|---|---|
| | Received (n=31) | Never received (n=538) | | |
| **How many sexual partners** | | | | |

| | | | | |
|---|---|---|---|---|
| 1 | 15 (26.8%) | 41 (73.2%) | $\chi^2$=4.514 | 0.211 |
| 2 | 10 (16.7%) | 50 (83.3%) | | |
| 3 | 6 (16.2%) | 31 (83.8%) | | |
| >3 | 0 (0.0%) | 416(100.0%) | | |
| **Condom Use** | | | | |
| Yes | 17 (11.3%) | 134 (88.7%) | $\chi^2$=0.042 | 0.837 |
| No | 14(3.3%) | 404 (96.7%) | | |

The table above explores the association between the number of sexual partners, condom use and HPV vaccination uptake. Greater proportion 416(100.0%) of respondents with greater than three sexual partners had never received HPV vaccination compared to others. The association was not statistically significant ($\chi^2$=4.514; p-value 0.211).

Greater proportion 404(96.7%) of respondents that did not use condoms had never received HPV vaccination compared to those that did,. The association was not statistically significant ($\chi^2$=0.042; p-value 0.837).

**TABLE 6: KNOWLEDGE AND HPV VACCINATION UPTAKE**

| Knowledge | Uptake(%) | | Test statistic | p-value |
|---|---|---|---|---|
| | Received Freq (%) | Never received Freq(%) | | |
| Good knowledge | 31(5.8) | 298(94.2) | Fisher's exact=0.041 | 0.832 |
| Poor knowledge | 0 (0.0) | 240(100.0) | | |

The table above represents the relationship between knowledge of HPV and the uptake of the HPV vaccine.

Majority 298(94.2%) of respondents who had good knowledge had never received HPV vaccination while 31(5.8%) had. In contrast, none of the participants with poor knowledge had received the vaccine, with 240(100%) reporting they had never been vaccinated.

The association was not statistically significant (Fisher's exact=0.041; p-value 0.832)

## SECTION D

## BARRIERS AND MEASURES THAT PROMOTE HPV VACCINATION.

**TABLE 7: BARRIERS TO HPV VACCINATION**

| VARIABLE | FREQUENCY(n=569) | PERCENT |
|---|---|---|
| **Barriers to HPV vaccine uptake** | | |
| Not enough information on the vaccine | 178 | 31.3 |
| Inaccessibility of the vaccine | 156 | 27.4 |
| I am not sexually active | 116 | 20.4 |
| The vaccine is expensive | 71 | 12.5 |
| I am older than 26 years | 15 | 2.6 |
| Concerns about safety of the vaccine | 49 | 8.6 |
| Cultural beliefs | 18 | 3.2 |
| **Barriers to completing the HPV vaccination series** | | |
| Forgot or missed appointments | 18 | 3.2 |
| Experienced side effects | 6 | 1.1 |
| Lack of access to healthcare providers | 6 | 1.1 |
| Cost of additional doses | 8 | 1.4 |
| Belief that one dose is sufficient | 3 | 0.5 |

A significant portion of participants, 178 (31.3%), cited insufficient information about the vaccineas the primary reason for not getting vaccinated. Inaccessibility to the vaccine was also a notable barrier, affecting 156 (27.4%) of respondents. Notably, no respondent cited religious beliefs as a barrier to not receiving the HPV vaccine.

Regarding reasons for not completing the vaccine series, most respondents, 18(3.2%), stated they forgot or missed appointments, while a mere 3 (0.5%) believed that one dose was sufficient.

**TABLE 8: RESPONDENTS' EXPERIENCES WITH HPV VACCINATION PROMOTION INITIATIVES**

| VARIABLE | FREQUENCY(n=569) | PERCENT |
|---|---|---|
| **Provision of information about the HPV vaccine** | | |
| Yes | 243 | 42.7 |
| No | 326 | 57.3 |
| **Promotion methods for HPV vaccine uptake*** | | |
| Health Talks | 170 | 27.8 |
| Social Media Campaigns | 158 | 25.8 |
| Workshops | 82 | 13.4 |
| Distribution of Informational Flyers or Brochures | 75 | 12.3 |
| Television or Radio Advertisements | 50 | 8.2 |
| School or University Campaigns | 44 | 7.2 |
| Peer Education Programs | 33 | 5.4 |
| **Influence of promotion method on decision to vaccinate** | | |
| Yes | 171 | 30.1 |
| No | 57 | 10.0 |
| Not sure | 25 | 4.4 |

***Multiple response.**

Majority 326 (57.3%) of respondents have never been provided information about the HPV vaccine as part of a promotion campaign or initiative.

