KNOWLEDGE, ATTITUDE AND ACCEPTANCE OF HUMAN PAPILLOMA VIRUS VACCINATION AMONGST MOTHERS IN EGOR LGA

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MAY, 2026

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By

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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.

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF MEDICINE AND BACHELOR OF SURGERY (MBBS) DEGREE IN THE UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA.

MAY, 2026

DECLARATION

I hereby declare that this project work is original and will be carried out by the under-listed students under the supervision of **Prof Obehi Okojie** and **Dr. Ndubuisi Mokogwu** and has not been published elsewhere for the award of a degree or certificate.

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CERTIFICATION

This is to certify that this research work titled “knowledge, attitude and acceptance of human papilloma virus vaccination amongst mothers in Egor LGA” will be carried out in the Department of Community Health, School of Medicine, College of Medical Sciences, University of Benin, Benin City, Edo State, Nigeria as part of the requirements for the award of Bachelor of Medicine, Bachelor of Surgery (MBBS) by **HILLARY OVOSHOSHUMUNU SEGUN** with matriculation number **MED1807496.**

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DEDICATION

I dedicate this work to God Almighty, who has brought me this far in my pursuit of becoming a medical doctor. This project is also dedicated to my family, who have been my pillar over the years and have contributed immensely to my project. I also dedicate this to my colleagues, friends, and well-wishers.

ACKNOWLEDGEMENT

First and foremost, I give all glory and honour to God Almighty, whose mercies and grace have been my constant companion throughout this journey. None of this would have been possible without Him.

I would like to express my sincere gratitude to my project supervisors, Prof. Okojie Obehi and Dr. Mokogwu Ndubuisi, for their invaluable guidance, patience, and expertise throughout the course of this project. Their constructive feedback and dedication to my academic growth shaped this work in ways I am truly thankful for.

To my beloved parents, Mr. Oriloye Segun and Mrs. Ben Ileyemi Theresa, thank you for your unwavering love, sacrifice, and support. You are the foundation upon which everything I am is built. To my siblings, Segun Glory, Blessing Asekharume, and God'spower Samuel, thank you for the encouragement and warmth you always brought my way.

I also extend my heartfelt gratitude to my aunts and uncles, Ben Ogbodode and Ben Monday whose words of encouragement kept me going at every turn. I also want to appreciate my grandma for being the best I could ever ask for.

A very special acknowledgement goes to Dr. Promise Ugbodaga, my mentor who may not even know he holds that title. At a point when I doubted myself and considered abandoning my course after my JAMB score, it was his voice of reassurance that steadied me. He consistently reminded me not to let fear get the better of me, and for that, I am deeply grateful.

To my Church family, the ever-loving Church of Christ, UNIBEN/UBTH, your prayers, support, and love have been a source of strength I cannot adequately put into words. Thank you for being home away from home.

To my amazing friends, Collins, Ayobami, Jude, Chimdubem, Wisdom, Godwin, Atamfon, Oluwabukola, Sarah (Edeoghogho), Oluwaseyi, Mehetabel and many others too numerous to fully list, your friendship made this journey lighter and more joyful. Nsinne-Abasi; thank you so much for being amazing.

A special place of appreciation is reserved for Bosede Inumidun, Osarumwense (Efe), and Nnenna, who are truly dear to my heart. When data collection for this project felt overwhelming and nearly impossible, you all stood by me and refused to let me give up. I am forever grateful.

To my mentors and models, Bro. Eric Okomado, Bro. Osagiede Idehen, Bro. Titus Jude, Sis. Ajokpaoghene, Sis. Daniella, Bro Philemon Okpokpa and Bro. Moses Odia, you guided my steps from the very beginning of my university days to the very end. Your investment in my life has left a mark that words cannot fully capture. Eternal appreciation to Mrs Adebola who took me as her so before leaving this world.

To my Room 146 brothers, Moses Abegunde, Samson Okwufulueze, Okoh Emmanuel, Smart Ainyanyor, Callixtus Eshiramhe, and Maduka Mike, the memories we built together will last a lifetime. Thank you for the brotherhood.

To my incredible friends and classmates, Nelson Ugbodaga, Constance Jarikpe, Ruth Edigue, and Kennedy Odume, you were more than coursemates; you were family. Thank you for showing up in ways that truly mattered.

And to my amazing discussion group, the 100% Squad, you all know what you mean to me. The late nights, the shared notes, the push to keep going, all of it was worth it.

This degree is dedicated to every single one of you.

TABLE OF CONTENTS

PAGES

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AOR: Adjusted odds ratio

HPV: Human papilloma virus

LGA: Local government area

WHO: World health organization

SPSS: Statistical package for the social sciences

OPERATIONAL DEFINITIONS

Virus: a virus is an infectious microbe consisting of a segment of nucleic acid (either DNA or RNA) surrounded by a protein coat.

Cancer: cancer refers to any of the large number of diseases characterized by the development of abnormal cells that divide uncontrollably and have the ability to infiltrate and destroy normal body tissues

Vaccine: a vaccine is a simple, safe, and effective biological preparation that trains the body's natural defenses (immune system) to build resistance to specific infectious diseases by creating antibodies, without causing the actual illness.

ABSTRACT

Background: Human Papillomavirus (HPV) infection is the principal causative agent of cervical cancer, which remains a leading cause of cancer-related mortality among women in Nigeria. Despite the availability of effective HPV vaccines, uptake among eligible girls remains unacceptably low, partly due to poor knowledge, negative attitudes, and low acceptance among mothers who serve as primary decision-makers for childhood immunization. This study assessed the knowledge, attitude, and acceptance of HPV vaccination among mothers in Egor Local Government Area, Benin City, Edo State, Nigeria.

Methods: A descriptive cross-sectional study was conducted among 424 mothers in Egor LGA, selected using a multistage sampling technique. Data were collected using a pretested, structured, interviewer-administered questionnaire covering sociodemographic characteristics, knowledge of HPV and its vaccine, attitude towards HPV vaccination, acceptance of the HPV vaccine, and factors influencing acceptance. Knowledge and attitude scores were categorised as good (≥70%) or poor (<70%). Data were analysed using IBM SPSS version 27.0. Descriptive statistics, chi-square tests, and logistic regression were used as appropriate.

Results: The mean age of respondents was 37.41 ± 10.10 years, and the majority (43.2%) were in the 30–39 years age group. Most respondents (51.9%) had tertiary education, and 84.4% belonged to the middle socioeconomic class. Overall, 70.8% of respondents had previously heard of HPV, with hospitals and health centres being the most common source of information (52.0%). Only 53.0% of respondents demonstrated good knowledge of HPV and its vaccine, while 81.0% had a positive attitude and 81.0% accepted or were willing to vaccinate their daughters. On multivariable logistic regression, independent predictors of good knowledge were older age (OR = 1.030, 95% CI: 1.010–1.051, p = 0.004) and higher educational attainment (p < 0.001).

Independent predictors of positive attitude were good knowledge (OR = 5.053, 95% CI: 2.807–9.098, $p < 0.001$) and being ever-married (OR = 4.349, 95% CI: 1.368–13.824, $p = 0.013$). Positive attitude was the sole independent predictor of acceptance of HPV vaccination (OR = 5.003, 95% CI: 2.746–9.114, $p < 0.001$).

Conclusion: Despite poor knowledge among the majority of respondents, attitudes towards and acceptance of HPV vaccination were high. Targeted health education programmes addressing the knowledge gap are essential to sustaining and translating positive attitudes into improved HPV vaccine uptake among eligible girls in Egor LGA and similar urban communities in Nigeria.

Keywords: Human Papillomavirus; HPV vaccine; knowledge; attitude; acceptance; mothers; Egor LGA; Nigeria.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Human Papilloma Virus (HPV) is a group of viruses that are very prevalent and cause several health problems in both males and females including genital warts and cervical cancer.[1] HPV is a sexually transmitted infection which affects both genders. The virus implicated in this infection are of different serotypes, some of which cause benign lesions (serotypes 6 and 11) while others cause malignant lesions (serotypes 16 and 18).[2] It is estimated that approximately one in ten sexually active women with normal cytology may be affected by current genital HPV infection. By the age of 45, the probability of HPV infection for sexually active individuals is assessed to be over 80%. Although majority of those infected remain asymptomatic and eliminate the infection, some individuals may experience persistent or recurrent benign lesions, while others may develop precancerous lesions and cancer. According to the World Health Organization (WHO), HPV infections are responsible for approximately 5% of all cancers worldwide, and every year 625,600 women and 69,400 men develop cancer due to HPV infection. Almost all cases (99.7%) of cervical cancer are caused by HPV and 80% of all cancers caused by HPV are cervical.[3]. Cervical cancer, caused by HPV infection, is the fourth most frequently diagnosed cancer and the fourth leading cause of cancer related death among women globally. Low resource countries including those in sub- Saharan Africa have the highest infection burden of the disease with an estimate of 84% and related deaths at 88%. In 2020, the number of new cervical cancer cases stood at over 600,000 with 340,000 deaths, with 90% of these new infections and deaths occurring in low- and middle-income countries. In the same year, in the

Africa region alone, 100,000 women were infected, of whom about 70,000 women died, making up 21% of global cervical mortality. Therefore, the brunt of the global HPV burden by region is borne predominantly by sub- Saharan Africa, at an average of 24%.[4] Cervical cancer kills about 7,968 women annually in Nigeria. This makes it the second leading cause of maternal cancer deaths in Nigeria.[5]

HPV infection which leads to benign or malignant lesions have been shown to be one of the vaccine preventable diseases through the emergence of vaccines which target different serotypes of the virus, hence preventing infection. The first HPV vaccine was licensed in 2006; currently, the WHO has licensed six HPV vaccines. All the vaccines contain virus like particles (VLPS) targeting high-risk HPV serotypes 16 and 18.[6] The nonavalent vaccine also includes VLPS against serotypes 31,33,45,52,58 while the quadrivalent and nonavalent vaccines provide protection against anogenital warts caused by HPV types 6 and 11. The six available vaccines include the bivalent (Cervarix, Cecolin, and Walrinvax), quadrivalent (Gardasil and Cervavax) and nonavalent (Gardasil9) HPV vaccine formulations.[6] HPV vaccines are most effective when administered before sexual debut and consequent sexual exposure to HPV infection. The WHO recommends targeting girls aged 9-14 years for HPV vaccination programmes, with secondary targets including boys and older females where feasible and affordable. Initially, a two-sided schedule of six months in between doses was recommended for girls aged 9-14years, and a three-sided schedule for those 15 years or older. However, immunogenicity trials have shown that a single dose can elicit an immune response comparable to a multi dose regimen. Therefore, WHO now recommends a one or two dose schedule for girls aged 9-14 years and girls/women aged 15-20 years, and two doses six months apart for women older than 21 years.[7] As of 2022, 125 countries have introduced the HPV vaccine for girls and 47 countries for boys in their national

immunization programs.[8] The WHO's global strategy towards elimination of cervical cancer as a public health concern aims for all its members states to lower incidence of cervical cancer below 4 per 100,000 women per year. The strategy relies in three key areas: vaccination against HPV, screening and treatment of precancerous lesions and treatment and palliative care.[9] The first strategy outlined by the WHO assembly in 2020 to eliminate cervical cancer was through the vaccination of 90% of girls with the HPV vaccine by age 15.[10] Evidence from population studies , including post vaccination follow up has shown HPV vaccines to be highly immunogenic, safe, and effective in preventing HPV infection, cervical lesions, anogenital warts, and other related diseases (Drolet et al., 2019)[11.]

1.2 STATEMENT OF PROBLEM

Cervical cancer is preventable, yet it remains a major killer of women in Nigeria. HPV vaccines have been available for over a decade, but fewer than 20% of eligible girls in Nigeria receive the vaccine (UNICEF, 2022).[12]

Human Papillomavirus (HPV) infection remains a major public health concern due to its strong association with cervical cancer, a disease that continues to claim the lives of many women in Nigeria despite being largely preventable.[13] Although HPV vaccination is recommended as an effective preventive measure, uptake in many Nigerian communities remains low, particularly among adolescent girls who are the primary target group.[14]

One of the major challenges contributing to low HPV vaccine uptake is poor knowledge among mothers regarding HPV infection, its modes of transmission, and the protective role of vaccination. Inadequate knowledge leads to misinformation, underestimation of personal and

familial risk, and failure to prioritize vaccination as a preventive health measure.[15,16] As a result, eligible children may miss the opportunity for early protection against HPV infection.

In addition, negative or indifferent attitudes toward HPV vaccination among mothers further worsen the situation. Such attitudes are often influenced by fear of side effects, misconceptions that the vaccine promotes sexual promiscuity, cultural and religious beliefs, and distrust in vaccines or healthcare systems.[17,18] Poor attitude discourages proactive health-seeking behavior and reduces willingness to accept vaccination even when services are available.

Consequently, poor acceptance of HPV vaccination results in low vaccine coverage, sustained HPV transmission, increased incidence of cervical cancer, and preventable morbidity and mortality. It also places an additional burden on the healthcare system due to increased costs associated with cancer treatment and long-term care.[13] Despite these serious implications, there is limited documented evidence on the level of knowledge, attitude, and acceptance of HPV vaccination among mothers in Egor local government area, Edo state.

This gap in knowledge underscores the need for this study, which aims to assess these key factors and identify barriers to HPV vaccine uptake. Understanding these issues is essential for designing effective interventions to improve acceptance of HPV vaccination and reduce the burden of cervical cancer in the study area.

1.3 JUSTIFICATION OF STUDY

Human Papillomavirus (HPV) infection constitutes a significant global public health challenge and is recognized as the principal causative agent of cervical cancer, which remains one of the leading causes of cancer-related morbidity and mortality among women worldwide.[19] The burden of cervical cancer is disproportionately higher in low- and middle-income countries,

including Nigeria, where organized screening programs and preventive interventions remain limited.[13] HPV vaccination has been proven to be a highly effective primary preventive strategy against HPV infection and subsequent development of cervical cancer when administered before exposure to the virus.[14]

Despite the demonstrated effectiveness and safety of HPV vaccines, their uptake in Nigeria remains unacceptably low. Several studies conducted in different parts of the country have reported poor awareness, limited knowledge, and low acceptance of HPV vaccination among parents, particularly mothers, who are the primary decision-makers regarding childhood immunization.[15,16] Mothers play a crucial role in determining whether their daughters receive preventive healthcare services, including vaccinations; therefore, their level of knowledge and attitude toward HPV vaccination directly influences vaccine uptake.

