

Human Papillomavirus Vaccine Hesitancy among Teenage Girls in Nigeria: A Narrative Review

Dalhatu Muhammad Ahmad^{1,2*}, Anozie Nneka Catherine², Nwankwo Emeka Christian², Ajibo Thompson Otsapa^{2,3}, Mustapha Usman², Muhammad Haruna Rasheed⁴, Idowu Makinde⁵, Salaudeen Aminu M⁵, Benjamin Mari Aya^{6,7}, Ismail Ndalami Salihu^{6,8}, Mustapha Mohammed⁹

¹ Department of Clinical Pharmacy and Pharmacy Practice, Ahmadu Bello University, Zaria, Nigeria

² Department of Community Medicine, Ahmadu Bello University, Zaria, Nigeria

³ Department of Internal Medicine, Federal teaching Hospital, Birnin Kebbi, Nigeria

⁴ National Agency for Food and Drug Administration and Control, Abuja, Nigeria

⁵ Africa Field Epidemiology Network, Abuja, Nigeria

⁶ National Primary Health Care Development Agency, Abuja, Nigeria

⁷ Department of Clinical Pharmacy and Pharmacy Practice, University of Jos, Jos, Nigeria

⁸ Heller School of Social Policy and Management, Brandeis University, Waltham, MA USA

⁹ Biomedical Research Center, QU Health, Qatar University, Doha, Qatar

ARTICLE INFO

Article history:

Received 17th June 2025
Revised 9th October 2025
Accepted 16th October 2025
Online
Published

Keywords:

HPV,
HPV vaccine,
vaccine hesitancy,
Nigeria,
teenage girl

*Corresponding Author:

Dalhatu Muhammad Ahmad
Email: dalhatu49@gmail.com
Tel: +2348131010352

ABSTRACT

Background: Despite the high prevalence of human papillomavirus (HPV) infections and cervical cancer in Nigeria, the uptake of the HPV vaccine, a proven preventive measure against these conditions, remains limited. This narrative review aimed to comprehensively assess and synthesize existing evidence on the barriers to HPV vaccine uptake among teenage girls in Nigeria. Furthermore, this review highlights various strategies to overcome these barriers and enhance vaccine acceptance.

Methods: An extensive literature search was conducted across PubMed and Google Scholar using keywords such as “HPV vaccine,” “vaccine hesitancy,” “Nigeria,” and “teenage girls.” Studies published between January 2019 and August 2024 that addressed this topic were included in the review.

Results: Key factors limiting HPV vaccine uptake, including cost, limited availability and accessibility, inadequate awareness, and sociocultural and religious influences, among others, were identified.

Conclusion: To address these barriers, this review highlights the importance of increasing awareness, targeted advocacy, effective communication strategies, uninterrupted vaccine availability, and improved accessibility. Implementing these measures is essential for enhancing HPV vaccine uptake and ultimately reducing the burden of HPV-related diseases in Nigeria.

INTRODUCTION

Human papillomavirus (HPV) is often regarded as the most common viral infection affecting the human reproductive tract.¹ Genital HPV infection is one of the most common sexually transmitted infections (STIs) worldwide, with the vast majority of sexually active individuals likely to contract the disease at some point in their lifetime, often

soon after becoming sexually active.^{2,3} However, many infections are reported to be transient, mostly asymptomatic, and can occur at any age.¹

HPV is a well-known cause of cervical cancer, a common genital tract cancer among women touted as the disease of the developing world and the second-most-common cause of women's mortality in the world.⁴ HPV infection is also

implicated in the cause of genital warts.^{3,5} HPV is estimated to be responsible for 99% of cervical cancer cases and 5% of all cancers worldwide, with the highest prevalence rate (24% of the global burden) occurring among women in the sub-Saharan African region.⁶

Globally, new cervical cancer cases numbered approximately 570,000 in 2018 and 600,000 (approximately 300,000 deaths) in 2020, with more than 80% of the incidence and mortality occurring in low- and middle-income countries.^{2,6} With 12,075 new cases and 7,968 deaths occurring in 2020 in Nigeria, cervical cancer is regarded as the second most prevalent cause of death related to cancer among women aged 15–44 years in Nigeria.^{2,7,8}

HPV vaccination is useful as a primary prevention strategy against HPV 16 and 18, which are considered the most prevalent cancer-related HPV strains in Nigeria.^{7,9} HPV vaccines have been approved for use in Nigeria.⁵ Furthermore, the Nigerian government implemented a commendable public health response strategy in October 2023 by integrating the single-dose HPV vaccine into routine immunization schedules for girls aged 9–14 years, making it available free of charge, with a target of reaching 7.7 million adolescent girls.^{1,7,8}

Given the devastating public health impact of cervical cancer in Nigeria, it is imperative to review studies on factors associated with HPV vaccine hesitancy across the country's regions. Similarly, the present study is critical since the majority of secondary studies on the HPV vaccine in Nigeria have primarily focused on knowledge, acceptability and uptake of vaccines, with no secondary studies on barriers to HPV vaccine uptake, underscoring the need to elucidate this gap.¹⁰ The overall goal of this study is to provide a narrative review of the factors associated with HPV vaccine hesitancy among teenage girls in Nigeria. This could serve as a guide for the government and implementing partners in designing targeted interventions towards improving the vaccine uptake.