Health talks 170 (29.9%) was the most frequent method used to promote HPV vacine uptake, while peer education program 33(5.8%) was the least.

Most 171 (30.1%) of the respondents affirmed that promotional efforts had influenced their decision regarding HPV vaccination.

**TABLE 9: HPV VACCINATION PROMOTION MEASURES (3-POINT LIKERT SCALE)**

| VARIABLE | EFFECTIVE FREQ (%) | | SOMEWHAT EFFECTIVE FREQ (%) | | INEFFECTIVE FREQ (%) | |
|---|---|---|---|---|---|---|
| Health Talks | 472 | 83.0 | 85 | 14.9 | 9 | 1.6 |
| Workshops | 406 | 71.4 | 140 | 24.6 | 20 | 3.5 |
| Distribution of Informational Flyers or Brochures | 349 | 61.3 | 157 | 27.6 | 60 | 10.5 |
| Social Media Campaigns | 454 | 79.8 | 88 | 15.5 | 24 | 4.2 |
| School or University Campaigns | 466 | 81.9 | 92 | 16.2 | 8 | 1.4 |
| Television or Radio Advertisements | 389 | 68.4 | 50 | 8.8 | 127 | 22.3 |
| Peer Educator Programs | 458 | 80.5 | 89 | 15.6 | 19 | 3.3 |
| Interactive Workshops | 472 | 83.0 | 85 | 14.9 | 9 | 1.6 |
| Interactive Webinars | 425 | 74.7 | 120 | 21.1 | 21 | 3.7 |
| Student-Led Awareness Campaigns | 481 | 84.5 | 78 | 13.7 | 7 | 1.2 |
| HPV Vaccine Information Sessions during Orientation | 474 | 83.3 | 86 | 15.1 | 6 | 1.1 |
| Collaboration with Student Health Centers for Vaccine Distribution | 516 | 90.7 | 46 | 8.1 | 4 | 0.7 |
| Incentives for Vaccine Participation (e.g., Discounts, Freebies) | 512 | 90.0 | 50 | 8.8 | 4 | 0.7 |
| Peer Mentorship Programs | 474 | 83.3 | 80 | 14.1 | 12 | 2.1 |

A vast majority of respodents, 516 (90.7%), considered collaboration with student health centres for vaccine distribution as the most effective HPV vaccination measure, followed closely by 512 (90.0%) of respondents citing incentives for vaccine participation as the most effective. Television or radio advertisement was cited the most ineffective by 127 (22.3%) of respondents.

# CHAPTER FIVE

# DISCUSSION

The findings of this study indicate a generally high level of awareness and knowledge about HPV infection and vaccination among respondents, though there were notable gaps in specific areas of understanding.

Majority of respondents had heard of HPV with about half receiving this information from schools, underscoring the importance of school-based health programs as part of a comprehensive public health strategy to increase HPV awareness and vaccination rates. This finding is in contrast with a descriptive cross-sectional study carried out among female students at the University of Lagos, where majority of participants cited television/radio as their source of information.[15] Another study done in 2021 among female undergraduate students of Ambrose Alli University, Ekpoma showed majority of respondents received information on HPV from healthcare workers.[21]

However, despite high awareness, only about half of respondents were aware of the link between HPV and cervical cancer, showing a gap in deeper understanding of HPV-related health risks.