Evidence from studies in Lagos, Ibadan, Owerri, and other Nigerian cities reveals that a significant proportion of mothers have either never heard of HPV or possess inadequate knowledge about its association with cervical cancer and the benefits of vaccination.[15-17] Even when awareness exists, misconceptions regarding vaccine safety, fear of adverse effects, cost concerns, cultural beliefs, and lack of access to vaccination services contribute to poor attitudes and low acceptance of the vaccine.[18] These factors collectively hinder effective implementation of HPV vaccination programs.

Furthermore, Nigeria bears one of the highest burdens of cervical cancer in sub-Saharan Africa, with thousands of new cases and deaths recorded annually.[13] Poor knowledge and acceptance of HPV vaccination among mothers perpetuate continued transmission of the virus and increase the risk of preventable morbidity and mortality. Addressing these gaps is essential to achieving national and global targets aimed at cervical cancer elimination.[19]

This study was therefore justified as it assessed the knowledge, attitude, and acceptance of HPV vaccination among mothers in Egor local government area, Edo state, Nigeria, a population for which data are currently scarce. Findings from this study will provide context-specific evidence that can inform targeted health education programs, guide policymakers, support immunization campaigns, and strengthen maternal involvement in HPV prevention strategies. Ultimately, the study will contribute to improved vaccine uptake and a reduction in the burden of HPV-related diseases within the study area and similar settings.

1.4 RESEARCH QUESTIONS

1. What is the level of knowledge of HPV and HPV vaccine among mothers in Egor LGA?
2. What are the perceptions of mothers in Egor LGA regarding the HPV vaccine?
3. What is the level of acceptance of the HPV vaccine among mothers in Egor LGA?
4. What factors influence the acceptance or refusal of the HPV vaccine?

1.5 GENERAL OBJECTIVE

To assess the knowledge, attitude and acceptance of human papilloma virus vaccination amongst mothers in Egor LGA, Benin City, Nigeria with a view of improving vaccine uptake amongst eligible teenage girls.

1.6 SPECIFIC OBJECTIVES

1. To determine the level of knowledge of HPV and HPV vaccine among mothers in Egor LGA
2. To assess perception of mothers in Egor LGA regarding HPV vaccination
3. To evaluate the acceptance and willingness of mothers in Egor LGA to vaccinate their children against HPV

4. To identify factors influencing acceptance or hesitancy of mothers in Egor LGA towards the HPV vaccine

CHAPTER TWO

LITERATURE REVIEW

2.1 Knowledge of mothers about HPV vaccine

A community-based, observational study was conducted to access the knowledge of cervical cancer, human papilloma virus and acceptance of the HPV vaccine among parents of daughters in Riyadh, Saudi Arabia, from 17 October to 27 November 2022. Data was collected using a questionnaire adapted from a study by Saqer A. Et al. The collected data were analyzed using IBM SPSS Statistics version 26.0. Five hundred and twenty-one individuals participated in the questionnaire, of whom 131 were excluded from the analysis (77 do not have daughters, and 54 do not live in Riyadh). Therefore, only 390 responses that met the inclusion criteria were analyzed; 88% were females, and 11.79% were male. To identify participants' awareness level, they were asked if they had heard of cervical cancer, HPV, and the HPV vaccine. Of the participants, 78.97% claimed that they had heard of cervical cancer, while fewer (50% and 41.28%) claimed that they had heard of HPV or the HPV vaccine, respectively. Subsequently, the participants who claimed to have heard of cervical cancer, HPV, or the HPV vaccine were asked specific questions regarding these domains to determine their knowledge level. Their responses about each domain were scored and categorized as good knowledge level if the average score of the participants was more than 60% and poor if the average score was less than 60%. The average knowledge of participants in all domains was poor (cervical cancer 53.05%, HPV 51.79%, and the HPV vaccine 34.09%). Participants' sources of information were also assessed. The Internet was the most popular source of information for the participants on cervical cancer, HPV, and the HPV vaccine, with an average of 42.2% in all three domains, followed by

school, university, and work with an average of 20.9%.[20] The study was conducted in a cross sectional manner which is appropriate for assessing knowledge and attitudes.

A quantitative cross-sectional survey was employed in Vhembe district, South Africa to access the knowledge and attitudes of women towards human papilloma virus and HPV vaccine between June and August 2015. Data was collected through self- reporting questionnaires. Data was analysed by means of frequencies to summarize background characteristics, HPV awareness, and knowledge about HPV vaccine. A total of 1600 women aged 30yrs and above were recruited from the clinics in Vhembe and 1546 completed the questionnaire. The results indicate that only 246 (25.9%) of the respondents had heard about HPV and the majority, 1146 (74.1%) had not heard about HPV. The results confirmed that the majority 1312 (85%) did not know how the virus was transmitted, 149 (9.6%) indicated transmission through sexual contact, 51 (3.2%) reported through kissing and 34 (2.1%) by not using a condom. The results showed that most of the respondents, 1512 (97.5%) did not know that HPV caused cervical cancer, only 38 (2.5%) of the respondents indicated that HPV caused cervical cancer. Regarding knowledge of HPV and HPV vaccine the findings revealed that the respondents had limited information on who gets infected with HPV, only a minority 32 (2.1%) had knowledge that both sexes can get infected with HPV and majority of respondents had no knowledge. The results revealed that 1410 (91.2%) of respondents did not know about the HPV vaccine and only136 (8.8%) had heard about the HPV vaccine. The results indicated lack of knowledge about vaccine. Furthermore, majority of the respondents, 1440 (93.1%) indicated that they did not know the age range, 50 (3.2%) indicated age range 9 to 26, 28 (1.8%) indicated age range 26 to 40, and another 28 (1.8%) indicated age range 41 to 50. The results confirmed lack of knowledge among respondents about HPV vaccine. Majority of the respondents 1458 (94.3%) did not know who was eligible for HPV

vaccine, 44 (2.8%) indicated that females were eligible for HPV vaccine, 18 (1.2%) indicated males and then 26 (1.7%) indicated both female and male eligible. The results showed that most of the respondents did not know who was eligible for HPV vaccine.[21] A challenge with this study is the fact that the surveys relied on self-report knowledge items without clear indication of validation or pre-testing in the local context.

A cross-sectional survey was conducted to assess parental knowledge of HPV infection, cervical cancer and the acceptance of HPV vaccination for their children in Jos, Plateau State Nigeria in 2024. Following a multistage sampling, 8 out of 20 communities in Jos north were selected randomly for the survey. The survey was among a sample of mothers and fathers with children in the 9–14 years age bracket. A pretested semi-structured investigator-administered questionnaire, without identifiers, was used to collect information on parental knowledge of HPV, cervical cancer, HPV vaccine and its acceptance for their 9–14-yearold children. The data were analysed using SPSS version 23.0. Bivariate analysis was done using chi-square statistical test. Five hundred and nine parents were interviewed. The mean age of the respondents was 43.7 ± 9.43 years. Most of the participants (86.1%) had formal education from primary to tertiary level. Only 1.60%, 11.60% and 1.62% of respondents had knowledge of HPV, cervical cancer and HPV vaccines respectively.[22] The involvement of 8 randomly selected communities out of 20 in the survey increases its representativeness within the local context hereby increasing the reliability of data obtained.

An analytical cross-sectional study was carried out in Ogun state between 24th to 28th October, 2023 to evaluate knowledge of human papilloma virus and its vaccine alongside attitudes and programme satisfaction among parents and caregivers of vaccinated adolescents. Data collection was done during the five-day HPV vaccination campaign from the 24th to 28th October, 2023. A

total of 1012 respondents was recruited using a facility-based consecutive sampling technique, where eligible caregivers presenting at vaccination sites were enrolled. Data were collected using interviewer-administered structured questionnaires, which assessed socio-demographic characteristics, knowledge of HPV and cervical cancer, and knowledge of the HPV vaccine. Data analysis involved descriptive statistics, inferential analysis, including chi-square test and logistic regression. Analysis showed that there was high awareness of the HPV vaccine. All the respondents had heard of HPV vaccine and 67.5% had heard of cervical cancer. Eighty-two percent of the respondents heard of HPV vaccine for the first-time during the introduction programme. Eighty-two percent of respondents had good knowledge of HPV vaccine and 47.7% had good knowledge of cervical cancer. Forty-four percent of respondents heard about HPV vaccine via town/market announcers, 36.2% via radio, and 28.6% via social media. A limitation of the study is its sampling frame, which included only parents and caregivers of adolescents who already had already received the HPV vaccine. This introduces selection bias and likely inflates estimates of knowledge and positive attitudes, as caregivers who brought their children for vaccination may already be more health conscious or receptive to immunization messages.[23]

2.2 Attitude of mothers towards HPV vaccine

A questionnaire-based survey was conducted in Italy to Italian mothers of unvaccinated 9 to 12-year-old girls from November 2018 to July 2019 to evaluate knowledge and awareness toward HPV vaccination and cervical cancer. Three hundred subjects were enrolled, and one hundred and ninety-one subjects were <45 years old, while 109 subjects were >45 years old. The proportion of parents against vaccination in children aged between 9 and 12 years was higher in the >45 years old (29.4%) while for the other group (16.2%), mainly because of the notion that

this problem did not affect children in this age group.[24] The study failed to explore the drivers of vaccine hesitancy which is what I intend to explore in the course of this study.

A community-based cross-sectional study was conducted to assess the knowledge and attitude towards human papilloma virus vaccine and associated factors amongst mothers in Debre Markos town in Ethiopia from February to March 2021. The study participants were selected using a multistage sampling technique from mothers who have eligible daughters. The data was collected using an interview administration questionnaire. The data were entered into EPI data version 3.1 then, exported to SPSS version 25 for analysis. A total of 601 study participants with a response rate of 100% were included in the study. The majority of the participants 465 (77.4%) had positive attitudes towards the HPV vaccine. From total study participants, 330 (54.9%) replied, they do not think their daughters are susceptible to HPV infection; 154 (25.6%) of mothers/guardians said HPV vaccine is not safe and effective; 195 (32.4%) of respondents think HPV vaccine will lead to complicated sexual activities; 272 (45.3%) of respondents think vaccinating their daughter against HPV will encourage them to start sexual activity and 203 (33.8%) of mothers/guardians believe HPV vaccine promotes risky sexual behaviors among teenagers.[25] The study employed bivariate and multivariate analysis which helped in identifying independent predictors strengthens the study's applied insights into targetable determinants. I equally intend to employ bivariate analysis in the course of this study.

A descriptive cross-sectional study was conducted in 2012 amongst working mothers in Obafemi Awolowo University in Osun state to assess their attitude towards HPV vaccination of their daughters. Data was collected using structured self-administered questionnaire adapted from the Internet journal of academic physician's assistant. A sample size of 340 was used and this included mothers with daughters aged 0-13 years. Data entry and analysis were achieved using

SPSS version 16 software. About 49% of the respondents approved of the vaccination while about 51% disapproved of the vaccination of their daughters. The most popular reason for approving of the vaccination was that all vaccines are good (77.7%) while the most popular reason for disapproval of vaccination was that they needed more information about the vaccine (62.6%).[26] The study involved mothers who had children who were younger than the target age for HPV vaccination. This helped to widen the study pool and also to access future possibility of vaccination. I also intend to do this in this study.

A descriptive cross-sectional study was carried out in 2020 amongst parents in Ibadan southwest local government area of Oyo state to assess knowledge, attitudes and perceptions towards HPV vaccines. A multistage sampling technique was done to select 186 parents who met the inclusion criteria. Data was collated using a structured questionnaire which was validated by carrying out a pilot test to ascertain reliability. Data entry, coding and running of data was done using SPSS version 22. Data was analyzed using descriptive statistics of mean, frequencies and percentages, and inferential statistics. The majority (72%) reported that they have some reservations for the HPV vaccines, 69% reported that their moral upbringing contradicts HPV vaccines, and their faith contradicts HPV vaccines (61%). The specific details of how stages were defied and how the households or individuals were randomly selected were not sufficiently detailed. This limits reproducibility and raises concerns about potential selection bias.[27]

2.3 Acceptance of HPV vaccine amongst mothers

A community-based, observational study was carried out in Riyadh, Saudi Arabia, in late2022 to assess the acceptance of the HPV vaccine by mothers. Data was collected using a questionnaire adapted from a previous study by Saqer. The collected data were analyzed using IBM SPSS Statistics version 26.0. Five hundred twenty-one individuals participated in the questionnaire, of

whom 131 were excluded from the analysis (77 do not have daughters, and 54 do not live in Riyadh). Therefore, only 390 responses that met the inclusion criteria were analyzed; 88% were females, and 11.79% were male. 60% of the participants agreed that their daughters should receive the HPV vaccine, while 40% disagreed. The main reasons behind parents' refusal of the HPV vaccine, as described by the participants, were inadequate knowledge about the HPV vaccine (60%), followed by side effects (31%).[28]

A cross-sectional survey was conducted to assess if parental knowledge of HPV infection and cervical cancer influenced the acceptance of HPV vaccines in Jos, Plateau State Nigeria in 2024. The survey was among a sample of mothers and fathers with children in the 9–14 years age bracket. A pretested semi-structured investigator-administered questionnaire, without identifiers, was used to collect information on parental knowledge of HPV, cervical cancer, HPV vaccine and its acceptance for their 9–14-year old children. About 79.9% of parents were favourably disposed to protecting their children from cervical cancer by vaccinating them moreso approximately 70.7% of them believe in the safety and effectiveness of the vaccine in prevention of cervical cancer. However, only 34.6% of the parents expressed concern about side-effect like infertility.[29] The survey included fathers whereas children are primarily taken for vaccinations by their mothers. This skews the prevalence of knowledge. I will not include fathers in my study.