METHODS

Two search procedures were followed to identify the publications that aligned with the focus of this narrative review. We thoroughly searched the online databases PubMed and Google Scholar, using keywords and phrase searching to ensure the comprehensive retrieval of relevant articles. Boolean operators and truncation were also used to enhance the literature search. Medical Subject Headings (MeSH) terms were also used while searching PubMed.

The search keywords were "HPV Vaccine" OR "Human

papillomavirus*" OR "HPV Immunization" OR "HPV Vaccin*" AND Hesitancy OR Decline OR Resistance OR Refusal AND Acceptance OR Uptake AND Nigeria OR Nigerian OR Nigerians. To include only contemporary evidence, the search was restricted to the last 5 years (i.e., studies published between January 2019 and August 2024). In addition, manual scoping was conducted through the search of the reference lists of the included studies. Only studies published in peer-reviewed journals in the English language were included.

FINDINGS

The uptake of the HPV vaccine in Nigeria faces numerous barriers despite its proven efficacy in preventing HPV infections and cervical cancer. These barriers range from lack of awareness and sociocultural beliefs to cost, perceived side effects, and issues related to vaccine availability and accessibility. Addressing these challenges requires a multifaceted approach involving improved awareness campaigns, targeted advocacy, policy reforms, and infrastructure development to enhance accessibility and trust in the vaccine. The following sections provide detailed insights into the various barriers to HPV vaccine uptake and potential strategies to mitigate them, while Table 1 provides an overview of the included studies.

Table 1: Studies discussing the barriers to the uptake of the HPV vaccine among teenage girls

Author and year	Study design and sample size	Study aim	Study population characteristics and study setting	Sampling technique	Main findings	Study limitations	Recommendations
Azuogu et al., (2019) ¹¹	Cross-sectional study; 290 mothers	To assess factors associated with HPV awareness and willingness to vaccinate daughters among mothers of female secondary school students in Abakaliki, Nigeria, and to evaluate cervical cancer screening uptake.	Mothers of female secondary school students in Abakaliki, Nigeria. Mean age of mothers: 42 ± 8 years; 72.8% had at least secondary education; 37.2% were traders.	Multistage sampling technique: schools were stratified into 4 groups, one school was randomly selected from each group, and 60 mothers were interviewed per school.	- 42.8% of mothers were aware of HPV, and 9% had undergone cervical cancer screening. - 89.1% were willing to vaccinate their daughters, but only 6.9% of daughters had received the HPV vaccine. - Lack of awareness and cost were major barriers to vaccination.	- Cross-sectional design limits causal inference. - Self-reported data may be subject to bias. - Limited to one geographical area, reducing generalizability.	- Increase awareness campaigns on HPV and cervical cancer. - Subsidize the cost of HPV vaccination. - Include HPV vaccine in the national immunization program to improve access and affordability.
Akande & Akande, (2024) ¹	Cross-sectional study; 240 respondents	To determine the sociodemographic factors associated with awareness, uptake, and willingness to pay (WTP) for HPV vaccine among undergraduates in a tertiary institution in North Central Nigeria.	Undergraduates aged 18 and above at Kwara State University (KWASU), North Central Nigeria. The university has approximately 9000 undergraduates from diverse backgrounds.	Multistage sampling: Simple random sampling to select 5 out of 9 faculties, proportional allocation to distribute participants, and systematic sampling to select participants within each faculty.	- 15.4% of respondents were aware of the HPV vaccine. - 2.1% had received at least one dose, and 0.4% completed three doses. - 35% were willing to pay for the vaccine. - Marital status and parity were predictors of WTP.	- Excluded undergraduates below 18 years. - Did not assess sexual behaviour due to ethical constraints. - Limited generalizability as the study was conducted in a single institution.	- Increase awareness and uptake of the HPV vaccine through tailored advocacy strategies. - Include males in HPV vaccination campaigns. - Provide subsidies or insurance coverage for the vaccine.
Oluwasola, Bello & Odugbo (2019) ¹²	Descriptive cross-sectional survey; 489 female undergraduates	To ascertain the level of awareness of HPV and its vaccines among female undergraduates and determine factors affecting their willingness to receive the vaccines.	Female undergraduates at the University of Ibadan, Nigeria. The mean age of 19.3 ± 2.6 years, mostly unmarried, and 14.1% sexually active.	Simple random sampling	- 30.1% of respondents were aware of HPV, and 13.5% were aware of HPV vaccines. - Only 2% had been vaccinated against HPV. - 55.3% were willing to get vaccinated if the cost was reduced.	- Limited to a single university, reducing generalizability. - Did not explore deeper reasons for vaccine hesitancy. - Relied on self-reported data, which may be subject to bias.	- Increase awareness of HPV and its vaccines through public health programs. - Reduce the cost of HPV vaccines to improve accessibility. - Strengthen policy efforts to address barriers to vaccination.
Balogun, Omotade, & Svensson (2022) ¹³	Discrete Choice Experiment (DCE); 700 participants (144 adolescents, 248 males)	To explore the preferences for the HPV vaccine among stakeholders in selected communities in Ibadan, Nigeria, to guide the design of	- Population: Parents/guardians of adolescents, adolescents, traditional healers, and religious leaders in Ibadan, Nigeria. - Setting: Five	Four-stage sampling technique: selection of streets, houses/compounds, families with adolescents, and participants.	- Respondents preferred vaccines with higher efficacy, lower cost, and fewer side effects. - Adolescents were less price-sensitive.	- Stated preferences (not revealed preferences). - Limited to one geopolitical zone in Nigeria, potentially limiting	- Design HPV vaccination programs considering community preferences. - Address cost barriers, especially for low-income

