AWARENESS, ATTITUDE AND UPTAKE OF HUMAN PAPILLOMA VIRUS VACCINES AMONG FEMALE SECONDARY SCHOOL STUDENTS IN BENIN CITY, NIGERIA

BY

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BEING A ONE-YEAR PROJECT PRESENTED TO THE DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE, SCHOOL OF MEDICINE, COLLEGE OF MEDICAL SCIENCES, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARDS OF BACHELOR OF MEDICINE AND BACHELOR OF SURGERY (MBBS) DEGREE IN UNIVERSITY OF BENIN, BENIN CITY

DEDICATION

I dedicate this work to God almighty for His grace and undiluted favour throughout this journey.

I also dedicate this work to my supervisors, Prof. Obehi Okojie and Dr. Ndubuisi Mokogwu, for their invaluable time and support in making this research possible. Also, to my friends, family and colleagues.

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Finally, I remain grateful to all who supported me in diverse ways, and to the participants of this study, without whom this research would not have been possible.

DECLARATION

I hereby declare that this research project titled "AWARENESS, ATTITUDE AND UPTAKE OF HUMAN PAPILLOMA VIRUS VACCINES AMONG FEMALE SECONDARY SCHOOL STUDENTS IN BENIN CITY, NIGERIA" will be conducted under supervision and has not been submitted in part or in full for any purpose.

_____ _____

AISOSA MIRACLE OMOREGIE **DATE**

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CERTIFICATION

This is to certify that this research study titled "**AWARENESS, ATTITUDE AND UPTAKE OF HUMAN PAPILLOMA VIRUS VACCINES AMONG FEMALE SECONDARY SCHOOL STUDENTS IN BENIN CITY, NIGERIA**" will be conducted by **Aisosa Miracle Omoregie** with matriculation number MED1706261 under the supervision of **Prof. Obehi Okojie** in the Department of Public Health and Community Medicine, College of Medical Sciences, University of Benin as part of the requirements for the award of Bachelor of Medicine, Bachelor of Surgery (MBBS) degree.

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LIST OF ABBREVIATIONS

FGDs: Focused Group Discussions

HPV: Human Papilloma Virus

JSS: Junior Secondary School

SPSS: Statistical Package for the Social Sciences

SSS: Senior Secondary School

DEFINITION OF TERMS

Awareness: knowing or being conscious of something.

Secondary School: the second stage of formal education, following primary school and preceding higher education like college or university, usually from ages 11 to 18.

Students: people who are learning at a school.

Uptake: to accept or adopt something.

Vaccines: preparations administered to stimulate the body's immune response against a specific infectious agent.

ABSTRACT

Background: Humam Papilloma Virus (HPV) is the most prevalent viral infection of the reproductive system. HPV is a sexually transmitted infection, and most people acquire it soon after becoming sexually active. HPV infection is the primary cause of almost all cervical cancers and certain HPV types also contribute to the development of cancers in the anus, vulva, vagina, penis, and oropharynx. Cervical cancer can be prevented through interventions such as health education, safe sex practices, and HPV vaccination.

Aim: The study evaluated the awareness about HPV vaccines, attitude towards HPV vaccination, the prevalence of HPV vaccination and associated factors among female secondary school students in Benin City, Edo State.

Methods: A descriptive cross-sectional study was conducted among 330 secondary school students who were selected using multi-stage sampling technique. A pretested, structured interviewer-administered questionnaire was used to collect data on socio-demographic characteristics, awareness and knowledge of HPV and HPV vaccination, attitudes towards HPV vaccination; and uptake of the vaccine. Data were analyzed using SPSS version 27.0. Univariate analysis was used to assess the mean, standard deviation, frequency and percentages of variables. Bivariate analysis using chi-square test and Fischer's Exact test were used to determine the association between respondent's sociodemographic characteristics and knowledge, attitude, and uptake of HPV vaccination. Independent predictors of knowledge, attitude, and uptake of HPV vaccination were assessed using binary logistic regression. The level of statistical significance was set to $p<0.05$. Results were presented in prose, tables and charts.

Results: A total of 330 respondents participated in the study, with a mean age of 14.5 ± 2.4 years. A higher proportion of the students were Benin 164 (49.7%) and Christian 295 (89.4%). Only 81 (24.5%) of the female students had good knowledge of HPV had HPV vaccination, while a large proportion 249 (75.5%) had poor knowledge. In regards to attitude towards HPV vaccination, the majority of the respondents 282 (85.5%) demonstrated positive attitude whereas, 14 (14.5%) showed negative attitude. Only a small proportion of the students 19 (5.8%) had received the vaccine, while 311 (94.2%) had not taken it. Factors that predicted good knowledge about HPV vaccine and vaccination were; increasing age (OR=1.279, 95% CI=1.073-1.525, p=0.006), being in senior secondary school (OR=0.308, 95% CI=0.118-0.803, p=0.016), attending a private school (OR=0.463, 95% CI=0.255-0.841, p=0.012) and respondents who had mothers with secondary level of education (OR=3.003, 95% CI=1.460-6.179, p=0.003). Positive attitude towards HPV vaccination was predicted only by students who had mothers with no formal education (OR=0.106, 95% CI=0.021-0.520, p=0.006). The only factor that predicted HPV vaccine uptake among the respndents, was knowing a girl that had taken the vaccine (OR=286.090, 95% CI=14.316-5717.052, p= <0.001).

Conclusion: Majority of the respondents had poor knowledge, positive attitude and poor uptake of the HPV vaccine. This calls for widespread enlightenment of secondary school students, teachers as well as parents on HPV and its prevention through vaccination; and intergration into school curricula.

Keywords: Human Papilloma Virus, HPV, HPV vaccination, secondary school students, cervical cancer, Benin City.

CHAPTER ONE

INTRODUCTION

1.1 Background

Worldwide, HPV is the most prevalent viral infection of the reproductive system.[1] The majority of sexually active individuals will contract HPV at some point in their lives. HPV is a sexually transmitted infection, and most people acquire it soon after becoming sexually active. HPV infection is the primary cause of almost all cervical cancers. Additionally, certain HPV types contribute to the development of cancers in the anus, vulva, vagina, penis, and oropharynx (the back of the throat).[1] There are over 100 different types of HPV, categorized as low-risk and high-risk. Thirty HPV types specifically affect the genitals, and about 15 of these are considered high-risk, meaning they can cause cancer. It's estimated that around 75% of individuals will contract HPV at some point in their lives. By the age of 50, at least 80% of women will have been infected with HPV.[1,2,3]

Worldwide, persistent infection with high-risk HPV subtypes 16 and 18 is associated with approximately 70% of all cervical cancer cases.[5] HPV infection is most common among younger individuals, with the highest rates observed in the 20-30 age group.[5,6]

In Nigeria, approximately 23.7% of women and 73% of men have an HPV genital infection. Within the first three years of sexual activity, 50% of women show signs of an HPV infection.[5] Globally, cervical cancer was the fourth most commonly diagnosed cancer and the fourth leading cause of cancer death in women in 2018, with an estimated 570,000 cases and 311,000 deaths.[7] Cervical cancer is the second most frequent cancer among women residing in less developed regions of the world.[1]

The development of cervical cancer is a multi-stage process that unfolds over several years. It begins when a woman becomes infected with an oncogenic (cancer-causing) type of HPV. In Nigeria, cervical cancer is the second most prevalent cancer among women aged 15 to 44, with an estimated 14,943 new cases diagnosed each year.[4] It is the second leading cause of cancer-related deaths in the country.[8] These statistics highlight a significant burden of disease in a country with an estimated 53.1 million women aged 15 and older, the population at risk for cervical cancer.[5]

Cervical cancer can be prevented through interventions such as health education, which includes promoting delayed sexual debut, safe sex practices, and the benefits of HPV vaccination, as well as through prophylactic HPV vaccination. Cervical cancer can be completely cured when detected early through screening methods such as the Papanicolaou (Pap) smear test. Unfortunately, the uptake of both HPV vaccination and cervical screening services in Nigeria remains low.[9] It is recommended that girls aged 9 to 15 years receive a two-dose HPV vaccine schedule with a 6-month interval between doses (0, 6 months) before they become sexually active. Women aged 16 to 26 years can receive a three-dose schedule (0, 1, and 6 months or 0, 2, and 6 months). However, even after HPV vaccination, cervical cancer screening remains crucial.[10]

1.2 Statement of the Problem

Given the availability of HPV vaccination as the primary preventive measure against cervical cancer, a decline in HPV infections is anticipated. Despite advancements in HPV vaccination and education, over half a million women worldwide develop cervical cancer annually. A significant proportion of these cases, exceeding 85%, occur in developing countries primarily due to inadequate screening and prevention programs.[9] Although HPV vaccine was introduced in Nigeria in 2009, over a decade later, awareness of HPV as the cause of cervical cancer and HPV vaccination as a preventative measure remains extremely low. Furthermore, the uptake of the vaccine among the target population of young people is still significantly inadequate. Numerous studies conducted among female students in secondary schools and universities in Nigeria have supported this observation. [11-15]

Similarly, parents and caregivers of young people in Nigeria have also exhibited limited knowledge regarding cervical cancer prevention and screening for their children.[16,17] This lack of knowledge may negatively impact the acceptance and uptake of the HPV vaccine. Furthermore, the availability and affordability of HPV vaccines also hinder the uptake of HPV vaccination. Currently, HPV vaccines in Nigeria are primarily available in private healthcare facilities, and their cost is prohibitive for many Nigerians.[18] Despite ongoing efforts by the Nigerian government to include the HPV vaccine in the national routine immunization program, the progress has been relatively slow.

1.3 Justification of Study

In Nigeria, cervical cancer is the second most prevalent cancer among women aged 15 to 44, with an estimated 14,943 new cases diagnosed each year.[4] It is the second leading cause of cancer-related deaths in the country.[8] Although HPV vaccine was introduced in Nigeria in 2009, over a decade later, awareness of HPV as the cause of cervical cancer and HPV vaccination as a preventative measure remains extremely low. Furthermore, the uptake of the vaccine among the target population of young people is still significantly inadequate. Numerous studies conducted among female students in secondary schools and universities in Nigeria have supported this observation.[11-15] Secondary school female students represent a specific population at increased risk for cervical cancer. Besides being adolescents, some of these students may be living independently for the first time. This newfound independence may expose them to activities, including but not limited to sexual encounters, which can increase their risk of HPV infection and, consequently, cervical cancer in the future, especially if they haven't received the HPV vaccine.

To enhance awareness and knowledge of HPV infection and HPV vaccination among female secondary school students and contribute to the growing body of evidence on efforts to reduce the burden of cervical cancer in Nigeria, this study will be conducted to assess the knowledge of human papillomavirus and the uptake of HPV vaccine among female secondary school students in Benin City, Edo State.