A descriptive, cross-sectional, health institution-based survey involving female caregivers was conducted at the Well-Child and Immunization clinic of the Federal Teaching Hospital (FTH), Owerri, between August and October 2023 to assess their perception and acceptance of HPV vaccine. A total of 302 caregivers were recruited into the study using convenience sampling technique. Data was obtained from all consecutive parents who attended the well-child clinic, using a questionnaire that covered baseline characteristics, knowledge, and attitude about HPV

and the HPV vaccine. Questions were interpreted into the local language on participant's requests, without further explanations to remove bias. Questionnaires were administered to 302 respondents and 35 out of the 302 questionnaires were incompletely filled and not analyzed further. Only 267 questionnaires were analyzed, giving an effective response rate of 88.4%. The SPSS version 26.0 (IBM Corp., USA) statistical software was used for data entry, validation, and analysis. Pearson's Chi-square ($\chi 2$) statistic was used to examine the associations between categorical variables and effect estimates were presented as odds ratios along with their 95% confidence intervals. A majority of respondents 207 (77.5%) stated that they wanted their children to receive HPV vaccine, 55 (20.6%) did not wish their children to be vaccinated and 3 (1.1%) were undecided. Two (0.7%) respondents did not state their preference for HPV vaccination of their children. This study employed convenience sampling and this introduces selection bias and limits generalizability. The hospital-based setting likely over-represents educated, health-seeking mothers.[30]

2.4 Factors influencing acceptance or refusal of HPV vaccine

A descriptive cross-sectional survey was conducted in 2015 on the knowledge, attitude and practice of parents of primary school children in west Austria on the newly implemented school-based HPV vaccination program. The study participants were parents of a total of 671 fourth grade school children from 20 primary schools in Tyrol – a region in west Austria. The schools were selected randomly out of a total of 383 primary schools in the region . Logistic regression model was used to compute odds ratios with corresponding 95% confidence intervals for HPV vaccine acceptance across. Statistical analyses were performed in SPSS (Version 20.0. Armonk, NY: IBM Corp.). A total of 439 study participants with 449 vaccine eligible boys and girls returned filled out questionnaires making a total response rate of 67%. Having child receive

other school-based vaccines was associated with over a fifteen-fold higher probability of being vaccinated for HPV. Parents who report to have heard of HPV were significantly more likely to have child receive the vaccine. Moreover, having obtained information on HPV vaccine from physicians associated positively with the decision to accept the vaccine. The association was statistically significant for overall and female child vaccinations. Educational status of the male partner positively influenced HPV vaccine acceptance. This was particularly statistically significant for vaccination of boys whose fathers had reached levels of high school or above. On the contrary, neither respondents' (women's) educational status nor other socio-demographic factors like religion, marital, employment or immigration status showed significance on HPV vaccine acceptance. The most commonly cited reasons for not having child receive HPV vaccine included, fear of debilitating or temporary side effects, child being too young for the vaccine, vaccine being too new and lack of adequate information on the vaccine. Approximately ten percent of the study participants (one fifth of those who refused the vaccine) reported to be "generally against all vaccines". About five percent of the parents who declined the vaccine gave the reason that their general practitioner or paediatrician was not convinced about the necessity of HPV vaccine. Most parents gave a combination of factors; however, child's age at vaccination was the most commonly cited single reason for opting out.[31] The study's inclusion of both gender-neutral vaccination data (boys and girls) broadens insight beyond female-only programs. However, I do not intend to include boys within the scope of this study.

A community-based cross-sectional study was conducted among parents or guardians to assess the knowledge and acceptance of HPV vaccination and its associated factors among parents of daughters in the age group of 9–17 years in AkakiKality sub-city, Addis Ababa, from January 20–31, 2021. Four hundred twenty-two (422) participants responded completely to the interview

(98.1% response rate) and included in the analysis. In the bivariate analysis, variables with p value < 0.25 include: marital status, income, knowledge of vaccine, attitude towards the vaccine, and knowledge of HPV. In the further multi-variable analysis, vaccine acceptability was associated with monthly income, knowledge of HPV, knowledge of vaccine, and attitude towards the vaccine. Accordingly, the odds of HPV vaccine acceptability among those parents of daughters with monthly income > 3200 ETB was 2.5 times (aOR = 2.48, 95% CI 1.08–6.34) higher as compared to those with parents of daughters with monthly income ≤ 3200 ETB. The odds of HPV vaccine acceptability among those parents of daughters with adequate knowledge on HPV (aOR = 2.32, 95% CI 1.56–4.87) and the vaccine (aOR = 2.24, 95% CI 1.12–8.60) was two times higher than their counterparts. Similarly, the odds of HPV vaccine acceptability among those parents of daughters with positive attitude towards the vaccine was five times (aOR = 5.03, 95% CI 1.63–9.56) higher as compared to those with negative attitude.[32] Data were collected using structured interviewer-administered questionnaires which improves comprehension among participants. However, the study did not clearly describe whether the questionnaire was validated or pretested beyond reliability checks, which may affect the robustness of the knowledge and attitude measurements.

A cross-sectional analytical observational study was conducted in metropolitan Lima, Peru in 2025 with the aim of assessing factors associated with parental acceptance of the HPV vaccine in girls. A total of 204 parents who had girls aged 9-19 years were recruited into the study. Data was collected using structured questionnaires which was validated by a panel of experts in the field of gynaecology. The dataset was recorded in excel and imported into IBM SPSS statistics 25 for analysis. Analysis showed that socioeconomic factors played a role in the acceptance of the vaccine. High income parents (74.5%) were significantly more willing to vaccinate compared

to low income parents (27.3%). Higher education levels were strongly associated with vaccine acceptance, as 97.1% of university-educated parents expressed willingness compared to 20% of those with no formal education. Employment was another key factor, with employed parents (70.2%) more likely to vaccinate than unemployed parents (27.9%). Additionally, higher knowledge about HPV vaccination was significantly associated with increased vaccine acceptance. The sampling technique employed during the study was not stated which questions the veracity of the findings stated.[33]

A cross-sectional study was conducted in Kano State, Northern Nigeria, in December 2022 to assess HPV vaccine hesitancy among parents and caregivers of adolescents in Northern Nigeria. Surveys were administered to 1071 parents or caregivers of children aged 9–14 years. The participants were selected via a multistage sampling method. All selected parents consented to participate, and the response rate was 100 %. Approximately one-third (32.7 %) would not vaccinate their children against HPV, even if the vaccine was free or subsidized. Some of the reasons for their hesitancy included the following in descending order: worried about the safety of the vaccine (24.3 %), not knowing enough about the vaccine (23.2 %), doctors not recommending it (20.3 %), the child does not need it (20.3 %), child is not sexually active (18.6 %), child is too young (16.5 %), my spouse/family member is against it (10.9 %), and my religion is against it (6.7 %).[34] The researchers used a community-based cross sectional survey, which is appropriate for assessing the prevalence and predictors of vaccine hesitancy at a single point in time.

CHAPTER THREE

METHODOLOGY

3.1 STUDY AREA

This study was conducted in Egor local government area, located in Benin City Edo State, Nigeria. Edo State is one of the 6 Southern States in the 36 states of Nigeria with its capital in Benin City. Edo State is bounded by Kogi State to the Northeast and East, Anambra to the East, Delta to the Southeast and South and Ondo to the West and Northwest; the Niger River flows along the state's eastern boundary. Edo State lies at elevations between 500 feet (150 metres) in the South and more than 1800 feet (550 metres) in the North and tropical rain forest covers most of the area. Agriculture is the mainstay of the economy with produce such as yams, cassava, oil palm, corn (maize) with an excellent road network and an airport at Benin City facilitating transportation. The State is largely inhabited by the Benin people and other ethnic groups including Esan, Owan, Estako and other tribes that reside in there. There are seven (7) universities in the state comprising one federal university, two state universities and four private universities.[35]

Egor local government area is one of the eighteen (18) local government areas in Edo state, Nigeria. Its headquarters are in the town of Uselu and it has a total of ten (10) wardsEgor is one of the local government areas that are part of the larger metropolitan area of Benin city. It has an area of 93km^2 and a population of 339,899 as at the 2006 census. Using an estimated annual population growth rate of 2.5% used for the period of 2006-2026, the estimated population of Egor is approximately 554,838. The postal code of the area is 300. A number of towns and villages make up Egor local government area and these include Okhoro, Use, Uwelu, Iguikpe,

Ugbighoko, Iguediaye, Evbouugide and Oghedaivbiobaa. The area hosts members of different tribal groups such as the Esan, Bini, and the Owan et.c. The area is home to Christians, Muslims, and Traditional worshippers while the Bini, Owan and Esan languages are spoken in the area.[36]

3.2 STUDY DESIGN

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

3.3 SCOPE OF STUDY

The study assessed the knowledge, attitude and acceptance of HPV vaccination amongst mothers in Egor LGA, Benin city.

3.4 STUDY DURATION

This study was carried out between 2025 and March 2026. During this 12-month period,

March-July: Conceptualization and initial write-up.

August- October: Data collection was done in the community.

November-January: Collated data was analysed.

February-March: Final write-up was done.

3.5 STUDY POPULATION

This study was carried out among mothers in Egor local government area.

3.6 SELECTION CRITERIA

3.6.1 Inclusion Criteria

I. Mothers who were present at the time of data collection.

3.6.2 Exclusion Criteria

I. Mothers who were not residents in Egor

II. Mothers with cognitive impairment

3.7 SAMPLE SIZE DETERMINATION

The minimum sample size (n) was calculated using the Cochran's formula used for descriptive studies.[37]

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

Where:

n = minimum sample size.

z = normal standard deviate (1.96 at 95% confidence interval)

p = proportion of characteristic of interest, which is the proportion of mothers who only heard of the HPV vaccine after enrolling their children in school study done in Ogun and Lagos = 48.4%[18]

p = 0.484

q = 1– p

q = 1– 0.484 = 0.516

d = degree of precision set at 0.05

n = 383.7

n ~ 384

To account for non-response, 10% non-response rate was added to the minimum sample size, utilizing the formula for non-response rate.

ns = adjusted sample size

ns = calculated sample size + non-response rate

nr = non-response rate = 10% = 0.1

nr = 0.1x 384 = 38.4

n = calculated sample size = 384

ns = 377 + 38.4= 422.4

ns ~ 422

However, a total of 424 mothers were included in the study.

3.8 SAMPLING TECHNIQUE

A multi-stage sampling technique was used in selecting respondents and a total of 424 respondents were selected with the questionnaires being administered to mothers from selected areas of Egor local government area. Respondents who met the inclusion criteria were selected.

3.8.1 Stage 1: Selection of Wards

Egor local government area has 10 wards. Three wards were selected using simple random sampling by balloting.

3.8.2 Stage 2: Selection of Streets/Communities

A list of the streets/communities in the selected wards was obtained from the local government office in Egor. Three communities were selected per ward using simple random sampling by balloting

3.8.3 Stage 3: Selection of households

Every selected community were taken as a cluster and every household in the clusters were included in the study.

3.9 DATA MANAGEMENT

3.9.1 TOOLS FOR DATA COLLECTION

Data was obtained with the aid of a structured, interviewer-administered questionnaire with close ended and open-ended questions that sought to answer the study objectives. This tool was adapted from a survey done by the department of nursing of the University of Ibadan in 2020. This tool was validated by using 10% of the estimated sample size for the study.

The questions were divided into 5 sections as follows:

Section A: Sociodemographic Data which obtained information on the respondents such as age, sex, faculty, department, level and socioeconomic status

Section B: Knowledge of HPV and its vaccines

Section C: Attitude towards the HPV vaccine and acceptance

Section D: Acceptance of HPV vaccines

Section E: Factors influencing acceptance of the HPV vaccine

3.9.2 PRETESTING

To ensure standardization of the questionnaire, it was pretested using 10% of the initial sample size. It was pre-tested amongst mothers in Ekosodin community in Ovia North-east Local government area of Benin-city, Edo state. This helped to validate the research instrument. This helped to test the questionnaire for correctness and understanding of respondents to aid appropriate data collection. Corrections were made to the questionnaire where necessary before the commencement of the survey

3.9.3 METHOD OF DATA COLLECTION

The pre-tested structured questionnaires were interviewer-administered at Egor. The respondents were allowed to provide answers to the questions in or around their houses or anywhere where they will feel safe and their privacy was ensured. Informed consent was obtained from the respondents and they were assured of confidentiality.

3.9.4 RESEARCH ASSISTANTS

Research assistants were recruited for the purpose of this study with proper standardization of the questionnaire. These research assistants were medical students of the University of Benin and students from other health related departments at the University of Benin and University of Benin teaching hospital. They were trained on how to administer the questionnaire.

3.9.5 DATA ANALYSIS

Data was collated and screened for completeness, after which they were exported to IBM SPSS version 27.0 software for coding, scoring and analysis. Descriptive statistics such as frequencies, percentages, mean, and standard deviations were used to summarise sociodemographic responses.

Bivariate and multivariate analysis (e.g., chi square, logistic regression were used to assess associations between sociodemographic variables and knowledge, attitude, and acceptance of HPV vaccine and factors influencing acceptance.

Results obtained were presented using frequency distribution tables, contingency tables, charts and prose.

3.9.6 SCORING SYSTEM

Data was collected using a structured interviewer-administered questionnaire of 37 questions using multiple response questions, 5-point Likert scale questions, and binary (Yes/No) questions to comprehensively assess the students' knowledge, attitude, acceptance of HPV vaccine and factors influencing acceptance.

Responses to the Likert scale were scored as follows: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree except stated otherwise. Each correct binary or multiple-choice response was scored as 1; incorrect or "No" was scored as 0.

Total scores were converted to percentages and grouped as follows:

- Good Knowledge: scores ≥ 70% and Poor Knowledge: scores < 70%.
- Good Attitude: scores ≥ 70% and Poor Attitude: scores < 70%.
- Good Acceptance: scores ≥ 70% and Acceptance: scores < 70%.