Regarding prevention, most respondents recognized vaccination as a preventive method against HPV, which is important in reducing the burden of HPV-related diseases. However, it is noteworthy that just over half understood that the vaccine helps prevent cervical cancer, suggesting that while vaccination is recognized as important, its specific benefits may not be fully appreciated. This is in contrast to a cross-sectional study done in 2019 at Bowen University Teaching Hospital, Ogbomosho (BUTH) among medical and paramedical students, where about one-fifth of respondents knew HPV vaccination prevents cervical cancer.[14]

Gaps in knowledge were more pronounced in areas relating to vaccine itself. Nearly half of respondents did not know the route of administration, and a significant minority were aware of the recommended doses or when the first dose should be taken. This is similar to findings from a descriptive cross-sectional study conducted among female undergraduates of Obafemi Awolowo University in 2019.[38] In that study, it was found that two-third of respondents did not know the correct dosage of the HPV vaccine.These findings suggest that even though awareness of the vaccine is relatively high, more detailed information about how it is administered and when it should be taken is lacking. Filling the information gaps regarding HPV vaccine administration and timing is essential for optimizing public health outcomes and improving the effectiveness of vaccination campaigns.

Furthermore, less than half of respondents knew that both genders should be vaccinated.This finding is in tandem with a scoping review carried out in 2020 among college-aged men, which found that 80% of respondents did not know the HPV vaccine was available for men.[47] This finding is significant given the importance of vaccinating both males and females to reduce the overall transmission of HPV. The relatively low awareness of this fact could indicate that public health campaigns might be overly focused on women, with less emphasis on the role men play in the spread of HPV.

When considering overall knowledge of HPV infection and vaccination, a clear majority of respondents were classified as having good knowledge while a significant minority were classified as having poor knowledge. This suggests that while a majority have a reasonable understanding of HPV, a significant proportion of the population remains underinformed.

There was significant relationship between sex and knowledge of HPV as nearly two-third of female respondents having good knowledge compared to about half of male respondents. This

difference highlights a gender disparity in understanding HPV, possibly due to targeted messaging toward women and emphasizes the need for more inclusive, gender-balanced and comprehensive HPV education to improve overall public knowledge and reduce the burden of HPV-related diseases in all segments of the population. This finding corroborates a cross-sectional study among college students in Mississippi in 2015, which showed significantly more females were aware of HPV than males.[51]

There was also statistically significant association between class level and knowledge of HPV with 200 level students demonstrating the highest levels of knowledge. This suggests that students in this level may be receiving effective health education early in their academic journey. This finding underscores the need for continuous and reinforced health education throughout all academic levels. This is in contrast with a study carried out among medical students at the college of medicine, University of Lagos where good knowledge was more with higher class level.[44]

A significant association was found between the age of respondents and their attitude toward HPV vaccination, with younger respondents (16–19 years) having a more positive attitude, demonstrated by a stronger willingness to get vaccinated, compared to older respondents (20–26 years). This is in tandem with a similar study done in Lagos State where the age of the respondents was statistically significantly associated with attitude towards the HPV vaccination.[15] This could be attributed to younger individuals being more engaged with recent public health campaigns or educational efforts promoting the vaccine. In contrast, older respondents may have developed misconceptions or feel less vulnerable to HPV, leading to a more hesitant attitude toward vaccination. The greater willingness of younger respondents to receive the HPV vaccine presents an opportunity to boost vaccination rates and prevent HPV-

related diseases early. However, the hesitancy in older respondents underscores the need for targeted education to address misconceptions and promote vaccination across all age groups, ensuring broader public health protection.

A significant association was found between sexual experience and attitude towards HPV vaccination, as approximately one-third of respondents with sexual experience showed a positive attitude. This could be due to the misconception that individuals with sexual experience and more sexual partners are already exposed to HPV and believe vaccination is less beneficial. This highlights the need for targeted campaigns educating sexually active individuals that HPV vaccination remains crucial regardless of sexual history. This is in contrast with a similar study done in a South-Eastern University where there was no significant association between sexual experience and the attitude towards HPV vaccination.[72]

This study finds no significant association between gender, marital status, place of residence, level of education of respondents' caregivers, monthly allowance, number of sexual partners, condom use, and attitude towards HPV vaccination. Although the class level of the respondents was not significantly associated with attitude towards HPV vaccination, respondents in higher levels had more positive attitude than those in lower levels. This is in variance with a previous study which was done in Lagos State which found significant association between the class level of respondents and their attitude towards HPV vaccination.[15] This could reflect the role of education in shaping health behaviours, as students in advanced levels might have more exposure to health-related information.