1.4 Research Questions

The study will address the following research questions.

1. What is the level of awareness of HPV vaccines among female secondary school students in Benin City?
2. What is the attitude towards HPV vaccination among female secondary school students in Benin City?
3. What is the level of uptake of HPV vaccines among female secondary school students in Benin City?
4. What are the factors influencing the uptake of HPV vaccines among female secondary school students in Benin City?

1.5 Aim

The aim of this study is to evaluate the awareness about HPV vaccines, attitude towards HPV vaccination, the prevalence of HPV vaccination and associated factors among female secondary school students in Benin City, with the aim of making recommendations to addressing the problem.

1.6 Specific Objectives

1 To assess the level of awareness about HPV vaccines among female secondary school students in Benin City.

2 To assess the attitude towards HPV vaccination among female secondary school students in Benin City.

3 To determine the level of uptake of HPV vaccines among female secondary school students in Benin City.

4 To identify factors influencing HPV vaccination uptake among female secondary school students in Benin City.

CHAPTER TWO

LITERATURE REVIEW

This chapter provides a critical overview of existing knowledge on this topic highlighting what has been studied, gaps in knowledge and placing this current research within the context of previous work. By examining theories, empirical studies and scholarly debates, this review will establish the present foundation on which this present study will be built.

2.1 Awareness of HPV vaccines among female secondary school students

A descriptive cross-sectional study was carried out in Benin City, Edo State, in 2016. Its aim was to evaluate the level of awareness about HPV, the prevalence of HPV immunization and its associated factors among the study population. About 210 females attending secondary schools in Benin city were selected for the study using multi-stage sampling technique. An interviewer-administered questionnaire was used to collect data. Results showed the majority of the participants were between 14 to 18 years (58.6%). Almost all the participants (>97%) had not heard of HPV, HPV Vaccines and Cervical cancer. In addition, 2 (0.9%) persons correctly identified that the virus can be transmitted sexually. It has the strength of focusing on context-specific data on secondary school students in Nigeria and directly measures uptake, not just awareness. However, the study site is restricted to Benin City, which reduces representativeness. Also, cross-sectional design limits cause-effect inference and the sample size used was small compared to national scope.[19]

In 2019, adescriptive cross-sectional study was conducted in Morocco among selected public universities. Its objective was to evaluate the awareness of female university students in the study area, to HPV and the vaccine; and to identify predictors of its acceptability. About 1080 participants were recruiterd using using multistage sampling technique. Structured interviewer-

administered questionnaires were used to collect data. Results showed that the awareness of HPV infection was 14.7% and that of HPV vaccine was 7.8%. The strength of this study was that it included a large sample of female university students and explored awareness, attitudes, and acceptability, giving a holistic view. Only female participants were assessed, ignoring male students' perspectives; and self-administered questionnaire used may introduce recall/social desirability bias.[20]

A descriptive cross-sectional study was conducted in India, in 2019. It aimed to assess the awareness about HPV vaccine as a cause of cervical cancer as well as its vaccination among medical students in Vydehi Institute of Medical Sciences and Research Centre, Bangalore, Karnataka, India. A total of 150 students in second and third year were recruited using convenience sampling technique. A self-administered questionnaire was used to collect data from respondents. Results showed knowledge regarding HPV as a causative agent for cervical cancer was 67 (95.7%) of male students and 79 (98.8%) of female students with no statistically significant difference. Awareness about availability of HPV vaccine was seen in 66 (82.5%) females as compared to 50 (71.4%) males with a p value of 0.078, which was not statistically significant. Its strength lies in the focus on medical students who are future health professionals, ensuring high relevance; highlights both knowledge and attitudes; contributes data from Asia where HPV vaccination is still under-researched however, it was limited to a single institution (reduces generalizability); cross-sectional design only shows associations, not causality; possible self-report bias.[21]

2.2 Attitude towards uptake of HPV vaccines among female secondary school students

In 2018, a descriptive cross-sectional study was conducted among female secondary school students in Enugu, Nigeria. Its objective was to detreermine the knowledge and acceptability of HPV vaccine among the study population. The sample size consisted of 384 respondents who

were selected using stratified sampling technique. Data was collected through interviewer-administered questionnaires. Results showed that 97.3% were willing to receive the HPV vaccine. This study provided insight into secondary school adolescents, exploring both knowledge and acceptance. However, a small sample size from one school limits representativeness.[22]

A mixed-methods school-based study was conducted in 2021 among adolescent girls in Kampala, Uganda. It was to assess the knowledge, perceptions, and practices of adolescent girls regarding HPV vaccination to develop evidence to guide programmmes targeted at improving uptake of HPV vaccination. A sum of 524 adolescent girls and 24 key informants were selected for the study using multi-stage and purposive sampling techniques respectively. Quantitative data was collected from the adolescents using a structured questionnaire while qualitative data was collected using FGDs and Key informant interviews. It was revealed that about half (51.9%) of the adolescents had a negative perception towards HPV vaccination. Its strengths were using a mixed-methods approach which improves depth, large school-based adolescent population and exploring perception in addition to knowledge and uptake. This study is however, limited to Kampala only and qualitative findings may have interviewer bias. Self-reporting also limits accuracy.[23]

In 2022, a descriptive cross-sectional study was carried out among teanage girls attending high schools in Bihor, Romania. The main aim of the study was to evaluate the knowledge, attitudes and factors that that could influence decisions for HPV vaccination. Six hundred and ninety teenagers were recruited for the study using multi-stage sampling technique. A structured questionnaires was used to collect data. Results showed that about 44% were positive about being vaccinated against HPV. Being an European context, it adds comparative insight, focused on adolescents' knowledge and attitude and used a large sample size. However, attitude was assessed

without measuring actual uptake and cultural and policy-specific findings may not be transferable outside Romania.[24]

2.3 Uptake of HPV vaccine among female secondary school students

In 2018, a descriptive cross sectional survey was conducted among female undergraduates in Lagos State polytechnic, Lagos, Nigeria. The study aimed at assessing the knowledge, attitude, uuptake of HPV vaccine and factors influencing uptake among the study population. Participants selected using multi stage sampling technique were 384. Data was collected with a pretested, self administered, semi structured questionnaire. Results showed that only 10 (2.6%) of the respondents had received a single dose of HPV vaccine. The study's strength was that it assessed knowledge, attitudes, and uptake among undergraduates, however, it was limited to Lagos State, is relatively old compared to newer data and self-reported vaccination status may not be fully accurate.[25]

A descriptive cross-sectional study was conducted in 2022, among female secondary school students in Southwest Shoa Zone, Oromia, Ethiopia. It aimed at assessing the uptake of HPV vaccine and associated factors among the study population. The sample size was 634 and rerspondents were included using multi-stage sampling technique. Data was collected using self-administered structured questionnaires. Findings showed that the uptake of HPV vaccine was 31.65%. this study explored both uptake and associated factor and addressessed a sub-Saharan African context where HPV vaccination coverage is low. Because it is school-based only, it excluded out-of-school adolescents, thus, counting as a weakness.[26]

In 2019, a cross-sectional survey was conducted in the eastern, central, and western regions of China among female college students. It had the objective of exploring the uptake of HPV vaccine

among college adult females. A total of 4220 respondents took part in the study and they were recruited using convenience sampling technique. An online structured questionnaire was used for data collection. Results showed that among the total 4220 students who participated in this study, only 11.0% reported having been vaccinated against HPV. The study has the strengths of using a multicenter design across China which increases generalizability, focuses on both uptake and willingness, providing predictive insights and a robust statistical analysis employed. It was weak in that only female college students were studied, limiting broader applicability and cultural factors were not deeply explored. [27]

2.4 Factors influencing HPV vaccination uptake among secondary school students

In 2023, a descriptive cross-sectional study was conducted among in-school students in Ibadan, Oyo State, Nigeria. It aimed to assess the knowledge, perception, interntion and concerns about HPV vaccination among in-school adolescents. The sample size was 300 and participants were recruited using multi-stage sampling technique. Data was collected using a semi-structured questionnaire. Findings were that parental involvement, vaccination pain and religious organizations were factors influencing vaccine uptake. Its strength lies in the fact that it explored intentions and concerns, which helps in predicting future uptake, however, it did not measure actual vaccination uptake,was conducted in one city and cultural and socioeconomic influences were not fully captured.[28]

A cross-sectional study was carried out in Nekemte city, Western Ethiopia, in 2020. Its objective was to assess HPV vaccination uptake and associated factors among adolescenyts in high schools of the study area. Two hundred and sixty-two respondents were selected for the study using multi-stage sampling technique. A structured questionnaire was used for data collection. School health education, health professionals' advice, media advertising and family support were associated with

positive uptake, while fear of being infertile, not trusting the vaccine, and anticipated absenteeism from school following vaccination were negative factors influencing HPV vaccine uptake. The strengths of this study are that it was community-based, not just school-based which improves representativeness; had a large adolescent sample and explored associated factors systematically. However, self-reported uptake can be lead to recall bias and the findings are localized to one Ethiopian city.[29]

A descriptive cross-sectional study was carried out among nursing, midwifery and dietetics students in Geneva and Lausanne universities, Switzerland, in 2019. Its aim was to describe the socio-demographic characteristics of the two study areas and to compare between the vaccinated and unvaccinated groups in other to determine if they are factors which may influence the uptake of HPV vaccination. A total of 234 female students were included in the study using purposive sampling technique. A sef-administered questionnaire was used to collect data. Results showed that fear of side effects, parental opposition and reluctance of attending physician were the main reasons associated with refusal for uptake of HPV vaccines. This study targeted health students who will influence future vaccine advocacy. It also explored decision-making factors and not just knowledge. However, the sample may not represent general population as only one category of students were studied.[30]

CHAPTER THREE

METHODOLOGY

3.1 Study Area

This research was conducted among secondary schools in Benin City, Edo State, Nigeria. Edo State is one of Nigeria's 36 states, it is located within the South-South geopolitical zone of Nigeria. The state was established in 1991, emerging from the Northern segment of the former Bendel State. It encompasses an area of 19,743 square kilometers and is positioned between latitudes 6°23'55"N to 6°27'39"N and longitudes 5°36'18"E to 5°44'18"E. Edo State shares its borders with Ondo State to the west, Anambra State to the east, Kogi State to the northeast, and Delta State to the southeast. Edo State is home to diverse ethnic groups, including Benin, Esan, Etsako, Owan, and various smaller tribes. The state hosts a total of seven universities, comprising one Federal university, two State universities, and four privately owned institutions.[31]

Benin City, an ancient urban center, serves as the capital and administrative hub of Edo State. Its geographical coordinates span latitude 60 06’N to 60 30’N and longitude 50 30’E to 50 45’E, relative to the Greenwich meridian. Covering an area of 500 square kilometers, it's positioned 200 miles east of Lagos and 25 miles north of the Benin River. As of the 2006 census, the city had a population of 1,147,188, with a projected population of 1,782,000 for 2021. Administratively, it consists of three major local government areas (LGAs) namely; Oredo, Egor and Ikpoba-Okha; and parts of Ovia North-East and Uhunmwonde. The predominant ethnic group in Benin City is the Benin people, and their language is Benin. The city's economic activities primarily revolve around transportation and small-scale trading. Additionally, there are industrial establishments

including brewing factories, a petroleum storage depot, a battery assembly factory, and several small-scale pharmaceutical production facilities.

