KNOWLEDGE, SOCIOCULTURAL BARRIERS, AND HESITANCY TO HPV VACCINE AMONG CAREGIVERS OF ADOLESCENTS IN BENIN CITY, NIGERIA

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PROJECT SUPERVISOR

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DECLARATION

We hereby declare that this project work titled "**Knowledge, Sociocultural Barriers, and Hesitancy to HPV Vaccine Among Caregivers of Adolescents in Benin City, Nigeria**" Was conducted under supervision and has not been submitted in part or in full for any purpose.

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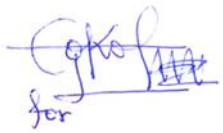
CERTIFICATION

This is to certify that this research work titled "KNOWLEDGE, SOCIOCULTURAL BARRIERS, AND HESITANCY TO HPV VACCINE AMONG CAREGIVERS OF ADOLESCENTS IN BENIN CITY, NIGERIA" was conducted by IDIA OGHENEVOWERO SANDRA with matriculation number MED1606081 and IGBASANMI OLAJUMOKE with matriculation number MED1505182 under supervision of Prof. Obehi Hilda Okojie in the Department of Public Health and Community Medicine, School of Medicine, College of Medical Sciences, University of Benin as part of the requirements for the award of bachelor of medicine and bachelor surgery (MBBS) degree.



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Igbasanmi Olajumoke

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LIST OF ABBREVIATIONS

ATR	African Traditional Religion
CDC	Center for Disease Control
DNA	Deoxyribonucleic Acid
FDA	Food and Drug Administration
HIC	High Income Countries
HPV	Human Papilloma Virus
ILO	International Labour Organization
LGA	Local Government Area
LMIC	Low- and Medium-Income Countries
NPI	National Program on Immunization
QoL	Quality of Life
SAGE	Strategic Advisory Group of Experts
SDG	Sustainable Development Goal
SPSS	Statistical Package for the Social Sciences
VIA	Visual Inspection with Acetic acid
VLP	Virus Like Particles
WHO	World Health Organization

DEFINITION OF TERMS

Adolescent: any person between ages 10 and 19 years of age.

Complacency: where perceived risks of vaccine-preventable diseases are low, and vaccination is not deemed a necessary preventive action.

Confidence: trust in the effectiveness and safety of vaccines; the system that delivers them and the motivations of the policy makers who decide on the needed vaccines.

Convenience: how easy and accessible it is for individuals to receive a vaccine

Vaccination: the act of introducing a vaccine into the body to produce protection from a specific disease.

Vaccine: a biological preparation that provides acquired immunity against a particular disease

Vaccine hesitancy: refers to delay in acceptance or refusal of vaccines despite availability of vaccination services.

Vaccine uptake: the number of people vaccinated with a certain dose of the vaccine in a certain period.

ABSTRACT

Background: The Human Papilloma Virus (HPV) causes more than 95% of cervical cancer worldwide. HPV infection is the most common viral infection of the reproductive tract. In Nigeria, prevalence is high across all female age groups, but is highest among persons aged 15-23 years. Cervical cancer is the fourth most common cancer in women worldwide and the most common cancer of the female reproductive tract. HPV-related diseases including cervical cancer can successfully be prevented by prophylactic vaccination.

Objective: To determine the knowledge, sociocultural barriers, and hesitancy to HPV vaccine among caregivers of adolescents in Benin city, in order to decrease the burden of cervical cancer in Nigeria.

Methodology: This descriptive cross-sectional study was carried out among 397 caregivers of adolescents in Evboumore community, selected using multi-staged sampling technique. Data was collected using self-administered questionnaires with open and close ended questions. Data was entered and analyzed using Statistical Package for the International Business Machines Corporation Social Science (IBM SPSS) version 25.0 software with statistical significance set at $p < 0.05$ and 95% confidence interval.

Results: The response rate was 100%. Most of the respondents in this study were between the age group of 30 – 39 years with mean age (±SD) of 39.89 ± 8.97. Majority of the respondents had poor knowledge about HPV (72.8%) and HPV vaccine (80.9%). This study identified distance, misinformation and unavailability of the vaccines as the major sociocultural barriers to HPV vaccination. And 41.4% expressed hesitance towards future HPV vaccination of their adolescents.

Conclusion: Most of the respondents were not aware of HPV and HPV vaccine. Majority of the respondents had poor knowledge concerning HPV and HPV vaccine. Distance, misinformation and unavailability of the vaccines were identified as the major sociocultural barriers to HPV vaccination. About half of the respondents were vaccine hesitant.

Keywords: Adolescent, Caregivers, HPV, Hesitancy, Vaccine

CHAPTER ONE

INTRODUCTION

1.1 Background

The Human Papilloma Virus (HPV) causes more than 95% of cervical cancer worldwide.[1] HPV infection is the most common viral infection of the reproductive tract. In 2018 the Centre for Disease Control (CDC) estimated that 43 million persons are infected with HPV and there are 13 million new cases occurring each year. HPV is so common that almost every sexually active person will get infected at some point if they do not get vaccinated.[2] The World Health Organization (WHO) in 2017 estimated the worldwide prevalence of HPV among women to be 11.7% with the highest prevalence among women in Sub-Saharan Africa. HPV is widespread among men globally, with a prevalence of 21% in all regions.[3] In Nigeria, prevalence is high across all female age groups, but is highest among persons aged 15-23 years.[4]

HPV are small, non-enveloped, circular, double-stranded deoxyribonucleic (DNA) viruses belonging to the family Papillomaviridae. Many HPV types are considered benign but at least 14 HPV types have been considered as carcinogenic and are known as high-risk HPV types (HPV16, 18, 31, 33, 35 etc.).[3] HPV infection is a sexually transmitted infection. Transmission is by vaginal, anal, and oral sex, also by close skin-skin contact during sex.[2] The Papilloma viruses target epithelial cells of skin, oral and anogenital mucosa. Most infections do not cause symptoms and resolve spontaneously within 1 to 2 years, but when infection becomes persistent, it can cause infections at cutaneous and mucosal sites, sometimes leading to warts and several HPV-associated cancers, including those of the cervix, vulva, penis and anus, and a subset of benign head and neck cancers. Cervical cancer is the commonest.[5]

Cervical cancer is the fourth most common cancer in women worldwide and the most common cancer of the female reproductive tract. It is a leading cause of mortality among women. In 2020, an estimated 604,000 women were diagnosed with cervical cancer worldwide and about 342,000 died from the disease. [6] In Nigeria, cervical cancer ranks as the 2nd most frequent cancer among women accounting for 14.8% of all cancer deaths. Current statistics in Nigeria indicate that women at risk for cervical cancer (female population aged ≥15 years) are 52.6 million with 12,075 women diagnosed with cervical cancer and 7,968 deaths from the disease annually.[7] Cervical cancer is a potentially preventable disease if appropriate screening and prophylactic strategies are employed. The traditional method to screen women for cervical pre-cancer lesions has been cytology (the Papanicolaou test, also called Pap smear). When cytology results are positive, diagnosis is confirmed by colposcopy and biopsy for histology. Newer screening tests includes visual inspection with acetic acid (VIA) and HPV DNA tests. Treatment is based on a positive screening test and can be by ablative treatment and excision treatment. It is established that well organized ed cervical screening programs or widespread good quality cytology can reduce cervical cancer incidence and mortality [8]

HPV-related diseases including cervical cancer can successfully be prevented by prophylactic vaccination. The first HPV vaccine, Gardasil, the quadrivalent HPV vaccine was licensed by the United States Food and Drug Administration (FDA) in 2006. The bivalent HPV vaccine, Cervarix was approved by FDA in 2009, it protects against HPV types 16 and 18. Gardasil, in addition to HPV16 and 18, also targets HPV6 and 11, which cause around 90% of genital warts.[9] These vaccines are produced from virus like particles (VLP) created with recombinant technology. Since immune response to HPV is viral-type specific, comBeninng VLPs from multiple HPV types into a single multivalent vaccine has greatly improved the vaccine potency.

To maximize the effectiveness of the vaccine, it should be given to girls before they are sexually active because the vaccines offer no protection to women with prior HPV infection. [2]

The CDC recommends routine vaccination of preteens at ages 11 or 12 years. A two-dose series (0, 6-12 months) for most persons who initiate vaccination at ages 9 through 14 years and a three-dose series (0, 1-2, 6 months) for persons who initiate vaccination at ages 15 through 45 years, and for immunocompromised persons.[10]

Over time, doubt, apprehension, and reluctance towards vaccinations have been persistent. The Strategic Advisory Group of Experts (SAGE) working group on vaccine hesitancy described vaccine hesitant individuals as a heterogeneous group in the middle of a continuum that ranges from total acceptance to complete refusal.[10] Vaccine hesitant individuals may refuse some vaccines but agree to others; delay vaccines or accept vaccines but unsure in doing so.[10] Vaccine hesitancy has increased over decades for numerous reasons and was declared by WHO as one of the top ten threats to global health in 2019.[11] The advisory group identified complacency, inconvenience in assessing vaccines, and lack of trust a major reasons underlying hesitancy. This is the complacency, convenience and confidence "3Cs" model of vaccine hesitancy.[11]

1.2 Statement of the problem

Studies have investigated the reasons for low uptake of HPV vaccine in Nigeria. In 2018, a study in Enugu, Nigeria carried out among caregivers of female children reported low awareness and knowledge of HPV and HPV vaccine.[12] A similar study in 2020 among parents of adolescents in Lagos, Nigeria was low (27%).[13]

Early detection becomes achievable using diverse screening services, ultimately preventing invasive cervical cancer. While cervical cancer screening is crucial for successful prevention, its availability in Nigeria is limited, and in areas where it exists, the uptake of screening

services has not been particularly encouraging. The problem statement revolves around the limited participation of rural women in Lagos and Ibadan, Nigeria, in cervical cancer screening. A study in Lagos revealed that only 13% of respondents had ever been screened, none of which had occurred within the last three years. Similarly, a 2020 study in Ibadan reported only 14% of women who had sought cervical cancer screening.[15]

HPV vaccines are not included as part of the free vaccines offered under the National Program on Immunization (NPI) in Nigeria and this is currently only available and administered on request and are paid for by the recipient at a high cost, which is beyond what most Nigerians can afford thus limiting its affordability. Enhanced backing for continuous initiatives to enhance availability and accessibility, including subsidized costs, has the potential to boost administration rates in Nigeria, ultimately reducing death rates from cervical cancer in this demographic.[16]

Over 70% of patients with cervical cancer present late at the invasive stage of the disease leading to poor outcome. The effects of late presentation include complicated diagnosis and treatment, poor prognosis, increased risks of side effects from the use of second- or third-line therapies, huge costs of treatment, loss of productivity, and increased mortality rates. Some of the reasons that have been provided for the late presentation include low literacy levels, high rates of poverty, cultural and religious traditions, poor geographical access to cancer care, low level of awareness of cervical cancers, lack of screening, poor uptake of vaccine and poor diagnostic procedure and treatment among health-care provider.[17]

Women diagnosed with cervical cancer suffer a decrease in all aspects of Quality of Life (QoL), that is in mental, financial, physical and social well-being. In a 2014 conducted among women with advanced cervical cancer in Zaria, Nigeria, it was observed that the quality of the 378 patients under examination was profoundly impacted. Specifically,

physical functions were compromised in 70% of the patients, emotional well-being in 60%, financial aspects in 76%, and the sexual domain experienced adverse effects in over 85% of the patients. Some of the challenges included social discrimination, loss of body image, loss of sexual functioning, loss of femininity, loss of income, financial distress, work and employment challenges, side effects of treatment etc.[18]

1.3 Justification of the study

This study will provide needed information on the scale of intervention required and the best strategies to address the specific reasons for HPV vaccine hesitancy in Benin city and Nigeria as a whole, stopping the scourge that cervical cancer has on its citizens.

The HPV vaccine was introduced to reduce the incidence of cervical cancer, despite its availability, vaccine uptake remains a major challenge. Parental influence and vaccine acceptability plays a major role in vaccine uptake therefore obtaining comprehensive data on parental knowledge on HPV and HPV vaccine hesitancy will ensure policy formation to curb the incidence of HPV vaccine hesitancy.

There's paucity of sub-national studies on knowledge, sociocultural barriers, and hesitancy to HPV vaccine among caregivers of adolescent. We are aware of studies carried out in Ibadan[19], Abakaliki[20] and Lagos[21]. Only one study was found in the Southern part of Nigeria assessing willingness of caregivers to Vaccinate their adolescents[22]. Many western studies assessed Caregivers' knowledge on HPV and HPV vaccine uptake, however there is paucity of literature that assessed caregivers' willingness for HPV vaccination in Nigeria hence the importance of assessing caregivers' knowledge, sociocultural barriers, and hesitancy to HPV vaccine in Edo state, Nigeria.

In previous studies the respondents were adolescent girls, only a few studies have involved the caregivers. Since the vaccine is usually administered to adolescents, parental consent becomes

necessary before administration. Hence the importance of assessing the caregiver's knowledge, sociocultural barriers and hesitancy to HPV vaccine.

There is need to ascertain the prevalence and determinants of HPV vaccine hesitancy to know the depth and major causes of vaccine hesitancy. Findings from this study will help in informed health education about the vaccine and eradication of fears and misconceptions about the vaccine thus increasing their overall willingness to vaccinate their adolescents. There is also need for widespread education of the populace on the importance HPV vaccination and the public health implication cervical cancer to increase uptake of HPV vaccine. Overall, this will contribute to the attainment of Sustainable Development Goal 3 (SDG 3) aimed at ensuring healthy lives and promoting well being for all at all ages.

