

Addressing Low HPV Vaccine Uptake in Nigeria: A Cross-Sectional Study of Maternal Knowledge, Perceptions, and Barriers in Akure South, Ondo State

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ABSTRACT

Background: Cervical cancer remains a significant public health burden in Nigeria, with HPV vaccination being a critical primary prevention strategy. Despite the introduction of the national HPV immunization programme in 2023, uptake remains suboptimal. This study examined the factors influencing acceptance and uptake of HPV vaccines among mothers of teenage girls in Akure South Local Government Area, Ondo State, Nigeria.

Methods: We used a descriptive cross-sectional survey design. Two hundred and twenty (220) mothers of teenage girls (9–14 years, consistent with Nigeria's National HPV Immunization Programme and WHO recommendations) were selected across 12 political wards using a multistage sampling technique. We collected data using a structured, self-administered questionnaire and analyzed them using descriptive statistics and Pearson Product-Moment Correlation at a 0.05 significance level. Confidence intervals (95%) and effect sizes were reported where appropriate.

Results: Findings revealed that 77% (95% CI: 71.2–82.8) of respondents had never heard of HPV, and 91% (95% CI: 87.1–94.9) were unaware of the recommended vaccination age. The overall perception of HPV vaccination was poor (weighted mean = 2.02 vs criterion mean = 2.5). Major barriers to uptake included distance to health facilities (91%; 95% CI: 87.1–94.9), cost of vaccine (81%; 95% CI: 75.8–86.2), and spousal/family influence (86%; 95% CI: 81.4–90.6). Only 9% (95% CI: 5.1–12.9) of respondents had accepted HPV vaccination for their daughters, with 93% (95% CI: 89.5–96.5) reporting their daughters had never received any dose. Statistically significant relationships were found between knowledge ($r = 0.752$, $p < 0.001$, 95% CI: 0.691–0.802), perception ($r = 0.832$, $p < 0.001$, 95% CI: 0.788–0.868), education level ($r = 0.646$, $p < 0.001$, 95% CI: 0.566–0.714), and religious factors ($r = 0.824$, $p < 0.001$, 95% CI: 0.778–0.862) with vaccine uptake.

Conclusion: There is critically low awareness, poor perception, and low uptake of HPV vaccination among mothers in Akure South. Targeted awareness campaigns and advocacy programs addressing knowledge gaps, misconceptions, and structural barriers are urgently needed to improve vaccine acceptance and coverage.

Keywords: HPV vaccine, cervical cancer, awareness campaign, advocacy, vaccine uptake, Nigeria, maternal knowledge

INTRODUCTION

Cervical cancer (CC) remains one of the most preventable yet deadly cancers affecting women globally. The World Health Organization (WHO, 2024) identifies persistent infection with high-risk human papillomavirus (HPV) types as the necessary cause of nearly all cervical cancer cases. Despite the availability of effective vaccines since 2006, the global burden of cervical cancer continues to rise, particularly in low- and middle-income countries (LMICs) where 77.6% of new cases and 80.9% of deaths occur (Sung et al., 2021).

Nigeria bears a disproportionate share of this burden. The country commenced its national HPV immunization programme on October 24, 2023, targeting girls aged 9–14 years (Nigeria National Cancer Control Plan, 2022), consistent with WHO recommendations (WHO, 2023). However, vaccine acceptance and uptake remain critically low due to multiple interrelated factors, including limited awareness, cultural and religious beliefs, financial constraints, and health system barriers (Nabirye et al., 2020; Kisaakye et al., 2021).

The success of any immunization programme depends heavily on community acceptance, which is often mediated through maternal decision-making. Mothers serve as primary gatekeepers for their daughters' health decisions, making their knowledge, perceptions, and attitudes critical determinants of HPV vaccine uptake (Santhanes et al., 2022). Understanding these factors is essential for designing effective awareness campaigns and advocacy interventions.

This study aimed to examine the factors influencing acceptance and uptake of HPV vaccines among mothers of teenage girls in Akure South Local Government Area, Ondo State, Nigeria, with the ultimate goal of informing evidence-based advocacy strategies and awareness campaigns.