3.2 Study Design

A descriptive cross-sectional study design was used for this study.

3.3 Study Duration

This study was carried out between September 2024 and September 2025.

3.4 Study Population

The study population consisted of female secondary school students in Benin City, Edo State.

Inclusion Criteria

Female secondary school students aged 9-18 years who were present at the time of the study and who gave informed consent.

Exclusion Criteria

- Those who were physically ill.
- Those with cognitive impairment.

3.5 Sample Size Determination

The minimum sample size (n) was calculated using the Cochran formula for a cross-sectional study by adopting the prevalence rate of HPV vaccine uptake among female adolescents in Benin City, Edo State, Nigeria, which was 23.4%.[32]

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

Where,

n = minimum sample size

Z = standard normal deviation set at 1.96 (at 95% confidence interval)

d = degree of precision set at 0.05

p = prevalence rate (23.4% uptake of HPV vaccine by female secondary school students in Benin City)[32]

Therefore,

p = 23.4%

$= \frac{23.4}{100} = 0.234$

q = 1 – 0.234 = 0.766

Hence:

$$\frac{(1.96)^2 \times 0.234 \times 0.766}{(0.05)^2}$$

n= 275.4

n ≈ 276

Including a 20% room for attrition,

n=333+53 =329

Thus, minimum sample size for this study was 330.

3.6 Sampling Technique

This study employed a multi-stage sampling technique to select participants. The stages were as followed:

Stage 1: LGA Selection – One LGA was selected from the three LGAs in Benin City using simple random technique by employing a table of random numbers.

Stage 2: Ward Selection - From the electoral wards in selected LGA, two wards were chosen using a simple random sampling method with a table of random numbers.
Stage 3: School Selection - In each of the two selected wards, two secondary schools were randomly chosen, also using a table of random numbers. This resulted in a total of four schools for the study.

Stage 4: Participant Selection - Within each of the four selected schools, the sample population was evenly distributed across all classes, from Junior Secondary School 1 (JSS1) to Senior Secondary School 3 (SSS3). Participants were selected from each class using a systematic sampling technique based on the class attendance register on the day of sampling. Once the participants were selected, trained interviewers administered the questionnaire to them.

3.7 Data Management

3.7.1. Data Collection Tools

Data were collected using structured, interviwer-administered questionnaire. It consisted of five sections – Sections A, B, C, D and E. The questionnaire was majorly adapted from the 2018 World

Health Organization's (WHO) "Improving Data for Decision-Making: A Toolkit for Cervical Cancer Prevention and Control Programmes".[33] This toolkit was designed to help countries and programmes strengthen data collection related to cervical cancer prevention, including HPV vaccination. It also helps in developing data collection materials such as questionnaires by providing guidance in areas that assess awareness, knowledge, attitudes and uptake of HPV vaccination, among various population groups including secondary school students. Thus, it provides a vast range of modification to suit the population being studied. The sections for the questionnaire are as follow;

Section A collected data on sociodemographic characteristics of respondents such as age, ethnic group, religion, class, type of school and parents' level of education.

Section B assessed awareness and knowledge of HPV and the HPV vaccine. It contained 10 close-ended questions such as having heard of HPV and the HPV vaccine, sources of information, disease caused by HPV, age group for taking the vaccine among others.

Section C focused on collecting data that assesses respondent's attitude towards the HPV vaccine. It comprised 6 close-ended questions with options presented using the Likert scale which ranges from "strongly agree" to "strongly disagree". Questions in this section assessed responses in relation to the HPV vaccine being important for girls, likeliness of being taken if available in their schools, fear of vaccines, vaccine safety, parental consent before taking the vaccine and belief that the HPV vaccine will encourage sexual activity.

Section D primarily assessed HPV vaccine uptake using 4 close-ended questions that focused on ever having received the vaccine, number of doses if taken before including the place it was received and if parental permission was involved.

Section E, which was the last section, collected data on factors influencing HPV vaccine uptake by making use of 5 close-ended questions and including aspects like; reasons for not taking the vaccine, availability of health education about HPV or cervical cancer among others.

Training of Research Assistants

Five undergraduates were recruited as research assistants and were trained on how to administer the questionnaire and collate data. Similuations were used during the training to imitate real-world data collection scenarios. The training lasted for 2 days and ensured that the research assistants understood the structure of the questionnaire and were able to respond to possible questions from the various sections of the questionnaire that respondents may ask.

3.7.2 Pretesting

This was carried out in UBTH Staff school, Benin City, among female seconadary school students who met the inclusion criteria for the study using 10% of the calculated sample size.

3.8 Data Analysis

Data were cleaned, coded and analyzed using IBM® Statistical Package for Social Sciences version 27.0 software. Descriptive statistics using univariate analysis was used for categorical and continuous variables such as for those of sociodemographic characteristics. Parameters such as mean, frequency, percentage and standard deviation were employed during the analysis.

Bivariate analysis using chi square and Fischer's Exact test was adopted to test for association between sociodemographic characteristics and; awareness, attitude and uptake of HPV vaccination.

Multivariate analysis using binary logistic regression was employed to identify independent predictors of outcomes of awareness, attitude and uptake of HPV vaccine. All key variables were entered into the initial regression model. A stepwise backward elimination method (likelihood ratio) was employed to refine the model and control for potential confounding. The results were presented as Adjusted Odds Ratios (AORs) with 95% Confidence Intervals, and the level of statistical significance was set at $p < 0.05$.

Scoring System

There were 10 questions that assessed for awareness and knowledge**.** Each positive answer was scored a point of one, incorrect or 'do not know' responses were scored zero. The maximum and minimum total scores attainable were 10 and zero respectively. Total scores were converted into percentages and participants with results of 50% and above were categorized as having good knowledge while those with results less than 50% were categorized as having poor knowledge.[3] For the 6 closed ended question on attitude using the Likert scale, each was scored from 1 for strongly disagree to 5 for strongly agree if the question asked had a positive sense. While for a negative-sensed question, points were allotted from 1 for strongly agree to 5 for strongly disagree. This ensured that an increasing total score tended more towards a good attitude. The minimum and maxiumum total score were 6 and 30 respectively. Total scores were categorized into two; negative attitude for scores between 6-17 and positive attitude for scores between 18-30. For uptake, participants who had received at least one HPV vaccine were scored '1' while those who had not were scored zero. The maximum score was '1' and the minimum score zero. A score of one classified participants into having “good uptake” and a score of zero as having “poor uptake”.

3.9 Ethical Consideration

Ethical approval was sought and obtained from the University of Benin Teaching Hospital Ethics and Research Committee.

Permission was requested from the administrative heads of the selected secondary schools.

Participation was voluntary and verbal or written informed consent was obtained from respondents before administering the questionnaires. Names and addresses were omitted to ensure confidentiality. The respondents were informed that they had the right to withdraw from the interview at any time and that withdrawal posed no loss or harm.

3.10 Study Limitation

This study relied on information provided by the respondents and may therefore be limited by recall bias. It may also be limited by some errors made by the researchers during the course of the study. These errors may be due to the subjective interpretation of questions by the interviewer to participants such as in the use of pidgin to interpret questions which may omit or add more information outside of the purpose of the question resulting in biased answers from participants.

CHAPTER FOUR

RESULTS

A total of 330 responses were collected from respondents giving a 100% response rate.

The results will be presented based on the sections of the questionnaire, which are;

Section A: Sociodemographic characteristics of respondents.

Section B: Awareness and knowledge of HPV and HPV vaccination.

Section C: Attitude towards HPV vaccination.

Section D: HPV vaccine uptake.

Section E: Factors influencing HPV vaccine uptake.

SECTION A

SOCIODEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Table 1: Sociodemographic characteristics of respondents

Variable	Frequency (n=330)	Percent
Age group (years)		
11-15	209	63.3
16-20	113	34.2
21-25	8	2.5
Mean age =14.5 ± 2.4 (years)		
Ethnic group		
Benin	164	49.7
Esan	61	18.5
Igbo	36	10.9
Urhobo	25	7.6
Yoruba	25	7.6
Hausa	12	0.9
Akwa-Ibom	3	0.6
Ijaw	2	0.3
Owan	1	0.3
Akoko-Edo	1	0.3
Religion		
Christianity	295	89.4
Islam	23	7.0
ATR	12	3.6
Class		
JSS1	48	14.5
JSS2	53	16.1
JSS3	46	13.9
SS1	53	16.1
SS2	60	18.2
SS3	70	21.2
Type of School Attending		
Public	165	50.0
Private	165	50.0
Mother's highest level of Education		
No formal education	19	5.8
Primary	17	5.2
Secondary	77	23.3
Tertiary	217	65.8
Father's highest level of Education		
No formal education	11	3.3
Primary	16	4.8
Secondary	49	14.8
Tertiary	254	77.0

ATR: African Traditional Religion

The mean age of female secondary school students was 14.5 years ± 2.4 with a minimum age of 11 years and a maximum age of 25 years.

About two-thirds of the students, 209 (63.3%) were in the age range of 11-15 years and the major ethinic groups were Benin, 164 (49.7%); Esan, 61 (18.5%); and Igbo, 36 (10.9%).

Majority, 295 (89.4%) were Christians while 23 (7.0%) and 12 (3.6%) were Muslims and African Traditional religion worshippers respectively.

The distribution of students among the junior and senior classes was almost equal, with JSS2 consisting of 53 (16.1%) students and SS3, 70 (21.2%) students.

An equal number of students, 165 (50.0%) attended both public and private schools and a higher proportion had mothers with tertiary level of education, 217 (65.8%) and fathers with tertiary level of education, 254 (77.0%).

SECTION B

AWARENESS AND KNOWLEDGE OF HPV AND HPV VACCINATION

Table 2: Awareness of HPV and HPV vaccination

Variable	Frequency (n=330)	Percent
Heard of HPV		
Yes	85	25.8
No	245	74.2
Heard of the HPV vaccine (n=85)		
Yes	75	88.2
No	10	11.8
***Source of information about the HPV vaccine**		
School health talk	30	40.0
Health worker	29	38.7
Parents or family	26	34.7
Social media	21	28.0
Friend/classmate	11	14.7
Television or radio	9	12.0
I don't remember	7	9.3
Religious leader	6	8.0

*Multiple Choice Question

Most of the students, 245 (74.2%) had not heard of HPV while only 85 (25.8%) had heard of it.