In this study, the uptake of HPV vaccine in this study was remarkably low, as only a small fraction of respondents had been vaccinated, while the majority had not. This may be due to a lack of awareness about the vaccine's benefits and the importance of timely vaccination, cultural

or religious beliefs that perceive the vaccine as unnecessary, and barriers related to cost and accessibility. This is in tandem with a similar study done in Edo State where the uptake of HPV vaccination was also found to be very poor.[21] This underscores the need to address any cultural or religious misconceptions regarding the vaccine, improve general awareness, and also improve access through university health centres to reduce HPV-related cancers and enhance community health. Failure to address these findings poses risk of continued rise in HPV-related diseases and persistent health disparities in that region.

The findings of this study highlight significant barriers to HPV vaccination among respondents, with about one-third citing a lack of information about the vaccine as the most frequent reason for not receiving it. This emphasizes a critical gap in health education and communication. This finding is corroborated by an interventional study conducted in 2019 among medical students in Mangalore, India. In this study, most participants cited lack of information about vaccine and not thinking it was essential to get vaccinated because they were not sexually active as reasons for not getting vaccinated.[20] The misconception or unawareness regarding the vaccine can lead to hesitancy, as individuals may not fully understand its benefits or the implications of HPV-related diseases. This barrier underscores the necessity for comprehensive educational campaigns aimed at increasing awareness about HPV and the importance of vaccination.

In addition, most respondents reported forgetting or missing appointments as the reason for not completing vaccination, pointing to logistical barriers in accessing healthcare services. This suggests that reminders and follow-up systems are crucial in facilitating vaccination completion. Addressing these barriers is essential for increasing vaccination rates and ultimately reducing the incidence of HPV-related diseases.

This study highlights that the most effective strategies for promoting HPV vaccine uptake among students involve direct access to the vaccine through health centres, provision of incentives for vaccine participation, peer-led initiatives, and interactive educational programs. These strategies not only address immediate barriers to vaccination but also cultivate a proactive approach to health among students, leading to better informed and healthier populations.

## CONCLUSION

The study highlights good overall knowledge of HPV infection and vaccination among respondents.

It also highlights significant association between age, sexual experience and attitude toward HPV vaccination with younger respondents and one-third of sexually active respondents showing positive attitude.

Furthermore, this study demonstrates remarkably low uptake of the HPV vaccine, primarily driven by a lack of awareness, cultural misconceptions and logistical barriers such as missed appointments.

Additionally, improving access to vaccine through university health centers, peer-led initiatives, interactive educational programs and providing incentives can help boost vaccination rates.

## RECOMMENDATIONS

### TO THE FEDERAL GOVERNMENT:

1. **Increase Funding for HPV Vaccination**: Allocate more resources to national health initiatives focused on HPV vaccination. This funding should target the development of comprehensive vaccination campaigns that include education, outreach and direct access to vaccines in various communities, particularly underserved areas.
2. **Implement National Vaccination Guidelines**: Establish clear guidelines for HPV vaccination, including recommendations for mandatory vaccination in school health programs, to ensure that all eligible individuals receive the vaccine.
3. **Establish Subsidized Vaccine Programs**: Introduce federal funding initiatives to subsidize the cost of HPV vaccines for low-income individuals and communities, making the vaccine more affordable and accessible.

### TO THE UNIVERSITY:

1. **Integrate HPV Vaccination into Student Health Services**: Ensure that all university health centers provide HPV vaccinations as part of their routine services. Universities should also develop promotional campaigns that inform students about the availability of the vaccine and its importance.
2. Organise regular educational workshops and incentive programs to promote HPV vaccine uptake.

**TO HEALTHCARE PROVIDERS:**

1. **Enhance Patient Education**: Create and distribute clear, concise educational materials about the HPV vaccine and address common myths and concerns patients may have about the vaccine.