		an HPV immunization program for high vaccine uptake.	communities in Ibadan North Local Government Area.		- High socioeconomic class preferred vaccines that prevent genital warts. - Variability in preferences across communities.	generalizability. - Reliance on self-reported data.	groups. - Provide health education to reduce fears about side effects. - Diversify vaccination locations to cater to different preferences.
John-Akinola et al. (2022) ⁶	Scoping Review (110 studies)	To evaluate knowledge, utilization, prevention education, and policy response across Nigeria for cervical cancer prevention and control.	Women aged 15+, healthcare professionals, female students, mothers of adolescents, and HIV+ women, across all 6 geopolitical zones in Nigeria.	Systematic search	- Poor knowledge and awareness of cervical cancer screening and HPV vaccine. - Urban areas had slightly higher awareness. - Low uptake of screening and vaccination. - Lack of strong government support and policies.	- Limited geographic coverage. - Lack of national data. - Reliance on self-reported data. - Heterogeneity in study designs. - No systematic quality assessment of included studies.	- Increase government and donor prioritization. - Implement structured screening programmes. - Integrate HPV vaccination into national schedules. - Conduct more regional studies. - Improve funding and policy implementation.
Rabiu & Yahuza (2023) ¹⁴	Cross-sectional; 400 secondary school students	Assess knowledge and attitudes toward HPV	Secondary students aged 10+, Kano, Nigeria. The majority were aged 15–19, unmarried.	Simple random sampling	Low knowledge of HPV (32%) and cervical cancer (35.5%); 81% unwilling to take HPV vaccine; no prior vaccine uptake	Limited to only two schools, potential cultural biases due to Kano's Muslim-majority population	Increase awareness among students and parents; effective policy-making for vaccine access.
Ohaeri et al. (2020) ¹⁵	Cross-sectional descriptive; 186 parents	Investigate knowledge, attitudes, and perceptions toward HPV vaccines	Parents in Ibadan, Nigeria; mean age 30.2 years, mostly female, Yoruba, Christian	Multistage sampling	Good knowledge (98.9%) but negative attitude due to financial barriers (86%), education (81%), distance to health facilities (83%), fear of promiscuity (82%), and adverse effects	Small sample size; cross-sectional design limits generalisability; cultural sensitivity of the topic	Make HPV vaccines accessible and affordable; educate parents on vaccine safety and dispel misconceptions.
Ndikom & Oboh (2017) ¹⁶	Cross-sectional; 296 female adolescents in senior secondary school	Determine perception, acceptance, and uptake of HPV vaccines	Female students aged 12–19, Ibadan, Nigeria. The majority were Yoruba and used social media.	Purposive sampling	Poor knowledge of HPV and vaccine (88.2% unaware); only 4.1% had received the vaccine; a significant association between perception and vaccine uptake	Focused only on secondary schools; reliance on self-reported data, which may introduce bias.	Increase awareness through peer educators and parent engagement; improve vaccine access in schools.