Out of those who had heard about HPV, 75 (88.2%) had heard about the HPV vaccine, with the major sources of information being school health talk, 30 (40.0%); health worker, 29 (38.7%); parents or family, 26 (34.7%); and social media, 21 (28.0%). Only 7 (9.3%) could not remember the source of information.

Table 3: Knowledge of HPV and HPV vaccination

Variable	Frequency (n=85)	Percent
HPV causes Malaria		
Yes	4	4.7
No	81	95.3
HPV causes HIV/AIDS		
Yes	6	7.1
No	79	92.9
HPV causes Cervical cancer		
Yes	69	81.2
No	16	18.8
Ideal age girls should receive the HPV vaccine		
Before 9 years	4	4.7
9-14 years	37	43.5
15-19 years	11	13.0
I don't know	33	38.8
HPV vaccine prevents cervical cancer		
Yes	59	69.4
No	2	2.4
I don't know	24	28.2
Number of complete doses of the HPV vaccine needed		
One	9	10.6
Two	13	15.3
Three	13	15.3
I don't know	50	58.8
Know where to get the HPV vaccine		
Yes	38	44.7
No	47	55.3
Place to get the HPV vaccine (n=38)		
Hospital	22	57.9
All States	4	10.5
Health centre	4	10,5
Benin City	2	5.3
UBTH	2	5.3
Any Government facility	2	5.3
Outreach	1	2.6
Edo State	1	2.6

Among those who had heard about HPV, 81 (95.3%) agreed that HPV does not cause malaria, 79 (92.9%) agreed that HPV does not cause HIV/AIDS and 69 (81.2%) agreed that HPV causes

cervical cancer. Less than half, 37 (43.5%) affirmed that the ideal age for receiving the HPV vaccine was 9-14 years while 33 (38.8%) reported not knowing.

Similarly, 59 (69.4%) agreed that the HPV vaccine prevents cervical cancer while 2 (2.4%) did not agree. For the number of complete doses of HPV vaccine needed, more than half, 50 (58.8%) reported not knowing while equal proportions, 13 (15.3%) reported that the complete doses were two and three respectively.

Only 38 (44.7%) of those who had heard about HPV, affirmed they knew where to get the HPV vaccine with majority 22 (57.9%) reporting getting the vaccine at the hospital.

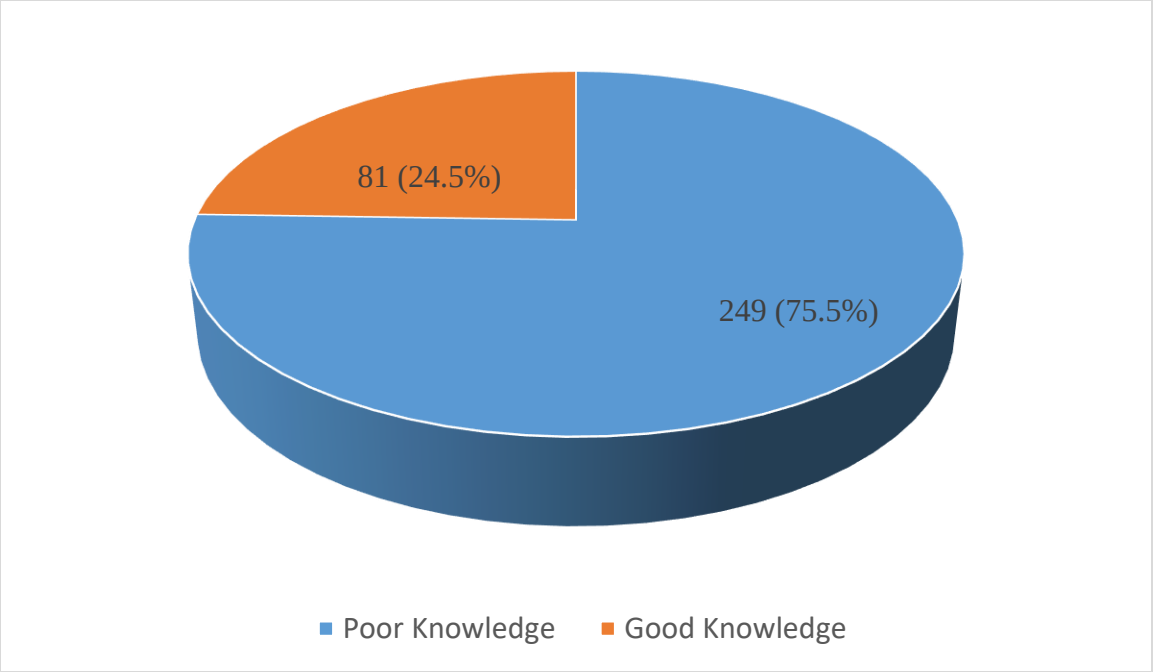

Fig. 1: Overall knowledge of HPV and HPV vaccination among respondents.

For the overall knowledge about HPV and HPV vaccination, 81 (24.5%) of the respondents demonstrated good knowledge while the remaining 249 (75.5%) had poor knowledge.

Table 4: Knowledge of HPV and HPV vaccination; and sociodemographic characteristics of respondents

Variable	Knowledge		Chi square	p-value
	Good (n=81) n (%)	**Poor (n=249) n (%)**		
Age group (years)			36.340*	**< 0.001#**
≤14	15 (9.6)	142 (90.4)		
>14	66 (38.2)	107 (61.8)		
Religion			1.037	0.595
Christianity	70 (23.7)	225 (76.3)		
Islam	7 (30.4)	16 (69.6)		
ATR	4 (33.3)	8 (66.7)		
Class			32.297*	**< 0.001#**
JSS	14 (9.5)	133 (90.5)		
SSS	67 (36.6)	116 (63.4)		
Type of School Attending			7.216*	**0.010#**
Public	30 (18.2)	135 (81.8)		
Private	51 (30.9)	114 (69.1)		
Mother's highest level of Education			14.370	**0.002#**
No formal education	7 (36.8)	12 (63.2)		
Primary	3 (17.6)	14 (82.4)		
Secondary	30 (39.0)	47 (61.0)		
Tertiary	41 (18.9)	176 (81.1)		
Father's highest level of Education			6.550	0.088
No formal education	3 (27.3)	8 (72.7)		
Primary	4 (25.0)	12 (75.0)		
Secondary	19 (38.8)	30 (61.2)		
Tertiary	55 (21.7)	199 (78.3)		

*Fisher's Exact Test; # statistically significant

As age increased, knowledge of HPV and HPV vaccination also increased with 15 (9.6%) of those aged 14 years and below having good knowledge when compared to 66 (38.2%) of those who were above 14 years. This was statistically significant (p=<0.001).

A higher proportion of those with poor knowledge were Christians, 225 (76.3%) when compared to Muslims, 16 (69.6%) and ATR, 8 (66.7%), however this was not statistically significant (p=0.595).

Those in senior secondary school had a higher proportion of students, 67 (36.6%) with good knowledge compared to those in junior secondary school, 14 (9.5%) and this aassociation was statistically significant (p=<0.001).

Also, among those with good knowledge, a higher proportion 51 (30.9%) attended private schools compared to 30 (18.2%) who attended public schools and this was a statistically significant association (p=0.010).

There was no demonstrable trend in knowledge as respondent's mother's level of education increased, with 176 (81.1%) of those who had mothers with tertiary level of education having poor knowledge when compared to 12 (63.2%) of those with mothers who had no formal education. This was statistically significant (p=0.002).

Similarly, no trend was demonstrated between respondent's father's level of education and awareness level, with 199 (78.3%) of those who had fathers with tertiary level of education having poor knowledge when compared to 8 (72.7%) of those with fathers who had no formal education. However, this was not statistically significant (p=0.088).

Table 5: Predictors of knowledge of HPV and HPV vaccination; and sociodemographic characteristics of respondents

Variable	B	OR (Exp (B))	95% CI (Lower)	95% CI (Upper)	p-value
Age group (years)	0.246	1.279	1.073	1.525	**0.006**[#]
Religion					
Christianity	0.390	1.477	0.500	4.362	0.480
Islam*		1			
ATR	0.204	1.226	0.214	7.024	0.819
Class					
JSS	-1.176	0.308	0.118	0.803	**0.016**[#]
SSS*		1			
Type of School Attending					
Public	-0.770	0.463	0.255	0.841	**0.012**[#]
Private*		1			
Mother's highest level of Education					
No formal education	1.369	3.930	0.852	18.120	0.079
Primary	-0.559	0.572	0.117	2.786	0.489
Secondary	1.100	3.003	1.460	6.179	**0.003**[#]
Tertiary*		1			
Father's highest level of Education					
No formal education*		1			
Primary	0.070	1.072	0.133	8.648	0.948
Secondary	1.223	3.398	0.508	22.720	0.207
Tertiary	0.323	1.381	0.215	8.879	0.734

R^2 = 20.4-30.4%; # statistically significant; * reference group

For every unit rise in respondents' age, the likelihood of having good knowledge increased by 1.279 and this relationship was statistically significant. (OR=1.279, 95% CI=1.073-1.525, p=0.006).

Christians (OR=1.477, 95% CI=0.500-4.362, p=0.480) and those who practicd ATR (OR=1.226, 95% CI=0.214-7.024, p=0.819) were more likely to have good knowledge when compared to Muslims, though these did not showed statistical significance.

Students in junior classes were 0.308 less likely to have good knowledge when compared to those in senior classes and this was significant. (OR=0.308, 95% CI=0.118-0.803, p=0.016).

In regards to type of school attended, students who attended public schools were 0.463 less likely to demonstrate good knowledge when compared to their counterparts in private schools. This was stastistically significant. (OR=0.463, 95% CI=0.255-0.841, p=0.012).

Students who had mothers with secondary level of education (OR=3.003, 95% CI=1.460-6.179, p=0.003) or no formal education (OR=3.930, 95% CI=0.852-18.120, p=0.079) were more likely to have good knowledge while those with mothers who had primary level of education (OR=0.572, 95% CI=0.117-2.786, p=0.489) were less likely to good knowledge when compared with those who had tertiary level od education. Only the association on secondary education was statistically significant.

The likelihood of having good knowledge was about 3 times much higher among students who had fathers with secondary level of education (OR=3.398, 95% CI=0.508-22.720, p=0.207), and slightly higher for those with primary (OR=1.072, 95% CI=0.133-8.648, p=0.948) and tertiary (OR=1.381, 95% CI=0.215-8.879, p=0.734) levels when compared with those with no formal education. Though, these were not startistically significant.