**TO UNIVERSITY UNDERGRADUATES:**

1. Students should participate in educational workshops on HPV vaccination organised by their university.
2. Student should engage in peer-education programmes.

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## APPENDIX I

## QUESTIONNAIRE DESIGN

**KNOWLEDGE, UPTAKE, BARRIERS, AND MEASURES THAT PROMOTE HUMAN PAPILLOMA VIRUS (HPV) VACCINATION AMONG UNDERGRADUATES IN UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA.**

Dear Respondents,

We are 600L medical students of the University of Benin, Benin City, conducting a research project on the knowledge, uptake, barriers, and measures that promote Human Papilloma Virus (HPV) vaccination among undergraduates in the University of Benin. The aim of this research project is to aid with the formulation, promotion, and implementation of public health policies and programs that will curtail the community transmission of HPV among undergraduates aged between 15 years to 26 years, and to also encourage their uptake of the HPV vaccine.

Please answer all questions as accurately as possible, as all information given will be treated with utmost confidentiality.

Thank you.

### SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS AND SEXUAL HISTORY OF RESPONDENTS

1. Age (as at last birthday) _____

2. Gender: Male [ ] Female [ ]

3. Ethnic Group: Hausa [ ] Igbo [ ] Yoruba [ ] Benin [ ] Others (Specify) _____

4. Religion: Christianity [ ] Islam [ ] African Traditional Religion [ ] Others (Specify) _____

5. Marital status: Single [ ] Married [ ] Cohabiting [ ] Separated [ ] Divorced[ ]

Widowed [ ]

6. Level: 100 level (Med 230) [ ] 200 level (Med 220) [ ] 300 level (Med 210) [ ] 300 level (Med 200) [ ] 400 level (Med 190) [ ] 500 level (Med 180) [ ] 500 level (Med 170) [ ] 600 level (Med 160) [ ]

7. What is the level of education of your caregiver: No formal education [ ] Primary [ ] Secondary [ ] Tertiary [ ]

8. Where do you stay: On campus (Junior staff quarters, Senior staff quarters, Blocks of flats) [ ] School hostel [ ] Off campus [ ]

9. What is your monthly allowance: Less than 5,000 [ ] 5,000 to 20,000 [ ] 20,000 to 50,000 [ ] 50,000 to 80,000 [ ] 80,000 to 100,000 [ ] Above 100,000 [ ]

10. Do you have any previous sexual experience: Yes [ ] No [ ]

**IF NO, SKIP TO SECTION B**

11. If yes, how many sexual partners have you had: 1 [ ] 2 [ ] 3 [ ] Others _____

12. If yes, do you use condoms during sexual intercourse: Yes [ ] No [ ]

**SECTION B: RESPONDENTS' KNOWLEDGE OF HUMAN PAPILLOMA VIRUS (HPV) INFECTION AND VACCINATION**

1. Have you heard of HPV: Yes [ ] No [ ]
2. If yes, how did you hear about it: School [ ] Internet [ ] Friends/peers [ ] Family [ ] Health professionals [ ] Media (TV, Newspapers, Radio) [ ] Others _____
3. What diseases do you think HPV can cause: Genital warts [ ] HIV [ ] Oral cancer [ ] Cervical cancer [ ] I don't know [ ] Others _____
4. What are the methods of preventing HPV: HPV vaccination [ ] Condoms [ ] Regular HPV screening [ ] Abstinence [ ] I don't know [ ]
5. Have you heard of the HPV vaccine: Yes [ ] No [ ]
6. If yes, how did you hear about it: School [ ] Internet [ ] Friends/peers [ ] Family [ ] Health professionals [ ] Media (TV, Newspapers, Radio) [ ] Others _____
7. What does HPV vaccine prevent against: Cancer of the cervix [ ] Cancer of the vulva [ ] Cancer of the vagina [ ] Cancer of the breast [ ] Cancer of the anus [ ] Cancer of the oropharynx [ ] Cancer of the penis [ ] I don't know [ ]
8. What is the route of HPV vaccine administration: Oral drops [ ] Tablets [ ] Injections [ ] Skin patches [ ] I don't know [ ]
9. What are the recommended doses of HPV vaccine: 1 dose [ ] 2 to 3 doses [ ] 3 to 4 doses [ ] Other_____
10. When should you take the HPV vaccination: Before first sexual intercourse [ ] After first sexual intercourse [ ] If you have more than one sexual partner [ ] I don't know [ ]
11. Who should be vaccinated against HPV: Males [ ] Females [ ] Both [ ] I don't know [ ]