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

Occupation:

Classified based on the International Labour Organization (ILO) occupational grouping adapted for the Nigerian context.[39]

Class 1: Professionals / Senior Officials; Managers, Professionals, Technicians & Associate Professionals e.g Doctors, Lawyers, Engineers, Senior Civil Servants, Professors

Class 2: Intermediate Occupations / Skilled Workers; Clerical Support, Service & Sales Workers e.g Nurses, Teachers, Police Officers, Technicians

Class 3: Skilled Non-manual Workers; Skilled Agricultural, Forestry & Fishery Workers e.g Clerks, Shop Assistants, Supervisors

Class 4: Partly Skilled Manual Workers; Craft & Related Trades Workers, Plant & Machine Operators e.g Factory operatives, drivers, artisans

Class 5: Unskilled / No Occupation; Elementary Occupations / Unclassified e.g Labourers, domestic workers, subsistence farmers, unemployed

Socioeconomic class:

Socioeconomic status (SES) was determined using the revised indices described by Ibadin and Akpede, which evaluates maternal and paternal education, occupation, and income levels on a 6-point ordinal scale. To maintain methodological validity amidst contemporary economic changes, the income parameter of the instrument was adapted and scaled proportionally using the National Minimum Wage Act baseline of ₦70,000 monthly (₦840,000 annually) as the threshold for Score 5. The mean composite score was subsequently derived for each participant. Participants with an overall mean score of 1.00–2.49 were stratified into the Upper SES class; those scoring 2.50–4.49 were classified as Middle SES; while those scoring 4.50–6.00 were classified as Lower SES.[38]

SECTION B: KNOWLEDGE OF HPV AND ITS VACCINE

One point was assigned to the correct answer and 0 point to the incorrect answer

Q8; Yes-1, No-0

Q9; Any option-1

Q10; Sexual intercourse-1, others-0

Q11; Every option apart from ‘I don’t know’-1, I don’t know-0

Q12; Yes-1, No-0

Q13; Cervical cancer/genital warts-1, others-0

Q14; Yes-1, others-0

Q15; Vaccination-1, others-0

Q16; Yes-1, No-0

Q17; Prevent HPV infection-1, others-0

Q18; Any option-1

Q19; Before sexual activity-1, others-0

SECTION C: ATTITUDE TOWARDS HPV VACCINE

The Likert scale for attitude was scored as 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree, with the scoring for questions number "23 & 24" being reversed. Higher scores indicate a more positive attitude. The maximum possible score for Section C is 35 points. Respondents' scores were converted to percentages. Respondents scores was classified as positive attitude if the score is $\geq$ 70% and negative attitude if the score is $<$ 70%

SECTION D: ACCEPTANCE OF HPV VACCINE

Q27&28; Yes-1, No-0

Q29; Any option-1

Q30; Any option;1

Q31; Yes-1, No-0

Q32; Any option-1

SECTION E; FACTORS INFLUENCING ACCEPTANCE OF HPV VACCINE

Q33; Yes-1, No-0

Q34; Yes-1, No-0

Q35; Yes-1, No-0

Q36; Yes-0, No-1

Q37; Yes-0, No-1

3.10 ETHICAL CONSIDERATIONS

Ethical approval and permission to carry out the study was obtained from the Health Research Ethics Committee of the University of Benin Teaching Hospital. Permission was sought at local government area level and at community level through the community leaders before commencing field work. Informed consent was also taken from the respondents before administering the questionnaires. The respondents were be informed that they had the right to withdraw their participation from the study at any time and that withdrawal poses no loss or harm.

3.11 LIMITATION OF STUDY

Recall bias language barrier were limitations as some participants had difficulty remembering past information and understanding some of the questions. These were addressed using simple terms to explain questions and also asking recent recall questions.

CHAPTER FOUR

RESULTS

A total of 424 mothers in Egor Local Government Area, Edo State, Nigeria participated in this study with a 100% response rate. The results are presented in line with the objectives as follows:

Section A: Sociodemographic characteristics of respondents

Section B: Knowledge of HPV infection and its vaccine

Section C: Attitude of mothers towards HPV vaccination

Section D: Acceptance of HPV vaccine

Section E: Factors influencing acceptance of HPV vaccine

SECTION A: SOCIODEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Table 1a: Sociodemographic characteristics of respondents

Variable	Frequency	Percent (%)
Age (in years)		
20–29	94	22.2
30–39	183	43.2
40–49	83	19.6
50–59	43	10.1
60 and above	21	5.0
Mean ± SD = 37.41 ± 10.10		
Marital Status		
Ever married	407	96.0
Never married	17	4.0
Ethnicity		
Bini	127	30.0
Yoruba	69	16.3
Igbo	68	16.0
Esan	54	12.7
Etsako*	50	11.8
Urhobo/Isoko-Delta†	32	7.5
Hausa	7	1.7
Benue/Idoma	4	0.9
Calabar/Akwa Ibom	4	0.9
Others‡	9	2.1
Religion		
Christianity	403	95.0
Islam	18	4.2
African Traditional Religion	3	0.7

**Etsako includes Owan (3) and Edo (3). †Urhobo/Isoko-Delta includes Agbor (3). ‡Others include: Ijaw (5), Rivers (1), Otuo (1), Efik (1), and Ebira (1).*

The age of respondents ranged from 19 to 65 years with a mean age of 37.41 ± 10.10 years. The largest age group was 30–39 years with 183 (43.2%) respondents, followed by 20–29 years 94 (22.2%), 40–49 years 83 (19.6%), 50–59 years 43 (10.1%), and 60 years and above 21 (5.0%). The vast majority of respondents, 407 (96.0%), had ever been married, while only 17 (4.0%) had never been married.

The predominant ethnic group was Bini with 127 (30.0%) respondents, followed by Yoruba 69 (16.3%), Igbo 68 (16.0%), Esan 54 (12.7%), Etsako 50 (11.8%), Urhobo/Isoko-Delta 32 (7.5%),

and Hausa 7 (1.7%). Benue/Idoma and Calabar/Akwa Ibom each had 4 (0.9%) respondents, while 9 (2.1%) belonged to other ethnic groups. In terms of religion, the vast majority 403 (95.0%) were Christians, 18 (4.2%) Muslims, and 3 (0.7%) practised African Traditional Religion.

Table 1b: Sociodemographic characteristics of respondents (continued)

Variable	Frequency	Percent (%)
Highest level of education		
No formal education	19	4.5
Primary	15	3.5
Secondary	170	40.1
Tertiary	220	51.9
Occupational class†		
2	52	12.3
3	361	85.1
5	11	2.6
Socioeconomic Status‡[38]		
Upper class	44	10.4
Middle class	358	84.4
Lower class	22	5.2
Monthly household income		
Less than ₦70,000	175	41.3
₦70,000 and above	249	58.7

†Occupation classified based on the International Labour Organization (ILO) occupational grouping adapted for the Nigerian context.

‡Socioeconomic class determined using the revised Ibadin & Akpede (2021) scoring scheme, based on level of education and occupation.

Regarding educational attainment, 220 (51.9%) respondents had tertiary education, 170 (40.1%) secondary, 19 (4.5%) no formal education, and 15 (3.5%) primary education. Occupational class was determined using the Ibadin and Akpede Modified Social Classification. The majority of respondents, 361 (85.1%), belonged to Class 3 (skilled manual and service and sales workers, comprising traders, self-employed, and factory/industrial workers). Class 2 (skilled non-manual and professional workers — civil servants and teachers) accounted for 52 (12.3%), and Class 5 (unemployed and students, not in the labour force) for 11 (2.6%). Classes 1 (senior managerial) and 4 (semi-skilled) were not represented in this sample. For inferential analyses, Class 5 served as the reference category.

Using the revised Ibadin and Akpede (2021) socioeconomic classification, the majority 358 (84.4%) belonged to the middle class, 44 (10.4%) to the upper class, and 22 (5.2%) to the lower class. Regarding monthly household income, 249 (58.7%) respondents earned ₦70,000 and above while 175 (41.3%) earned less than ₦70,000 monthly.

SECTION B: KNOWLEDGE OF HPV INFECTION AND ITS VACCINE

Table 2: Awareness of HPV and sources of information among respondents

Variable	Frequency (n=424)	Percent (%)
Ever heard about HPV		
Yes	300	70.8
No	124	29.2
Source of first information about HPV (n=300)*		
Hospital/Health centre	156	52.0
Media (TV/Radio/Internet)	109	36.3
Friends/Relatives	23	7.7
Church/Mosque	6	2.0
School	2	0.7
Market	1	0.3
Others	1	0.3

*Multiple choice question

Out of 424 respondents, 300 (70.8%) had previously heard about HPV while 124 (29.2%) had not. Among those who had heard (n=300), the most common source was hospital or health centre 156 (52.0%), followed by media 109 (36.3%), friends or relatives 23 (7.7%), church or mosque 6 (2.0%), and others 4 (1.3%).

Table 3a: Knowledge of HPV infection among respondents

Variable	Frequency (n=422)	Percent (%)
Routes of HPV transmission*		
Sexual intercourse	313	73.8
Blood transfusion	51	12.0
Sharing toilets	40	9.4
Kissing	14	3.3
Uncertain	28	6.6
Persons at risk of HPV infection*		
Men	355	83.7
Sexually active women	278	65.6
Teenage girls	62	14.6
Married women	61	14.4
Uncertain	30	7.1
HPV infection has easily noticed symptoms		
Yes	182	42.9
No	100	23.6
Uncertain	142	33.5
Conditions HPV infection can cause*		
Cervical cancer	208	49.1
Genital warts	55	13.0
Infertility	46	10.8
HIV	40	9.4
Uncertain	127	30.0
HPV infection can be prevented		
Yes	361	85.1
No	20	4.7
Uncertain	43	10.1

**Multiple responses were permitted for this question; percentages may exceed 100%.*

Regarding HPV transmission, 313 (73.8%) correctly identified sexual intercourse as a route, followed by blood transfusion 51 (12.0%), sharing toilets 40 (9.4%), and kissing 14 (3.3%), while 28 (6.6%) did not know. Concerning who is at risk, 355 (83.7%) identified men and 278 (65.6%) sexually active women. Teenage girls were identified by 62 (14.6%) and married women by 61 (14.4%), while 30 (7.1%) did not know. As to whether HPV has noticeable symptoms, 182 (42.9%) said yes, 100 (23.6%) said no, and 142 (33.5%) were unsure. On what

HPV can cause, 208 (49.1%) identified cervical cancer and 55 (13.0%) genital warts, while 127 (30.0%) did not know. A total of 361 (85.1%) correctly stated that HPV infection can be prevented, while 20 (4.7%) said no and 43 (10.1%) were unsure.

Table 3b: Knowledge of HPV vaccine among respondents

Variable	Frequency (n=424)	Percent (%)
How HPV can be prevented (n=361, MRQ)		
By vaccination	208	57.6
By using condoms	60	16.6
By faithfulness to one partner	53	14.7
By regular screening	37	10.2
I don't know	2	0.6
Ever heard of the HPV vaccine		
Yes	272	64.2
No	152	35.8
What is the HPV vaccine used for		
Prevent HPV infection	276	65.1
I don't know	88	20.8
Treat cervical cancer	40	9.4
Cure infection	20	4.7
Who is the HPV vaccine meant for		
Both girls and boys	239	56.4
Girls only	181	42.7
Boys only	4	0.9
At what age should the vaccine be given		
Before sexual activity (9–14 years)	249	58.7
Any age	111	26.2
After marriage	32	7.5
I don't know	32	7.5

MRQ = Multiple Response Question; percentages for MRQ items may exceed 100%

Among those who stated HPV can be prevented (n=361), 208 (57.6%) correctly identified vaccination as the method, while 60 (16.6%) cited condom use and 53 (14.7%) faithfulness to one partner. With respect to the HPV vaccine, 272 (64.2%) had heard of it while 152 (35.8%) had not. A majority, 276 (65.1%), correctly identified the vaccine as being used to prevent HPV infection, while 88 (20.8%) did not know. Regarding who the vaccine is meant for, 239 (56.4%) said both girls and boys and 181 (42.7%) said girls only. Concerning the recommended age, 249 (58.7%) correctly stated before sexual activity at 9–14 years.

Table 4: Correctness of responses to knowledge items among respondents

Knowledge Variables	Correct Freq. (%)	Incorrect Freq. (%)
Route of HPV transmission	313 (73.8)	111 (26.2)
Identification of who is at risk	394 (92.9)	30 (7.1)
HPV has easily noticed symptoms	182 (42.9)	242 (57.1)
HPV cause	222 (52.4)	202 (47.6)
HPV can be prevented	361 (85.1)	63 (14.9)
Prevention method	208 (57.6)	153 (42.4)
Heard of HPV vaccine	272 (64.2)	152 (35.8)
Vaccine use	276 (65.1)	148 (34.9)
Identified who vaccine is for	424 (100.0)	0 (0.0)
Age for reception of vaccine	249 (58.7)	175 (41.3)

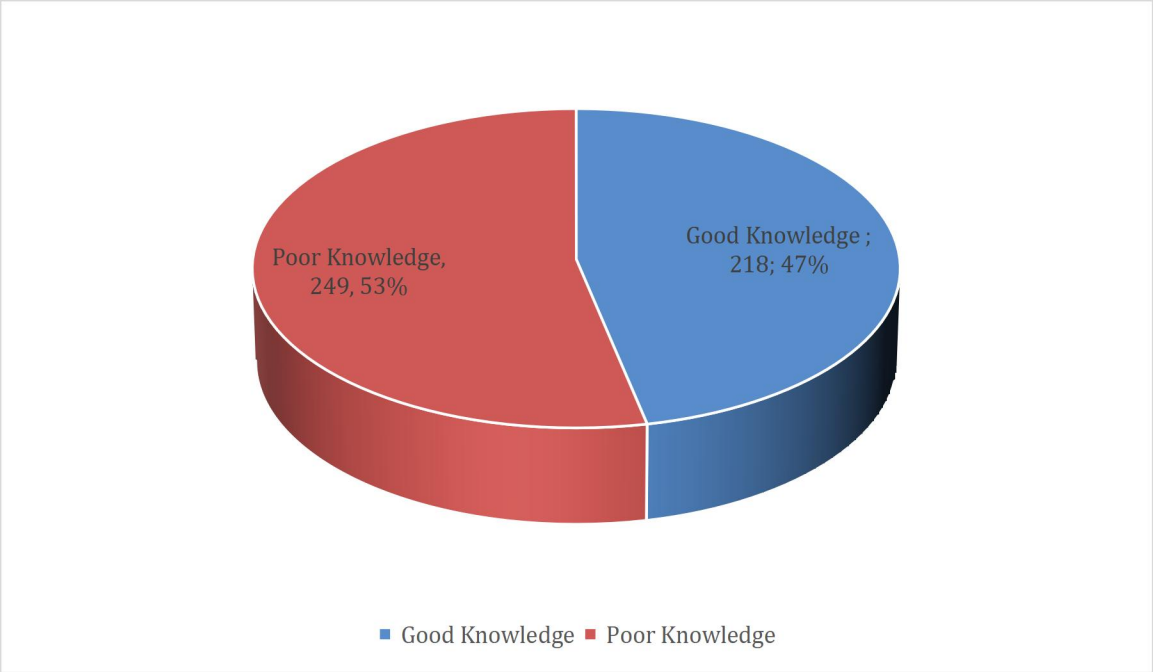

Figure 1: Knowledge of HPV among Respondents

The overall correctness of knowledge responses varied across items. The highest correct response rate was for identifying who the HPV vaccine is meant for, with all 424 (100.0%) providing a valid response. Knowing that HPV can be prevented was correctly answered by 361 (85.1%), and identifying the correct source of information about HPV was achieved by 300 (70.8%). The lowest correct response rate was for identifying that HPV has easily noticeable symptoms, with only 182 (42.9%) responding correctly. Knowledge of the correct cause of HPV infection (cervical cancer or genital warts) was demonstrated by 222 (52.4%) of respondents. Overall, 218 (51.4%) had good knowledge of HPV infection and its vaccine while 206 (48.6%) had poor knowledge.