1.4 Research Questions

1. What is the knowledge of HPV and HPV vaccine among caregivers of adolescents in Benin city, Nigeria?
2. What are the sociocultural barriers towards HPV vaccination among caregivers of adolescents in Benin city, Nigeria?
3. What is the prevalence of HPV vaccine hesitancy among caregivers of adolescents in Benin city, Nigeria?
4. What are the determinants of HPV vaccine hesitancy among caregivers of adolescents in Benin city, Nigeria?

1.5 Aim and Objectives

1.5.1 General Objective

To determine the knowledge, sociocultural barriers, and hesitancy to HPV vaccine among caregivers of adolescents in Benin city, in order to decrease the burden of cervical cancer in Nigeria.

1.5.2 Specific Objectives

1. To assess the knowledge of HPV and HPV vaccine among caregivers of adolescents in Benin city, Nigeria.
2. To identify the sociocultural barriers towards HPV vaccination among caregivers of adolescents in Benin city, Nigeria.
3. To estimate the prevalence of HPV vaccine hesitancy among caregivers of adolescents in Benin city, Nigeria.
4. To identify the determinants of HPV vaccine hesitancy among caregivers of adolescents in Benin city, Nigeria.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

In this chapter, selected research writings and works done on human papilloma virus and HPV vaccine across the globe were carefully reviewed in line with the specific objectives of this study. Works done and published in scientific publications in the last decade were selected for review.

2.1 Knowledge of HPV and HPV vaccine

Cross sectional studies conducted internationally in Italy and Texas, and the African studies in Kenya and Nigeria, provide insights into HPV vaccine awareness and hesitancy across different regions. Nigerian studies, particularly in Lagos, depict lower overall awareness levels compared to their international counterparts, indicating regional variations. In Italy, a multistage sampling was used to recruit 435 parents with at least one child aged 12 and 13 years in Naples and Salerno, Italy. The data was collected through self-administered questionnaires. 94.4% of parents were aware of HPV, 73.6% recognized the vaccine as preventive. Health-care providers (63.2%) and the internet/social media (42.1%) were primary information sources. However, the sample's limited representativeness and unverified vaccination data pose challenges to result generalization. [23]

Conversely, in the Rio Grande City Consolidated Independent School District, Starr County, Texas, a study carried out among parents/guardians of children ages 9 to 17 years showed that 86.7% of parents were aware of HPV and 83.6% of HPV vaccine, with 77.3% understanding its cancer-preventive role. Notably, the study included fathers as well, but limitations like low response rate (622/7,055 surveys completed) and potential recall bias in vaccine history were acknowledged, impacting result reliability.[24]

Another cross-sectional study done in 2020 in a tertiary hospital in Nairobi, Kenya to assess the impact of parental knowledge and beliefs on HPV vaccine hesitancy showed that 50% knew about HPV, 95% about cervical cancer, and 80% its preventability. Work colleagues were prominent information sources (82% females, 72% males), with pretesting enhancing questionnaire quality. It is commendable that the questionnaire was pretested, enhancing quality. However, the study did not explore the effect of religious beliefs, also the findings may not be generalizable to the rural settings of Kenya as the study was conducted in the urban area where parents were well educated and had better access to the HPV vaccine and information, and also, the sample was taken from an outpatient clinic and not a general population, which might reflect only persons with good health seeking behavior.[25]

Nigeria's studies portrayed varied awareness levels. In Lagos, in 2020, a study to assess parental acceptance of HPV vaccination for adolescent girls, showed that 45.9% had poor knowledge, 29.6% good knowledge about cervical cancer and HPV. Awareness of the vaccine was 54.7% poor, 18.6% fair, and 26.7% good. It is commendable that the questionnaires were pretested. The study was however limited by the fact that there might have been some recall bias in answering some of the questions by the respondents.[13]

Another study done in Enugu, Nigeria, a cross-sectional descriptive study of 508 caregivers of pre-adolescent girls to assess their knowledge and attitude to HPV infection and the factors that affect their acceptance of the vaccine. This study showed that awareness of HPV infections and cervical cancer, and HPV vaccines were low among the caregivers. Only 43.5% knew about HPV, 5.4% recognized its link to cervical cancer, and 59.7% of those aware knew about the vaccine, with only 19.7% associating it with cervical cancer prevention. A limitation of this study is that the study sample is small and might not reflect the knowledge of caregivers in the state.[12]

2.2 Sociocultural barriers of HPV vaccination

Despite the proven efficacy of the HPV vaccine, a significant portion of the population remains unvaccinated. The reasons behind the vaccine hesitancy are complex but two sociocultural barriers prevail in the studies reviewed: the fear of future promiscuity and deeply ingrained religious beliefs.[26,27,28,25]

A longitudinal study done to determine how religious, philosophical and moral beliefs and affiliation shape vaccine attitudes and behaviours to the flu, measles-mumps-rubella (MMR), and HPV vaccines. The Respondents were 3005 adults from a probability-based, four-wave panel survey in the United States done between September 2018 and March 2019. It showed that those who reported being more religious were more reluctant to vaccinate their daughters. Stronger philosophical beliefs (e.g., that health is controlled by God) and stronger moral beliefs (e.g., premarital sex is immoral) predicted more negative attitudes toward the HPV vaccine. Negative vaccine attitudes then predicted weaker intentions to encourage others to vaccinate and lower probability of receiving a vaccine. It is commendable that this strategy of a longitudinal study provided an opportunity to capture within-individual changes and stability across time, thereby providing stronger causal associations in predicting vaccine attitudes and behaviour. Also, the sample included a variety of religious groups, adequately representing the religious diversity of the United States.[26]

A descriptive qualitative study conducted with five African couples residing in north England in 2016 to explore factors influencing United Kingdom based African parents' acceptance or decline of the HPV vaccine. Purposive snowball sampling was used to select the participants and face to face semi-structured interviews were conducted. The results of the study indicated that HPV vaccination was generally unacceptable within the African population, with culture and religion influencing risk perceptions and playing important roles in vaccination decision

making (fathers were the ultimate decision makers). The study reported fear of promiscuity and perceived low risk (due to good moral and religious upbringing) as reasons for vaccine decline. The results of this study cannot be generalised as the study sample is not representative of the population.[27]

A systematic review of 43 literatures on documented barriers and supports to HPV vaccination in indigenous populations worldwide by researchers in Alberta, Canada. Methodology of the literatures were assessed using a universal appraisal tool, Quality Assessment Tool for Reviewing Studies with Diverse Designs. Majority of the journals reviewed involved male and female participants (parents, caregivers, healthcare workers etc.) and originated from North America and Oceania. Beliefs about sexual behaviour were the most reported barrier. Participants consistently reported concern that obtaining HPV vaccines may result in stigma from social perceptions of promiscuity. Parents reported concerns that the child and community members may interpret consent as a tolerance of sexual activity, child may engage in early, unprotected or promiscuous sexual activities, and avoid health protections such as condoms and gynaecological screening.[28]

A descriptive cross-sectional study done between June and August 2020 in a tertiary hospital in Nairobi, Kenya to assess the impact of parental knowledge and beliefs on HPV vaccine hesitancy. The study population included male and female Kenyan parents with preadolescent and adolescent children. Participants were selected using a quasi-randomized sampling method and a minimum sample size of 195 was calculated. Data were collected using a face-to-face interviewer-administered questionnaire. The study reported that 25% or more of parents would reject the vaccine because of concerns that their daughters would be stigmatized due to accusations of being promiscuous after being vaccinated, 16% of females and 13% of males would reject the vaccine because their religion does not allow vaccination,

also 25% of females and 27% of males reported that they would reject the vaccine because it would prompt early sexual activity.[25]

2.3 Prevalence of HPV vaccine hesitancy among caregivers

The level of HPV vaccine hesitancy varied in an international study conducted in 2019, with 33.3% of Italian parents of 12-13-year-olds and 23% of US parents with adolescents aged 11-17 exhibiting hesitancy. This study offered insights into regional and age-related differences in vaccine acceptance.

A cross-sectional study in Italy aimed at determining the determinants of HPV vaccine hesitancy among parents of adolescents aged 12 and 13 years. The study was undertaken from April to October 2019 amongst a random sample of 435 parents with at least one child aged 12 and 13 years attending six random public schools in the Naples and Salerno regions, Italy, that have been specifically selected. Data was collected through a self-administered questionnaire. Out of 550 parents selected and to whom the questionnaire was delivered, a total of 435 consented and were enrolled in the study giving a response rate of 79.1%. One-third of the survey respondents (33.3%) were hesitant toward anti-HPV vaccination. The study only focused on two geographical areas, which may limit the generalizability of its findings to other regions in Italy or internationally. By exclusively targeting parents of adolescents aged 12 and 13 years, the study excludes parents of older and younger adolescents, potentially missing variations in vaccine hesitancy among different age groups.[23]

In a study carried out in 2019 to determine the prevalence and characteristics of HPV vaccine hesitancy among parents of adolescents across the US among 2000 caregivers using a random sampling technique. The study population were parents, guardians, or foster parents of adolescents aged 11-17years living with the adolescent. Among the 2000 respondents, 23% were hesitant on accepting the vaccine. This study provides a more comprehensive national

perspective on HPV vaccine hesitancy among a wider age range of adolescents as well as a larger population size as opposed to a similar study carried out in Italy where only a quarter of this sample size was used. By including adolescents aged 11-17, the study captures a wide spectrum of parental concerns and attitudes towards HPV vaccination, accounting for variations in vaccine acceptance among different age groups.[2]

Subnational studies examine HPV vaccine hesitancy revealed varying attitudes among parents. In a family study, 32% of parents visiting Family Medicine Pediatrics Clinic in Riyadh showed hesitancy, but the findings might not generalize to the broader population. Meanwhile a South African study focused on girls in private schools, reported that 42% were unwilling to vaccinate when vaccines were free, potentially limiting the representation of broader vaccine attitudes. These studies highlight the need to consider the context and population when addressing HPV vaccine hesitancy.

A study carried out in Saudi to assess the attitude and hesitancy of HPV vaccine among Saudi parents. The study population were parents who came to the Family Medicine Pediatric Clinics in Riyadh, Saudi Arabia from November 2019 to May 2020. The criterion for inclusion was being Saudi parents. The exclusion criteria were non-Saudi nationality of the parents. The study included 296 participants of varying ages and levels of education. All participants were Saudi nationals, and of those, 80.7% were mothers while 18.3% were fathers. Most of the parents were relatively young: 39% aged between 20 and 30 years old and 46% aged between 31 and 40 years old. About 70% of the participants had higher education (bachelor's degree and above), 90% of them were married, while only 59.2% of them were employees. Amongst the 296 respondents 32% were hesitant on receiving the vaccine. The study focused on parents who visited Family Medicine Pediatric Clinics in Riyadh, Saudi Arabia limits the generalization of its findings. The attitudes of parents seeking medical care at these clinics may not represent the broader population.[30]

A cross sectional study aimed at assessing the misinformation driving low HPV vaccination coverage in South African girls attending private schools was carried out in 2018. The target population for this cross-sectional survey were 312 caregivers of girls aged ≥9 years in grades 4–7 attending private schools in South Africa. Amongst the 305 respondents on willingness to vaccinate their children if vaccines were provided free, 130 (42%) were unwilling to vaccinate, and 40 (13.1%) were unsure if they wanted to vaccinate their wards or not. On the other hand, 304 respondents on willingness to vaccinate their children if vaccine was provided at school, 145(47.7%) were unwilling, 34 (11.2%) were unsure. The study's focus on caregivers of girls attending private schools in South Africa may not provide a representative picture of the broader population. Private school attendees might have different socioeconomic backgrounds and access to healthcare than the general population, however, the study reports the percentages of caregivers who were unwilling to vaccinate or unsure in response to different scenarios, making the findings easy to understand and apply in public health strategies. [31]

National studies conducted in different regions of Nigeria shed light on parental intentions regarding HPV vaccination for adolescents. In Ibadan, Southwest Nigeria, a comprehensive study involving 678 parents revealed that 96.8% of them had the intention to vaccinate their adolescents, while only 3.2% expressed hesitancy. Notably, the study's thorough pre-interview education about HPV, the vaccine, and cervical cancer ensured clear responses. In Abakaliki, Nigeria, a separate study with 290 mothers of female students found that 89.1% were willing to vaccinate their daughters, with only 1.9% showing hesitancy, primarily due to a lack of awareness and financial constraints. These studies underscore the importance of tailored education and awareness campaigns to enhance HPV vaccine acceptance among parents in different regions of Nigeria.