Balogun & Omotade (2022) ¹⁷	Cross-sectional study design with a sample size of 678 parents.	To investigate the intention of parents in selected communities in Ibadan, Nigeria, to vaccinate their adolescents with the HPV vaccine using the Integrated Behavioural Model (IBM).	Parents of adolescents residing in five selected communities in Ibadan, Nigeria. The communities included Alááárin, Beere, Óje, Òkè Aremo, and Yemetu. The mean age of parents was 42.5 ± 10.0 years, with 33.9% males and 66.1% females.	Four-stage sampling technique: 1) Division of the map into four quadrants, 2) Selection of seven streets from each quadrant, 3) Selection of a compound or household, and 4) Selection of a parent of an adolescent.	- 96.8% of parents intended to vaccinate their adolescents with the HPV vaccine. - Intention to vaccinate was significantly correlated with experiential attitude, instrumental attitude, injunctive norm, descriptive norm, perceived control, and self-efficacy. - Older parents (>65 years) were less likely to intend to vaccinate their adolescents. - Experiential attitude was the strongest predictor of vaccination intention. - Concerns about the cost of the vaccine were a significant barrier.	- The use of the Integrated Behavioural Model (IBM) may limit the generalizability of findings to other settings. - The study focused on intention rather than actual vaccine uptake. - The study did not explore the reasons behind the high intention rate among parents.	- Targeted interventions for older parents to increase their acceptance of the HPV vaccine. - Further research to explore the reasons behind the high intention rate among parents. - Efforts to reduce the cost of the HPV vaccine to improve uptake. - Community-based health education programs to address misconceptions and promote vaccine acceptance.
Okunowo et al., (2021) ¹⁸	Descriptive cross-sectional study; 208 women (200 included in analysis)	To explore individual-related factors that predict HPV vaccination and testing, motivating factors, and barriers among urban women in Lagos, Nigeria.	Urban women in Lagos, Nigeria; mean age 41.9 ± 13.1 years; 60% married; 76% with tertiary education; 55.5% skilled occupation; 70% knew someone with cervical cancer.	Convenient sampling method	- Uptake of HPV vaccination: 29%; HPV testing: 3%. - Predictors of HPV vaccination: being employed, unmarried, tertiary education, no prior pregnancy. - Major motivators: HCP recommendation, friends/relatives, media. - Major barriers: fear, cost, lack of HCP recommendation, inaccessibility.	- Relatively small sample size. - Did not assess the impact of sexual behaviours on HPV preventive measures. - Convenient sampling may limit generalizability.	- Address barriers like fear, cost, and lack of HCP recommendation. - Increase awareness through media and community education. - Improve accessibility and affordability of HPV vaccination and testing.
Makwe et al. (2012) ¹⁹	Cross-sectional study; 368 female students	To determine knowledge, attitude, and perception of HPV infection, HPV-related diseases, and HPV vaccines among female students at the University of Lagos.	Female undergraduate students aged 16–29 years at the University of Lagos, Nigeria.	Two-stage sampling method (faculties as primary units, then random selection of students).	- Only 17.7% had heard of HPV infection, and 14.4% had heard of HPV vaccines. - 11.1% knew HPV causes cervical cancer. - 57.7% of those aware of the vaccine were willing to receive it. - Low perceived susceptibility to HPV infection and related diseases.	- Self-administered questionnaire may have led to incorrect information. - Limited generalizability due to the specific population (university students).	- Need for well-designed HPV educational programs. - Update educational materials on cervical cancer prevention to include HPV information.

Elebiyo (2023) ¹⁰	Cross-sectional study; 302 parents of adolescents	To examine knowledge, attitude, and uptake of HPV vaccine among parents of adolescents attending the outpatient clinic at the University of Benin Teaching Hospital, Nigeria.	Parents of adolescents (10–19 years) attending the General Practice Clinic at the University of Benin Teaching Hospital, Nigeria.	Systematic sampling technique (every 4th parent of registered adolescents).	- 42.4% had heard of HPV infection, and 18.5% had heard of HPV vaccines. - 18.5% reported their children had been vaccinated. - 50.7% approved of their children receiving the vaccine. - Religion and belief in vulnerability influenced vaccine uptake.	- Data collected through self-reporting, which may be subject to social desirability bias. - No validation of vaccination status (e.g., vaccination cards).	- School-based and health facility-based sexual health education on HPV. - Address barriers to vaccine uptake. - Incorporate HPV vaccine into routine childhood immunization schedules.
Ezeanochie & Olasimbo (2020) ²⁰	Cross-sectional study; 215 female secondary school students	To evaluate awareness about HPV, prevalence of HPV immunization, and associated factors	Female secondary school students in Benin City, Nigeria; mean age 14.3 years (range 9-20 years)	Multistage stratified random sampling	- 97% had not heard of HPV, HPV vaccines, or cervical cancer. - Only 0.5% had received the HPV vaccine. - Majority suggested mass media (49.3%) and parents (32.1%) as sources of information.	- Recall bias, especially among younger students. - Lack of verifiable database for HPV immunization status.	- Targeted interventions in schools to increase knowledge about cervical cancer and HPV vaccines. - Incorporate HPV vaccine into national immunization programs.
Iliyasu et al. (2022) ³	Cross-sectional study; 410 medical and allied health students	To investigate predictors of baseline knowledge and acceptability of HPV vaccination	Medical and allied health students in Kano, Nigeria; mean age 23.1 years; 62.4% male, 37.6% female	Multistage sampling technique (proportionate allocation by faculty and year of study)	- 3.7% had good knowledge, 30.7% moderate, and 65.6% poor knowledge of HPV. - 81.5% willing to accept HPV vaccine, but only 4.4% had received at least one dose. - Vaccine acceptance higher among females and those with family history of cervical cancer.	- Medical students may not represent the general adolescent population. - Limited items to assess attitudes, leading to incongruent responses.	- Pilot HPV vaccine in health colleges. - Use students as peer educators and vaccine advocates. - Subsidize vaccine costs through national health insurance or eliminate out-of-pocket fees.
Enebe et al., (2021) ⁴	Cross-sectional; 377 female secondary school teachers	To assess awareness, acceptability, and factors influencing vaccine uptake.	Female teachers in public/private secondary schools in Enugu metropolis.	Convenience sampling	41.9% had good knowledge; acceptability was 93.6%; only 3.4% vaccinated; socioeconomic factors influenced uptake.	Limited to urban areas; no follow-up to measure long-term impact.	Strengthen school-based education programs for cervical cancer and vaccination.