SECTION C

ATTITUDE TOWARDS HPV VACCINATION

Table 6: Respondents' Attitude towards HPV vaccination

Variable	Strongly agree n (%)	Agree n (%)	Undecided n (%)	Disagree n (%)	Strongly disagree n (%)
The HPV vaccine is important for girls my age	28 (8.5)	62 (18.8)	225 (68.2)	10 (3.0)	5 (1.5)
I would take the HPV vaccine if it were available in my school	4 (1.2)	107 (32.4)	172 (52.1)	20 (6.1)	27 (8.2)
I am afraid of taking vaccines	4 (1.2)	46 (13.9)	175 (53.0)	86 (26.1)	19 (5.8)
I believe the HPV vaccine is safe	22 (6.7)	96 (29.1)	197 (59.7)	12 (6.7)	3 (0.9)
My parents won't allow me to take the HPV vaccine	4 (1.2)	30 (9.1)	157 (47.6)	119 (36.1)	20 (6.1)
Getting the HPV vaccine might make people think I'm sexually active	4 (1.2)	76 (23.0)	170 (51.5)	65 (19.7)	15 (4.5)

n=330

In regards to attitude towards HPV vaccination, majority, 225 (68.2%) were undecided towards acknowledging that HPV vaccine was important for girls their age while only 28 (8.5%) strongly agreed.

When asked if they would take the HPV vaccine if it were available in their school, about half, 172 (52.1%) were undecided, 107 (32.4%) agreed and 27 (8.2%) strongly disagreed.

About half of the students, 175 (53.0%) were undecided about being afraid of taking vaccines, 86 (26.1%) disagreed while 46 (13.9%) agreed that they were afraid of taking vaccines.

Only 22 (6.7%) strongly agreed that the HPV vaccine was safe while 197 (59.7%) were undecided and 12 (6.7%) disagreed that the vaccine was safe.

About half, 157 (47.6%) were undecided that their parents would not allow them take the vaccine while 119 (36.1%) disagreed on this.

Seventy-six (23.0%) students agreed that taking the HPV vaccine might make people think they are sexually active while 170 (51.5%) were undecided and 65 (19.7%) did not agree to this.

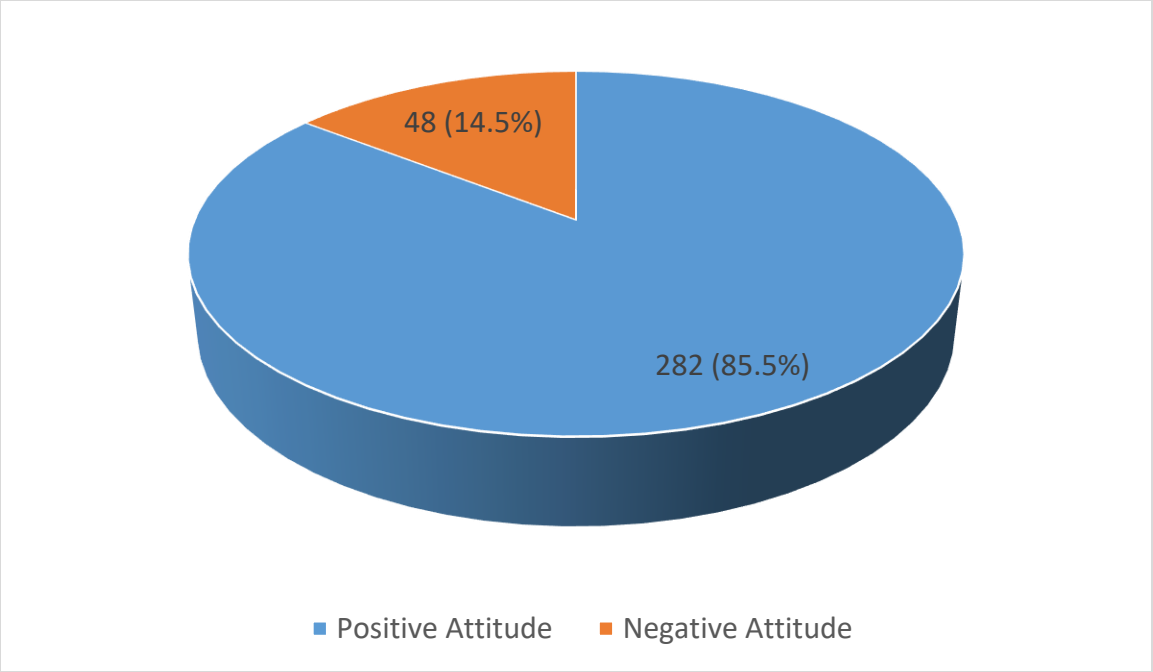

Fig 2: Distribution of respondents' attitude towards HPV vaccination.

A major proportion of the respondents 282 (85.5%) had positive attitude towards HPV vaccination while the remaining 48 (14.5%) demonstrated negative attitude.

Table 7: Atitude towards HPV vaccination and sociodemographic characteristics of respondents

Variable	Attitude		Chi square	p-value
	Positive (n=282) n (%)	**Negative (n=48) n (%)**		
Age group (years)			0.4582*	0.534
≤14	132 (84.1)	25 (15.9)		
>14	150 (86.7)	23 (13.3)		
Religion			5.089	0.079
Christianity	250 (84.7)	45 (15.3)		
Islam	23 (100.0)	0 (0.0)		
ATR	9 (75.0)	3 (25.0)		
Class			0.258*	0.640
JSS	124 (84.4)	23 (15.6)		
SSS	158 (86.3)	25 (13.7)		
Type of School Attending			0.390*	0.640
Public	143 (86.7)	22 (13.3)		
Private	139 (84.2)	26 (15.8)		
Mother's highest level of Education			14.201	**0.003**[#]
No formal education	11 (57.9)	8 (42.1)		
Primary	14 (82.4)	3 (17.6)		
Secondary	64 (83.1)	13 (16.9)		
Tertiary	193 (88.9)	24 (11.1)		
Father's highest level of Education			7.908	**0.048**[#]
No formal education	8 (72.7)	3 (27.3)		
Primary	11 (68.8)	5 (31.3)		
Secondary	39 (79.6)	10 (20.4)		
Tertiary	224 (88.2)	30 (11.8)		

statistically significant; * Fischer's Exact

As age increased, positive attitude towards HPV vaccination increased slightly, with those aged greater than 14 years, 150 (86.7%) having positive attitude compared to 132 (84.1%) aged 14 years and below and this association was not statistically significant (p=0.534).

In regards to religion, students who had positive attitude comprised 250 (84.7%) Christians and 9 (75.0%) ATR worshippers when compared to Muslims who all had positive attitude 23 (100.0%). However, this was not statistically significant (p=0.079).

As level of class increased, a higher proportion of students had positive attitude towards HPV vaccination with 158 (86.3%) of those in senior secondary school having positive attitude when compared to 124 (84.4%) in junior secondary school. This association was not statistically significant (p=0.640).

Similarly, those in public schools had a slightly higher proportion 143 (86.7%) with positive attitude compared to 139 (84.2%) of those in private schools, this however was not statistically significant (p=0.640).

As level of education of respondent's mother increased, the proportion of those with positive attitude tend to increase with 193 (88.9%) of those with positive attitude having mothers who had tertiary level of education when compared to 14 (82.4%) who had primary and 64 (83.1) who had secondary level. This was statistically significant (p=0.003).

While as father's level of education increased, a higher proportion of students demonstrated positive attitude, with 224 (88.2%) of those with fathers having tertiary level of education having positive attitude when compared to 11 (68.8%) who had primary level and 39 (79.6%) who secondary education. Moreover, this association was statistically significant (p=0.048).

Table 8: Predictors of attitude towards HPV vaccination and sociodemographic characteristics of respondents

Variable	B	OR (Exp (B))	95% CI (Lower)	95% CI (Upper)	p-value
Age group (years)	-0.020	0.981	0.800	1.202	0.850
Religion					
Christianity	-0.652	0.521	0.153	1.773	0.297
Non-christianity*		1			
Class					
JSS	-0.162	0.850	0.304	2.383	0.758
SSS*		1			
Type of School Attending					
Public	0.560	1.751	0.077	0.887	3.456
Private*		1			
Mother's highest level of Education					
No formal education	-2.248	0.106	0.021	0.520	**0.006**[#]
Primary	-0.584	0.558	0.121	2.560	0.452
Secondary	-0.368	0.692	0.297	1.613	0.394
Tertiary*		1			
Father's highest level of Education					
No formal education*		1			
Primary	-0.838	0.433	0.055	3.429	0.428
Secondary	-0.474	0.623	0.090	4.324	0.623
Tertiary	-0.116	0.891	0.128	6.197	0.891

R^2 = 7.6-13.6%; # statistically significant; * reference group

For every 1 unit rise in age, students were 0.981 times less likely to portray a positive attitude towards HPV vaccination although, this was not statistically significant. (OR=0.981, 95% CI=0.800-1.202, p=0.850).

Students who were Christians were 0.521 less likely to have a positive attitude when compared to those who worshipped other religions. However, these were not statistically significant. (OR=0.521, 95% CI=0.153-1.773, p=0.297).

Students in JSS were 0.850 times less likely to have a positive attitude compared to those in SSS, this also was not statistically significant. (OR=0.850, 95% CI=0.304-2.383, p=0.758).

When compared to students who attended private schools, those in public schools were 1.751 times more likely to have positive attitude though, this was not statistically significant. (OR=1.751, 95% CI=0.077-0-.887, p=3.456).

Students who had mothers with no formal education (OR=0.106, 95% CI=0.021-0.520, p=0.006), primary education (OR=0.558, 95% CI=0.121-2.560, p=0.452) and secondary level of education (OR=0.692, 95% CI=0.297-1.613, p=0.394) were less likely to have positive attitude when compared with those who had tertiary level of education. Only the association with no formal education was statistically significant.

The likelihood of having a positive attitude was lesser among students whose fathers had primary level of education (OR=0.433, 95% CI=0.055-3.429, p=0.428), secondary level (OR=0.623, 95% CI=0.090-4.324, p=0.623) and tertiary level (OR=0.891, 95% CI=0.128-6.197, p=0.891) when compared with those with no formal education. Though, these were not statistically significant.

SECTION D

HPV VACCINE UPTAKE

Table 9: HPV vaccine uptake among respondents

Variable	Frequency (n=330)	Percent
Received the HPV vaccine		
Yes	19	5.8
No	286	86.7
Not sure	25	7.6
Number of doses received (n=19)		
One	9	47.4
Two	7	36.8
Three	0	0.0
Not sure	3	15.8
Place received the vaccine (n=19)		
At a hospital or clinic	9	47.4
During a health outreach or campaign	8	42.1
At school	2	10.5
I don't remember	0	0.0
Received the vaccine with parental permission (n=19)		
Yes	15	78.9
No	1	5.3
I didn't ask my parents	3	15.8

In regards to HPV vaccine uptake, only 19 (5.8%) had received the vaccine with 9 (47.4%) receiving a dose and 7 (36.8%) receiving two doses. Three (15.8%) were not sure about the number of doses they had received.