A study carried out in selected communities in Ibadan, Southwest Nigeria, to assess parental intention to vaccinate adolescents with HPV vaccine. The study was conducted in five communities in Ibadan, a cosmopolitan city located in southwestern part of Nigeria. Participants were parents of adolescents who were residing in the selected communities in Ibadan. Four focus group discussions were conducted among 38 parents of adolescents to determine the relevant behavioural outcomes, important referents, environmental facilitators, and barriers to vaccinating adolescents with HPV vaccine. Participants were selected using a four-stage sampling technique, assisted by the communities' map. There were 678 parents of adolescents in this study and 230 (33.9%) were males. Their mean age was 42.5 ± 10.0 years and 21(3.1%) were more than 65 years old. Amongst these parents, 656(96.8%) had the intention of getting HPV vaccine for their adolescents. Only 22(3.2%) were hesitant on vaccinating their adolescents. This study is commendable because parents in the current study were given details about what HPV, HPV vaccine and cervical cancer before they were interviewed to avoid confusion with other disease conditions. This gave them a clear understanding about the questions they were being asked about the vaccine. Their responses were therefore a truer reflection of what they thought of the virus, the disease, and the vaccine. The study's inclusion of five communities in Ibadan, Southwest Nigeria, demonstrates a commitment to capturing a diverse range of perspectives and experiences, enhancing the study's representativeness. Furthermore, the use of focus group discussions involving 38 parents is commendable, as it allows for a deeper exploration of attitudes and perceptions, providing valuable qualitative insights into parental intentions regarding HPV vaccination.[19]

A cross-sectional study done in Abakaliki, Nigeria to determine the willingness of mothers of adolescent student to vaccinate their daughters with human papilloma virus vaccine was assessed. Participants were 290 mothers of female students selected through multistage

sampling technique using a pretested self-administered questionnaire. The study assessed the factors associated with HPV awareness and willingness to vaccinate daughters among mothers of female secondary school students in Abakaliki. Although 89.1% were willing to vaccinate their daughters only 1.9% were hesitant on vaccinating their adolescents. The primary reasons for low vaccine uptake were identified as insufficient awareness of the HPV vaccine and affordability concerns. Although most mothers expressed willingness to vaccinate their daughters, the barriers were attributed to a lack of awareness and financial constraints.[20]

2.4 Determinants of HPV vaccine among caregivers

Two distinct international studies examined HPV vaccine hesitancy in different settings. The systematic literature review in Europe (2019) found common concerns related to inadequate information, fear of side effects, and mistrust of health authorities. Differences among European countries were observed, possibly due to varying contexts and vaccination programs. In Los Angeles (2021), a cross-sectional survey identified that 14% of parents encountered negative information about the HPV vaccine, primarily related to side effects. High levels of medical mistrust were associated with increased hesitancy, but the reasons behind this mistrust were not explored. These studies underscore the complex determinants of HPV vaccine hesitancy.

In a systematic literature review aimed at identifying the determinants of HPV vaccine hesitancy in Europe in 2019, 103 unique articles on determinants of HPV vaccine hesitancy in Europe were identified. Most studies were conducted with parents (34/103), 10 of which were with mothers only) and HCWs (22/103); and reported results from the UK (28/103), Italy (12/103), France (10/103), and Sweden (10/103). Perceived insufficient and/or inadequate information and knowledge about the vaccine accounted for 44.2% of participants

across all studies, fear of perceived side effects (43.3%), mistrust of health authorities, new vaccines (39.7%), and doubts about the effectiveness of the vaccine (33.7%). Fear of needles and injections (9.4%) and low perceived need for the vaccine or low risk of HPV/cervical cancer (14.1%) were the categories least often reported by hesitant participants across all studies. Across European studies, the most prevalent concerns were about insufficient and inadequate information about HPV vaccination; potential side effects of the vaccine; issues around trust of health authorities, doctors, and new vaccines; and perceived low vaccine effectiveness. Some differences were observed between studies from different European countries, with studies from Italy reporting the highest average proportion of participants with concerns about vaccination in general, issues related to the sexual health aspects of the vaccine, and perceived low risk of HPV/cervical cancer and consequent doubts about the need for the HPV vaccine. Differences might be explained by different contexts and national immunization programs as well previous experiences with vaccination confidence crises but could also be due to differences in study designs and the methodology used for the systematic review.[32]

A cross-sectional survey carried out in March 2021 to assess the determinants of parental HPV vaccine hesitancy in Los Angeles. Participants in this study were parents of adolescents, ages 9–17 years. Few parents (14%) reported having heard negative information about the HPV vaccine, majority of open text responses on type of negative information parents encountered were related to side effects and the long-term effectiveness of the HPV vaccine. Parents who reported high levels of medical mistrust were more likely to have high HPV vaccine hesitancy. The study indicates that parents with high levels of medical mistrust were more likely to have high HPV vaccine hesitancy. However, it does not elaborate on the reasons behind this mistrust or provide a detailed analysis of how mistrust influences hesitancy.[33]

A Cross-sectional study in Malawi aimed at determining willingness of caregivers to vaccinate their children against childhood diseases and HPV in 2020. The study population included caregivers of children under five years of age and caregivers of adolescent girls whose children were eligible for HPV vaccination at local health centers. A total sample of 600 participants was enrolled. Within each stratum (district), a convenience sample of one primary and one secondary health facility was selected. For each sample, a systematic sampling technique was used to select study participants. The participants were 18 years or older (18–24 years: 18%; 25–34 years: 40%; 35–45 years: 33%; 45–60 years: 8%; 60 years and older: 1%); 81% of participants were female, and 19% were male. The majority indicated being Christian (75%) or Muslim (22%). Few indicated believing in traditional religion (1%) or not being religious at all (2%). In terms of education, 11% had no formal education, 38% had completed primary education, 29% had completed secondary education and 4% had completed tertiary education. Based on the study outcomes, caregivers' vaccination acceptance is motivated predominantly by aspects related to confidence in vaccine safety, followed by everyday stress (constraints; an unexpected relation) and some minor influences by variables, such as vaccine effectiveness (confidence), beliefs in the child's immune system (complacency), or husband's approval (masculinity). confidence in vaccine safety was the strongest predictor for vaccination intention. Confidence in vaccines did not differ according to demographic characteristics but was strongly related to rumours (i.e., that prayers prevent measles; and HPV vaccine ruins fertility). A further analysis demonstrated that confidence in vaccine safety decreased when people believed that prayers or religious rituals (e.g., taking "holy communion") could prevent or serve as prophylaxis against vaccine-preventable diseases, such as measles. [34]

Belief in rumours and being unemployed had a negative effect on safety perception; therefore, believing in these rumours and not having a job both decreased vaccination intention, hence

increasing vaccine hesitancy. Complacent behaviour among caregivers was a unique finding. The perception that vaccine-preventable diseases are not so severe or not perceiving diseases as high risk and vaccination as necessary was predominantly found among the older population (35–60) compared to the young adults (25–34). Husbands or fathers were identified in this study as crucial to childhood vaccination uptake. A father's consent for childhood vaccination had a significant positive effect on vaccination intentions. Even more so, a husband's or father's approval is important for women with little education (primary or secondary education), little trust in healthcare workers and those who believe in rumours. In Summary for the HPV vaccination, rumours, lack of trust in government (confidence), education level, and husband's approval to vaccinate daughters played predominant roles.

A community-based cross-sectional descriptive survey conducted in July-Sept 2018, involving parents of adolescent girls in Surulere Local Government Area (LGA), Lagos, south-western Nigeria aimed at determining parental willingness to vaccinate their adolescent daughters against human papilloma virus for cervical cancer prevention. In the study ten out of 40 houses on each street were selected by systematic sampling thus, fifty houses were selected per ward. In each house, if there was more than one eligible parent present, one parent (male or female) was selected by balloting, to participate in the study. Data were collected with the use of a pre-tested, semi-structured, interviewer-administered questionnaire. About 42% were unaware of how to get their daughters vaccinated, 11.5% were not available to vaccinate their daughters, 17.7% were hesitant because of the high cost of the vaccine and 11.5% were unsure of the safety of the vaccine were the reasons given for not having their daughters vaccinated. Some parents (18%) had no reason at all for not vaccinating their daughters. Amongst those who had not vaccinated their daughters, a large proportion (79%) of the parents were willing to have their daughters vaccinated if it was provided free of charge. Willingness improved with higher levels of education and about half of those who

had good knowledge were willing to vaccinate. The use of systematic sampling to select households and parents is a methodical approach, which enhances the study's transparency and minimizes selection bias. The study reveals that willingness to vaccinate improves with higher levels of education and good knowledge. This underscores the relevance of education campaigns in promoting HPV vaccination.[21]

CHAPTER THREE

METHODOLOGY

3.1 Study area

This research was conducted in the Evbuomore community, situated in Benin city, which is part of Edo State, one of Nigeria's 36 states. Edo state, with its capital in Benin city, is in the south-south region of Nigeria. It was established in 1991, following the division of the defunct Bendel state. Covering an area of approximately 19,743 square kilometers. According to the 2006 national population census, the estimated population of Edo state was 3,233,366, with a projected population of 4,921,058 based on an annual growth rate of 2.8%. In 2006, Benin City had an estimated population of 1,147,188, which is projected to have increased to 1,745,976 as of 2021. The dominant ethnic group in the region is the Benin tribe. Benin City is primarily divided into three LGAs: Egor, Oredo, and Ikpoba-Okha. The primary occupations in Edo state are trade, artisanry, and farming.

Evbuomore community is specifically located within the Ovia-Northeast LGA of Edo state, which is one of the 18 LGAs within the state. The LGA's administrative headquarters is situated in the town of Okada. Ovia-North East LGA shares its borders with Ondo State to the North, and it is surrounded by Uhunmwode, Egor, Oredo, and Ikpoba-Okha Local

Government Areas to the East. To the South, it is bordered by the Benin River, and to the West, it shares boundaries with Ovia South-West LGA. The LGA covers an area of 2,301 square kilometers and has an estimated population of 587,661, projected using an annual population growth rate of 2.8%. The population of Evbuomore is estimated to be around 5,000. Most of its residents are engaged in trading, and a significant portion of the population practices christianity. The predominant languages spoken in the area are Benin, English, and Pidgin.

3.2 Study design

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

3.3 Study population

The study was carried out among caregivers of adolescents in Evbuomore community.

3.4 Selection criteria

Inclusion criteria

1. Caregivers of adolescents in Evbuomore community who were available at the time of the study.

2. Caregivers of adolescents in Evbuomore community who gave consent to participate in the study.

Exclusion criteria

1. Language Barrier: Caregivers who did not have sufficient proficiency in the language in which the questionnaire was administered, which could have led to inaccurate responses.

2. Cognitive Impairment: Caregivers with known cognitive impairments that would have affected their ability to provide reliable responses.

3. Serious Medical Conditions: Caregivers who were dealing with serious medical conditions themselves, which could have led to undue stress and impacted their ability to participate effectively.

4. Non-residents: Caregivers who did not reside within the specified geographic area or community during the study period, as their experiences and perspectives might differ significantly.

5. Non-caregivers: Individuals who were not caregivers of adolescents in the specified age group, as they might not possess the relevant insights regarding vaccine hesitancy.

6. Minors: Caregivers who were themselves minors, as they may not have full legal responsibility for the adolescents in their care.

3.5 Study duration

The study was carried out from January 2023 to December 2023.

3.6 Sample size determination

This was calculated using the Cochran's formula in which a design effect was factored in, taking into consideration the sampling method (multistage sampling technique) to be used in the study.

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

Where:

n = minimum sample size

z = standard normal deviate

p = prevalence or proportion of population with characteristic of interest

q = 1 – p

d = degree of precision desired.

z = 1.96 at 95% confidence interval.

p = 63.2% (the proportion of respondents that had good knowledge of vaccine hesitancy in Italy metropolis) [23]

q = 1- 0.632 = 0.368

d = degree of precision desired set at 0.05

Substituting the above in the equation

$$n = \frac{(1.96)^2 \times (0.632)\ (0.368)}{(0.05)^2}$$

n = 357.38

n = 357

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

$$n_f = \frac{n}{1 - nr}$$

n = Minimum sample size = 357

nr = non-response rate = 10% = 0.10

n_f = Final Minimum sample size

$$n_f = \frac{313}{1 - 0.10}$$

$$n_f = \frac{357}{0.90} = 397.1$$

Thus, final minimum sample size that was used for this study is 397.

3.7 Sampling technique

A multi-stage sampling technique was used for the study.

Stage 1: Selection of LGA

There are eighteen (18) LGAs in Edo State, of which Ovia North-East LGA was chosen via a simple random sampling technique by balloting.

Stage 2: Selection of ward

Ovia North-East LGA is made up of 13 political wards (Adolor, Iguoshodin, Isiuwa, Oduna, Ofunmwegbe, Oghede, Okada East, Okada West, Okokhuo, Oluku, Uhen, Uhiere, and Utoka)

Oluku ward was chosen using a simple random technique by balloting.

Stage 3: Selection of the community.

There are eleven (11) communities in Oluku ward (Egbaen, Evbuomore, Isihor, Iguosa, Oluku, Okhumwun, Utekon, Uhogua, Olefure, Idumwowina, Ekosodin) from which Evbuomore was chosen via simple random technique by balloting.

Stage 4: Selection of household

Evbuomore was divided into two clusters A and B using Ohenhen Road running from Benin-Lagos express road through to the boundary road that separates Evbuomore community from Ekosodin. Cluster B was selected using a simple random sampling technique by balloting. Household enumeration was done in cluster B with a total count of 1757. The required sample was 397 which were selected by random sampling technique from the total household count in cluster B.

3.8 Data management

3.8.1 Method of data collection

Data was collected using a self-administered questionnaire with open and close ended questions. The questionnaire was modified by the author using information from literature reviews and previous studies on knowledge, prevalence and determinant of vaccine hesitancy.

The questionnaire had four sections: Section A contained questions that assessed the socio-demographic characteristics of respondents, Section B contained questions that assessed the prevalence of vaccine hesitancy among the respondents, Section C contained questions that assessed the barriers of respondents towards vaccine hesitancy and Section D contained questions that assessed the determinants of vaccine hesitancy.

3.8.2 Method of data analysis

The filled questionnaires were thoroughly checked for any inconsistencies. Data coding and cleaning were done. Data was entered and analyzed using Statistical Package for the International Business Machines Corporation Social Science (IBM SPSS) version 25.0 software with statistical significance set at $p < 0.05$ and 95% confidence interval. Categorical data was presented as frequencies and proportions. Continuous data was presented as means and standard deviations. Univariate analysis was done to assess the distribution of the variables. Bivariate analysis was done to determine association between respondents' socio-demographic characteristics and associated factors.

Socio-demographic characteristics

The age of respondents was grouped using a 10-year class interval as follows: 20 – 29, 30 – 39, 40 – 49, 50 - 59 and ≥ 60 years.