**SECTION C: RESPONDENTS' ATTITUDE TOWARDS UPTAKE OF THE HPV VACCINE, AND BARRIERS TO UPTAKE OF THE VACCINE**

12. Have you received the HPV vaccine: Yes [ ] No [ ]
13. If no, why?: Not enough information on the vaccine (Tick all that apply) [ ] Inaccessibility of the vaccine [ ] I am not sexually active [ ] The vaccine is expensive [ ] I am older than 26 years [ ] Concerns about safety of the vaccine [ ] Cultural beliefs [ ] Religious beliefs [ ] Others_____
14. If no to question 12, do you have intentions of taking the vaccine in the future: Yes [ ] No [ ]
15. If yes to above, how soon: Within the next 6 months [ ] 6 months to 1 year [ ] More than 1 year [ ]

**IF YOU HAVE NOT TAKEN THE HPV VACCINE, SKIP TO SECTION D**

16. If yes to question 12, where did you receive it: University health services [ ] Private clinic [ ] Public hospital [ ] Health campaign [ ] Other _____
17. If yes to question 12, how many doses of the vaccine have you received: 1 dose [ ] 2 doses [ ] 3 doses [ ]
18. If you have not completed the full course of the HPV vaccine, what are the reasons for not completing it (Tick all that apply): Forgot or missed appointments [ ] Experienced side effects [ ] Lack of access to healthcare providers [ ] Cost of additional doses [ ] Belief that one dose is sufficient [ ] Other _____

19. If you have not completed the full course of the HPV vaccine, would you consider completing the course of the HPV vaccine in the future: Yes [ ] No [ ] Not sure [ ]

**SECTION D: RESPONDENTS' THOUGHTS ON VACCINE UPTAKE PROMOTION MEASURES**

20. Have you ever been provided with information about the HPV vaccine as part of a promotion campaign or initiative: Yes [ ] No [ ]
21. If yes to above, which of the following methods were used to promote HPV vaccine uptake (Tick all that apply): Health Talks [ ] Workshops [ ] Distribution of Informational Flyers or Brochures [ ] Social Media Campaigns [ ] School or University Campaigns [ ] Television or Radio Advertisements [ ] Peer Educator Programs [ ] Others (please specify): _____
22. If yes to question 20, did any of these promotion measures influence your decision to consider or receive the HPV vaccine: Yes [ ] No [ ] Not Sure [ ]
23. Please tick the box that applies to each question:

| | Very Effective | Effective | Somewhat Effective | Ineffective | Very Ineffective |
|---|---|---|---|---|---|
| **Rate the promotion measures you believe were most effective in encouraging HPV vaccine uptake among students** | | | | | |
| Health Talks | | | | | |
| Workshops | | | | | |
| Distribution of Informational Flyers or Brochures | | | | | |
| Social Media Campaigns | | | | | |
| School or University Campaigns | | | | | |
| Television or Radio Advertisements | | | | | |
| Peer Educator Programs | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Rate the additional measures or strategies you think could be implemented to promote HPV vaccine uptake among students** | | | | | |
| Interactive Workshops | | | | | |
| Interactive Webinars | | | | | |
| Student-Led Awareness Campaigns | | | | | |
| HPV Vaccine Information Sessions during Orientation | | | | | |
| Collaboration with Student Health Centers for Vaccine Distribution | | | | | |
| Incentives for Vaccine Participation (e.g., Discounts, Freebies) | | | | | |
| Peer Mentorship Programs | | | | | |