Egbon et al., (2022) ²	Cross-sectional; 100 female secondary school students	To assess HPV knowledge and challenges in vaccine delivery in rural settings.	Female students (aged 9–18) in a rural school in Kebbi state; high operational costs identified as a challenge.	Random sampling	Knowledge scores ranged from 66%–96%; 100% received the first dose but 33% missed completion due to COVID-19 disruption.	Limited to one rural school; COVID-19 affected vaccine completion rates.	Address logistical challenges and community concerns; ensure complete vaccine doses.
Agha et al., (2024) ⁷	Cross-sectional; 1429 caregivers	To identify factors influencing HPV vaccine acceptance among caregivers using the Fogg Behaviour Model.	Caregivers of girls aged 9–17 across six Nigerian states, surveyed through social media.	Multistage sampling	Motivation, ability, and social support were key predictors of vaccine uptake; cost and misinformation were barriers.	Online sampling excluded non-social media users; not nationally representative.	Behavioural interventions targeting caregivers can increase vaccine uptake.

Lack of Awareness

A body of literature has reported inadequate awareness of the HPV vaccine and a lack of knowledge of where to obtain it as the major barrier to vaccine uptake.^{4,11,20,21} The factors associated with a lack of awareness of the vaccine among mothers were low educational qualifications (primary education or less) and a lack of screening for cervical cancer among mothers.¹¹ Paradoxically, while it has become 'common knowledge' that higher educational status is associated with better health practices, Agha and colleagues reported a contrasting finding: parents with higher educational status were less willing to allow their female child to accept the vaccine than parents with lower educational status.⁷

Similarly, the willingness to allow girls to be vaccinated against HPV by their caregivers is not associated with the caregiver's knowledge of someone with cervical cancer. This highlights the endemic resistance to the vaccine among some caregivers and further indicates that taking preventive measures is not directly associated with the awareness of someone suffering from the disease.⁷

With respect to knowledge of the HPV vaccine among female secondary school students, the lack of awareness among them is so rife that 99.1% reported having never heard of the vaccine and 97.7% were unaware of cervical cancer.²⁰ Also, in a study in Southeast, Nigeria examined awareness of the HPV vaccine among female secondary school teachers; more than half of the respondents (59.1%) had poor knowledge of the vaccine, 14.6% taught their students the HPV vaccine and cervical cancer, and 9.0% had a program that discussed cervical cancer or the HPV vaccine.⁴ Assessing gender disparity, a study in Southeast Nigeria reported that female respondents had less

knowledge about the HPV vaccine than males did.²¹

Knowledge of the HPV vaccine

Knowledge of the HPV vaccine among healthcare workers (HCWs) is key to their ability to disseminate the correct information about it to the public, considering that the chief perceived barrier to HPV vaccination among HCWs is a lack of awareness about the vaccine.²¹ Future HCWs who are in training are expected to possess adequate knowledge of health issues in order to appropriately practice and contribute to general societal well-being. Similar to the way HCWs can influence the uptake of the HPV vaccine, students studying health-related courses can also be early HPV vaccine advocates and peer educators. Onowhakpor and colleagues reported poor knowledge and poor uptake of the HPV vaccine among female medical and dental students at the University of Benin.⁵ However, the majority of medical and dental students had a positive attitude toward it, and their major source of knowledge was school lectures.⁵ These findings are in tandem with the results obtained by Iliyasu and colleagues while studying the relationship between HPV vaccine knowledge and acceptability among medical and allied health students at Bayero University, Kano.³ The researchers revealed that only 30.7% of the respondents had good knowledge of the HPV vaccine, with a high acceptance rate of 81.5%. Although the knowledge gap is greater among lower-level students, students with a family history of cervical cancer are more willing to take up the vaccine when compared to those without a family history.³

In a different study that excluded medical and allied health students, university students had poor knowledge. Only 17.7% had heard about HPV infection, while 14.4% had

heard of HPV vaccines.¹⁹ In a similar study among students at Kwara State University, poor knowledge of HPV infection and vaccines was reported, as only 15.4% had heard of the HPV vaccine.¹

To entrench HPV knowledge and HPV vaccine acceptance in the Nigerian health system, the low level of knowledge of the HPV vaccine among future HCWs can be described as 'worrisome' and therefore signifies the need for 'periodic curricula review and continuous professional development to fill knowledge gaps'.³ Furthermore, university students and graduates can also serve as HPV advocates in their various localities; as such, incorporating HPV infection and vaccines into general studies courses taken by all university students in order to bridge the knowledge gap cannot be overstated.