The occupation of respondents was coded into skill levels from 0 to 4 according to International Labour Organization (ILO) classification (modified ILO classification) as follows:

1. Skill level 0: Housewives, students, retired and unemployed.
2. Skill level 1: Farmers, traders, gardeners, laborers, artisans.
3. Skill level 2: Drivers, tailors, police officers, hairstylists, mechanics, electricians, sales assistants.
4. Skill level 3: Managers, laboratory scientists, sales representatives, secretaries and computer operators.
5. Skill level 4: doctors, lawyers, engineers, lecturers, nurses, accountants.

The monthly income was grouped using the minimum wage of Edo state civil service into <₦65,000, ₦65,000 – 99,999, ₦100,000 – 500,000 and >₦500,000.

Level of knowledge of HPV and HPV vaccine

The knowledge of HPV and HPV vaccine was assessed using 12 questions from 5 domains (awareness, definition, causes, complication and prevention). The questions on knowledge were scored; each correct answer was scored one (1) while each wrong answer or each unanswered question was scored zero (0). This gave a maximum achievable score of (12) and a minimum of (0). The percentage of knowledge score was computed as follows:

$$\text{Percentage of knowledge score} = \frac{\text{total correct score} \times 100}{\text{total possible score}}$$

$$\text{Percentage of knowledge score} = \frac{\text{total correct score} \times 100}{12}$$

The percentage of knowledge score was categorized into poor knowledge (0%–49.9%), and good knowledge (50.0%–100.0%).

Perception towards HPV vaccination

The perception towards HPV vaccination was assessed with eleven (5) questions using a 5–point Likert scale, namely: Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree. The questions with positive approach answers were scored as follows: Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, and Strongly Disagree = 1. While negative approach questions were scored in a reversed order. The maximum score attainable is 25 while minimum score attainable is 5.

Attitude towards HPV vaccination

The attitude towards HPV vaccination was assessed with eleven (5) questions using a 5–point Likert scale, namely: Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree. The questions with positive approach answers were scored as follows: Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, and Strongly Disagree = 1. While negative approach questions were scored in a reversed order. The maximum score attainable is 25 while minimum score attainable is 5.

3.9 Ethical consideration

The study was carried out under the supervision of a Consultant in Department of Community Health, University of Benin/University of Benin Teaching Hospital. Ethical clearance was obtained from the Ethics and Research Committee in UBTH. Informed consent was obtained from respondents and participants' confidentiality and privacy was maintained. The respondents were informed that they had the right to withdraw from the interview at any time and that withdrawal poses no loss or harm.

3.10 Study limitation

This study was conducted in the Evbuomore community in Benin city, Edo state, Nigeria. Firstly, the findings may not be fully representative of other communities or regions, limiting the generalizability of the results to a broader context. Furthermore, the study employed a cross-sectional design, which provides a snapshot of data at a single point in time, however, it may not capture long-term trends or causal relationships between variables. The selection of participants using a multi-stage sampling technique adds limitation such as non-response and sampling errors which could affect the accuracy and representativeness of the results. Lastly, data collection relied on self-administered questionnaires, which may introduce response bias or misinterpretation of questions, potentially affecting the quality of the data**.**

CHAPTER FOUR

RESULTS

A total of 397 caregivers participated in this study with 100% response rate. The results are presented in the following sections in line with the specific objectives:

SECTION A: Socio-demographic characteristics of respondents

SECTION B: Knowledge of HPV and HPV vaccine among respondents

SECTION C: Prevalence of HPV hesitancy among respondents

SECTION D: Sociocultural barriers towards HPV vaccination among respondents

SECTION E: Determinants of HPV vaccine hesitancy among respondents

SECTION A: Socio-demographic characteristics of respondents

Table 1: Socio-demographic characteristics of respondents

Variables	Frequency (n = 397)	Percent
Age group (years)		
20 – 29	36	9.0
30 – 39	158	39.8
40 – 49	144	36.3
50 – 59	44	11.1
≥ 60	15	3.8
Sex		
Male	169	42.6
Female	228	57.4
Ethnic group		
Benin	173	43.6
Esan	57	14.4
Igbo	49	12.3
Urhobo	37	9.3
Etsako	29	7.3
Yoruba	28	7.1
Others*	24	6.0
Religion		
Christian	377	95.0
Islam	17	4.3
ATR	3	0.7
Marital status		
Married	269	67.8
Not Married	128	32.2
Level of education		
None	33	8.3
Primary	71	17.9
Secondary	135	34.0
Tertiary	158	39.8
Relationship with adolescent		
Father	112	28.2
Mother	170	42.8
Aunt/Uncle	51	12.8
Elder sibling	53	13.3
Others*	11	2.9
Occupation		
Skill level 0	26	6.5
Skill level 1	45	11.3
Skill level 2	73	18.4
Skill level 3	126	31.7
Skill level 4	127	32.1
Monthly income (₦)		
< 65,000	166	41.8
65,000 – 99,999	150	37.8
100,000 – 500,000	76	19.1
> 500,000	5	1.3

Mean age ± SD (39.89 ± 8.97) *Hausa, Ijaw, Isoko, Igala, Itsekiri, Efik, Akoko Edo

Table above provides an overview of the socio-demographic characteristics of the 397 respondents involved in the study. The age distribution of the respondents reflects a diverse range, with the majority falling within the 30-39 (39.8%) and 40-49 (36.3%) age groups. Notably, a smaller percentage is represented by the 20-29 (9.1%), 50-59 (11.1%), and those aged 60 and above (3.8%). The mean age of the participants is reported as 39.89 years, with a standard deviation of 8.97. In terms of gender, the study includes a slightly higher proportion of female respondents (57.4%) compared to males (42.6%).

The respondents exhibit a rich ethnic diversity, with the Benin ethnic group being the most predominant (43.6%). Following Benin, the Esan (14.4%) and Igbo (12.3%) ethnic groups are also notable contributors to the study. Other represented ethnicities include Urhobo (9.3%), Etsako (7.3%), Yoruba (7.1%), Hausa (1.5%), Ijaw (1.5%), Isoko (1.3%), and a diverse array labeled as 'Others' (1.8%), encompassing Igbira, Igala, Itshekiri, Efik, and Akoko Edo. Most respondents identify as Christians (95.0%), followed by a smaller proportion practicing Islam (4.3%), and a minimal representation adhering to African Traditional Religion (ATR) at 0.7%.

Majority of respondents reported being married, constituting 67.8% of the sample. Single individuals make up 22.2%, followed by separated (4.3%), cohabiting (3.5%), widowed (2.0%), and divorced (0.3%) individuals. When considering the educational background of the participants, the data reveal a diverse distribution. A notable percentage holds tertiary education qualifications (39.8%), followed by secondary (34.0%), primary (17.9%), and a smaller group with no formal education (8.3%).

The nature of the relationship between respondents and adolescents varies, with mothers (42.8%) and fathers (28.2%) being the most prevalent. Other relationships include aunts/uncles (12.8%), elder siblings (13.3%) and a minor percentage classified as 'Others'

(2.8%), which includes guardians, grandmothers and friends. Participants' occupations are classified into skill levels ranging from 0 to 4. Skill level 4 dominates the distribution with 32.0%, followed closely by skill level 3 (31.7%). Skill levels 2 and 1 constitute 18.4% and 11.3%, respectively, while skill level 0 represents 6.5% of the respondents. The monthly income distribution showcases a varied economic landscape, with 41.8% earning less than 65,000, 37.8% earning between ₦65,000 and ₦99,999 and 19.1% falling within the ₦100,000 to ₦500,000 bracket. A smaller percentage (1.3%) reports a monthly income exceeding ₦500,000.

SECTION B: Knowledge of HPV and HPV vaccine among respondents

Table 2: Awareness of HPV and HPV vaccine among respondents

Variables	Frequency	Percent
Awareness of HPV	**(n = 397)**	
No	245	61.7
Yes	152	38.3
Source of information*	**(n = 152)**	
Healthcare workers	83	54.6
Internet	75	49.3
Books	58	38.2
Television	52	34.2
Teachers	42	27.6
Radio	34	22.4
Peers	29	19.1
Family	24	15.8
Religious bodies	11	7.2
Awareness of HPV vaccine		
No	227	61.7
Yes	170	38.3
Source of information*	**(n = 170)**	
Healthcare workers	91	59.9
Internet	80	52.6
Books	59	38.8
Television	56	36.8
Teachers	47	30.9
Peers	34	22.4
Radio	31	20.4
Family	20	13.2
Religious bodies	9	5.9

***Multiple responses**

The majority of respondents, comprising 61.7%, indicated a lack of awareness regarding HPV. However, a notable proportion, accounting for 38.3% of the sample, reported awareness. Among those who demonstrated awareness, primary sources of information included healthcare workers (54.6%), the internet (49.3%), books (38.2%), television (34.2%), teachers (27.6%), radio (22.4%), peers (19.1%), family (15.8%), and religious bodies (7.2%).

Similarly, 57.2% of respondents were not aware of the HPV vaccine, while 42.8% affirmed awareness. Healthcare workers played a significant role as the primary source of information

(59.9%), followed by the internet (52.6%), books (38.8%), television (36.8%), teachers (30.9%), peers (22.4%), radio (20.4%), family (13.2%), and religious bodies (5.9%).

Table 3: Knowledge of HPV among respondents

Variables	Frequency (n = 152)	Percent
Meaning of HPV*		
A viral infection	116	76.3
Most common cause of cervical cancer	78	51.3
A common cause of genital warts	54	35.5
A bacterial infection	13	8.6
Mode of transmission of HPV*		
Sexual intercourse	143	94.1
Skin to skin contact	27	17.8
Kissing	26	17.1
Aerosol/air droplets	4	2.6
Susceptible host		
Both	96	63.2
Female	48	31.6
Male	6	3.9
Sequelae of HPV*		
Cervical cancer	128	84.2
Cervical cancer is a leading cause of death	109	71.7
Asymptomatic	72	47.4
Overall Knowledge		
Good	108	27.2
Poor	289	72.8

***Multiple responses**

The table above presents a comprehensive analysis of the knowledge levels across various domains regarding HPV among the 152 respondents who indicated awareness. The findings reveal a nuanced understanding of various aspects related to HPV. A substantial 76.3% of participants correctly identified HPV as a viral infection. Additionally, 51.3% recognized HPV as the most common cause of cervical cancer, while 35.5% associated it with being a common cause of genital warts. However, a small percentage (8.6%) erroneously considered HPV to be a bacterial infection.

The majority of respondents (94.1%) accurately linked sexual intercourse with the transmission of HPV. However, a smaller percentage associated HPV transmission with skin-to-skin contact (17.8%), kissing (17.1%), and aerosol/air droplets (2.6%). Concerning the

susceptible host, 63.2% correctly identified both genders as susceptible to HPV, while 31.6% considered only females and 3.9% thought only males were susceptible.

Table 4: Knowledge of HPV vaccine among respondents

Variables	Frequency (n = 152)	Percent
Meaning of HPV vaccine*		
A vaccine to protect against HPV	162	95.4
A vaccine to make skin glow	3	1.7
A vaccine to reduce infertility	3	1.7
A vaccine to reduce promiscuity	2	1.1
Diseases HPV vaccine protect against*		
Cervical cancer	146	85.9
Anal cancer	13	7.6
Vulvar cancer	19	11.2
Wart	33	19.4
HIV/AIDS	5	2.9
Breast cancer	3	1.8
Vaccine types*		
Aware	62	36.5
Gardasil	49	28.8
Cervarix	54	31.8
Possible locations for HPV vaccination*		
School	36	21.2
Health facilities/clinic	163	95.9
Community	27	15.9
Village market	15	8.8
Place of worship	19	11.2
Shopping mall	7	4.1
Cinemas	5	2.9
Leisure places	3	1.8
Previous vaccination or infection*		
HPV vaccine	88	51.8
Cervical cancer	33	19.4
Overall Knowledge		
Good	76	19.1
Poor	321	80.9

***Multiple responses**

A significant proportion (84.2%) correctly identified cervical cancer as a sequela of HPV. Furthermore, 71.7% acknowledged that cervical cancer is a leading cause of death, while 47.4% recognized HPV infection as asymptomatic. On overall knowledge, 27.2% of respondents demonstrated good knowledge of HPV, while a majority (72.8%) exhibited a comparatively good knowledge of HPV.

A substantial 95.4% of respondents correctly identified the HPV vaccine as a preventive measure against HPV. However, a small percentage held misconceptions, with 1.7% perceiving it as a vaccine for enhancing skin glow, another 1.7% associating it with reducing infertility, and 1.1% linking it to reducing promiscuity.

Regarding the diseases the HPV vaccine protects against, 85.9% correctly identified cervical cancer. Additionally, smaller percentages recognized the vaccine's efficacy against anal cancer (7.6%), vulvar cancer (11.2%), warts (19.4%), HIV/AIDS (2.9%), and breast cancer (1.8%).

Respondents demonstrated awareness of various HPV vaccine types, with 36.5% indicating general awareness, 28.8% identifying Gardasil, and 31.8% recognizing Cervarix. Concerning possible vaccination locations, respondents identified health facilities or clinics (95.9%) as the most common venue. Other locations included schools (21.2%), community settings (15.9%), village markets (8.8%), places of worship (11.2%), shopping malls (4.1%), cinemas (2.9%), and leisure places (1.8%). Regarding previous vaccinations, 51.8% of respondents reported having known someone who received the HPV vaccine, while 19.4% knew someone with cervical cancer. When evaluating overall knowledge, 19.1% of respondents demonstrated good knowledge of the HPV vaccine, while the majority (80.9%) exhibited a comparatively lower level of understanding.