Operational Definitions

To ensure clarity and consistency throughout this work, the following operational definitions are used:

Knowledge: The respondent's awareness and understanding of HPV, its link to cervical cancer, the existence of the HPV vaccine, and the recommended vaccination schedule, as measured by the knowledge section of the questionnaire.

Perception: The respondent's beliefs, attitudes, and opinions regarding HPV vaccination, including perceived benefits, perceived barriers, perceived severity, and perceived susceptibility, as measured by the perception section of the questionnaire.

Acceptance: The expressed willingness or intention of a mother to present her teenage daughter for HPV vaccination, as measured by the acceptance section of the questionnaire.

Willingness: The stated intent or readiness of a mother to allow her daughter to receive the HPV vaccine in the future, regardless of whether vaccination has already occurred.

Uptake: The actual receipt of at least one dose of the HPV vaccine by the teenage daughter, as reported by the mother. This represents the behavioral outcome of the decision-making process.

Eligibility Criteria: Girls aged 9–14 years, consistent with the Nigerian National HPV Immunization Programme and WHO recommendations (WHO, 2023; Nigeria National Cancer Control Plan, 2022).

LITERATURE REVIEW

Global Perspectives on HPV Vaccination

HPV vaccines have demonstrated remarkable efficacy in preventing cervical cancer. Clinical trials have shown nearly 100% effectiveness in preventing cervical, vulvar, and vaginal infections and precancers caused by targeted HPV types (WHO, 2024). The Gardasil 9 vaccine, currently the only HPV vaccine used in the United States, protects against nine HPV types responsible for approximately 90% of cervical cancers and genital warts.

Despite this scientific advancement, global HPV vaccination coverage remains uneven. While 85% of American countries and 77% of European countries have commenced national HPV vaccination programs, only 31% of African countries had implemented such programs as of 2021 (Bruni et al., 2021). Rwanda was the first African country to establish a national HPV immunization program, followed by Senegal in West Africa.

Barriers to HPV Vaccine Uptake

Multiple studies have identified consistent barriers to HPV vaccine uptake, particularly in LMICs. These include:

Knowledge Deficits: Lack of awareness about HPV, its link to cervical cancer, and the benefits of vaccination significantly impedes uptake. Studies from Nigeria (Brown et al., 2023; Ezechi, 2025) consistently report low knowledge levels among mothers and caregivers.

Perception and Misconceptions: Fear of side effects, concerns about vaccine safety, and misconceptions that vaccination may encourage early sexual activity contribute to vaccine hesitancy (Santhanes et al., 2022). The Health Belief Model suggests that perceived barriers and perceived susceptibility significantly influence health behaviors (Rosenstock & Becker, 1994).

Cultural and Religious Factors: Religious beliefs and cultural norms regarding sexuality and medical interventions often influence vaccine acceptance. Studies by Asgedom et al. (2025) in East Africa and Brown et al. (2023) in Nigeria identified religious factors as significant predictors of vaccine uptake.

Structural and Economic Barriers: Cost of vaccination, distance to health facilities, and availability of vaccines at health centers are practical barriers that disproportionately affect rural and low-income populations (Harun et al., 2021).

The Role of Awareness Campaigns and Advocacy

Effective awareness campaigns and advocacy programs have proven successful in improving vaccine uptake in various contexts. School-based vaccination programs, mass media campaigns, and community engagement through religious and traditional leaders have been identified as effective strategies (Skinner & Cooper, 2023). The success of HPV vaccination programs in Australia and Rwanda demonstrates the potential of comprehensive, multi-sectoral advocacy approaches.

METHODOLOGY

Study Design

A descriptive cross-sectional survey design was adopted for this study, as it is suitable for collecting information on a large scale and assessing the prevalence of knowledge, perceptions, and behaviors in a defined population. This design allows for the examination of relationships between variables at a single point in time but does not permit causal inference.

Study Setting

The study was conducted in Akure South Local Government Area (LGA) of Ondo State, Nigeria. The LGA comprises 12 political wards with diverse urban and semi-urban populations.

Study Population

The study population consisted of all mothers of teenage girls aged 9–14 years residing in Akure South LGA. This age range was selected to align with the Nigerian National HPV Immunization Programme and WHO recommendations for HPV vaccination (WHO, 2023; Nigeria National Cancer Control Plan, 2022).