Table 5: Sociodemographic characteristics and knowledge of HPV among Respondents

Variable	Good Knowledge (n = 218) n (%)	Poor Knowledge (n = 206) n (%)	Test statistic	p-value
Age group (years)				
20–29	42 (44.7)	52 (55.3)	χ^2=7.07	0.132
30–39	88 (48.1)	95 (51.9)		
40–49	47 (56.6)	36 (43.4)		
50–59	25 (58.1)	18 (41.9)		
60 and above	16 (76.2)	5 (23.8)		
Marital Status				
Ever married	206 (50.6)	201 (49.4)	χ^2=2.61	0.106
Never married	12 (70.6)	5 (29.4)		
Religion				
Christianity	209 (51.9)	194 (48.1)	Fisher's exact =1.44	0.486
Islam	7 (38.9)	11 (61.1)		
African Traditional Religion	2 (66.7)	1 (33.3)		
Highest level of education				
No formal education	4 (21.1)	15 (78.9)	χ^2=32.82	**<0.001**
Primary	4 (26.7)	11 (73.3)		
Secondary	69 (40.6)	101 (59.4)		
Tertiary	141 (64.1)	79 (35.9)		
Occupational class				
2	28 (53.8)	24 (46.2)	χ^2=0.284	0.868
3	185 (51.2)	176 (48.8)		
5*	5 (45.5)	6 (54.5)		
Socioeconomic Status				
Upper class	25 (56.8)	19 (43.2)	χ^2=5.74	0.057
Middle class	187 (52.2)	171 (47.8)		
Lower class	6 (27.3)	16 (72.7)		
Monthly household income				
< ₦70,000	76 (43.4)	99 (56.6)	χ^2=7.61	**0.006**
≥ ₦70,000	142 (57.0)	107 (43.0)		

Table 5 shows that two sociodemographic variables were significantly associated with knowledge of HPV. Level of education was significantly associated with knowledge (χ^2 = 32.82, $p < 0.001$): among respondents with no formal education, only 4 (21.1%) had good knowledge,

while among those with tertiary education, 141 (64.1%) had good knowledge. Monthly household income was also significantly associated with knowledge ($\chi^2 = 7.61$, $p = 0.006$), with 142 (57.0%) of those earning ≥ ₦70,000 having good knowledge, compared to 76 (43.4%) among those earning less than ₦70,000.

Age group ($\chi^2 = 7.07$, $p = 0.132$), marital status ($\chi^2 = 2.61$, $p = 0.106$), religion (Fisher's exact = 1.44, $p = 0.486$), occupational class ($\chi^2 = 3.14$, $p = 0.208$), and socioeconomic status ($\chi^2 = 5.74$, $p = 0.057$) were not significantly associated with knowledge.

Table 6: Predictors of knowledge of HPV infection and its vaccine among respondents

Variable	β	p-value	Odds Ratio	95% CI for OR	
				Lower	Upper
Age i(years)	0.030	0.004	1.030	1.010	1.051
Marital Status					
Never married	-0.940	0.102	0.390	0.125	1.218
Ever married*			1		
Religion					
Islam	-0.480	0.363	0.620	0.223	1.715
African Traditional Religion	0.770	0.601	2.160	0.121	38.521
Christianity*			1		
Highest level of education)					
No formal education	-3.320	0.036	0.040	0.002	0.816
Primary	-1.880	0.004	0.150	0.043	0.546
Secondary	-0.860	0.000	0.430	0.264	0.677
Tertiary*			1		
Occupational class					
5*		1			
2	-0.210	0.811	0.079	8.351	0.858
3	0.110	1.116	0.184	6.775	0.904
Socioeconomic Status					
Upper class	-0.210	0.800	0.810	0.156	4.206
Lower class	1.280	0.415	3.600	0.166	78.038
Middle class*			1		
Monthly household income					
≥ ₦70,000	0.410	0.065	1.510	0.979	2.319
< ₦70,000*			1		

*Cox & Snell R^2 = 0.110; Nagelkerke R^2 = 0.150. *Reference category. OR = Odds Ratio; CI = Confidence Interval.*

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In the multivariable binary logistic regression analysis (Table 6), two variables emerged as independent predictors of good knowledge of HPV infection and its vaccine. Age in years was a significant predictor (β = 0.030, OR = 1.030, 95% CI: 1.010–1.051, p = 0.004), indicating that each additional year of age was associated with a 3% increase in the odds of having good knowledge. Level of education was also a significant predictor: compared to respondents with tertiary education, those with no formal education (OR = 0.040, 95% CI: 0.002–0.816, p =

0.036), primary education (OR = 0.150, 95% CI: 0.043–0.546, p = 0.004), and secondary education (OR = 0.430, 95% CI: 0.264–0.677, p < 0.001) were all significantly less likely to have good knowledge.

Marital status, religion, occupation, socioeconomic status, and monthly household income were not significant independent predictors of knowledge when other variables were controlled for in the regression model.

SECTION C: ATTITUDE OF MOTHERS TOWARDS HPV VACCINATION

Table 7: Respondents' Attitude towards HPV Vaccination

Variables	Strongly Agree Freq (%)	Agree Freq (%)	Neutral Freq (%)	Disagree Freq (%)	Strongly Disagree Freq (%)
Vaccinating girls against HPV is important for preventing cervical cancer	217 (51.2%)	153 (36.1%)	41 (9.7%)	8 (1.9%)	5 (1.2%)
HPV vaccine is safe for children	113 (26.7%)	180 (42.5%)	86 (20.3%)	38 (9.0%)	7 (1.7%)
My daughter should receive the vaccine	156 (36.8%)	170 (40.1%)	71 (16.7%)	22 (5.2%)	5 (1.2%)
Fear that the vaccine may encourage early sexual activity	22 (5.2%)	58 (13.7%)	164 (38.7%)	139 (32.8%)	41 (9.7%)
HPV vaccine goes against my religious beliefs	11 (2.6%)	23 (5.4%)	61 (14.4%)	210 (49.5%)	119 (28.1%)
The government should make the HPV vaccine compulsory for eligible girls	166 (39.2%)	155 (36.6%)	71 (16.7%)	24 (5.7%)	8 (1.9%)
I would encourage other mothers to vaccinate their daughters	185 (43.6%)	159 (37.5%)	64 (15.1%)	9 (2.1%)	7 (1.7%)

The majority, 370 (87.3%), agreed or strongly agreed that vaccinating girls against HPV is important. A total of 293 (69.1%) agreed the vaccine is safe, and 326 (76.9%) believed their daughter should receive it. On negatively worded items, 180 (42.5%) appropriately disagreed

that the vaccine encourages sexual activity, and 329 (77.6%) appropriately disagreed that it goes against religious beliefs.

Table 8: Appropriate responses to attitudinal statements among respondents

Variables (n = 424)	Appropriate response (%)	Inappropriate response (%)
Vaccinating girls against HPV is important for preventing cervical cancer	370 (87.3%)	54 (12.7%)
The HPV vaccine is safe for children	293 (69.1%)	131 (30.9%)
I believe my daughter should receive the vaccine	326 (76.9%)	98 (23.1%)
Fear that vaccine encourages sexual activity	180 (42.5%)	244 (57.5%)
HPV vaccine against religious beliefs	329 (77.6%)	95 (22.4%)
Government should make vaccine compulsory	321 (75.7%)	103 (24.3%)
Would encourage other mothers to vaccinate	344 (81.1%)	80 (18.9%)

Appropriate responses were highest for agreement that vaccinating girls is important for cervical cancer prevention, with 370 (87.3%) responding appropriately. Encouragement of other mothers to vaccinate was appropriately endorsed by 344 (81.1%), and appropriate belief that the government should make vaccination compulsory was expressed by 321 (75.7%). The lowest appropriate response was for the item on fear of promoting sexual activity, with only 180 (42.5%) appropriately disagreeing, suggesting that misconceptions about this issue persist among a substantial proportion of respondents.

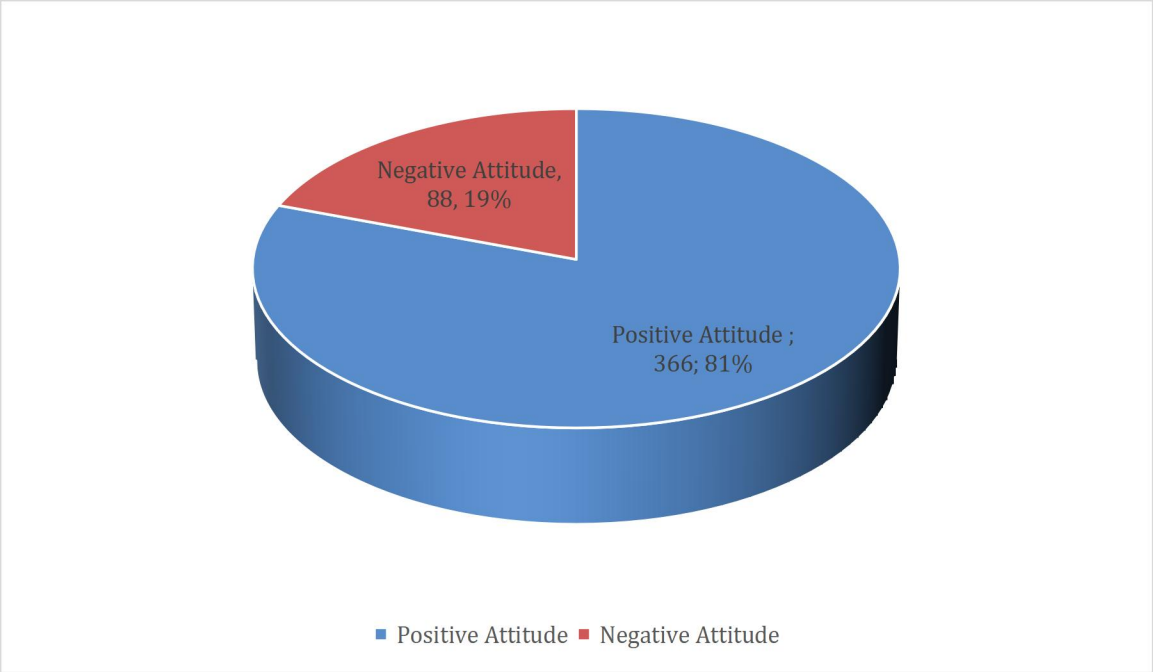

Figure 2: Overall attitude of mothers towards HPV vaccination

Overall, 336 (79.2%) had a positive attitude while 88 (20.8%) had a negative attitude.

Table 9: Respndents' characteristics and attitude towards HPV vaccination

Variable	Positive Attitude (n = 336) n (%)	Negative Attitude (n = 88) n (%)	Test statistic	p-value
Age group (years)				
20–29	65 (69.1)	29 (30.9)	Fisher's exact =8.58	0.073
30–39	149 (81.4)	34 (18.6)		
40–49	66 (79.5)	17 (20.5)		
50–59	35 (81.4)	8 (18.6)		
60 and above	21 (100.0)	0 (0.0)		
Marital Status				
Ever married	326 (80.1)	81 (19.9)	χ^2=4.49	**0.034**
Never married	10 (58.8)	7 (41.2)		
Religion				
Christianity	321 (79.7)	82 (20.3)	Fisher's exact =3.91	0.142
Islam	14 (77.8)	4 (22.2)		
African Traditional Religion	1 (33.3)	2 (66.7)		
Highest level of education				
No formal education	15 (78.9)	4 (21.1)	Fisher's exact =5.13	0.162
Primary	10 (66.7)	5 (33.3)		
Secondary	128 (75.3)	42 (24.7)		
Tertiary	183 (83.2)	37 (16.8)		
Occupational class				
2	41 (78.8)	11 (21.2)	Fisher's exact =0.049	0.976
3	286 (79.2)	75 (20.8)		
5	9 (81.8)	2 (18.2)		
Socioeconomic Status				
Upper class	35 (79.5)	9 (20.5)	Fisher's exact =0.06	0.972
Middle class	284 (79.3)	74 (20.7)		
Lower class	17 (77.3)	5 (22.7)		
Monthly household income				
< ₦70,000	138 (78.9)	37 (21.1)	χ^2=0.03	0.869
≥ ₦70,000	198 (79.5)	51 (20.5)		
Knowledge of hPV				
Good Knowledge	197 (90.4)	21 (9.6)	χ^2=33.74	**<0.001**
Poor Knowledge	139 (67.5)	67 (32.5)		

Knowledge of HPV was significantly associated with attitude towards HPV vaccination. Respondents with good knowledge had a markedly higher proportion of positive attitude at 197 (90.4%) compared to those with poor knowledge at 139 (67.5%) ($\chi^2 = 33.74$, $p < 0.001$). Marital status was also significantly associated with attitude ($\chi^2 = 4.49$, $p = 0.034$): 326 (80.1%) of ever-married respondents had a positive attitude compared to 10 (58.8%) of never-married respondents.

Age group showed a borderline non-significant trend (Fisher's exact = 8.58, $p = 0.073$), with respondents aged 60 years and above having the highest proportion of positive attitude at 21 (100.0%) and those aged 20–29 years having the lowest at 65 (69.1%). Religion (Fisher's exact = 3.91, $p = 0.142$), level of education (Fisher's exact = 5.13, $p = 0.162$), occupation grouped by ISCO-08 Major Groups (Fisher's exact = 0.33, $p = 0.954$), socioeconomic status (Fisher's exact = 0.06, $p = 0.972$), and monthly household income ($\chi^2 = 0.03$, $p = 0.869$) were not significantly associated with attitude.

Table 10: Predictors of attitude of mothers towards HPV vaccination

Predictors	β (Regression Coefficient)	Odds ratio	95% CI		p-value
			Lower	Upper	
Age (years)					
Age (years)	0.020	1.020	0.996	1.044	0.206
Marital status					
Never married*		1			
Ever married	1.470	4.349	1.368	13.824	**0.013**
Religion					
Christianity*		1			
Islam	0.030	1.030	0.314	3.386	0.963
African Traditional Religion	-2.680	0.069	0.005	0.992	0.050
Highest level of education					
Tertiary*		1			
No formal education	0.490	1.632	0.031	86.911	0.808
Primary	-0.580	0.560	0.154	2.037	0.377
Secondary	-0.410	0.664	0.357	1.233	0.192
Occupational Class					
Class 5*		1			
Class 2	-0.200	0.819	0.046	14.603	0.892
Class 3	-0.310	0.733	0.071	7.556	0.796
Socioeconomic status					
Middle class*		1			
Upper class	-0.440	0.644	0.094	4.405	0.656
Lower class	-0.580	0.560	0.010	30.342	0.777
Monthly household income					
< ₦70,000*		1			
≥ ₦70,000	-0.320	0.726	0.420	1.255	0.257
Knowledge category					
Poor knowledge*		1			
Good knowledge	1.620	5.053	2.807	9.098	**<0.001**

*CI = Confidence Interval; * = Reference Category; Bold = statistically significant (p < 0.05). Cox & Snell R^2 = 0.110; Nagelkerke R^2 = 0.180.*

In the multivariable logistic regression analysis (Table 10), knowledge category emerged as a significant independent predictor of attitude towards HPV vaccination: respondents with good knowledge had over five times higher odds of having a positive attitude compared to those with

poor knowledge (OR = 5.040, 95% CI: 2.807–9.098, p < 0.001). Marital status was also a significant predictor: ever-married respondents had over four times higher odds of a positive attitude compared to never-married respondents (OR = 4.360, 95% CI: 1.368–13.824, p = 0.013). Respondents practising African Traditional Religion were less likely to have a positive attitude compared to Christians (OR = 0.070, 95% CI: 0.005–0.986, p = 0.050), although this should be interpreted cautiously given the small number in that category.