The places reported for receiving the vaccine were at the hospital or clinic 9 (47.4%), during a health outreach or campaign 8 (42.1%) and at school 2 (10.5%).

A majority of them, 15 (78.9%) reported receiving parental permission before taking the vaccine while 3 (15.8%) did not ask their parents.

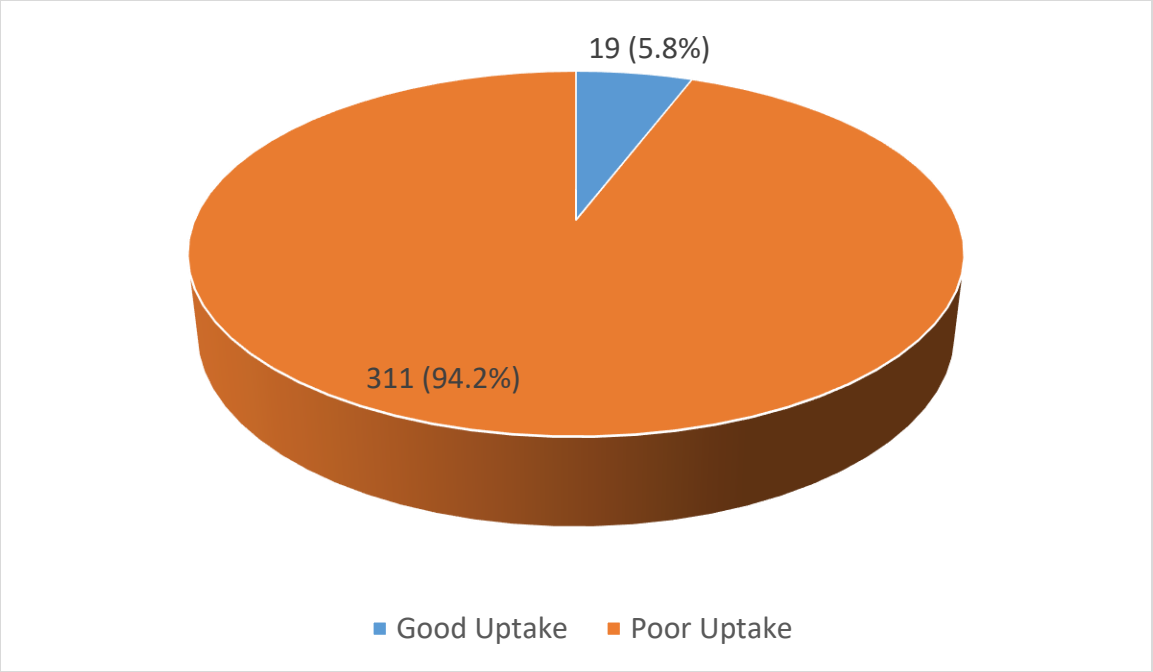

Fig. 3. Overall uptake of HPV vaccine among respondents

Among the 330 respondents, only 19 (5.8%) had taken the HPV vaccine and therefore, showed good uptake; while 311 (94.2%) had not taken the vaccine, thereby, demonstrating poor uptake.

Table 10: HPV vaccine uptake and sociodemographic characteristics of respondents

Variable	Uptake		Chi square	p-value
	Good (n=19) n (%)	**Poor (n=311) n (%)**		
Age group (years)			18.296*	**<0.001#**
≤14	0 (0.0)	157 (100.0)		
>14	19 (11.0)	154 (89.0)		
Religion			0.882	0.643
Christianity	18 (6.1)	277 (93.9)		
Islam	1 (4.3)	22 (95.7)		
ATR	0 (0.0)	12 (100.0)		
Class			16.195*	**<0.001#**
JSS	0 (0.0)	147 (100.0)		
SSS	19 (10.4)	164 (89.6)		
Type of School Attending			4.524*	0.056
Public	5 (3.0)	160 (97.0)		
Private	14 (8.5)	151 (91.5)		
Mother's highest level of Education			2.358	0.501
No formal education	0 (0.0)	19 (100.0)		
Primary	2 (11.8)	15 (88.2)		
Secondary	4 (5.2)	73 (94.8)		
Tertiary	13 (6.0)	204 (94.0)		
Father's highest level of Education			0.273	0.965
No formal education	1 (9.1)	10 (90.9)		
Primary	1 (6.3)	15 (93.8)		
Secondary	3 (6.1)	46 (93.9)		
Tertiary	14 (5.5)	240 (94.5)		

*Fisher's Exact Test; # statistically significant

As age increased, uptake of HPV vaccine also increased with only those aged above 14 years,19 (11.0%) having taken the vaccine when compared to those aged 14 years and below, 0 (0.0%) who had not taken the vaccine. This was statistically significant (p=<0.001).

A higher proportion of those who had good uptake were Christians, 18 (6.1%) when compared to Muslims, 1 (4.3%) however, this was not statistically significant (p=0.643).

Only those in senior secondary school, 19 (10.4%) had taken the vaccine compared to those in junior secondary school 0 (0.0%) and this association was statistically significant (p=<0.001).

Also, among those with good uptake, a higher proportion 14 (8.5%) attended private schools compared to 5 (3.0%) who attended public schools, though, this was not a statistically significant association (p=0.056).

There was no demonstrable trend in uptake of the vaccine as respondent's mother's level of education increased, with 13 (6.0%) of those who had mothers with tertiary level of education having good uptake when compared to 4 (5.2%) of those with mothers who had secondary level and primary level, 2 (11.8%) respectively. This was however, not statistically significant (p=0.501).

Closely, there was no trend between respondent's father's level of education and vaccine uptake, with 240 (94.5%) of those who had fathers with tertiary level of education having poor uptake when compared to 10 (90.9%) of those with fathers who had no formal education. However, this was not statistically significant (p=0.965).

SECTION E

FACTORS INFLUENCING HPV VACCINE UPTAKE

Table 11a: Factors influencing HPV vaccine uptake among repondents

*Reasons for not taking the HPV vaccine	Frequency (n=311)	Percent
I have never heard of it	217	69.8
It was not available in my area	75	24.1
I don't know where to get it	75	24.1
I don’t think I need it	55	17.1
I am afraid of side effects	44	14.1
My parents did not allow	16	5.1
It is too expensive	4	1.3
#Others	2	0.6

*Multiple Choice Question; #Others: I wasn’t aware as at the age I was supposed to take it, I’m not ever going to take it

Among those who had not received the vaccine, having not heard of the vaccine was the most common reason reported by more than two-thirds, 217 (69.8%) of the students. Non-availability of the vaccine in their area, 75 (24.1%); not knowing were to get the vaccine 75 (24.1%); thinking that they do not need the vaccine, 55 (17.1%); and fear of side effects, 44 (14.1%) were also reported by the students.

Table 11b: Other factors influencing HPV vaccine uptake among repondents

Variables	Frequency (n=330)	Percent
Received health education about HPV or cervical cancer in school		
Yes	56	17.0
No	274	83.0
Availability of vaccine in community or school		
Yes	47	14.2
No	59	17.9
I don't know	224	67.9
Know any girl who has taken the HPV vaccine		
Yes	56	17.0
No	274	83.0

Most, 274 (83.0%) had not received health education about HPV or cervical cancer in school and more than two-thirds, 224 (67.9%) did not know if the vaccine was available in their in community or school. Only 56 (17.0%) students knew any girl who had taken the vaccine.

Table 12: Predictors of HPV vaccine uptake among respondents

Variable	B	OR (Exp (B))	95% CI (Lower)	95% CI (Upper)	p-value
Age group (years)	0.278	1.321	0.883	1.974	0.175
Religion					
Christianity	0.793	2.209	0.286	17.075	0.447
Non-christianity*		1			
Type of School Attending					
Public	-1.053	0.349	0.077	1.573	0.171
Private*		1			
Mother's highest level of Education					
Tertiary*		1			
Non-tertiary	-0.287	0.751	0.225	2.504	0.641
Father's highest level of Education					
Tertiary*		1			
Non-tertiary	0.628	1.875	0.517	6.797	0.339
Received health education about HPV or cervical cancer in school					
Yes	-1.065	0.345	0.067	1.769	0.202
No*		1			
Availability of vaccine in community or school					
Yes	1.096	2.993	0.513	17.443	0.223
No	0.460	1.584	0.243	10.346	0.631
I don't know*		1			
Know any girl who has taken the HPV vaccine					
Yes	5.656	286.090	14.316	5717.052	**<0.001**[#]
No*		1			

R^2 = 22.3-62.6%; # statistically significant; * reference group

For every unit rise in age, students were 1.321 times more likely to receive the HPV vaccine, however, this was not statistically significant (OR=1.321, 95% CI=0.883-1.974, p=0.175).

Compared to non-christians, Christians (OR = 2.209, 95% CI = 0.286–17.075, p = 0.447) showed higher odds of uptake of the HPV vaccine; however, this was not significant.

Students in public schools (OR = 0.349, 95% CI = 0.077–1.573, p = 0.171) were less likely than those in private schools to take the HPV vaccine, and this association was also not statistically significant.

Having a mother without tertiary education (OR = 0.751, 95% CI = 0.225–2.504 p = 0.641), decreased the likelihood of uptake, compared to tertiary education, but this was not statistically significant.

For paternal education, those who did not attain tertiary education (OR = 1.875, 95% CI = 0.517–6.797, p = 0.339) were associated with higher odds of vaccine uptake compared to those who had tertiary education, though this association was not statistically significant

Students who had received health education about HPV or cervical cancer in school were 0.345 times less likely to take the HPV vaccine compared to those who had not received such educaton. This, however, was not statistically significant (OR=0.345, 95% CI=0.067 -1.769, p=0.202)

Those who reported that the vaccine were available in their community or school were 2.993 times more likely to receive the vaccine when compared to those who did not know if the vaccine were available however, this relationship was statistically significant (OR=2.993, 95% CI=0.513 - 17.443, p=0.223) while those who reported that the vaccine was not available were also 1.584 times more likely though this was not statistically significant (OR=1.584, 95% CI=0.243-10.346, p=0.631).

Students who reported that they knew any girl who had taken the HPV vaccine were much more likely to receive the vaccine when compared to those who reported otherwise and this association was statistically significant (OR=286.090, 95% CI=14.316-5717.052, p= <0.001).