## APPENDIX II

## THE MAP OF THE AREA

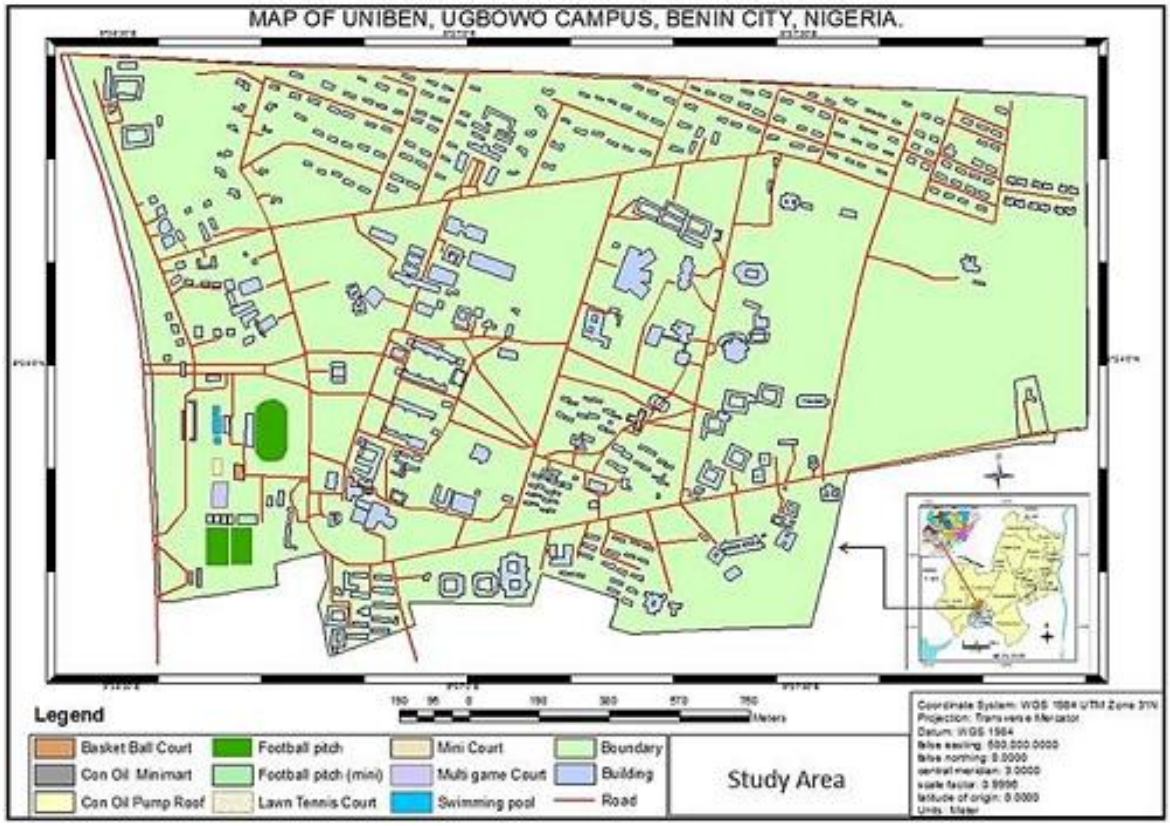


Figure 4: A Map Showing the Main (Ugbowo) Campus of the University of Benin.[73]

## APPENDIX III

## INFORMED CONSENT FORM

### TITLE OF STUDY

Knowledge, uptake, barriers, and measures that promote Human Papillomavirus (HPV) vaccination among undergraduates in the University of Benin.

### INSTITUTION

Department of Public Health and Community Medicine, College of Medical Sciences, University of Benin, Benin City.

### PRINCIPAL INVESTIGATORS

Ogiugo Osayamen Matilda

Ogo Mimi Stephanie

### SUPERVISORS

Prof A.N. Ofili

Dr. O.H.N. Okwara

### FINANCIAL SPONSORSHIP

This research work is financially sponsored by the principal investigators.

**PURPOSE OF RESEARCH**

The purpose of this research work is to assess the knowledge, uptake, barriers, and measures that promote Human Papillomavirus vaccination among undergraduates in the University of Benin.