The model explained between 11.0% (Cox & Snell R^2) and 18.0% (Nagelkerke R^2) of the variation in attitude. Age, level of education, occupation, socioeconomic status, and monthly household income were not significant independent predictors of attitude when other variables were controlled for in the regression model.

SECTION D: ACCEPTANCE OF HPV VACCINE

Table 11a: Acceptance of HPV vaccine among respondents

Variable	Frequency (n=424)	Percent (%)
Ever vaccinated daughter(s) against HPV		
Yes	93	21.9
No	331	78.1
Willingness to vaccinate daughter in future (n = 331)†		
Yes	258	77.9
No	70	21.1
No response	3	0.9

†Asked only to respondents who had not vaccinated their daughter (n = 331).

Table 11b: Respondents by acceptance of HPV vaccine

Variable	Frequency	Percent (%)
Reasons for not vaccinating daughter (n = 331)*		
Daughter not old enough	74	22.4
No daughter yet	47	14.2
Not sure of safety	42	12.7
Not informed by a health worker	41	12.4
Too expensive	20	6.0
Need to consult husband first	9	2.7
Religion does not support it	3	0.9
Reasons for vaccinating daughter (n = 93)*		
Fear of cervical cancer	59	63.4
Health worker's advice	27	29.0
Media campaign	15	16.1
School programme	9	9.7
Peer influence	4	4.3
Willingness to recommend the HPV vaccine to other mothers		
Yes	391	92.2
No	33	7.8
Factors that could increase vaccine acceptance*		
If more information is provided	247	58.3
If recommended by health workers	134	31.6
If the vaccine is free	114	26.9
If religious/community leaders support it	8	1.9

**Multiple responses permitted for this question; percentages may exceed 100%.*

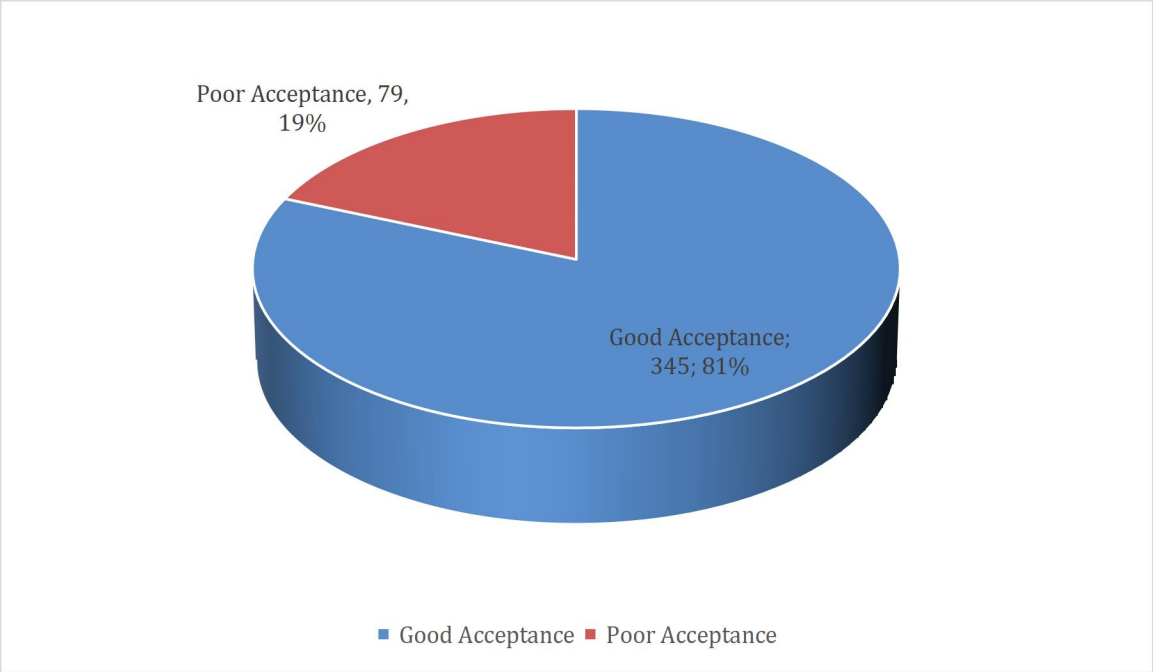

Figure 3: Overall acceptance of HPV vaccine among respondents

Out of the 424 respondents, 93 (21.9%) had already vaccinated their daughters against HPV, while 331 (78.1%) had not done so. Among the unvaccinated group (n = 331), 258 (77.9%) expressed willingness to vaccinate their daughters in the future, 70 (21.1%) were unwilling, and 3 (0.9%) did not respond. Concerning reasons for not vaccinating, the most common response was that the daughter was not yet old enough, reported by 74 (22.4%), followed by having no daughter yet 47 (14.2%), not being sure of the vaccine's safety 42 (12.7%), and not being informed by a health worker 41 (12.4%). Financial barriers were also reported, with 20 (6.0%) citing the vaccine being too expensive, while 9 (2.7%) needed to consult their husband first and 3 (0.9%) stated their religion did not support vaccination.

Among those who had vaccinated their daughters (n = 93), the most common reason was fear of cervical cancer, cited by 59 (63.4%), followed by a health worker's advice 27 (29.0%), media

campaign 15 (16.1%), school programme 9 (9.7%), and peer influence 4 (4.3%). An overwhelming majority of 391 (92.2%) respondents would recommend the HPV vaccine to other mothers, while only 33 (7.8%) would not. Regarding factors that could increase acceptance, 247 (58.3%) identified the provision of more information about the vaccine, 134 (31.6%) cited recommendation by health workers, 114 (26.9%) cited free access to the vaccine, and 8 (1.9%) mentioned support from religious or community leaders.

Overall, 345 (81.4%) respondents demonstrated good acceptance of the HPV vaccine, while 79 (18.6%) had poor acceptance.

Table 12: Respondents characteristics and acceptance of HPV vaccine

Variable	Good Acceptance (n = 345) n (%)	Poor Acceptance (n = 79) n (%)	Test statistic	p-value
Age group (years)				
20–29	76 (80.9)	18 (19.1)	Fisher's exact=0.41	0.982
30–39	149 (81.4)	34 (18.6)		
40–49	68 (81.9)	15 (18.1)		
50–59	35 (81.4)	8 (18.6)		
60 and above	17 (81.0)	4 (19.0)		
Marital Status				
Ever married	334 (82.1)	73 (17.9)	χ^2=3.24	0.072
Never married	11 (64.7)	6 (35.3)		
Religion				
Christianity	328 (81.4)	75 (18.6)	Fisher's exact=0.47	0.789
Islam	15 (83.3)	3 (16.7)		
African Traditional Religion	2 (66.7)	1 (33.3)		
Highest level of education				
No formal education	10 (52.6)	9 (47.4)	Fisher's exact=13.51	**0.004**
Primary	10 (66.7)	5 (33.3)		
Secondary	141 (82.9)	29 (17.1)		
Tertiary	184 (83.6)	36 (16.4)		
Occupational class				
2	45 (86.5)	7 (13.5)	Fisher's exact=6.138	0.046
3	294 (81.4)	67 (18.6)		
5	6 (54.5)	5 (45.5)		
Socioeconomic Status				
Upper class	38 (86.4)	6 (13.6)	χ^2=15.41	**<0.001**
Middle class	296 (82.7)	62 (17.3)		
Lower class	11 (50.0)	11 (50.0)		
Monthly household income				
< ₦70,000	143 (81.7)	32 (18.3)	χ^2=0.02	0.878
≥ ₦70,000	202 (81.1)	47 (18.9)		
Knowledge of HPV & vaccine				
Good Knowledge	186 (85.3)	32 (14.7)	χ^2=4.63	**0.031**
Poor Knowledge	159 (77.2)	47 (22.8)		
Attitude towards HPV vaccine				
Positive Attitude	293 (87.2)	43 (12.8)	χ^2=36.35	**<0.001**
Negative Attitude	52 (59.1)	36 (40.9)		

Three variables were significantly associated with acceptance of HPV vaccine. Attitude towards HPV vaccination showed a strong and highly significant association ($\chi^2 = 36.35$, $p < 0.001$): 293

(87.2%) of respondents with a positive attitude had good acceptance, compared to 52 (59.1%) among those with a negative attitude. Socioeconomic status was significantly associated (χ^2 = 15.41, $p < 0.001$), with only 11 (50.0%) of those in the lower class having good acceptance, compared to 38 (86.4%) in the upper class and 296 (82.7%) in the middle class. Level of education was also significantly associated (Fisher's exact = 13.51, $p = 0.004$), with acceptance rising from 10 (52.6%) among those with no formal education to 184 (83.6%) among those with tertiary education.

Knowledge of HPV was also significantly associated with acceptance ($\chi^2 = 4.63$, $p = 0.031$): good acceptance was higher among those with good knowledge at 186 (85.3%) compared to 159 (77.2%) among those with poor knowledge. Marital status showed a borderline non-significant trend ($\chi^2 = 3.24$, $p = 0.072$). Occupation (Fisher's exact = 6.138, $p = 0.046$) also did not reach significance. Age group (Fisher's exact = 0.41, $p = 0.982$), religion (Fisher's exact = 0.47, $p = 0.789$), and monthly household income ($\chi^2 = 0.02$, $p = 0.878$) were not significantly associated with acceptance.

Table 13: Predictors of acceptance of HPV vaccine among respondents

Predictors	β (Regression Coefficient)	Odds ratio	95% CI		p-value
			Lower	Upper	
Age (years)					
Age (years)	-0.020	0.980	0.956	1.005	0.164
Marital status					
Never married*		1			
Ever married	0.770	2.160	0.639	7.295	0.214
Religion					
Christianity*		1			
Islam	0.390	1.477	0.347	6.287	0.596
African Traditional Religion	0.090	1.094	0.083	14.487	0.948
Highest level of education					
Tertiary*		1			
No formal education	0.960	2.612	0.105	65.256	0.560
Primary	-0.520	0.595	0.160	2.210	0.441
Secondary	0.150	1.162	0.600	2.249	0.666
Occupational Class					
Class 5*		1			
Class 2	0.750	2.117	0.114	39.268	0.615
Class 3	0.140	1.150	0.190	6.981	0.881
Socioeconomic status					
Middle class*		1			
Upper class	-0.140	0.869	0.070	10.748	0.914
Lower class	-2.400	0.091	0.004	2.271	0.145
Monthly household income					
< ₦70,000*		1			
≥ ₦70,000	-0.110	0.896	0.500	1.607	0.706
Knowledge of HPV & its *vaccine*					
Poor knowledge*		1			
Good knowledge	0.130	1.139	0.630	2.058	0.676
Attitude towards HPV *vaccine*					
Negative attitude*		1			
Positive attitude	1.610	5.003	2.746	9.114	**<0.001**

*CI = Confidence Interval; * = Reference Category; Bold = statistically significant (p < 0.05). Cox & Snell R^2 = 0.110; Nagelkerke R^2 = 0.180.*

In the multivariable logistic regression analysis (Table 13), only attitude towards HPV vaccination emerged as a significant independent predictor of acceptance. Respondents with a positive attitude had five times higher odds of good acceptance compared to those with a negative attitude (OR = 5.000, 95% CI: 2.725–9.185, $p < 0.001$). When all other variables were controlled for, age, marital status, religion, level of education, occupation, socioeconomic status, monthly household income, and knowledge category were not independently associated with acceptance.

The model explained between 11.0% (Cox & Snell R^2) and 18.0% (Nagelkerke R^2) of the variation in acceptance.

SECTION E: FACTORS INFLUENCING ACCEPTANCE OF HPV VACCINE

Table 14: Factors influencing respondents' acceptance of HPV vaccine

Variable	Frequency (n=424)	Percent (%)
Belief that vaccines are generally safe		
Yes	373	88.0
No	36	8.5
Uncertain	15	3.5
Trust in information from health workers		
Yes	395	93.2
No	29	6.8
Ability to afford the vaccine if not free		
Yes	330	77.8
No	91	21.5
No response	3	0.7
Requires husband's permission to vaccinate daughter		
Yes	212	50.0
No	212	50.0
Nearest health centre for vaccination is too far		
Yes	92	21.7
No	332	78.3

As presented in Table 14, a large majority of 373 (88.0%) respondents believed that vaccines are generally safe, while 36 (8.5%) did not and 15 (3.5%) were uncertain. Trust in information provided by health workers about vaccines was high, with 395 (93.2%) respondents expressing trust and 29 (6.8%) not. Regarding affordability, 330 (77.8%) reported they could afford the vaccine if it were not free, while 91 (21.5%) could not afford it.

Concerning spousal involvement, exactly half of the respondents 212 (50.0%) reported needing their husband's permission before vaccinating their daughters, while the other half 212 (50.0%) did not. Regarding geographical accessibility of vaccination services, 92 (21.7%) respondents reported that the nearest health centre for vaccination was too far, while the majority 332 (78.3%) did not consider distance a barrier.

CHAPTER FIVE

DISCUSSION

The study conducted in Egor LGA found that while most mothers had heard of HPV and its vaccine, overall knowledge was only moderate, with education and income level being significant predictors of understanding. Despite this, the majority held positive attitudes toward the vaccine, viewing it as safe and effective against cervical cancer, though some had misconceptions about it promoting early sexual activity. A high level of acceptance and willingness to vaccinate daughters was reported, largely driven by prior awareness and favorable perceptions, though actual uptake remains potentially limited by cost, accessibility, and service availability. Overall, the findings highlight that knowledge, education, and socioeconomic status are the key determinants shaping mothers' attitudes and acceptance of HPV vaccination, underscoring the need for targeted health education and improved access to vaccination services.