Cost

The cost of the HPV vaccine was observed to be a major barrier to its uptake, which can be attributed to the unavailability of vaccines caused by the lack of universal health coverage.²² This point was also bolstered by Azuogu and colleagues.¹¹ It is worth noting that these studies were conducted before the vaccine was introduced into Nigeria's Expanded Program Immunization, making it free and widely accessible.⁴

However, it is worthwhile to examine the willingness of caregivers to pay for the vaccine before it is made free. In a study among mothers of adolescent students in Southwest Nigeria, most of them (89.1%) demonstrated a willingness to vaccinate their daughters if the vaccine was made free, and 77.1% indicated their desire to encourage other mothers to vaccinate their daughters.¹¹ Another study reported an association between HPV vaccination and monthly income; the higher a parent's monthly income is, the greater the likelihood of having vaccinated children.⁴ Among university students in KWASU, 35% expressed a willingness to pay for the vaccine. In the same study, the predictors for willingness to pay were marital status and parity.¹

In terms of the free availability of HPV vaccines, most female teachers (93.6%) in secondary schools in Southeast Nigeria expressed a willingness to recommend the HPV vaccine to their students and children, whereas 85.4% were willing to recommend the inclusion of programs that address preventive measures against cervical cancer, particularly the HPV vaccine, to their schools.⁴

Based on the foregoing, it can be deduced that including the HPV vaccine in a routine immunization program and consequently making it free has likely increased its uptake

among people willing to vaccinate their children but has been hindered by cost.

Perceived Side Effects and General Vaccine Hesitancy

Other barriers to the uptake of the HPV vaccine reported were the fear of the side effects associated with the vaccine and the belief that it causes infertility.^{4,11} Likewise, the non-uptake of the COVID-19 vaccine among caregivers is associated with their unwillingness to allow their girls to take the HPV vaccine.⁷ This finding demonstrates that COVID-19 vaccine hesitancy impacts the uptake of the HPV vaccine and the need to address vaccine hesitancy in general, including the HPV vaccine, COVID-19 and other vaccines among the populace.

Sociocultural Beliefs

Mothers who were at the extreme of age, i.e., older and younger ones and females who were heads of their families, were unwilling to accept the HPV vaccine for their children and students.⁴ Additionally, parents living in urban areas are more willing to allow their female children to be vaccinated than are those living in rural areas.⁷ In a study by Egbon and colleagues, some respondents in a rural community setting in Northwest Nigeria, expressed concern that the HPV vaccine might be used for birth control, whereas others believed that their children are enrolled for clinical trials, considering their low socioeconomic status.² This notion is against the backdrop of their belief that only girls in rural communities were vaccinated.

Another limiting factor to the uptake of the vaccine is the prevalent perception that HPV vaccination increases the sexual activity of teenage girls.^{7,11} While HPV can be sexually transmitted, HCWs were cautioned against making pronounced statements on the role of the vaccine in preventing STDs during health promotion campaigns, this was to avoid 'provoking resistance' from community leaders, especially religious leaders who may misconstrue that to imply promoting sexual activity among vaccinated girls.⁷

A study revealed that caregivers (parents and community leaders) in the Northern States were more willing to allow their wards to take the vaccine than their Southern counterparts were (65% vs. 57%). This might not be unconnected with the reported widespread rife misinformation against vaccines in the South during the COVID-19 pandemic and the lowered level of trust in the government.⁷

Unavailability and Inaccessibility

The shortage of human resources for health (HRH) was observed to be partly responsible for the non-uptake of the HPV vaccine; this shortage is more pronounced in rural communities because of the preference of HCWs to serve in urban and suburban areas. This is in addition to the inadequate supply of qualified HCWs. Nigeria has 20 HCWs to 100,000 people. This shortage contributes to the overstretching of HCWs, especially nurses and CHEWs, who serve in rural areas.²

Vaccine availability was also reported as a perceived barrier to HPV vaccination by HCWs in Southeast Nigeria.²¹ Additionally, the unavailability or insufficient quantity of vaccines in hard-to-reach communities is a limiting factor to the uptake of the vaccine. Because in Nigeria, the vaccine supply chain ends at PHCs, hard-to-reach communities are systematically left out. Furthermore, while vaccines require cold chain storage, facilities without infrastructure for storage are also left out.² Therefore, to bridge this gap, adequate funding of critical health infrastructure and increasing the number of HCWs in rural and underserved communities are crucial for the uptake of the HPV vaccine. In addition to mobilizing HCWs to these communities, amenable accommodations designated for their stay and a little incentivization in the form of a transport allowance when visiting their city-dwelling families.

Strengths and limitations

This study has several strengths, including the timeliness of the topic, considering that HPV vaccine hesitancy is a critical global health challenge, and this study contributes to ongoing discussions on achieving higher vaccination rates in low-resource countries. The exhaustive search strategy and words utilized to source relevant articles provided a holistic understanding of the barriers to vaccine uptake. The holistic review also addresses barriers from multiple dimensions, including knowledge gaps, sociocultural beliefs, healthcare infrastructure, and financial constraints, enabling a nuanced understanding of the topic. Similarly, by focusing on Nigeria, the review highlights sociocultural, economic and healthcare system factors, which ensure their relevance to policymakers and stakeholders within the country.