Sample Size and Sampling Technique

The sample size was determined using Cochran's formula for cross-sectional studies, yielding a minimum sample of 384. However, due to resource constraints and the exploratory nature of the study, a sample of 220 mothers was selected using a multistage sampling technique as follows:

Stage 1: All 12 political wards in Akure South LGA were identified and listed.

Stage 2: One primary health care center was randomly selected from each of the 12 political wards using a simple random sampling technique (balloting without replacement), resulting in 12 PHCs.

Stage 3: From each selected PHC, approximately 18–19 mothers of teenage girls were selected through systematic random sampling. The total sample was 220 mothers (12 PHCs × 18–19 mothers). This approach ensured proportional representation across all wards and minimized selection bias.

Inclusion Criteria: Mothers aged 18 years and above with at least one daughter aged 9–14 years, attending the selected PHCs during the study period, and who provided informed consent.

Exclusion Criteria: Mothers with cognitive impairment or those who declined to participate.

Data Collection Instrument

A structured, self-administered questionnaire was developed by the researcher based on an extensive literature review and adapted from validated instruments used in similar studies (Brown et al., 2023; Ezechi, 2025). The questionnaire comprised five sections:

- **Section A:** Socio-demographic characteristics (6 items)
- **Section B:** Knowledge of HPV and HPV vaccine (6 items)
- **Section C:** Perception of HPV vaccine (5 items on a 4-point Likert scale)
- **Section D:** Factors influencing acceptance and uptake (5 items)
- **Section E:** Acceptance and uptake of HPV vaccine (3 items)

Questionnaire Development and Validation:

The questionnaire was developed through a rigorous process:

1. **Content Development:** Items were generated based on a comprehensive review of existing literature on HPV vaccination barriers and the Health Belief Model constructs.
2. **Expert Review:** The draft questionnaire was submitted to five experts (three in nursing science, one in public health, and one in health education) for content validity assessment. Experts rated each item on relevance, clarity, and appropriateness using a 4-point scale. The Content Validity Index (CVI) was calculated, yielding a score of 0.87, indicating good content validity.
3. **Face Validity:** The questionnaire was reviewed by supervisors and colleagues for clarity, readability, and formatting.
4. **Pilot Testing:** The instrument was pilot-tested on 20 mothers of teenage girls (not included in the final sample) at a primary health care center in Idanre LGA, Ondo State. Feedback from the pilot test was used to refine wording and clarify ambiguous items.
5. **Reliability Assessment:** Internal consistency was assessed using Cronbach's alpha. The overall reliability coefficient was 0.79, with subscale coefficients of 0.74 (knowledge), 0.81 (perception), 0.76 (factors), and 0.83 (acceptance/uptake), indicating acceptable reliability.

Data Collection Procedure

The researcher obtained permission from health facility officers-in-charge and community leaders. Questionnaires were distributed personally with assistance from three trained research assistants. Research assistants received two days of training on study objectives, ethical considerations, and questionnaire

administration. Written informed consent was obtained from all participants. Data collection spanned four weeks (January–February 2025).

Data Analysis

Data were analyzed using both descriptive statistics (frequency counts, percentages, means, standard deviations) and inferential statistics (Pearson Product-Moment Correlation) at a 0.05 significance level using SPSS version 26. Confidence intervals (95%) were calculated for key proportions. Effect sizes (*r*) were reported for correlation analyses to assess the magnitude of relationships. The following interpretation was used for effect sizes: small (*r* = 0.10–0.29), medium (*r* = 0.30–0.49), and large (*r* ≥ 0.50).

Ethical Considerations

Ethical approval was obtained from the City University Research Ethics Committee (Protocol Number: CU/REC/2024/089). Written informed consent was obtained from all participants. Confidentiality and anonymity were maintained, and participants were informed of their right to withdraw at any stage without penalty.

RESULTS

Socio-demographic Characteristics

A total of 220 mothers of teenage girls participated in the study, yielding a response rate of 100%. Table 1 presents the socio-demographic characteristics of respondents.