Table 5: Socio-demographic characteristics, knowledge of HPV among respondents

Variables	Knowledge		Test statistics	p-value
	Good (n = 108) Freq (%)	Poor (n = 289) Freq (%)		
Age group (years)				
20 – 29	15 (41.6)	21 (58.4)	**13.748***	**0.008**
30 – 39	48 (30.3)	110 (69.7)		
40 – 49	35 (24.3)	109 (75.7)		
50 – 60	4 (0.1)	40 (90.9)		
≥ 60	6 (40)	9 (60)		
Sex				
Male	51 (11.3)	118 (88.7)	1.314*	0.252
Female	57 (25.0)	171 (75.0)		
Ethnic group				
Benin	43 (24.8)	130 (75.2)	14.044^{+}	0.183
Esan	11 (19.2)	46 (80.8)		
Igbo	17 (34.6)	32 (65.4)		
Urhobo	12 (32.4)	25 (67.6)		
Etsako	7 (24.1)	22 (75.9)		
Yoruba	8 (28.5)	20 (71.5)		
Others*	10 (41.6)	14 (58.4)		
Religion				
Christian	104 (27.5)	273 (72.5)	1.001^{+}	0.654
Islam	3 (17.6)	14 (82.4)		
ATR	1 (33.3)	2 (66.7)		
Level of education				
None	0 (0)	33 (100.0)	**91.882***	**<0.001**
Primary	2 (28.1)	69 (71.9)		
Secondary	23 (17.0)	112 (83.0)		
Tertiary	83 (52.5)	75 (47.5)		
Occupation				
Skill level 0	18 (69.2)	8 (30.8)	**100.282***	**<0.001**
Skill level 1	3 (6.6)	42 (93.4)		
Skill level 2	6 (8.2)	67 (91.8)		
Skill level 3	15 (11.9)	111 (88.1)		
Skill level 4	66 (51.9)	61 (49.1)		
Monthly income (₦)				
< 65,000	26 (84.3)	140 (16.7)	**39.207^{+}**	**<0.001**
65,000 – 99,999	38 (25.3)	112 (74.7)		
100,000 – 500,000	41 (53.9)	35 (46.1)		
> 500,000	3 (60.0)	2 (40.0)		

***Hausa, Ijaw, Isoko, Igala, Itsekiri, Efik, Akoko Edo**

On association between Socio-demographic factors and the knowledge of HPV, significant differences in knowledge levels were observed across different age groups ($\chi^2 = 13.748$, $p = 0.008$). Notably, the age group 30-39 demonstrated the highest proportion of good knowledge (44.4%), while the age group 50-60 had a higher percentage of poor knowledge (13.8%). No statistically significant association was found between sex and knowledge of HPV ($\chi^2 = 1.314$, $p = 0.252$). The association between ethnic groups and knowledge of HPV approached significance (Fisher's = 14.044, $p = 0.183$). The Benin ethnic group had the highest percentage of good knowledge (39.8%).

No statistically significant association was found between religion and knowledge of HPV (Fisher's = 1.001, $p = 0.654$). A significant association between education levels and knowledge of HPV was observed ($\chi^2 = 91.882$, $p < 0.001$). Tertiary-educated respondents had the highest proportion of good knowledge (76.9%).

Occupation exhibited a significant association with knowledge of HPV ($\chi^2 = 100.282$, $p < 0.001$). Skill level 4 and skill level 0 occupations had the highest proportions of good knowledge (61.1% and 16.7%, respectively). A significant association was observed between monthly income and knowledge of HPV (Fisher's = 91.882, $p < 0.001$). Respondents with a monthly income between ₦100,000 and ₦500,000 demonstrated the highest percentage of good knowledge (38.0%).

Table 6: Socio-demographic characteristics, knowledge of HPV vaccine among respondents

Variables	Knowledge		Test statistics	p-value
	Good (n = 108) Freq (%)	Poor (n = 289) Freq (%)		
Age group (years)				
20 – 29	11 (30.6)	25 (69.4)	7.768*	0.099
30 – 39	35 (22.1)	123 (77.9)		
40 – 49	23 (16.0)	121 (84.0)		
50 – 59	4 (9.1)	40 (90.9)		
≥ 60	3 (20.0)	12 (80.0)		
Sex				
Male	34 (20.1)	135 (79.9)	0.181*	0.700
Female	42 (18.4)	186 (81.6)		
Ethnic group				
Benin	35 (20.2)	138 (79.9)	7.208^{+}	0.176
Esan	8 (14.0)	49 (86.0)		
Igbo	13 (26.5)	36 (73.5)		
Urhobo	7 (18.9)	30 (81.1)		
Etsako	4 (13.8)	25 (86.2)		
Yoruba	5 (17.9)	23 (82.1)		
Others	4 (20.0)	1 6 (80.0)		
Religion				
Christian	75 (19.9)	302 (80.0)	2.004^{+}	0.336
Islam	1 (5.9)	16 (94.1)		
ATR	0 (0.0)	3 (100)		
Level of education				
None	0 (0)	33 (100)	**58.539**$^{+}$	**<0.001**
Primary	3 (4.2)	68 (95.8)		
Secondary	14 (10.4)	121 (89.6)		
Tertiary	59 (37.3)	99 (62.7)		
Occupation				
Skill level 0	13 (50.0)	13 (50.0)	**71.271***	**<0.001**
Skill level 1	2 (0.4)	43 (95.6)		
Skill level 2	5 (0.6)	68 (94.4)		
Skill level 3	8 (0.3)	118 (93.7)		
Skill level 4	48 (37.8)	79 (62.2)		
Monthly income (₦)				
< 65,000	15 (9.0)	151 (91.0)	**41.338**$^{+}$	**<0.001**
65,000 – 99,999	25 (16.7)	125 (83.3)		
100,000 – 500,000	33 (43.4)	43 (56.6)		
> 500,000	3 (60)	2 (40)		

$^{+}$ **Fisher's, * Chi-Square**

A comprehensive analysis of the influence of socio-demographic factors on the knowledge of the HPV vaccine among respondents revealed that no statistically significant association exist between age groups and knowledge of the HPV vaccine ($\chi^2 = 7.768$, $p = 0.099$). No statistically significant association was observed between sex and knowledge of the HPV vaccine ($\chi^2 = 0.181$, $p = 0.700$).

The association between ethnic groups and knowledge of the HPV vaccine approached significance (Fisher's = 7.208, $p = 0.576$). The Benin ethnic group had the highest percentage of good knowledge (46.1%). No statistically significant association was found between religion and knowledge of the HPV vaccine (Fisher's $p = 0.336$).

A significant association between education levels and knowledge of the HPV vaccine was observed ($\chi^2 = 58.539$, $p < 0.001$). Tertiary-educated respondents had the highest proportion of good knowledge (77.6%). Occupation demonstrated a significant association with knowledge of the HPV vaccine ($\chi^2 = 71.271$, $p < 0.001$). Skill level 4 occupations had the highest proportion of good knowledge (63.6%). A significant association was observed between monthly income and knowledge of the HPV vaccine (Fisher's = 41.338, $p = < 0.001$). Respondents with a monthly income between ₦100,000 and ₦500,000 demonstrated the highest percentage of good knowledge (43.4%).

SECTION C: Prevalence of HPV hesitancy among respondents

Table 7: Prevalence of HPV vaccination and hesitancy among respondents

Variables	Frequency	Percent
HPV vaccination	**n = 397**	
Yes	52	13.1
No	345	86.9
Doses received	**n = 52**	
1	17	32.7
2	24	46.2
3	11	21.2
Location of vaccination	**n = 52**	
Hospital	41	78.8
Health center	11	21.2
HPV Hesitancy	**n= 345**	
Reasons for vaccine hesitancy*		
Lack of awareness	201	58.3
Never considered it	91	26.4
Not certain of the usefulness of the vaccine	77	22.3
Not aware of possible site for vaccination	62	18.0
Fear of side effect	45	13.0
Not affordable	39	11.3
Religious reasons	6	1.7
Willingness to vaccinate in the future		
Yes	202	58.6
No	143	41.4
Reasons for unwillingness*		
Not certain of the usefulness of the vaccine	72	50.3
Fear of side effect	41	28.7
Never considered it	41	28.7
Not aware of possible site for vaccination	36	25.2
Not affordable	29	20.3
Religious reasons	5	3.5

***Multiple response**

The table above presents the prevalence of HPV vaccination among the 397 respondents. Of the total sample, 52 individuals, constituting 13.1%, reported having received the HPV vaccine, while the majority (86.9%) indicated they had not undergone HPV vaccination. For those who received the HPV vaccine (n = 52), the distribution of doses is as follows: 32.7% received 1 dose, 46.2% received 2 doses, and 21.2% received the full 3 doses.

Regarding the location of HPV vaccination (n = 52), the majority, 78.8%, received the vaccine at a hospital, while 21.2% received it at a health center. These findings offer a detailed perspective on the prevalence of HPV vaccination, the distribution of doses, and the common vaccination locations within the study population.

Most respondents cited lack of awareness as a key factor contributing to vaccine hesitancy, with 58.3% expressing this concern. Additionally, 26.4% reported never considering vaccination, while 22.3% were uncertain about the vaccine's usefulness. Other reasons included not being aware of possible vaccination sites (18.0%), fear of side effects (13.0%), unaffordability (11.3%), and religious reasons (1.7%).

When asked about their willingness to vaccinate their adolescent in the future, 58.6% of respondents expressed a positive inclination, while 41.4% indicated hesitancy. Among those unwilling to take the vaccine in the future, the predominant reasons included uncertainty about the vaccine's usefulness (50.3%), fear of side effects (28.7%), never considering vaccination (28.7%), lack of awareness of possible vaccination sites (25.2%), unaffordability (20.3%), and religious reasons (3.5%).

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Table 8: Socio-demographic characteristics and prevalence of HPV vaccination among respondents

Variables	HPV Vaccination		Test statistics	p-value
	Yes (n = 52) Freq (%)	No (n = 345) Freq (%)		
Age group (years)				
20 – 29	4 (9.5)	38 (90.5)	0.909*	0.836
30 – 39	20 (12.9)	134 (87.1)		
40 – 49	21 (14.7)	121 (85.3)		
≥ 50	7 (24.1)	52 (75.9)		
Sex				
Male	21 (12.4)	148 (87.6)	0.117*	0.766
Female	31 (13.5)	197 (86.5)		
Ethnic group				
Benin	25 (14.4)	148 (85.6)	4.050+	0.892
Esan	6 (10.5)	51 (89.5)		
Igbo	5 (8.4)	44 (91.6)		
Urhobo	5 (13.5)	32 (86.5)		
Etsako	4 (13.7)	25 (86.3)		
Yoruba	4 (14.2)	24 (85.8)		
Others	3(12.5)	21 (87.5)		
Religion				
Christian	49 (12.9)	328 (87.1)	1.683+	0.514
Islam	2 (11.7)	15 (88.3)		
ATR	1 (33.3)	2 (66.7)		
Level of education				
None	0 (0)	33 (100.0)	**32.356**+	**<0.001**
Primary	3 (4.2)	68 (93.8)		
Secondary	10 (7.4)	125 (92.6)		
Tertiary	39 (24.6)	119 (75.4)		
Occupation				
Skill level 0	5 (19.2)	21 (80.8)	**19.014***	**0.001**
Skill level 1	2 (4.4)	43 (95.6)		
Skill level 2	5 (6.8)	68 (93.2)		
Skill level 3	11 (8.7)	115 (91.3)		
Skill level 4	29 (22.8)	98 (77.2)		
Monthly income (₦)				
< 65,000	11 (6.6)	155 (93.4)	**17.989***	**0.002**
65,000 – 99,999	20 (13.3)	130 (86.7)		
100,000 – 500,000	20 (26.3)	56 (73.7)		
> 500,000	1 (20.0)	4 (80.0)		

+ **Fisher's, * Chi-Square**

An analysis of the association between socio-demographic characteristics and the prevalence of HPV vaccination among the respondents revealed that no statistically significant

association between age groups and the prevalence of HPV vaccination (χ^2 = 0.909, p = 0.836).

No statistically significant association was observed between sex and the prevalence of HPV vaccination (χ^2 = 0.117, p = 0.766). The association between ethnic groups and the prevalence of HPV vaccination approached significance (Fisher's p = 0.892). Various ethnic groups had different rates of HPV vaccination.

No statistically significant association was found between religion and the prevalence of HPV vaccination (Fisher's = 1.683, p = 0.514). A significant association between education levels and the prevalence of HPV vaccination was observed (χ^2 = 32.356, p < 0.001). Tertiary-educated respondents had a higher prevalence of HPV vaccination.

Occupation demonstrated a significant association with the prevalence of HPV vaccination (χ^2 = 19.014, p = 0.001). Skill level 4 occupations had a higher prevalence of HPV vaccination. A significant association was observed between monthly income and the prevalence of HPV vaccination (Fisher's = 17.989, p = 0.002). Respondents with a monthly income between ₦65,000 and ₦99,999 had a higher prevalence of HPV vaccination.

Table 9: Knowledge of HPV and prevalence of HPV vaccination among respondents

Variable	HPV Vaccination	Test Statistics	p-value

	Yes (n = 52) Freq (%)	No (n = 104) Freq (%)		
Knowledge of HPV				
Good knowledge	36 (33.3)	72 (66.7)	**52.416***	**<0.001**
Poor knowledge	16 (5.6)	269 (94.4)		
Knowledge of HPV Vaccine				
Good knowledge	34 (44.7)	42 (55.3)	**81.459***	**<0.001**
Poor knowledge	18 (5.7)	299 (94.3)		

*** Chi-Square**

The table explores the relationship between knowledge levels and the prevalence of HPV vaccination among respondents. Respondents were classified into two categories based on their knowledge levels: those with good knowledge and those with poor knowledge.