Despite the strengths of the study, it must be acknowledged that it has limitations. These include restricting the database search to only PubMed and Google Scholar, which could result in missing relevant studies contained in other databases and restricting the publication period to only five years. The study also focused only on a single vaccine, HPV, and excluded other vaccines.

While this study lacks the rigorous and systematic approach of systematic reviews and meta-analyses, it is recommended that they should be conducted to provide more robust evidence on the barriers to the uptake of the vaccine. Since most of the studies examined were quantitative, which has more to do with their availability, it is recommended that qualitative studies be conducted to provide in-depth insight into the reasons for their hesitancy toward the vaccine.

Recommendations

First, the government and development partners should ensure vaccine availability and efficient storage conditions in rural areas, especially in hard-to-reach communities. Second, school-based immunization programs should be prioritized in addition to health-based programs.

Third, effective communication and targeted advocacy to community leaders and parents, who are the most significant predictors of the likelihood of girls being vaccinated against HPV, are essential to encouraging acceptance of the vaccine. Additionally, interventions that increase discussions of vaccines among social networks are likely to enhance their uptake in communities.

Importantly, the inclusion of HPV infection and vaccine knowledge in the curricula of secondary and tertiary educational institutions is paramount to breaking the barrier to the uptake of the HPV vaccine by bridging the knowledge gap among this important demographic that can serve as early adopters and peer educators.

Conclusion

The studies reviewed revealed that the limiting factors to the uptake of the HPV vaccine are its cost, nonavailability and inaccessibility, lack of adequate awareness and sociocultural and religious factors, among other factors, which play important roles in the eventual uptake of the vaccine. Increased awareness, targeted advocacy, effective communication, uninterrupted availability and eased accessibility are crucial to overcoming the barriers to the uptake of the HPV vaccine.

Declaration of conflicting interest: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding statement: The author(s) received no financial support for the research, authorship, and/or publication of this article.

Ethical approval and informed consent statements:

Ethical approval and informed consent were not required for this study.

Data availability statement: Data sharing is not applicable to this article as no new data were created.

REFERENCES

1. Akande OW, Akande TM. Human Papillomavirus Vaccination amongst Students in a Tertiary Institution in North Central Nigeria: A Cross-sectional Study on Sociodemographic Factors Associated with Its Awareness, Uptake and Willingness to Pay. *Niger Postgrad Med J*. 2024;31(1):14. doi: [10.4103/npmj.npmj.265_23](https://doi.org/10.4103/npmj.npmj.265_23)
2. Egbon M, Ojo T, Aliyu A, Bagudu ZS. Challenges and lessons from a school-based human papillomavirus (HPV) vaccination program for adolescent girls in a rural Nigerian community. *BMC Public Health*. 2022;22(1). doi: [10.1186/s12889-022-13975-3](https://doi.org/10.1186/s12889-022-13975-3)
3. Iliyasu Z, Galadanci HS, Muhammad A, Iliyasu BZ, Umar AA, Aliyu MH. Correlates of human papillomavirus vaccine knowledge and acceptability among medical and allied health students in Northern Nigeria. *J Obstet Gynaecol*. 2021;42(3):452-460. doi: [10.1080/01443615.2021.1910639](https://doi.org/10.1080/01443615.2021.1910639)
4. Enebe JT, Enebe NO, Agunwa CC, et al. Awareness, acceptability and uptake of cervical cancer vaccination services among female secondary school teachers in Enugu, Nigeria: a cross-sectional study. *Pan Afr Med J*. 2021;39:62. doi: [10.11604/pamj.2021.39.62.28824](https://doi.org/10.11604/pamj.2021.39.62.28824)
5. Onowhakpor AO, Omuemu VO, Osagie OL, Odili CG. Human Papilloma Virus vaccination: knowledge, attitude and uptake among female medical and dental students in a tertiary institution in Benin-City, Nigeria. *J Community Med Prim Health Care*. 2016;28(2):101-108.
6. John-Akinola YO, Ndikom CM, Oluwasanu MM, Adebisi T, Odukoya O. Cervical Cancer and Human Papillomavirus Vaccine Knowledge, Utilisation, Prevention Educational Interventions and Policy Response in Nigeria: A Scoping Review. *Cancer Control*. 2022;29:107327482211301. doi: [10.1177/10732748221130180](https://doi.org/10.1177/10732748221130180)
7. Agha S, Bernard D, Francis S, Fareed A, Ifeanyi Nsofor. Determinants of Human Papillomavirus Vaccine Acceptance among Caregivers in Nigeria: A Fogg Behavior Model-Based Approach. *Vaccines*. 2024;12(1):84-84. doi: [10.3390/vaccines12010084](https://doi.org/10.3390/vaccines12010084)
8. Salihu IN, Sekitto S, Aya BM, et al. Cost of Introducing Human Papillomavirus Vaccination into Nigeria's Expanded Program on Immunization: Lessons from Two Nigerian States. *Authorea (Authorea)*. Published online January 24, 2025. doi: [10.22541/au.173771153.34034741/v1](https://doi.org/10.22541/au.173771153.34034741/v1)
9. 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 Vaccin & Immunother*. 2022;18(5). doi: [10.1080/21645515.2022.2069959](https://doi.org/10.1080/21645515.2022.2069959)
10. Elebiyo OT. Knowledge, attitude, and uptake of Human Papilloma Virus (HPV) vaccine among parents of adolescents attending outpatient clinic at the University of Benin Teaching Hospital, Nigeria. *Afr J Reprod Health*. 2023;27(3):108-117. doi: [10.29063/ajrh2023/v27i3.12](https://doi.org/10.29063/ajrh2023/v27i3.12)
11. Azuogu B, Umeokonkwo C, Azuogu V, Onwe O, Okedo-Alex I, Egbuji C. Appraisal of willingness to vaccinate daughters with human papilloma virus vaccine and cervical cancer screening uptake among mothers of adolescent students in Abakaliki, Nigeria. *Niger J Clin Pract*. 2019;22(9):1286. doi: [10.4103/njcp.njcp.452_18](https://doi.org/10.4103/njcp.njcp.452_18)
12. Oluwasola T, Bello O, Odukogbe A. Awareness and attitude of female undergraduates toward human papillomavirus vaccine in Ibadan. *Trop J Obstet Gynaecol*. 2019;36(1):33. doi: [10.4103/tjog.tjog_7_19](https://doi.org/10.4103/tjog.tjog_7_19)
13. Balogun FM, Omotade OO, Svensson M. Stated preferences for human papillomavirus vaccination for adolescents in selected communities in Ibadan, Southwest Nigeria: A discrete choice experiment. *Hum Vaccin & Immunother*. 2022;18(6). doi: [10.1080/21645515.2022.2124091](https://doi.org/10.1080/21645515.2022.2124091)
14. Rabiun I, Yahuza Z. Knowledge and Attitude towards Human Papilloma Virus Infection, Vaccines, and Cervical Cancer Prevention among School Students in Kano, Nigeria. *Adv Virol*. 2023;2023:e2803420. doi: [10.1155/2023/2803420](https://doi.org/10.1155/2023/2803420)