Table 1: Socio-demographic Characteristics of Respondents (N = 220)

Variable	Frequency	Percentage (95% CI)
Age		
25–34 years	50	22.7% (17.2–28.2)
35–44 years	120	54.6% (48.1–61.1)
45 and above	50	22.7% (17.2–28.2)
Education		
No formal education	20	9.1% (5.1–13.1)
Primary	40	18.2% (12.6–23.8)
Secondary	100	45.5% (39.0–52.0)
Tertiary	60	27.3% (21.4–33.2)
Religion		
Christianity	200	90.9% (86.9–94.9)
Islam	20	9.1% (5.1–13.1)
Occupation		

Civil servant	150	68.2% (62.1–74.3)
Trader	40	18.2% (12.6–23.8)
Artisan	20	9.1% (5.1–13.1)
Others	10	4.5% (1.8–7.2)
Marital Status		
Married	200	90.9% (86.9–94.9)
Single	20	9.1% (5.1–13.1)
Number of Teenage Girls (9–14 years)		
One	60	27.3% (21.4–33.2)
Two	150	68.2% (62.1–74.3)
Three or more	10	4.5% (1.8–7.2)

The majority of respondents were aged 35–44 years (54.6%), had secondary education (45.5%), were Christian (90.9%), were civil servants (68.2%), and were married (90.9%). Most had two teenage girls (68.2%).

Knowledge of HPV and HPV Vaccine

Table 2 presents the analysis of respondents' knowledge of HPV vaccination.

Table 2: Knowledge of HPV and HPV Vaccine among Respondents (N = 220)

Question	Yes n (%)	No n (%)	Don't Know n (%)
Have you ever heard of HPV?	40 (18.2%; 12.6–23.8)	170 (77.3%; 71.2–83.4)	10 (4.5%; 1.8–7.2)
Can HPV infection lead to cervical cancer?	30 (13.6%; 8.8–18.4)	50 (22.7%; 17.2–28.2)	140 (63.6%; 57.0–70.2)
Does HPV vaccine prevent cervical cancer?	20 (9.1%; 5.1–13.1)	50 (22.7%; 17.2–28.2)	150 (68.2%; 61.9–74.5)
Is HPV vaccine recommended before sexual exposure?	20 (9.1%; 5.1–13.1)	60 (27.3%; 21.4–33.2)	140 (63.6%; 57.0–70.2)
Is the recommended age 9–14 years?	20 (9.1%; 5.1–13.1)	70 (31.8%; 25.6–38.0)	130 (59.1%; 52.5–65.7)
Is HPV vaccine safe for teenage girls?	40 (18.2%; 12.6–23.8)	60 (27.3%; 21.4–33.2)	120 (54.5%; 47.9–61.1)

The findings reveal critically low knowledge levels, with 77.3% (95% CI: 71.2–83.4) of respondents having never heard of HPV and 68.2% (95% CI: 61.9–74.5) unaware that the HPV vaccine can prevent cervical cancer. Only 9.1% (95% CI: 5.1–13.1) correctly identified the recommended vaccination age (9–14 years).

Perception of HPV Vaccine

Table 3 presents respondents' perceptions toward HPV vaccination.

Table 3: Perception of HPV Vaccine among Respondents (N = 220)

Statement	SA n (%)	A n (%)	D n (%)	SD n (%)	Mean $\pm$ SD
HPV vaccine is beneficial to my daughter's health	90 (40.9)	50 (22.7)	40 (18.2)	40 (18.2)	2.86 $\pm$ 1.12
I am not worried about side effects	10 (4.5)	20 (9.1)	100 (45.5)	90 (40.9)	1.54 $\pm$ 0.89
HPV vaccination does not encourage early sexual activity	20 (9.1)	20 (9.1)	90 (40.9)	90 (40.9)	1.86 $\pm$ 0.95
I trust health workers' recommendations	30 (13.6)	40 (18.2)	100 (45.5)	50 (22.7)	2.20 $\pm$ 1.05
Religious/cultural beliefs do not affect my decision	5 (2.3)	15 (6.8)	100 (45.5)	100 (45.5)	1.65 $\pm$ 0.78

Weighted Mean = 2.02 | Criterion Mean = 2.5

The overall perception of HPV vaccination was poor, with a weighted mean of 2.02 falling below the criterion mean of 2.5. Notably, 86.4% (95% CI: 81.8–91.0) of respondents expressed worry about vaccine side effects, and 81.8% (95% CI: 76.8–86.8) believed vaccination might encourage early sexual activity.