This study showed that the majority of respondents were within the age group 30–39 years, with a mean age of 37.41 ± 10.10 years. Most respondents were married and predominantly of the Christian faith. In terms of education, over half had tertiary education, while the other had secondary education. The majority were self-employed and belonged to the middle socioeconomic class. Additionally, more than half earned ₦70,000 and above monthly.

The predominance of respondents within the 30–39 age group may be because this age range represents women in their active reproductive and child-bearing years, making them more likely to have daughters within the eligible age for HPV vaccination. The high proportion of married women is expected, as marriage is culturally associated with childbearing in the study setting.

The high level of tertiary education observed may be due to the urban nature of Egor LGA, which hosts several educational institutions and a relatively educated population. Similarly, the predominance of middle socioeconomic status and self-employment reflects the economic structure of the area, where trading and small-scale businesses are common.

This finding is similar to the study conducted in Jos, Nigeria, where the mean age of respondents was 43.7 ± 9.43 years and the majority had formal education[22].

It is also consistent with the study in Ethiopia, where mothers within the reproductive age group formed the bulk of respondents, however, they had lower levels of formal education and lower average income.[25].

However, the level of tertiary education observed in this study is higher than that reported in some other studies, such as the Vhembe study in South Africa, where lower levels of awareness and knowledge were partly attributed to lower educational exposure [21].

Sociodemographic characteristics such as age, education, and socioeconomic status play a crucial role in shaping health knowledge, attitudes, and health-seeking behaviors. The relatively high level of education observed in this study population may positively influence awareness and acceptance of HPV vaccination. However, disparities in income and education can still create gaps in access to accurate information and healthcare services.

Public health interventions should be tailored to account for variations in education and socioeconomic status. Health education campaigns should be simplified and adapted for mothers with lower educational levels. Additionally, outreach programs should target younger mothers and those in lower income groups to ensure equitable access to HPV-related information and vaccination services.

This study revealed that slightly above half of the respondents had good knowledge of HPV infection and its vaccine, while less than half had poor knowledge. A majority had heard of HPV of the HPV vaccine. However, detailed knowledge was inconsistent, as only less than half of the study population correctly identified cervical cancer as a consequence of HPV infection, and a little above half identified vaccination as a preventive method. Knowledge was significantly associated with level of education and household income. Awareness was higher among respondents with tertiary education and higher income levels, indicating a strong association between knowledge and socioeconomic status. Additionally, married women and those within the active reproductive age group (30–39 years) were more likely to be knowledgeable, likely due to increased interaction with healthcare services.

The relatively moderate level of knowledge observed may be attributed to increased exposure to health information through healthcare facilities, as hospitals and health centres were the major sources of information. Additionally, the high proportion of respondents with tertiary education likely contributed to better awareness. However, gaps in specific knowledge may be due to inadequate targeted health education, misinformation, and limited emphasis on HPV-related education in routine healthcare interactions.

This finding is higher than that reported in studies conducted in Vhembe, South Africa, where only about one-fourth heard of HPV and the majority had poor knowledge[21]. Similarly, a study in Jos, Nigeria reported extremely low knowledge levels, with less than one-tenth of the study population having knowledge of HPV and less than one-tenth being aware of the HPV vaccine.[22]

However, the findings are lower than those reported in Ogun State, Nigeria, where four-fifth of respondents demonstrated good knowledge of the HPV vaccine[23]. The higher knowledge in

Ogun may be due to the study being conducted during a vaccination campaign, which likely increased awareness.

Adequate knowledge of HPV and its vaccine is critical for informed decision-making and uptake of preventive services. The presence of knowledge gaps, especially regarding the link between HPV and cervical cancer, may hinder vaccine uptake and perpetuate the burden of cervical cancer in the community. This underscores the need for improved health education strategies.

There is a need for intensified community-based health education programs focusing on HPV infection, its complications, and the benefits of vaccination. Health workers should be trained to provide consistent and accurate information during routine healthcare visits. Media campaigns and school-based education programs should also be strengthened.

The majority of respondents, about four-fifth demonstrated a positive attitude towards HPV vaccination, while one-fourth had a negative attitude. Most respondents agreed that HPV vaccination is important for preventing cervical cancer and believed the vaccine is safe. However, misconceptions persisted, as only two-fifth appropriately disagreed with the notion that the vaccine encourages early sexual activity. Positive attitudes were more prevalent among mothers with higher educational attainment and better knowledge of HPV. Younger mothers within the reproductive age group also tended to have more favorable perceptions, while negative attitudes were more common among those with lower education and limited access to accurate information.

The generally positive attitude may be due to increased awareness of the benefits of vaccination and trust in healthcare systems. However, persistent misconceptions about sexual behavior may

be influenced by cultural beliefs, societal norms, and inadequate health education addressing these specific concerns.

This finding is similar to a study conducted in Ethiopia, where about four-fifth of mothers had a positive attitude towards HPV vaccination[25].

However, it contrasts with findings from Ibadan, Nigeria, where a much lower percentage of respondents had reservations about the HPV vaccine, largely due to moral and religious concerns[27].

It also differs from findings in Italy, where a significant proportion of older mothers were against vaccination due to perceived irrelevance to children[24].

A positive attitude is essential for improving vaccine uptake. However, lingering misconceptions—especially regarding sexual promiscuity—can significantly hinder acceptance and must be addressed to achieve optimal vaccination coverage.

Targeted behavioural change communication strategies should be implemented to address misconceptions about HPV vaccination. Religious and community leaders should be engaged in advocacy to improve acceptance. Educational campaigns should specifically address myths surrounding sexual behavior and vaccine safety.

This study demonstrated a high level of acceptance of HPV vaccination among mothers, with the majority expressing willingness to vaccinate their children and encourage others to do so. Additionally, about four-fifth believed their daughters should receive the vaccine. Willingness to vaccinate was higher among respondents with higher education, better income levels, and good

knowledge of HPV. Married women and those within the middle socioeconomic class also showed greater acceptance, suggesting that both socioeconomic stability and awareness influence health decisions.

The high acceptance may be linked to the generally positive attitude observed among respondents, as well as increasing awareness of the role of HPV vaccination in preventing cervical cancer. Exposure to health information from healthcare facilities may also have contributed.

This finding is consistent with studies conducted in Owerri, Nigeria, where about of respondents were willing to vaccinate their children[30], and in Jos, Nigeria, where about four-fifth expressed willingness to vaccinate[29].

However, it is higher than findings from Saudi Arabia, where only about three-fifth of respondents accepted HPV vaccination for their daughters, with refusal largely due to inadequate knowledge and fear of side effects[28].

High acceptance of HPV vaccination presents an opportunity for improving vaccine coverage and reducing the burden of cervical cancer. However, acceptance must be translated into actual uptake through accessible and affordable vaccination services.

Government and health authorities should ensure the availability and affordability of HPV vaccines in primary healthcare centres. Integration of HPV vaccination into routine immunization programmes and school-based vaccination initiatives should be prioritized.

This study found that knowledge significantly influenced attitude towards HPV vaccination, with respondents who had good knowledge being more likely to have a positive attitude. Additionally, education and income were significant predictors of knowledge, which indirectly influence

acceptance. Conversely, lower socioeconomic groups and less educated respondents were more likely to exhibit hesitancy due to misinformation and limited access to reliable health information.

Higher education and income levels likely improve access to information and healthcare services, leading to better understanding and acceptance of vaccination. Conversely, poor knowledge may lead to misconceptions, fear of side effects, and vaccine hesitancy.

This finding is consistent with a study conducted in Addis Ababa, where knowledge and positive attitude were strong predictors of HPV vaccine acceptance.[32]

Similarly, a study in Austria found that awareness of HPV and information from healthcare providers significantly increased vaccine acceptance.[31]

In contrast, a study in Kano, Nigeria reported that vaccine hesitancy was mainly driven by concerns about safety, lack of knowledge, and absence of healthcare provider recommendation[34].

Understanding factors influencing vaccine acceptance is crucial for designing targeted interventions. Addressing modifiable factors such as knowledge and misconceptions can significantly improve vaccine uptake and reduce disease burden.

Interventions should focus on improving knowledge through structured health education programs. Healthcare providers should play a central role in recommending HPV vaccination. Policies aimed at subsidizing vaccines and improving access should also be implemented.

CONCLUSION

This study revealed that over half of the respondents had good knowledge of HPV infection and its vaccine, while a significant proportion still had poor knowledge, particularly regarding the

link between HPV and cervical cancer, modes of transmission, and specific preventive measures. Despite these knowledge gaps, awareness of HPV and its vaccine was relatively high, with healthcare facilities serving as the major source of information.

The study demonstrated that the majority of respondents had a positive attitude towards HPV vaccination, recognizing its importance in preventing cervical cancer and expressing confidence in its safety. However, notable misconceptions persist, particularly the belief that HPV vaccination may promote early sexual activity among adolescents.

In terms of acceptance, the study revealed a high level of willingness among mothers to vaccinate their children against HPV and to encourage others to do the same.

Additionally, the study identified that knowledge plays a significant role in shaping attitudes towards HPV vaccination, with respondents who had better knowledge being more likely to exhibit positive attitudes. Educational level and household income were also significant determinants of knowledge, highlighting the influence of socioeconomic factors.

RECOMMENDATIONS

THE FEDERAL MINISTRY OF HEALTH AND RELEVANT AGENCIES

The Federal Government, through the Federal Ministry of Health and relevant agencies, should:

1. To develop and implement nationwide HPV awareness campaigns using mass media (radio, television, and social media), focusing on the link between HPV and cervical cancer, vaccine safety and addressing myths such as infertility and promotion of promiscuity
2. To strengthen school-based HPV vaccination programs, targeting girls aged 9–14 years, in line with WHO recommendations.

3. Train healthcare workers nationwide on HPV communication strategies so they can effectively educate and counsel mothers during routine healthcare visits.
4. To collaborate with the Ministry of Education to incorporate HPV and cervical cancer education into school health curricula.

TO THE EDO STATE GOVERNMENT

The Edo State Ministry of Health should:

1. Scale up state-wide HPV vaccination campaigns, particularly in urban and semi-urban areas like Egor LGA, where awareness exists but knowledge gaps persist.
2. Use community-based health promotion strategies like market outreaches, Church and Mosque sensitization programs, engagement of community leaders. They should also ensure consistent vaccine supply across all public health facilities to prevent missed opportunities for vaccination. Local media platforms should be employed to disseminate health messages to address misconceptions about the vaccine. Furthermore, they should partner with non-governmental organizations to fund and support HPV vaccination programs and awareness drives.

TO THE EGOR LOCAL GOVERNMENT AUTHORITY

The Egor Local Government Health Department should:

1. Organize regular community sensitization programs at ward level, focusing on mothers, as they are primary decision-makers for child health.
2. Utilize primary healthcare centres (PHCs) as hubs for HPV education and vaccination services.

3. Engage community influencers, including religious leaders, women leaders, market association heads to help address cultural and religious misconceptions about the vaccine.
4. Conduct door-to-door health education campaigns, especially targeting mothers with lower education and income levels who may have poorer knowledge.
5. Integrate HPV education into existing maternal and child health services, such as antenatal clinics and immunization days.

TO HEALTHCARE INSTITUTIONS

Healthcare facilities and professionals should:

1. Provide routine HPV education during clinic visits, especially at antenatal clinics, postnatal clinics and child welfare/immunization clinics.
2. Actively recommend HPV vaccination, as recommendations from healthcare providers is a strong determinant of vaccine acceptance.
3. Address misconceptions directly, particularly fear of infertility, concerns about promoting sexual activity and doubts about the vaccine
4. Train healthcare workers on effective communication skills, ensuring they can deliver clear, culturally sensitive, and evidence-based information.
5. Maintain proper records and follow-up systems to ensure completion of vaccine schedules where applicable.
6. Collaborate with schools and communities to conduct outreach vaccination programs.

TO THE COMMUNITY

The community members and community stakeholders should:

1. Promote a culture of open dialogue around HPV infection and vaccination within households and community gatherings, encouraging mothers to discuss and share accurate information about the HPV vaccine with their peers, thereby leveraging the influence of social networks to improve vaccine acceptance.
2. Community leaders, including traditional rulers, women group leaders, market association heads, and religious leaders, should actively champion HPV vaccination campaigns within their domains by making public endorsements, facilitating community sensitization events, and countering myths and misconceptions, particularly those linking the vaccine to infertility or sexual promiscuity that continue to negatively affect vaccine uptake.
3. Community-based organizations and women's groups should partner with primary healthcare centres to support door-to-door outreach activities that identify unvaccinated girls within the 9–14 years target age group and connect their mothers with available vaccination services, ensuring that no eligible girl is missed due to lack of awareness or access.

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APPENDIX

APPENDIX I

QUESTIONNAIRE

ASSESSING THE KNOWLEDGE, ATTITUDE AND ACCEPTANCE OF HUMAN PAPILLOMA VIRUS VACCINATION AMONGST MOTHERS IN EGOR LOCAL GOVERNMENT AREA.

I am a 600 level student of the University of Benin, Benin City and this study aims at assessing the knowledge, attitude and acceptance of human papilloma virus vaccination amongst mothers in Egor local government area**.** All information given will be treated as confidential. Please mark and fill any areas as appropriate. Thank you.