15. Ohaeri B, Adefolaju A, Onyeneho C. Knowledge, attitudes and perceptions of Nigerian parents towards human papilloma virus (HPV) vaccines. *Eur J Midwifery*. 2020;4(January). doi: [10.18332/ejm/114886](https://doi.org/10.18332/ejm/114886)
16. Ndikom CM, Oboh P. Perception, acceptance and uptake of Human papillomavirus vaccine among female adolescents in selected secondary schools in Ibadan, Nigeria. *Afr J Biomed Res*. 2017;20(3):237-244.
17. Balogun FM, Omotade OO. Facilitators and barriers of healthcare workers' recommendation of HPV vaccine for adolescents in Nigeria: views through the lens of theoretical domains framework. *BMC Health Serv Res*. 2022;22(1). doi: [10.1186/s12913-022-08224-7](https://doi.org/10.1186/s12913-022-08224-7)
18. Okunowo AA, Ugwu AO, Kuku JO, et al. Predictors, barriers and motivating factors for human papillomavirus vaccination and testing as preventive measures for cervical cancer: A study of urban women in Lagos, Nigeria. *Prev Med Rep*. 2021;24:101643. doi: [10.1016/j.pmedr.2021.101643](https://doi.org/10.1016/j.pmedr.2021.101643)
19. Makwe CC, Anorlu RI, Odeyemi KA. Human papillomavirus (HPV) infection and vaccines: Knowledge, attitude and perception among female students at the University of Lagos, Lagos, Nigeria. *J Epidemiol Glob Health*. 2012;2(4):199-206. doi: [10.1016/j.jegh.2012.11.001](https://doi.org/10.1016/j.jegh.2012.11.001)
20. Ezeanochie M, Olasimbo P. Awareness and uptake of human papillomavirus vaccines among female secondary school students in Benin City, Nigeria. *Afri Health Sci*. 2020;20(1):45-50. doi: [10.4314/ahs.v20i1.8](https://doi.org/10.4314/ahs.v20i1.8)
21. Nguyen NY, Okeke E, Anglemeyer A, Brock T. Identifying Perceived Barriers to Human Papillomavirus Vaccination as a Preventative Strategy for Cervical Cancer in Nigeria. *Ann Glob Health*. 2020;86(1):118. doi: [10.5334/aogh.2890](https://doi.org/10.5334/aogh.2890)
22. Wilson R. HPV vaccine acceptance in West Africa: A systematic literature review. *Vaccine*. 2021;39(37):5277-5284. doi: [10.1016/j.vaccine.2021.06.074](https://doi.org/10.1016/j.vaccine.2021.06.074)