**PROCEDURES**

Participants (undergraduate medical students) would be asked questions regarding the knowledge, uptake, barriers, and measures that promote Human Papillomavirus vaccination among undergraduates.

**CONFIDENTIALITY**

All information collected would be kept confidential and stored securely. Data collected would be anonymized and only accessible to the research time.

**COMPENSATION**

Participants would not receive any compensation for their participation.

**VOLUNTARY PARTICIPATION**

Your participation in this study is voluntary. You may withdraw from the study at any time without any consequences.

**RISKS**

There are no risks associated with participation in this study.

**BENEFITS**

Participants would contribute to important research that may help improve public health promotion strategies. The results gotten from this research work would help us assess the knowledge, uptake, barriers, and measures that promote Human Papillomavirus vaccination among undergraduates in the University of Benin.

**CONTACT INFORMATION**

If you have any questions or concerns regarding this research work please contact:

Ogiugo Osayamen Matilda or Ogo Mimi Stephanie

Department of Public Health and Community Medicine, UBTH, Benin City, Edo State, Nigeria.

Email: Ogiugoosayamen@gmail.com or Oghenemn@gmail.com

Phone Number: 0807 368 5510 or 0701 990 4248

Ethics and Research Committee,

Email: ubthresearchethics@gmail.com

Phone number: 0706 333 1337

**IF THERE IS ANY PORTION OF THIS CONSENT AGREEMENT THAT YOU DO NOT UNDERSTAND, ASK THE FIELD WORKER OR INVESTIGATOR BEFORE SIGNING.**

Please, sign below if you have agreed to participate in the study.

## CERTIFICATION OF CONSENT

I, ……. having full capacity to consent for myself do thereby to my participation in the research study.

The methods and means by which the study will be conducted have been explained to me by Ethical Committee. I have been given the opportunity to ask questions concerning this investigational study, and any such questions have been answered to my full and complete satisfaction.

I understand that I may at any time during this study revoke this consent and withdraw myself from the study without prejudice.

Participant's Signature: _____

Date: _____

# HEALTH RESEARCH ETHICS COMMITTEE (HREC)

## UNIVERSITY OF BENIN TEACHING HOSPITAL

P.M.B. 1111 BENIN CITY NIGERIA Telephone: 052-600418 Website: ubth.org

**CHIEF MEDICAL DIRECTOR**
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**DIRECTOR OF ADMINISTRATION**
Jim Uwadie, Esq

**CHAIRMAN**
Prof. (Mrs.) Antoinette N. Ofili

**HREC OFFICE:**
Committee email: ubthresearchethics@gmail.com
**Registration Number:**
NHREC-UBTH-HREC/24/12/2022B

**PROTOCOL NUMBER:** ADM/E 22/A/VOL. VII/148654841

**PROPOSAL TITLE:** "KNOWLEDGE, UPTAKE, BARRIERS, AND MEASURES THAT PROMOTE HUMAN PAPILLOMAVIRUS (HPV) VACCINATION AMONG UNDERGRADUATES IN UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA"

**PRINCIPAL INVESTIGATOR(S):** OGIUGO OSAYAMEN MATILDA, OGO MIMI STEPHANIE

**DEPARTMENT/INSTITUTION:** DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE, SCHOOL OF MEDICINE, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA.

**DATE CONSIDERED:** JULY 5TH, 2024

**DECISION OF THE COMMITTEE:** APPROVED

***THIS APPROVAL DATES 5/7/2024 TO 4/7/2025. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY***

**REMARK:**

**CHAIRMAN: PROF. (MRS) A.N. OFILI** **SIGNATURE & DATE**..... 5/7/2024

**SUPERVISOR (S): PROF. A.N. OFILI, DR. O.H.N. OKWARA**

**DECLARATION BY INVESTIGATOR(S):**
**PROTOCOL NUMBER** (please quote in all enquiries)
Note that no participant accrual or activity related to this research may be conducted outside of these dates. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual re-port to the HREC early in order to obtain renewal of your approval and avoid disruption of your research. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification

**Signature & Date**..... 25/09/24