CHAPTER FIVE

DISCUSSION

Findings from this study showed that the sociodemographic profile majorly consisted of respondents within the age bracket of 11-15 years with a mean age of 14.5 ± 2.4 years. This is in contrast with a study conducted among female secondary school students in Nnewi, Anambra State, Nigeria, which reported most respondents being between 15–18 years with a mean age of 15.0 ± 1.9 years.[34] This variation may reflect school enrollment structures across regions in Nigeria, but both findings emphasize the need for early adolescent vaccination before the onset of sexual debut.

The predominant ethnic group represented was Benin, followed by Esan and Igbo. Consisitent with this was the study carried out in Ibadan, Nigeria where most respondents were from the Igbo ethnic group.[14] These reflect the most common ethnicity in the geographical region and is relevant because cultural practices and community beliefs may influence health behaviour, including acceptance of vaccination. Christianity was the predominant religion, consistent with studies in Ibadan, Nigeria where Christianity was also dominant among adolescents.[28] The predominance of Christianity reflects the general religious distribution in southern Nigeria. This is important because churches often serve as platforms for community health education, meaning religious institutions could influence awareness and uptake of health interventions.

Parental education was high, with 65.8% of mothers and 77.0% of fathers having tertiary education. This is comparable to that in Ibadan, were a slightly lower proportion of the mothers had tertiary level of education.[28] The high level of parental education may be explained by the urban setting of the study, where access to higher education is greater. Parents with higher

education are more likely to value formal health information, which can positively shape their children's knowledge and attitudes towards vaccination.

Knowledge of HPV in this study was low, as only about a quarter of respondents showed good knowledge. This contrasts with a study in Benin City, Nigeria which showed that nearly all the respondents had never heard of HPV.[19] Similarly, in Nnewi, Anambra State, about two-thirds of secondary school students were unaware of HPV and its vaccine.[34] However, a study done across multiple states in Nigeria reported that about 23% were aware of HPV and 18% were aware of the vaccine.[35] A plausible explanation for the generally poor knowledge observed in this study and across similar settings is the limited integration of HPV education into school health programmes and curricula. In addition, many adolescents rely on teachers, peers, and health talks for health information, and where these sources are inconsistent, knowledge tends to remain poor. Access to reliable media information and parental guidance may also explain why private school students and older adolescents are often better informed. The implication of this low knowledge is significant, as limited knowledge reduces the likelihood of early acceptance and uptake of the HPV vaccine. Without adequate information on HPV transmission, its link to cervical cancer, and the role of vaccination, many adolescents may remain indifferent or resistant when vaccination opportunities arise.

Increasing age was found to have a statistically significant association with good knowledge. Comparable findings have been reported among adolescents in Nigeria, where older girls demonstrated higher knowledge of HPV and its vaccine.[35] This may be attributed to increased exposure to reproductive health information with advancing age, either through school curriculum or peer interactions. The implication is that without deliberate early sensitization, younger adolescents may remain uninformed at the critical recommended age of 9–14 years for HPV

vaccination. Religious affiliation was not significantly associated with knowledge in this study. Similar non-significant associations have been documented in Bauchi, Nigeria.[36] This suggests that religious identity may not be a major determinant of HPV knowledge, although faith-based institutions could still be leveraged as platforms for awareness campaigns.

Increasing class level showed a strong association with knowledge. This aligns with study in Cross River, where higher school level correlated was significantly associated with HPV knowledge. [37] The likely explanation is that senior students are closer to sexual debut age, and hence more often exposed to discussions on reproductive health. This highlights the importance of tailoring HPV health education to reach younger students before they transition to senior classes. School type was also significantly associated with knowledge, with more of those in private school demonstrating good knowledge. This is inconsistent with findings in Oyo, Ibadan where public school students had more awareness.[28] This may reflect differences in resource availability, parental socioeconomic status, and opportunities for exposure to health campaigns. It reinforces the need to strengthen public school health programs to ensure equity in HPV-related information.

Mother's level of education showed significant association with knowledge level unlike father's level of education though there was no consistent trend. This mirrors findings from Oromia, Ethiopia which reported same findings.[26] Possible explanation for the finding in the present study may be that parental education in itself does not necessarily translate into communication about sensitive topics such as reproductive health. In many Nigerian households, discussions about sexual health are limited by cultural and religious norms, regardless of parental educational attainment. This could reduce the expected advantage that children of educated parents might have. The implication of this finding is that improving HPV knowledge among adolescents cannot depend solely on parental educational background. If children of highly educated parents remain

poorly informed, then school-based health promotion and direct adolescent-focused interventions become even more crucial.

A majority of the students showed positive attitude towards HPV vaccination in this study. This is similar to reports in Rivers State, Nigeria where a more than two-thirds also showed positive attitude.[37] Students may express favourable attitudes towards vaccination due to generalised acceptance of vaccines, perceived authority of health workers, teachers, or government programmes, and the belief that vaccines are inherently beneficial, even without understanding their specific purpose. In such settings, attitudes may reflect social desirability, compliance with perceived norms, or trust in public health interventions rather than informed conviction. The presence of a positive attitude in the context of poor knowledge highlights a critical gap between acceptance and understanding. This presents an opportunity for targeted school-based health education programmes that can build accurate knowledge on HPV and its consequences, thereby strengthening informed decision-making.

Increasing parental educational level was statistically, significantly associated with a positive attitude towards HPV vaccination among the students. Students whose mothers had no formal education were less likely to demonstrate a positive attitude towards HPV vaccination compared to those whose mothers had some level of formal education. The observed association may be attributed to the influential role of parental education, particularly maternal education, on adolescents' health attitudes. Mothers with formal education are more likely to possess better health awareness, be exposed to accurate health information, and understand the importance of preventive health measures such as vaccination. This finding highlights the importance of incorporating parents, especially mothers with little or no formal education, into HPV vaccination awareness programmes

In this study, uptake of the HPV vaccine was significantly poor with only less than 6% having taken the vaccine mostly through hospitals or outreach campaigns rather than in schools. In constrast, about a quarter of students had taken the vaccine in a study conducted in Benin City.[32] A key explanation is that the HPV vaccine was of recent fully integrated into the national immunization schedule, which makes access irregular and dependent on health facilities, outreach campaigns, or private provision. Misconceptions about the vaccine and lingering concerns about safety may also contribute to the poor uptake. The implication is that without structural integration of HPV vaccination into routine adolescent health services, coverage is likely to remain poor and schools represent a missed opportunity for large-scale delivery in Nigeria, and integrating HPV vaccination into school health systems could improve accessibility.

There were statistically significant associations between age and class; and vaccine uptake, with older adolescents more likely to be vaccinated. However, studies in Ethiopia[26] and Benin City, Nigeria[19] found no such association.This may be explained by greater maturity, increased health awareness, higher exposure to reproductive health education and vaccination campaigns; and more autonomy in decision-making among older students. The implication is that younger adolescents who are the primary target group for HPV vaccination may remain excluded unless targeted sensitization and early access strategies are implemented. Students in private schools demonstrated higher uptake compared to those in public schools, though the difference was not statistically significant, likewise parental level of education. Other studies did not find such relatioships.[28,37,36] This is often linked to socioeconomic advantage and greater access to health information.The implication is that reliance on private healthcare channels risks widening inequities, as students in public schools who make up the majority are left underserved.

The only independent factor reported to influence uptake was peer influence. Students who knew a peer who had taken the vaccine were far more likely to be vaccinated. Similar findings were reported in Ondo and Rivers States.[28,37] This demonstrates that social proof strongly influence uptake. The implication is that peer-led sensitization, could play a central role in normalizing HPV vaccination among adolescents.

CONCLUSION

This study provides insight into the awareness of HPV, attitudes toward HPV vaccination, vaccine uptake, and the associated sociodemographic factors among secondary school students. Awareness and knowledge of HPV and its vaccine were generally low, with only about a quarter of respondents demonstrating good knowledge. Increasing age, higher class level, attending private schools, and mother's level of education were significantly associated with better knowledge, while religious affiliation and father's level of education were not. Attitudes toward HPV vaccination showed considerable level of positivity and this was more among students who had parents with higher level of education, particularly that of the mother . Uptake of the HPV vaccine was poor, with less than 6% of students vaccinated. Factors significantly associated with uptake included older age, higher class level, and peer influence. Most vaccinated students received the vaccine through hospitals or outreach campaigns rather than schools.

RECOMMENDATIONS

In line with the findings from this study, a number of recommendations to improve awareness of HPV, attitudes toward HPV vaccination, and vaccine uptake among secondary school students are as follows:

To the Ministry of Education

- Strengthening of HPV Education in secondary schools by integrating comprehensive HPV education into the school curriculum, with emphasis on HPV transmission, its link to cervical cancer, and the benefits of vaccination.
- Integration of talk shows on HPV and HPV vaccination in schools that target younger students before the recommended vaccination age of 9–14 years to ensure early sensitization and informed decision-making.

To the Ministry of Health

- The Ministry of Health should collaborate with the Ministry of Education to implement school-based HPV vaccination campaigns to improve accessibility and uptake, particularly in public schools. Such programmes should include regular outreach, vaccine availability, and information sessions to address misconceptions and safety concerns.
- Health authorities should also collaborate with media outlets and social media platforms to deliver targeted, age-appropriate HPV information. This should include using platforms popular among adolescents to expand reach and reinforce positive attitudes toward vaccination.

To the Community

- Community youth leaders can assign trained ambassadors to lead discussions, share personal experiences, and act as champions for HPV awareness and vaccination.
- Members of the community should be receptive and supportive towards programmes and campaigns on HPV and vaccination carried out in their community by bodies such the Ministry of Health and related NGOs.

To the Parents

- Parents should be part of community health talks, parent-teacher meetings, and awareness campaigns to encourage open discussions about HPV and vaccination. Special emphasis should be placed on equipping parents with accurate information to support informed choices for their children.
- They should also provide quality time for their children and be less judgemental in order to foster openness and trusthworthiness needed to promote asking of questions in regards to HPV, its risk factors and prevention; and subsequently, providing accurate information.

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APPENDIX I

INFORMED CONSENT FORM

TITLE OF STUDY: AWARENESS, ATTITUDE AND UPTAKE OF HUMAN PAPILLOMA VIRUS VACCINES AMONG FEMALE SECONDARY SCHOOL STUDENTS IN BENIN CITY, NIGERIA.

INVESTIGATOR: AISOSA MIRACLE OMOREGIE

SUPERVISOR: PROF. OBEHI OKOJIE

FINANCIAL SPONSORSHIP: This research project is self-sponsored.

PURPOSE OF THE RESEARCH: The purpose of this study is to assess the awareness, attitude and uptake of human papilloma virus vaccines among female secondary school students in Benin city, Nigeria.

PROCEDURES AND PROTOCOL INVOLVED IN THE STUDY

You are kindly requested to complete a questionnaire designed to assess the awareness, attitude and uptake of human papilloma virus vaccines among female secondary school students in Benin city, Nigeria. This questionnaire is for research purposes only.