SOCIODEMOGRAPHIC CHARACTERISTICS

1. Age (In years at last birthday)
2. Marital status: Single [ ] Married [ ] Divorced [ ] Co-habiting [ ] Separated [ ] Widowed [ ]Others [ ]
3. Tribe: Igbo [ ] Hausa [ ] Yoruba [ ] Bini [ ] Estako [ ] Esan [ ]Others, specify_____
4. Religion: Christian [ ] Muslim [ ] ATR [ ] Others, specify_____
5. Level of Education: Primary [ ] Secondary [ ] Tertiary [ ] No formal education [ ]
6. Occupation: Civil servant [ ] Trader [ ] Self-employed [ ] Employed[ ] Unemployed [ ] Others_____

7. Household income (in naira): less than 20,000 [ ] 21,000 - 50,000 [ ] 51, 000 – 100,000 [ ] 100,000 and above [ ]

KNOWLEDGE OF HUMAN PAPILLOMA VIRUS INFECTION AND ITS VACCINE

8. Have you ever heard about Human papilloma virus before? Yes [ ] No [ ]
9. If yes, where did you first hear about HPV? Hospital [ ] Media (TV, Radio, Internet) [ ] Friends/Relatives [ ] Church/Mosque [ ] Others [ ]
10. How is HPV transmitted?(You can tick as many as possible) Through sexual intercourse [ ] Sharing toilets [ ] Kissing [ ] Blood transfusion [ ]
11. Who do you think is at risk of HPV infection? (You can tick as many as possible) Sexually active women [ ] Men [ ] Teenage girls [ ] Married women [ ] I don't know [ ]
12. Do you think HPV infection has symptoms that are easily noticed? Yes [ ] No [ ] I don't know [ ]
13. Which of these do you think HPV infection can cause? Cervical cancer [ ] Genital warts [ ] HIV [ ] Infertility [ ] I don't know [ ]
14. Do you think HPV infection can be prevented? Yes [ ] No [ ] I don't know [ ]
15. If yes, how can it prevented? By vaccination [ ] By using condoms [ ] By faithfulness to one partner [ ] By regular screening [ ] I don't know [ ]
16. Have you heard of the HPV vaccine? Yes [ ] No [ ]
17. What is the HPV vaccine used for? Prevent HPV infection [ ] Treat cervical cancer [ ] Cure infections [ ] I don't know [ ]
18. Who is the HPV vaccine meant for? Girls [ ] Boys [ ] Both [ ]

19. At what age should the vaccine be given? Before sexual activity (9-14yrs) [ ] After marriage [ ] At any age [ ] I don't know [ ]

ATTITUDE TOWARDS HPV VACCINES

S/N		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
20	Vaccinating girls against HPV is important for preventing cervical cancer					
21	The HPV vaccine is safe for children					
22	I believe my daughter should					

	receive the vaccine					
23	I am afraid the vaccine may encourage early sexual activity					
24	The HPV goes against my religious beliefs					
25	The government should make the HPV vaccine compulsory for eligible girls					
26	I would encourage other					

	mothers to vaccinate their daughters					

ACCEPTANCE OF HPV VACCINE

27. Have you vaccinated your daughter(s) against HPV? Yes [ ] No [ ]

28. If no, are you willing to vaccinate your daughter in the future? Yes[ ] No [ ]

29. If no to 27, why not? (Tick all that apply) I don't know where to get the vaccine [ ] It is too expensive [ ] I'm not sure it is safe [ ] I need to consult my husband first [ ] My religion does not support it [ ] I have not been informed by a health worker [ ] Daughter is not old enough [ ] No daughter yet[ ] others(specify)_____

30. If yes to 27, what made you decide to vaccinate your daughter? Health worker's advice [ ] Fear of cervical cancer [ ] Media campaign [ ] Peer influence [ ] School program [ ]

31. Would you recommend the vaccine to other mothers? Yes [ ] No[ ]

32. What could make you more likely to accept HPV vaccine for your daughter? If it is free [ ] If I receive more information[ ] If religious/community leaders support it[ ] If health workers recommend it[ ]

FACTORS INFLUENCING ACCEPTANCE OF HPV VACCINE

33. Do you believe vaccines are generally safe? Yes[ ] No[ ]

34. Do you trust information given by health workers about vaccines? Yes[ ] No[ ]

35. Can you afford to pay for it if it's not free? Yes[ ] No[ ]

36. I need my husband's permission before I can vaccinate my daughter Yes [ ] No[ ]

37. The nearest health centre for vaccination is too far for me. Yes [ ] No[ ]

APPENDIX II

INFORMED CONSENT FORM

TITLE OF RESEARCH: KNOWLEDGE, ATTITUDE AND ACCEPTANCE OF HUMAN PAPILLOMA VIRUS VACCINATION AMONGST MOTHERS IN EGOR LGA

NAMES AND AFFILIATIONS OF INVESTIGATORS:

Hillary Ovoshoshumunu Segun

Department of Public Health and Community Medicine,

University of Benin Teaching Hospital,

PMB 111,

Benin City,

Edo State.

Email: segunhillary@gmail.com

PURPOSE OF RESEARCH: To assess the knowledge, attitude and acceptance of human papilloma virus vaccination amongst mothers in Egor LGA, Benin City, Nigeria with a view of improving vaccine uptake amongst eligible teenage girls.

PROCEDURES INVOLVED IN THE STUDY: In this study, questions will be asked regarding the knowledge, attitude and factors influencing the acceptance of human papilloma virus vaccine

CONFIDENTIALITY: All data collected will be treated with utmost confidentiality. Mothers who volunteer to participate in this study will be given a unique study number, and data will be collected. Participants' information will be stored safely secured by codes in computers using only the study identification number. All those handling data will not at any time reveal participants' identity.

FINANCIAL COMPENSATION: There shall be no monetary compensation for participation in this study.

VOLUNTARY PARTICIPATION: Your participation in this study is entirely voluntary. If you desire to withdraw from this study at any time, no punitive measures will be meted against you for your withdrawal. Your refusal to participate or withdraw from the study will not involve any negative consequences or loss of benefits to which you are otherwise entitled.

RISK: It is not expected that any harm will come to you because of your participation in this study. The study does not entail any activity that would harm you.

BENEFIT: The study will help to assess the knowledge, attitude and acceptance of human papilloma virus vaccination amongst mothers in Egor LGA

FINANCIAL SPONSORSHIP: This study will be sponsored by the principal investigator.

The investigator may be contacted in case you have any clarifications to make.

The under-listed may be contacted in case you have any clarifications to make.

Hillary Ovoshoshumunu Segun

Department of Public Health and Community Medicine,

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OR

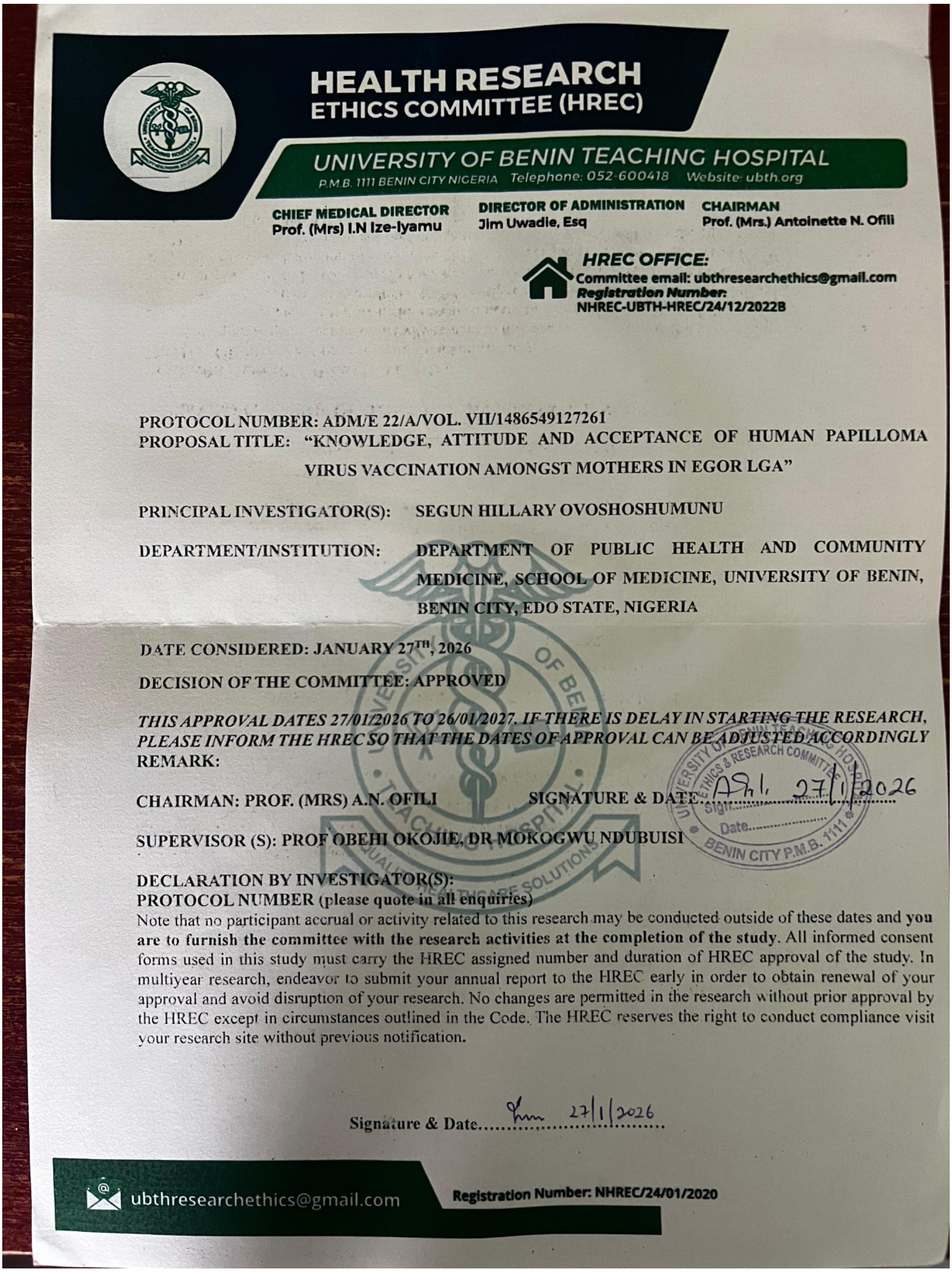
Ethics and Research Committee,

University of Benin Teaching Hospital

Phone Number: +234 706 333 1337

APPENDIX III

ETHICAL APROVAL



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 Prof. (Mrs) I.N Ize-Iyamu

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/1486549127261
PROPOSAL TITLE: "KNOWLEDGE, ATTITUDE AND ACCEPTANCE OF HUMAN PAPILLOMA VIRUS VACCINATION AMONGST MOTHERS IN EGOR LGA"

PRINCIPAL INVESTIGATOR(S): SEGUN HILLARY OVOSHOSHUMUNU

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

DATE CONSIDERED: JANUARY 27TH, 2026

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 27/01/2026 TO 26/01/2027. 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: 27/1/2026

SUPERVISOR (S): PROF OBEHI OKOJIE, DR MOKOGWU NDUBUISI

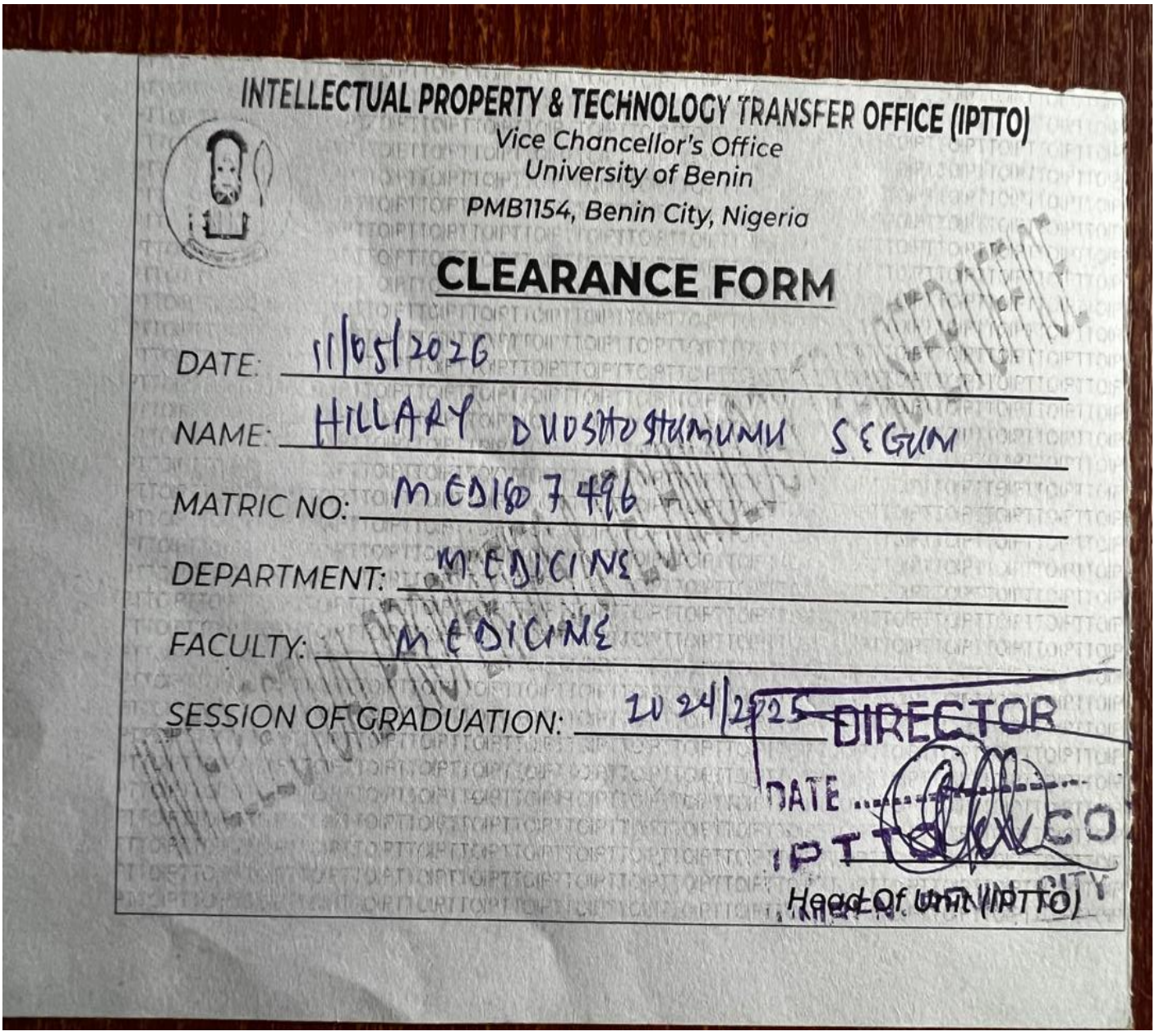
DECLARATION BY INVESTIGATOR(S):
PROTOCOL NUMBER (please quote in all enquiries)
Note that no participant accrual or activity related to this research may be conducted outside of these dates and **you are to furnish the committee with the research activities at the completion of the study**. All informed 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 report 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: 27/1/2026

ubthresearchethics@gmail.com Registration Number: NHREC/24/01/2020

APPENDIX IV

PLAGIARISM CLEARANCE FORM



INTELLECTUAL PROPERTY & TECHNOLOGY TRANSFER OFFICE (IPTTO)

Vice Chancellor's Office
University of Benin
PMB1154, Benin City, Nigeria

CLEARANCE FORM

DATE: 11/05/2026

NAME: HILLARY DUOSITO STANLEY SEGUN

MATRIC NO: MED/18/7496

DEPARTMENT: MEDICINE

FACULTY: MEDICINE

SESSION OF GRADUATION: 2024/2025

DIRECTOR

DATE .....

IPTTO

Head Of Unit (IPTTO)