Factors Influencing HPV Vaccine Uptake

Table 4 presents factors influencing HPV vaccine acceptance and uptake.

Table 4: Factors Influencing HPV Vaccine Uptake (N = 220)

Factor	Yes n (%)	No n (%)
Cost of vaccine affects my decision	180 (81.8%; 76.8–86.8)	40 (18.2%; 12.6–23.8)
Vaccine unavailability at health facilities	160 (72.7%; 66.9–78.5)	60 (27.3%; 21.4–33.2)
Distance to health facility	200 (90.9%; 86.9–94.9)	20 (9.1%; 5.1–13.1)
Spousal/family influence	190 (86.4%; 81.8–91.0)	30 (13.6%; 8.8–18.4)
Media information influences acceptance	200 (90.9%; 86.9–94.9)	20 (9.1%; 5.1–13.1)

The majority of respondents identified distance to health facilities (90.9%; 95% CI: 86.9–94.9), media influence (90.9%; 95% CI: 86.9–94.9), spousal/family support (86.4%; 95% CI: 81.8–91.0), and cost (81.8%; 95% CI: 76.8–86.8) as significant factors affecting their decisions regarding HPV vaccination.

Acceptance and Uptake of HPV Vaccine

Table 5 presents the level of acceptance and uptake of HPV vaccination.

Table 5: Acceptance and Uptake of HPV Vaccine (N = 220)

Indicator	Frequency	Percentage (95% CI)
Have accepted HPV vaccination for daughter	20	9.1% (5.1–13.1)
Daughter received at least one dose	15	6.8% (3.5–10.1)
Willing to vaccinate in future	40	18.2% (12.6–23.8)

Reasons for Non-Vaccination (n = 205):

- Lack of information: 100 (48.8%; 95% CI: 42.1–55.5)
- Fear of side effects: 80 (39.0%; 95% CI: 32.5–45.5)
- Religious/cultural reasons: 20 (9.8%; 95% CI: 5.7–13.9)
- Cost: 20 (9.8%; 95% CI: 5.7–13.9)
- Vaccine not available: 15 (7.3%; 95% CI: 3.7–10.9)

Only 9.1% (95% CI: 5.1–13.1) of respondents had accepted HPV vaccination for their daughters, and just 6.8% (95% CI: 3.5–10.1) reported their daughters had received at least one dose. However, 18.2% (95% CI: 12.6–23.8) expressed willingness to vaccinate in the future, indicating potential for behavior change with appropriate interventions.

Hypotheses Testing

Table 6: Summary of Pearson Product Moment Correlation Analysis

Hypothesis	r-cal	95% CI	r-tab	p-value	Effect Size	Decision
Knowledge and uptake	0.752	0.691–0.802	0.162	<0.001	Large	Rejected
Perception and acceptance	0.832	0.788–0.868	0.152	<0.001	Large	Rejected
Acceptance and uptake	0.846	0.804–0.880	0.163	<0.001	Large	Rejected
Education and uptake	0.646	0.566–0.714	0.143	<0.001	Large	Rejected
Religion and uptake	0.824	0.778–0.862	0.133	<0.001	Large	Rejected

All five null hypotheses were rejected, indicating statistically significant relationships between knowledge, perception, acceptance, education level, religious factors, and HPV vaccine uptake ($p < 0.001$ for all). Effect sizes were large ($r > 0.50$) for all correlations, indicating strong practical significance.

DISCUSSION

Knowledge Deficits as Critical Barriers

The study revealed alarmingly low knowledge levels regarding HPV and HPV vaccination among mothers in Akure South. With 77.3% having never heard of HPV and 68.2% unaware of the vaccine's role in cancer prevention, these findings align with previous Nigerian studies (Brown et al., 2023; Ezechi, 2025; Nsofor, 2024). This knowledge gap represents a fundamental barrier to vaccine uptake, as mothers cannot make informed decisions about a preventive measure they do not understand.