The analysis revealed a statistically significant association ($\chi^2 = 52.416$, $p < 0.001$) between knowledge levels and HPV vaccination. Among individuals with good knowledge, 69.2% had received the HPV vaccine, while only 21.1% of those with poor knowledge had undergone vaccination. This underscores the noteworthy impact of knowledge levels on the likelihood of individuals getting vaccinated against HPV.

The analysis reveals a highly significant association ($\chi^2 = 81.459$, $p < 0.001$) between knowledge levels and HPV vaccination. Among individuals with good knowledge, 65.4% had received the HPV vaccine, while only 12.3% of those with poor knowledge had undergone vaccination. This underscores the substantial impact of knowledge levels on individuals' likelihood of receiving the HPV vaccine.

SECTION D: Sociocultural barriers towards HPV vaccination among respondents

Table 10: Socio-cultural barriers towards HPV vaccination among respondents

Sociocultural barriers (n = 397)	Yes Freq (%)	No Freq (%)	Not sure Freq (%)
HPV vaccination can cause infertility	27 (6.8)	156 (39.3)	214 (53.9)
My culture is against HPV vaccination	22 (5.5)	268 (67.5)	107 (27.0)
HPV vaccine will encourage premarital sex	47 (11.8)	181 (45.6)	169 (42.6)
My religion is against HPV vaccination	24 (6.0)	280 (70.5)	93 (23.5)
I'd give my adolescent if friends and family members suggested the vaccine	205 (51.6)	60 (15.1)	132 (33.2)
Vaccination Centre is too far	52 (13.1)	197 (49.6)	148 (37.3)
Healthcare provider did not recommend vaccine	114 (28.7)	173 (43.6)	109 (27.5)
Misinformation about the HPV vaccine	54 (13.6)	214 (53.9)	129 (32.5)

Table 8 provides insights into sociocultural barriers influencing respondents' attitudes towards HPV vaccination, presenting data in three response categories: "Yes," "No," and "Not Sure." Respondents express concerns about the potential link between HPV vaccination and infertility, with 6.8% affirming this belief, while 39.3% reject it, and 53.9% remain unsure. A similar trend is observed regarding cultural opposition to HPV vaccination, as 5.5% acknowledge this barrier, while 67.5% reject it, and 27.0% remain uncertain.

Concerns about the HPV vaccine encouraging premarital sex are raised by 11.8% of respondents, while 45.6% reject this notion, and 42.6% are uncertain. Religious opposition to HPV vaccination is acknowledged by 6.0%, opposed by 70.5%, and remains uncertain for 23.5% of respondents. A notable finding is that 51.6% of respondents indicate a willingness to vaccinate their adolescents if suggested by friends and family, contrasting with 15.1% who reject the idea, and 33.2% who are uncertain.

Barriers related to distance and accessibility are highlighted, with 13.1% finding vaccination centers too far, 49.6% disagreeing, and 37.3% uncertain. Additionally, 28.7% express concerns about healthcare providers not recommending the vaccine, while 43.6% disagree,

and 27.5% are uncertain. Misinformation about the HPV vaccine is acknowledged by 13.6%, rejected by 53.9%, and remains uncertain for 32.5% of respondents.

SECTION E: Determinants of vaccine hesitancy among respondents

Table 11: Attitude and perception towards HPV vaccination

Variable	Strongly agree Freq (%)	Agree Freq (%)	Neutral Freq (%)	Disagree Freq (%)	Strongly disagree Freq (%)
Attitude (n=397)					
I will recommend HPV vaccine to my friends and family	84 (21.2)	129 (32.5)	142 (35.8)	35 (8.8)	7 (1.8)
I feel my adolescent is too young to receive the vaccine	21 (5.3)	51 (12.8)	171 (43.1)	113 (28.5)	41 (10.3)
I feel only sexually active ladies should receive the vaccine.	22 (5.5)	59 (14.9)	151 (38.0)	123 (31.0)	42 (10.6)
I feel it is better to get vaccination before becoming sexually active	67 (16.9)	116 (29.2)	179 (45.1)	28 (7.1)	7 (1.8)
I feel my adolescent will take the vaccine if at risk of HPV infection	108 (27.2)	140 (35.3)	116 (29.2)	27 (6.8)	6 (1.5)
Perception (n=397)					
HPV vaccine can prevent HPV infection and its complications	106 (26.7)	132 (33.2)	148 (37.3)	8 (2.0)	3 (0.8)
HPV vaccine is ineffective	6 (1.5)	22 (5.5)	180 (45.3)	133 (33.5)	56 (14.1)
HPV vaccine is not safe	8 (2.0)	39 (9.8)	178 (44.8)	122 (30.7)	50 (12.6)
I believe there are significant risks associated with the HPV vaccine	24 (6.0)	59 (14.9)	208 (52.4)	81 (20.4)	25 (6.3)
More information on HPV vaccine is needed	189 (47.6)	127 (32.0)	73 (18.4)	7 (618)	1 (0.3)

This table presents the attitudes of 397 respondents towards HPV vaccination, categorizing responses into five levels: "Strongly Agree," "Agree," "Neutral," "Disagree," and "Strongly Disagree." The data indicates that 21.2% of respondents strongly agree, 32.5% agree, 35.8% are neutral, 8.8% disagree, and 1.8% strongly disagree with recommending HPV vaccine to friends and family. Regarding the belief that adolescents are too young for the vaccine, 5.3% strongly agree, 12.8% agree, 43.1% are neutral, 28.5% disagree, and 10.3% strongly disagree.

In terms of the opinion that only sexually active ladies should receive the vaccine, 5.5% strongly agree, 14.9% agree, 38.0% are neutral, 31.0% disagree, and 10.6% strongly disagree. Concerning the belief that it is better to get vaccinated before becoming sexually active, 16.9% strongly agree, 29.2% agree, 45.1% are neutral, 7.1% disagree, and 1.8% strongly disagree. Regarding the perspective that adolescents will take the vaccine if at risk of HPV infection, 27.2% strongly agree, 35.3% agree, 29.2% are neutral, 6.8% disagree, and 1.5% strongly disagree.

The perceptions of 397 respondents toward HPV vaccination are detailed, categorized into five levels: "Strongly Agree," "Agree," "Neutral," "Disagree," and "Strongly Disagree." Regarding the belief that HPV vaccine can prevent HPV infection and its complications, 26.7% strongly agree, 33.2% agree, 37.3% are neutral, 2.0% disagree, and 0.8% strongly disagree. Conversely, opinions on the vaccine's effectiveness vary, with 1.5% strongly agreeing, 5.5% agreeing, 45.3% being neutral, 33.5% disagreeing, and 14.1% strongly disagreeing.

Concerns about the safety of the HPV vaccine are reflected in responses, where 2.0% strongly agree, 9.8% agree, 44.8% are neutral, 30.7% disagree, and 12.6% strongly disagree. Meanwhile, beliefs in significant risks associated with the vaccine yield 6.0% strongly agreeing, 14.9% agreeing, 52.4% being neutral, 20.4% disagreeing, and 6.3% strongly disagreeing. Furthermore, the need for more information on the HPV vaccine is expressed by 47.6% strongly agreeing, 32.0% agreeing, 18.4% being neutral, 0.3% disagreeing, and 0.3% strongly disagreeing.

Table 12: Attitude and perception towards HPV vaccine and willingness to vaccinate adolescent among respondents

Variable	Willingness		Test statistics	p-value
	Yes (n = 202) Freq (%)	No (n = 143) Freq (%)		
Attitude				
Positive attitude	183 (62.4)	110 (37.6)		
Negative attitude	19 (15.7)	33 (74.3)	**16.537***	**<0.001**
Perception				
Positive perception	154 (82.3)	58 (17.7)		
Negative perception	48 (36.0)	85 (64.0)	**49.091***	**<0.001**

*** Chi-Square**

In the positive attitude group, 90.6% express a willingness to vaccinate their adolescents, while 74.3% are unwilling. Conversely, in the negative attitude group, 9.4% are willing to vaccinate, and 25.7% are unwilling. The statistical analysis, utilizing the Chi-Square test, reveals a significant association between attitude towards the HPV vaccine and the willingness to vaccinate adolescents ($\chi^2 = 16.537$, $p < 0.001$).

In the positive perception group, 76.2% express a willingness to vaccinate their adolescents, while 39.2% are unwilling. On the other hand, in the negative perception group, 23.8% are willing to vaccinate, while 60.8% are unwilling. The statistical analysis, utilizing the Chi-Square test, reveals a significant association between perception towards the HPV vaccine and the willingness to vaccinate adolescents ($\chi^2 = 49.091$, $p < 0.001$).

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CHAPTER FIVE

DISCUSSION

Most of the respondents in this study were between the age group of 30 – 39 years. The main reason responsible for this finding in this study was because the majority of people living in the community are young people. This finding is similar to a study carried out in Saudi to assess the attitude and hesitancy to HPV vaccine among Saudi parents were most of the parents were relatively young.[25] The youth can take on leadership roles in promoting maternal care. They can organize community events, volunteer with organizations that support maternal health, and advocate for maternal health policies at local and national levels.

More than half of the respondents were female. This is because many societies have traditionally assigned specific gender roles, with women expected to be caregivers and men as providers. These roles can be deeply ingrained in cultural norms and expectations. This finding is in tandem to a study carried out in Kenya to assess the impact of parental knowledge and beliefs on HPV vaccine hesitancy which revealed that 82% were female.[30] Women play a central role in maternal and child health. Ensuring access to maternal healthcare services and promoting women's health improves outcomes for both mothers and children.

About two-third of the respondents are married. This study is similar to a study carried out in Saudi to assess the attitude and hesitancy of HPV vaccine among Saudi parents where majority of the respondents were married. Marriage provides companionship and can reduce feelings of loneliness and isolation, which are linked to negative health outcomes, including mental health issues and cardiovascular problems.[25]

Most of the respondents had tertiary level of education. This finding is similar to a study in Saudi to assess the attitude and hesitancy to HPV vaccine among Saudi parents where more

than two-third of the respondents had bachelor degree.[25] This is due to the community having good access to high-quality education which has encouraged more individuals to get tertiary education. Individuals with a tertiary level of education will likely have a good understanding of health information, including information related to HPV. This can help them make informed decisions about their health.

This study identified that about one-third of the respondents are aware of HPV. This can be due to a lack of comprehensive sex education that includes information about sexually transmitted infections. This is similar to study done in Enugu, Nigeria, assess their knowledge and attitude to HPV infection and the factors that affect their acceptance of the vaccine which showed that awareness of HPV infections and cervical cancer, and HPV vaccines were low among the caregivers.[30] It is also in contract with a study carried out in Texas, a study carried out among parents/guardians of children ages 9 to 17 years showed that 86.7% of parents were aware of HPV.[24] HPV is a leading cause of several cancers, including cervical, anal, and oropharyngeal cancers. Raising awareness about the connection between HPV and cancer emphasizes the importance of vaccination as a preventive measure, ultimately reducing the incidence of these cancers.

Majority of the respondents had poor knowledge about HPV vaccine, while a smaller proportion got good knowledge. This can be due to limited education and awareness about HPV and its link to cervical cancer can contribute to low awareness. This is in contract to a study carried in Lagos to assess parental acceptance of HPV vaccination which showed that about one third of the respondents had poor knowledge.[12] It is also in tandem with a study carried out in India to explore the knowledge, attitude and practice (KAP) on HPV vaccination were about 25% of the respondents had good knowledge of HPV vaccine.[39] HPV is a leading cause of several cancers, including cervical, anal, and oropharyngeal cancers.

Raising awareness about the connection between HPV and cancer emphasizes the importance of vaccination as a preventive measure, ultimately reducing the incidence of these cancers.

This study found four variables that simultaneously have a significant relationship with caregivers in knowledge of HPV and HPV vaccine including age, level of education, occupation and monthly income. This study is similar to a study in Saudi to evaluate the barriers and facilitators of HPV vaccination and its associated factors among parents, which revealed knowledge about HPV and its vaccine in mothers was 1.627 times higher than in fathers, mainly when employed, highly educated, aged <40 years, and earning a higher income.[35] Individuals with higher incomes may have better access to healthcare resources, including regular check-ups and information about preventive measures like vaccinations. They may be more likely to afford health insurance, allowing them to receive recommended vaccinations, including the HPV vaccine. Younger individuals may be more likely to be targeted by educational campaigns and school-based vaccination programs. Age-appropriate educational materials and outreach efforts may be more effective in reaching and informing younger populations about HPV and the vaccine.

In contract to a study carried out in Spain to assess differences in the knowledge of HPV and HPV vaccine acceptability according to different factors, and to identify the role of different sources of information which revealed that parent gender and number of children tender affect the knowledge of HPV and HPV vaccine. Mothers often play a significant role in healthcare decisions and health-related information within families.[36] Research suggests that maternal knowledge and attitudes can influence the likelihood of children receiving the HPV vaccine.

Also, this study revealed that about half of the respondents are hesitant towards HPV vaccination. This is because many of them are uncertain about the usefulness of the vaccine

and also many of them feared the side effect of the vaccine. This is similar to a study carried out in Italy aimed at determining the determinants of HPV vaccine hesitancy among parents of adolescents aged which revealed that one third of the respondents were hesitant toward anti-HPV vaccination.[23] this is also in contract to a study carried out in Ethiopia to identify the variables that affect HPV vaccine resistance and evaluate HPV uptake resistance and related variables were about one third of the respondents were are hesitant towards HPV vaccination.[39] Vaccination is one of the most effective tools for preventing infectious diseases. When individuals hesitate or refuse to get vaccinated, it can lead to outbreaks of vaccine-preventable diseases, compromising the overall health of the population. There should be informational sessions led by healthcare professionals or trusted community figures to address misconceptions and provide evidence-based information about the safety and efficacy of vaccines.