COMPENSATION

There will be no financial compensation for participating in this study.

VOLUNTARY PARTICIPATION

Your participation in this research is completely voluntary. There will be no discrimination against you if you choose not to participate. You are free to change your mind and withdraw from the study at any time, even if you initially agreed to take part.

SIDE EFFECTS

There is no anticipated adverse effect associated with participating in this study.

BENEFIT

The benefit of this study includes the provision of useful local data for the improvement of medical education and student welfare.

CONFIDENTIALITY

All information and data obtained during this study will be kept confidential. Participant names will not be recorded on the questionnaires, and all collected information will be securely stored in a password-protected file on my personal computer. Any physical copies will be stored in a locked personal document cabinet.

CONTACT INFORMATION

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ETHICS AND RESEARCH COMMITTEE

University of Benin Teaching Hospital

Benin City.

Phone Number: 07063331337

CERTIFICATE OF CONSENT

I have read the above information (or it has been read to me). I had the opportunity to ask questions about it and the questions were answered to my satisfaction.

(A) I consent voluntarily to take part as a participant in this study

(B) I do not consent to participate in this study.

Name of Participant: ----------

Signature of participant: ----------

Date:----------

APPENDIX II

DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE

SCHOOL OF MEDICINE, UNIVERSITY OF BENIN

AWARENESS, ATTITUDE AND UPTAKE OF HUMAN PAPILLOMA VIRUS VACCINES AMONG FEMALE SECONDARY SCHOOL STUDENTS IN BENIN CITY, NIGERIA

I am a 600 level medical student of the University of Benin, Benin City. This questionnaire is designed to assess the awareness and uptake of human papilloma virus vaccines among female secondary school students in benin city. All information given will be treated as confidential. Please tick (✓) and fill any areas as appropriate. Thank you for your participation.

SECTION A: SOCIODEMOGRAPHIC CHARACTERISTICS

1. Age (as at last birthday): _____
2. Ethnic group: Benin ( ) Esan ( ) Urhobo ( ) Igbo ( ) Hausa ( ) Yoruba ( ) Other (please specify) _____
3. Religion: Christianity ( ) Islam ( ) Traditional ( ) Other (please specify): _____
4. Class: JSS1 ( ) JSS2 ( ) JSS3 ( ) SS1 ( ) SS2 ( ) SS3 ( )
5. Type of School Attending: Public ( ) Private ( )
6. Mother's highest level of Education: No formal education ( ) Primary ( ) Secondary ( ) Tertiary ( )
7. Father's highest level of Education: No formal education ( ) Primary ( ) Secondary ( ) Tertiary ( )

SECTION B: AWARENESS AND KNOWLEDGE OF HPV AND THE HPV VACCINATION

8. Have you ever heard of HPV (Human Papilloma Virus)? Yes ( ) No ( ). If No, skip to next section.
9. Have you ever heard of the HPV vaccine? Yes ( ) No ( )
10. Where did you hear about the HPV vaccine? (Tick all that apply) TV or radio ( ) Social media ( ) School health talk ( ) Parents or family ( ) Health worker ( ) Religious leader □ Friend/classmate ( ) I don't remember
11. HPV causes Malaria. Yes ( ) No ( )
12. HPV causes HIV/AIDS. Yes ( ) No ( )
13. HPV causes Cervical cancer. Yes ( ) No ( )
14. At what age should girls ideally receive the HPV vaccine? Before 9 years □ 9–14 years □ 15–19 years ( ) I don't know ( )
15. Can the HPV vaccine prevent cervical cancer? Yes □ No ( ) I don't know ( )
16. How many complete doses of the HPV vaccine are needed? One ( ) Two ( ) Three ( ) I don't know ( )
17. Do you know where you can get the HPV vaccine? Yes ( ) No ( ). If Yes, state_____

SECTION C: ATTITUDE TOWARDS HPV VACCINATION

ITEM	STRONGLY DISAGREE	DISAGREE	UNDECIDED	AGREE	STRONGLY AGREE
The HPV vaccine is important for girls my age					
I would take the HPV vaccine if it were available in my school					
I am afraid of taking vaccines					
I believe the HPV vaccine is safe					
My parents won't allow me to take the HPV vaccine					
Getting the HPV vaccine might make people think I'm sexually active					

SECTION D: HPV VACCINE UPTAKE

18. Have you ever received the HPV vaccine? Yes ( ) No ( ) Not sure ( )
19. If yes, how many doses have you received? One ( ) Two ( ) Three ( ) Not sure ( )
20. Where did you receive the vaccine? At school ( ) At a hospital or clinic ( ) During a health outreach or campaign ( ) I don't remember ( )
21. Did you receive the vaccine with parental permission? Yes ( ) No ( ) I didn't ask my parents ( )

SECTION E: FACTORS INFLUENCING HPV VACCINE UPTAKE

22. If you have not received the HPV vaccine, why? (Tick all that apply) I have never heard of it ( ) My parents did not allow it ( ) I am afraid of side effects ( ) It was not available in my area ( ) I don't know where to get it ( ) I don't think I need it ( ) It is too expensive ( ) Other (please specify) _____
23. Have you ever received health education about HPV or cervical cancer in school? Yes ( ) No ( )
24. Are vaccines generally available in your community or school? Yes ( ) No ( ) I don't know ( )
25. Do you know any girl who has taken the HPV vaccine? Yes ( ) No ( )

APPENDIX III

HEALTH RESEARCH ETHICS COMMITTEE (HREC)

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Registration Number:
NHREC-UBTH-HREC/24/12/2022B

PROTOCOL NUMBER: ADM/E 22/A/VOL. VII/1486549127242

PROPOSAL TITLE: **"AWARENESS, ATTITUDE AND UPTAKE OF HUMAN PAPILLOMA VIRUS VACCINES AMONG FEMALE SECONDARY SCHOOL STUDENTS IN BENIN CITY, NIGERIA"**

PRINCIPAL INVESTIGATOR(S): **AISOSA MIRACLE OMOREGIE,**

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

DATE CONSIDERED: 18TH SEPTEMBER, 2025

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 18/09/2025 TO 17/09/2026. 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:** Email 18/9/2025

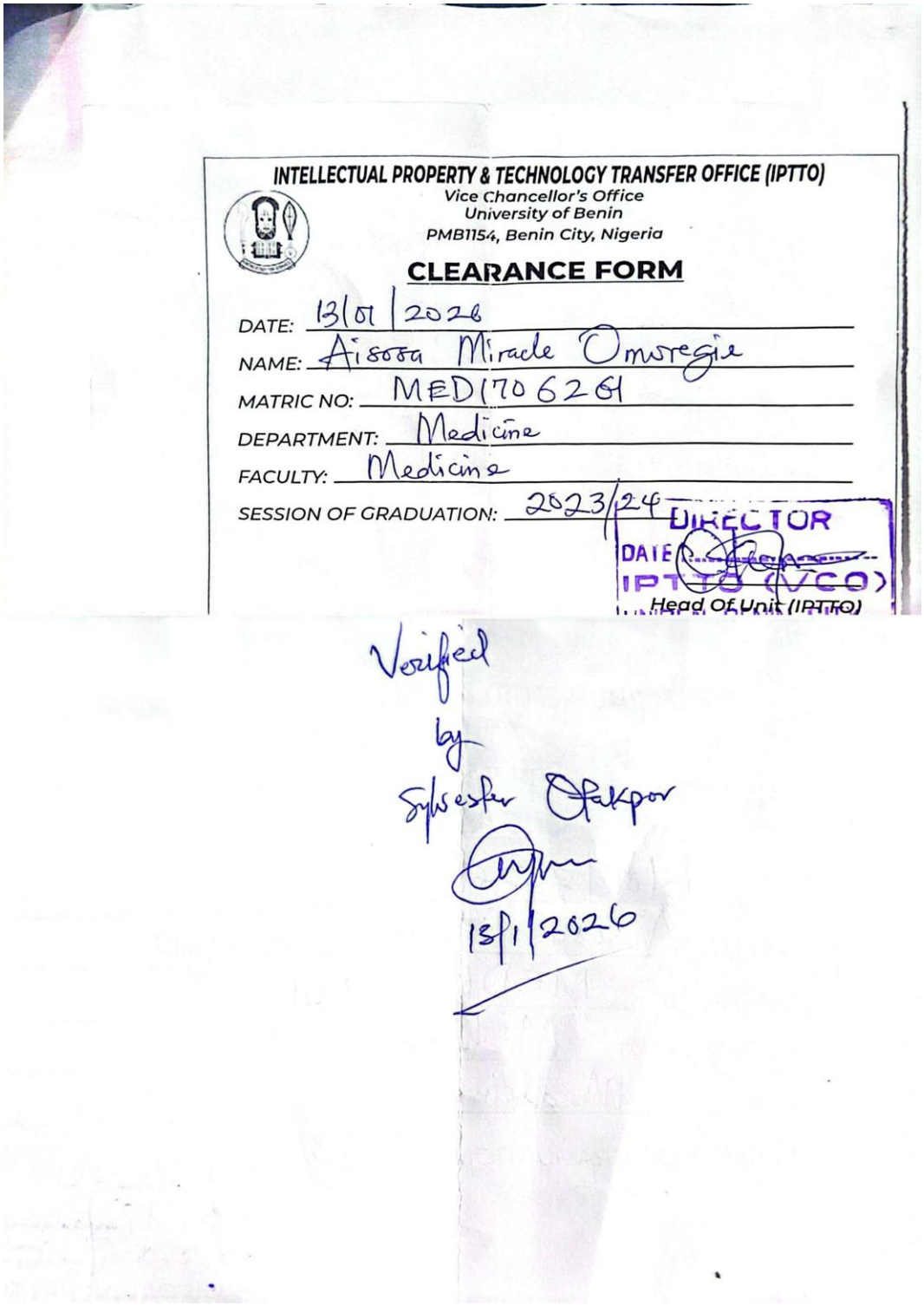
UNIVERSITY OF BENIN TEACHING HOSPITAL ETHICS & RESEARCH COMMITTEE Date BENIN CITY P.M.B. 1111

SUPERVISOR (S): PROF. OBEHI OKOJIE

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..... 18/9/2025

APPENDIX IV



INTELLECTUAL PROPERTY & TECHNOLOGY TRANSFER OFFICE (IPTTO)
Vice Chancellor's Office
University of Benin
PMB1154, Benin City, Nigeria

CLEARANCE FORM

DATE: 13/01/2026
NAME: Aisosa Miracle Omoregie
MATRIC NO: MED170626
DEPARTMENT: Medicine
FACULTY: Medicine
SESSION OF GRADUATION: 2023/24

DIRECTOR
DATE
IPTTO (VCO)
Head Of Unit (IPTTO)

Verified
by
Sylvester Ofekpor
13/1/2026