In this study it was identify that level of education, occupation, monthly income and knowledge of HPV and HPV vaccine were factors affecting HPV vaccination. This finding is similar to a finding in northern Uganda aimed to assess the uptake of HPV vaccine and associated factors were knowledge was a significant factor in affecting HPV vaccination.[37] When individuals have accurate and comprehensive knowledge about HPV and the HPV vaccine, they are better equipped to make informed decisions about their own health or the health of their children. Informed decision-making involves understanding the risks of HPV infection and the potential consequences of related cancers, as well as recognizing the preventive benefits of the vaccine.

Most of the respondents from this study has not been vaccinated. This can be due to lack of convenient and affordable access to vaccination centers, transportation issues, or the absence of nearby healthcare facilities can hinder individuals from receiving vaccines. Socioeconomic factors may also contribute to disparities in access. This is contract to a study in Austalia in

which most of the respondents were already vaccinated.[38] it is similar to a study carried out in Benin, to evaluate awareness about HPV, the prevalence of HPV immunization and its associated factors were majority of the participant has not been vaccinated.[40] HPV vaccination contributes to the development of herd immunity. When a significant portion of the population is vaccinated, it helps protect those who cannot be vaccinated, providing indirect protection to the community and reducing the overall prevalence of the virus. Distributing information to parents and guardians well in advance, explaining the importance and safety of the HPV vaccine can help in widening HPV vaccination coverage.

This study identifies distance, misinformation and unavailability of the vaccine as the sociocultural barriers to HPV vaccination. However, this is in contract to a study carried out in United states, were concerns about the vaccine's effect on sexual behavior, low perceived risk of HPV infection, social influences, irregular preventive care, and vaccine cost were also identified as potential barriers among parents.[41] Sociocultural barriers, such as misinformation, mistrust, or lack of awareness, can contribute to lower vaccine uptake rates. This compromises herd immunity, which is crucial for protecting vulnerable individuals who cannot receive vaccinations due to medical reasons. Improving vaccine coverage helps prevent the spread of infectious diseases within communities.

Most of the participant who had positive attitude and perception are willing to take HPV vaccine. However, it was in contract to a study carried out in Lagos determining parental willingness to vaccinate their adolescent daughters against human papilloma virus for cervical cancer prevention were willingness to HPV vaccine was significantly determine by availability, cost of the vaccine and knowledge of HPV vaccine. This study is similar to a study carried out in Oyo state to investigated knowledge, attitudes and perceptions of parents towards HPV vaccines were majority of the participants showed positive perception to HPV vaccine.[42] A positive attitude toward the HPV vaccine involves a belief in its efficacy and the

understanding that it can effectively prevent HPV infections and related cancers. Also, positive perceptions about the vaccine's effectiveness are often associated with a belief that it provides a reliable and scientifically proven method of protection against HPV. Encouraging healthcare professionals to actively discuss HPV vaccination during patient visits with providing healthcare providers with training on effective communication strategies to address concerns and promote the importance of vaccination can help in achieving 100% success towards attitude and perception to take HPV vaccine.

The research exhibits several notable strengths that contribute to its overall robustness. Of note is that the study provides a detailed and comprehensive description of the Evbuomore community, offering valuable contextual insights into its demographics, geography, and socioeconomic characteristics. This detailed overview enhances the understanding of the research setting and provides a solid foundation for interpreting the study's findings within the local context.

The study employs a robust multi-stage sampling technique, involving random selection at different levels, including Local Government Area, Ward, Community, and Household. This method enhances the representativeness of the sample, thereby improving the external validity of the study's findings. The thoroughness of the sampling process contributes to the reliability and credibility of the research outcomes.

Ethical considerations are evident throughout the study. The research team has sought and obtained clearance from the Ethics and Research Committee, highlighting a commitment to ethical standards. Additionally, the study emphasizes the importance of informed consent, confidentiality, and privacy for participants, demonstrating a responsible and respectful approach to research ethics.

While the study exhibits strengths, certain limitations should be acknowledged to provide a balanced assessment. The primary limitation lies in the potential lack of generalizability of the findings. Focusing exclusively on the Evbuomore community may restrict the applicability of the results to other communities or regions, emphasizing the need for caution when extrapolating the findings to a broader context.

The use of a cross-sectional study design, although appropriate for capturing a snapshot of data, has inherent limitations. It may not reveal causal relationships or long-term trends, limiting the depth of understanding regarding the dynamics of vaccine hesitancy over time.

Reliance on self-administered questionnaires for data collection introduces the possibility of response bias or misinterpretation of questions. Participants may provide answers influenced by personal biases or misunderstand the intent of certain inquiries, potentially affecting the reliability and validity of the collected data.

CONCLUSION

The study reveals that most respondents are young, over half were female, and the majority are married with a tertiary education.This information is relevant for understanding the context in which HPV vaccination decisions are made among caregivers.

Most of the respondents were not aware of HPV and HPV vaccine. Majority of respondents who were aware had poor knowledge concerning HPV and HPV vaccine. With the large burden of HPV infection and cervical cancer in developing countries, there ought to be adequate knowledge about the disease as they are important in transmitting the knowledge to less enlightened individuals.

This study identifies several sociocultural barriers to HPV vaccination, including distance, misformation, and the unavailability of the vaccine. These factors collectively contribute to changes in accessing and obtaining HPV vaccine. Recognizing and addressing these sociocultural obstacles is crucial for developing targeted interventions.

Majority of the respondent had not vaccinated their adolescents and only about half of the respondents were willing to get their adolescents vaccinated in the future. This poses a good picture for the effective control of the virus and their likelihood of participating in regular screenings.

The attitude and perception about HPV and HPV vaccine were observed to be poor. And it was found to significantly affect the willingness to vaccinate. The intricate interplay between the suboptimal attitudes and perceptions regarding HPV and the consequential impact on vaccination willingness underscores the pivotal role of health education to rectify the identified gaps in knowledge and sentiment for the purpose of fostering a more receptive environment towards HPV vaccination.

RECOMMENDATIONS

To the federal government

Implement comprehensive and culturally sensitive education campaigns to raise awareness about HPV, its link to various cancers, and the importance of HPV vaccination. These campaigns should target various age groups, emphasizing the vaccine's preventive benefits.

Foster partnerships with community organizations, healthcare providers, and educational institutions to engage communities in discussions about HPV and the vaccine. Community leaders can play a crucial role in promoting awareness and acceptance.

To the local government chairman

Develop and implement community-based awareness programs that involve schools, community centers, and healthcare facilities.

Collaborate with local healthcare providers, schools, and community leaders to ensure the effective delivery of accurate and culturally sensitive information.

To the caregivers

Regularly seek information from reliable sources, such as healthcare providers, reputable health organizations, and educational materials provided by public health agencies.

Consult with healthcare providers to understand the recommended age for HPV vaccination and the appropriate vaccination schedule.

REFERENCES

1. Cohen PA, Jhingran A, Oaknin A, Denny L. Cervical cancer. The Lancet. 2019 Jan 12;393(10167):169-82.
2. Std Facts - Human papillomavirus (HPV) [Internet]. Centers for Disease Control and Prevention. Centers for Disease Control and Prevention; 2022 [cited 2023 Jan15]. Available from: https://www.cdc.gov/std/hpv/stdfact-hpv.htm
3. Human papillomavirus (HPV) vaccine [Internet]. Human Papillomavirus (HPV) Vaccine - PAHO/WHO | Pan American Health Organization. [cited 2023Jan15]. Available from: https://www.paho.org/en/human-papillomavirus-hpv-vaccine
4. Ezenwa BN, Balogun MR, Okafor IP. Mothers' human papilloma virus knowledge and willingness to vaccinate their adolescent daughters in Lagos, Nigeria. International Journal of Women's Health. 2013;5:371.
5. Wang R, Pan W, Jin L, Huang W, Li Y, Wu D, Gao C, Ma D, Liao S. Human papillomavirus vaccine against cervical cancer: Opportunity and challenge. Cancer letters. 2020 Feb 28;471:88-102.
6. Mühr LS, Eklund C, Dillner J. Towards quality and order in human papillomavirus research. Virology. 2018;519:74–6.

7. Bruni L, Albero G, Serrano B, Mena M, Collado JJ, Gómez D, Muñoz J, Bosch FX, de Sanjosé S. ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre). Human Papillomavirus and Related Diseases in Nigeria. Summary Report 22 October 2021. [Date Accessed]
8. WHO guideline for screening and treatment of cervical pre-cancer lesions for cervical cancer prevention [Internet]. World Health Organization. World Health Organization; [cited 2023Jan15]. Available from: https://www.who.int/publications/i/item/9789240030824
9. Cheng L, Wang Y, Du J. Human papillomavirus vaccines: an updated review. Vaccines. 2020 Jul 16;8(3):391.
10. HPV vaccine administration [Internet]. Centers for Disease Control and Prevention. Centers for Disease Control and Prevention; 2021 [cited 2023Jan15]. Available from: https://www.cdc.gov/vaccines/vpd/hpv/hcp/administration.html
11. Strategic Advisory Group of Experts on Immunization (sage) [Internet]. World Health Organization. World Health Organization; 2014 [cited 2023Jan15]. Available from: https://www.who.int/groups/strategic-advisory-group-of-experts-on-immunization/
12. Bisi-Onyemaechi AI, Chikani UN, Nduagubam O. Reducing incidence of cervical cancer: Knowledge and attitudes of caregivers in Nigerian city to human papilloma virus vaccination. Infectious Agents and Cancer. 2018;13(1).
13. Rabiu KA, Alausa TG, Akinlusi FM, Davies NO, Shittu KA, Akinola OI. Parental acceptance of human papillomavirus vaccination for adolescent girls in Lagos, Nigeria. Journal of Family Medicine and Primary Care. 2020;9(6):2950.
14. Oluwole EO, Mohammed AS, Akinyinka MR, Salako O. Cervical cancer awareness and screening uptake among rural women in Lagos, Nigeria. Journal of community medicine and primary health care. 2017;29(1):81-8.

15. Ilevbare OE, Adegoke AA, Adelowo CM. Drivers of cervical cancer screening uptake in Ibadan, Nigeria. Heliyon. 2020;6(3).
16. Ezeanochie MC, Olagbuji BN. Human papilloma virus vaccine: determinants of acceptability by mothers for adolescents in Nigeria. African Journal of Reproductive Health. 2014 Oct 28;18(3):154-8
17. Awofeso O, Roberts AA, Salako O, Balogun L, Okediji P. Prevalence and pattern of late-stage presentation in women with breast and cervical cancers in Lagos University Teaching Hospital, Nigeria. Nigerian Medical Journal. 2018;59(6):74.
18. Zayyan MS, Akpa M, Dawotola DA, Oguntayo AO, Kolawole AO. Quality of life in patients with advanced cervical cancer in Nigeria. Sahel Medical Journal. 2018;21(2):61.
19. Balogun FM, Omotade OO. Parental intention to vaccinate adolescents with HPV vaccine in selected communities in Ibadan, Southwest Nigeria: an application of Integrated Behavioral Model. Hum Vaccine Immunotherapy. 2022 Nov 30;18(5):2069959. doi: 10.1080/21645515.2022.2069959. Epub 2022 May 13. PMID: 35561294; PMCID: PMC9359392.
20. Azuogu BN;Umeokonkwo CD;Azuogu VC;Onwe OE;Okedo-Alex IN;Egbuji CC; Appraisal of willingness to vaccinate daughters with human papilloma virus vaccine and cervical cancer screening uptake among mothers of adolescent students in Abakaliki, Nigeria [Internet]. Nigerian journal of clinical practice. U.S. National Library of Medicine; [cited 2023Jan31]. Available from: https://pubmed.ncbi.nlm.nih.gov/31489868/2I6wJ
21. Akinleye HW, Kanma-Okafor OJ, Okafor IP, Odeyemi KA. Parental willingness to vaccinate adolescent daughters against human papilloma virus for cervical cancer

prevention in Western Nigeria. Pan Afr Med J. 2020 Jun 19;36:112. doi: 10.11604/pamj.2020.36.112.19007. PMID: 32821323; PMCID: PMC7406451.

22. Ezeanochie MC, Olagbuji BN. Human papilloma virus vaccine: determinants of acceptability by mothers for adolescents in Nigeria. African Journal of Reproductive Health. 2014 Oct 28;18(3):154-8
23. Della Polla G, Pelullo CP, Napolitano F, Angelillo IF. HPV vaccine hesitancy among parents in Italy: A cross-sectional study. Human Vaccines & Immunotherapeutics. 2020;16(11):2744–51.
24. Victory M, Do TQ, Kuo Y-F, Rodriguez AM. Parental knowledge gaps and barriers for children receiving human papillomavirus vaccine in the Rio Grande Valley of Texas. Human Vaccines & Immunotherapeutics. 2019;15(7-8):1678–87.
25. Kolek CO, Opanga SA, Okalebo F, Birichi A, Kurdi A, Godman B, et al. Impact of parental knowledge and beliefs on HPV vaccine hesitancy in Kenya—findings and implications. Vaccines. 2022;10(8):1185.
26. Kuru O, Chan MP, Lu H, Stecula DA, Jamieson KH, Albarracín D. Religious affiliation and philosophical and moral beliefs about vaccines: A longitudinal study. Journal of Health Psychology. 2022 Nov;27(13):3059-81.
27. Mupandawana ET, Cross R. Attitudes towards human papillomavirus vaccination among African parents in a city in the north of England: a qualitative study. Reproductive health. 2016 Dec;13:1-2.
28. MacDonald SE, Kenzie L, Letendre A, Bill L, Shea-Budgell M, Henderson R, et al. Barriers and supports for uptake of human papillomavirus vaccination in indigenous people globally: A systematic review. PLOS Global Public Health. 2023;3(1).
29. Szilagyi PG, Albertin CS, Gurfinkel D, Saville AW, Vangala S, Rice JD, et al. Prevalence and characteristics of HPV vaccine hesitancy among parents of

adolescents across the US [Internet]. Vaccine. U.S. National Library of Medicine; 2020 [cited 2023Jan31]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9495911/

30. Alhusayn KO;Alkhenizan A;Abdulkarim A;Sultana H;Alsulaiman T;Alendijani Y; Attitude and hesitancy of human papillomavirus vaccine among Saudi parents [Internet]. Journal of family medicine and primary care. U.S. National Library of Medicine; [cited 2023Jan31]. Available from: https://pubmed.ncbi.nlm.nih.gov/36119278/

31. Find and explore academic papers [Internet]. Connected Papers. [cited 2023Jan31]. Available from: http://www.connectedpapers.com/main/edf5a7f0aba57291fc2d11d95fc43923a77328aa/Human-Papillomavirus-Vaccine-Hesitancy-Highly-Evident-among-Caregivers-of-Girls-Attending-South-African-Private-Schools/graph

32. Karafillakis E;Simas C;Jarrett C;Verger P;Peretti-Watel P;Dib F;De Angelis S;Takacs J;Ali KA;Pastore Celentano L;Larson H; HPV vaccination in a context of public mistrust and uncertainty: A systematic literature review of determinants of HPV vaccine hesitancy in Europe [Internet]. Human vaccines & immunotherapeutics. U.S. National Library of Medicine; [cited 2023Jan31]. Available from: https://pubmed.ncbi.nlm.nih.gov/30633623/

33. Tsui J;Martinez B;Shin MB;Allee-Munoz A;Rodriguez I;Navarro J;Thomas-Barrios KR;Kast WM;Baezconde-Garbanati L; Understanding medical mistrust and HPV vaccine hesitancy among multiethnic parents in Los Angeles [Internet]. Journal of behavioral medicine. U.S. National Library of Medicine; [cited 2023Jan31]. Available from: https://pubmed.ncbi.nlm.nih.gov/35107656/

34. Adeyanju GC, Sprengholz P, Betsch C, Essoh TA. Caregivers' Willingness to Vaccinate Their Children against Childhood Diseases and Human Papillomavirus: A Cross-Sectional Study on Vaccine Hesitancy in Malawi. Vaccines (Basel). 2021 Oct 22;9(11):1231.

35. 1. Ohaeri B, Adefolaju A, Onyeneho C. Knowledge, attitudes and perceptions of Nigerian parentstowards human papilloma virus (HPV) vaccines. European Journal of Midwifery. 2020;4(January). doi:10.18332/ejm/114886

36. Holman DM, Benard V, Roland KB, Watson M, Liddon N, Stokley S. Barriers to human papillomavirus vaccination among us adolescents. JAMA Pediatrics. 2014;168(1):76. doi:10.1001/jamapediatrics.2013.2752

37. Dera M, Wondimagegnehu A, Asfaw ZG. Determinants for hesitancy in human papillomavirus (HPV) vaccine uptake among school girls in Jimma Town, Ethiopia. A mixed approach: Quantitative and qualitative. Reproductive Health. 2023;20(1). doi:10.1186/s12978-023-01711-y

38. Chawla Pc, Chawla A, Chaudhary S. Knowledge, Attitude & Practice on human papillomavirus vaccination: A cross-sectional study among healthcare providers. Indian Journal of Medical Research. 2016;144(5):741. doi:10.4103/ijmr.ijmr_1106_14

39. Al Ghamdi N. Knowledge of human papilloma virus (HPV), HPV-vaccine and pap smear among adult Saudi women. Journal of Family Medicine and Primary Care. 2022;11(6):2989. doi:10.4103/jfmpc.jfmpc_2094_21

40. López N, Salamanca de la Cueva I, Vergés E, Suárez Vicent E, Sánchez A, López AB, et al. Factors influencing HPV knowledge and vaccine acceptability in parents of adolescent children: Results from a survey-based study (KAPPAS study). Human

Vaccines & Immunotherapeutics. 2022;18(1).

doi:10.1080/21645515.2021.2024065

41. Nakayita RM, Benyumiza D, Nekesa C, Misuk I, Kyeswa J, Nalubuuka A, et al. Factors associated with uptake of human papilloma virus vaccine among school girls aged 9-14 years in Lira City Northern Uganda: A cross-sectional study. 2023; doi:10.21203/rs.3.rs-2511777/v1

QUESTIONNAIRE

KNOWLEDGE, SOCIOCULTURAL BARRIERS, AND HESITANCY TO HPV VACCINE AMONG CAREGIVERS OF ADOLESCENTS IN BENIN CITY, NIGERIA.

Dear Respondent,

We are 600L medical students carrying out a one-year project which is designed to assess the knowledge, sociocultural barriers, and hesitancy to HPV vaccine among caregivers of adolescents in Benin city. Kindly give your true opinion about each statement. Your opinion will be treated with utmost confidentiality. You are not required to include your name. Completing this questionnaire implies consent to this study. Thanks for your cooperation.

Please tick [ ] where appropriate.

SECTION A: SOCIODEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

1. Age (as at last birthday): _____ years
2. Sex: Male [ ] Female [ ]
3. Religion: Christianity [ ] Islam [ ] African Traditional Religion [ ] Others _____
4. Ethnic group: Benin [ ] Esan [ ] Etsako [ ] Igbo[ ] Yoruba[ ] Hausa [ ] Urhobo [ ] Others _____
5. Marital status: Single [ ] Married [ ] Separated [ ] Divorced [ ] Widowed [ ] Cohabiting [ ]
6. Level of education: No formal education [ ] Primary [ ] Secondary [ ] Tertiary [ ]
7. Relationship of respondent to adolescent: Mother [ ] Father [ ] Aunt [ ] Uncle [ ] Elder brother [ ] Elder sister [ ] Others _____
8. Occupation: Doctor[ ] Lawyer[ ] Nurse[ ] Teacher[ ] Civil servant[ ] Hair stylist[ ] Trader[ ] Farmer[ ] Tailor[ ] Driver[ ] Others _____
9. Average monthly household income of the respondent: <#65,000 [ ] #65,000-#99,999 [ ] #100,000-#499,999[ ] #500,000-#999,999[ ] #1,000,000-#5,000,000 [ ] >#5,000,000 [ ]

SECTION B: KNOWLEDGE OF HPV AND HPV VACCINE AMONG CAREGIVERS OF ADOLESCENTS

10. Have you ever heard of the term Human Papilloma Virus? Yes [ ] No [ ] **If no, skip to Q 18**
11. What is the source of your information? Books [ ] TV [ ] Radio [ ] Teachers [ ] Family [ ] Peers [ ] Internet [ ] Religious Bodies [ ] Healthcare workers [Others (Specify)_____ **(Multiple responses allowed)**
12. What is Human Papilloma Virus? a viral infection [ ] a bacterial infection [ ] the most common sexually transmitted infection that causes cervical cancer [ ] a common sexually transmitted infection that can cause genital warts [ ] None of the above [ ] **(Multiple responses allowed)**
13. What is the mode of transmission of HPV? Skin to skin [ ] Aerosol/Air droplet [ ] Sexual intercourse [ ] Kissing [ ] Other (specify) _____ **(Multiple responses allowed)**
14. Which of the following persons can be infected by HPV? Male [ ] Female [ ] Both [ ] I don't know [ ]
15. Nearly everyone infected with HPV will have symptoms True [ ] False [ ] I don't know [ ]
16. Infection with HPV may lead to cervical cancer: True [ ] False [ ] I don't Know [ ]
17. Cervical cancer is a leading cause of cancer deaths in women in Nigeria. True [ ] False [ ] I don't Know [ ]
18. Have you ever heard of the term HPV vaccine? Yes [ ] No [ ] **If no, skip to Q 27**
19. What is the source of your information? Books [ ] TV [ ] Radio [ ] Teachers [ ] Family [ ] Peers [ ] Internet [ ] Religious Bodies [ ] Healthcare workers [ ] Others (Specify)_____ **(Multiple responses allowed)**
20. What is HPV vaccine? a vaccine given to protect against HPV infection [ ] a vaccine to make your skin glow [ ] a vaccine to reduce fertility [ ] a vaccine to reduce promiscuity [ ] a vaccine to prevent pregnancy [ ]
21. What diseases does HPV vaccine protect against? Cervical Cancer [ ] Anal Cancer [ ] Vulvar Cancer [ ] Warts [ ] HIV/AIDS [ ] Breast cancer [ ] Others (Specify) _____ **(Multiple responses allowed)**
22. Do you know the types of HPV vaccines? Yes [ ] No [ ] **If No, skip to Q 24**
23. What are the types of HPV vaccine? Gardasil [ ] Cervarix [ ] **(Multiple responses allowed)**
24. Where can HPV vaccine be taken? Schools [ ] Health facilities/clinics [ ] Community [ ] Village market [ ] Place of worship (churches/mosque) [ ] Shopping mall [ ] Cinemas [ ] Leisure places [ ] Others (Specify) _____ **(Multiple responses allowed)**

25. Do you know anyone that has received the HPV vaccine? Yes [ ] No [ ]
26. Do you know anyone that has cervical cancer? Yes [ ] No [ ]

SECTION C: PREVALENCE OF HPV VACCINE HESITANCY AMONG CAREGIVERS OF ADOLESCENTS

27. Has your adolescent received HPV vaccine before? Yes [ ] No [ ] **If No, skip to Q 30**
28. If they received the vaccine, how many doses did they receive? 1 [ ] 2 [ ] 3[ ]
29. If they received the vaccine, where did they receive it? Hospital [ ] Health center [ ]
30. If they have not received the HPV vaccine, why? Lack of awareness [ ] It is not affordable [ ] Don't know where to obtain the vaccine [ ] Don't know or uncertain about usefulness of the vaccine [ ] Fear of side effect [ ] Never considered it [ ] Religious reasons [ ] Others:_____ **(Multiple responses allowed)**
31. Are you willing to give them the vaccine later? Yes [ ] No [ ] **If Yes, skip to Q 33**
32. If no, why are you unwilling to give them the vaccine? It is not affordable [ ] Don't know where to obtain the vaccine [ ] Don't know or uncertain about usefulness of the vaccine [ ] Fear of side effect [ ] Never considered it [ ] Religious reasons [ ] Others:_____ **(Multiple responses allowed)**

SECTION D: SOCIOCULTURAL BARRIERS TOWARDS HPV VACCINATION AMONG CAREGIVERS OF ADOLESCENTS

33. HPV vaccination can cause infertility: Yes [ ] No [ ] I am not sure [ ]
34. It is against my culture to receive HPV vaccine: Yes [ ] No [ ] I am not sure [ ]
35. HPV vaccine will encourage premarital sex: Yes [ ] No [ ] I am not sure [ ]
36. My religion is against HPV vaccination: Yes [ ] No [ ] I am not sure [ ]
37. If my friends and family members suggested the vaccine, I'd give my adolescent: Yes [ ] No [ ] I am not sure [ ]
38. Vaccination Centre is too far: Yes [ ] No [ ] I am not sure [ ]
39. Healthcare provider did not recommend vaccine: Yes [ ] No [ ] I am not sure [ ]
40. I have encountered misinformation about the HPV vaccine: Yes [ ] No [ ] I am not sure [ ]

SECTION E: DETERMINANTS OF HPV VACCINE HESITANCY AMONG CAREGIVERS OF ADOLESCENTS

TABLE 1. ATTITUDE TOWARDS HPV VACCINATION

Statement	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
41.I will recommend HPV vaccine to my friends and family					
42.I feel my adolescent is too young to receive the vaccine					
43.I feel only sexually active ladies should receive the vaccine.					
44.I feel it is better to get					

vaccination before becoming sexually active					
45.If I feel my adolescent is at risk of HPV infection, they will take the vaccine					

TABLE 2. PERCEPTION TOWARDS HPV VACCINATION

Statement	**Strongly Agree**	**Agree**	**Undecided**	**Disagree**	**Strongly Disagree**
46.HPV vaccine can prevent HPV infection and it's complications					
47.HPV vaccine is ineffective					
48.HPV vaccine is not safe					
49.I believe there are significant risks associated with the HPV vaccine					
50.More information on HPV vaccine is needed					

Thank you for participating!

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HEALTH RESEARCH ETHICS COMMITTEE APPROVAL

PROTOCOL NUMBER: ADM/E 22/A/VOL. VII/14830112927

PROPOSAL TITLE: "KNOWLEDGE, SOCIOCULTURAL BARRIERS, AND HESITANCY TO HPV VACCINE AMONG CAREGIVERS OF ADOLESCENTS IN BENIN CITY, NIGERIA"

PRINCIPAL INVESTIGATOR(S): IDIA OGHENEVOWERO SANDRA, IGBASANMI OLAJUMOKE

DEPARTMENT/INSTITUTION: DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY HEALTH, COLLEGE OF MEDICAL SCIENCES, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA

DATE CONSIDERED: JANUARY 5TH, 2024

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 5/01/2024 TO 4/01/2025. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY

REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI **SIGNATURE & DATE** 5/1/2024

SUPERVISOR (S): PROF. OBEHI HILDA OKOJIE

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

Signature & Date 18/1/24