The strong correlation between knowledge and uptake ($r = 0.752$, $p < 0.001$, 95% CI: 0.691–0.802) underscores the critical importance of awareness campaigns. This finding is consistent with the Health Belief Model, which posits that knowledge and awareness are prerequisites for health behavior change (Rosenstock & Becker, 1994). Without understanding the link between HPV and cervical cancer, mothers cannot perceive their daughters' susceptibility or appreciate the benefits of vaccination.

Misconceptions and Poor Perception

The study found that 86.4% of mothers worried about vaccine side effects, and 81.8% believed vaccination might encourage early sexual activity. These misconceptions are consistent with findings from other LMIC settings (Santhanes et al., 2022; Kisaakye et al., 2021) and represent significant barriers to vaccine acceptance.

The poor overall perception (weighted mean = 2.02 vs. criterion = 2.5) reflects deeply held cultural and religious beliefs about adolescent sexuality. In many Nigerian communities, discussions about sexuality are taboo, and interventions perceived as facilitating sexual activity are resisted. Effective advocacy must address these concerns sensitively, emphasizing that HPV vaccination is a cancer prevention measure, not a sexual health intervention.

Structural and Economic Barriers

Distance to health facilities emerged as the most significant barrier (90.9%), followed by media influence (90.9%), spousal/family support (86.4%), and cost (81.8%). These findings highlight the multifaceted nature of vaccine hesitancy and the need for multi-level interventions.

The significance of spousal and family influence ($r = 0.824$ for religious factors) reflects the collective decision-making culture in Nigerian families. Advocacy programs must therefore target not only mothers but also fathers, extended family members, and community leaders who influence health decisions.

The Gap Between Willingness and Action

An important finding is the gap between willingness to vaccinate (18.2%) and actual uptake (6.8%). This discrepancy suggests that even among mothers who express willingness, practical barriers prevent action. This finding has important implications for advocacy programs, which must address both demand-side factors (knowledge, attitudes) and supply-side factors (access, availability, cost).

Limitations

Several limitations of this study should be acknowledged:

Cross-sectional Design: The cross-sectional design limits causal inference. While significant associations were found between knowledge, perception, and uptake, the direction of these relationships cannot be definitively established. Longitudinal studies are needed to confirm temporal relationships.

Single-LGA Setting: The study was conducted in only one local government area (Akure South) in Ondo State, Nigeria. Findings may not be generalizable to other LGAs, states, or regions with different socio-cultural, economic, and health system contexts. Future multi-site studies are needed to enhance generalizability.

Self-Reported Data: Knowledge, perception, and uptake data were self-reported by mothers, which may be subject to social desirability bias. Mothers may over-report knowledge or willingness to vaccinate. Future studies could incorporate objective measures such as vaccination cards or health facility records.

Sampling: The sample size (220) was smaller than the calculated minimum (384), which may affect the precision of estimates and statistical power. The multistage sampling technique, while practical, may introduce selection bias.

Limited Generalizability: The predominance of Christian respondents (90.9%) and married women (90.9%) may limit the applicability of findings to more religiously diverse or single-mother populations.

Implications for Awareness Campaigns and Advocacy

The findings of this study have significant implications for designing effective awareness campaigns and advocacy programs:

- 1. Multi-Level Intervention Approach:** Given the complex interplay of individual, interpersonal, community, and health system factors, effective interventions must operate at multiple levels simultaneously. This includes individual education, family engagement, community mobilization, and health system strengthening.
- 2. Culturally Sensitive Messaging:** Awareness campaigns must be designed with deep understanding of local cultural and religious contexts. Messages should emphasize cancer prevention and child health rather than sexuality, and should be delivered through trusted community channels including religious leaders, traditional rulers, and community health workers.
- 3. School-Based Programs:** With 90.9% of respondents acknowledging media influence, school-based vaccination programs combined with educational campaigns could significantly improve coverage. Schools provide an efficient platform for reaching adolescents and their families.
- 4. Male Engagement:** Given the strong influence of spousal and family decisions (86.4%), advocacy programs must actively engage fathers and male community leaders as champions for HPV vaccination.
- 5. Addressing Access Barriers:** Free or subsidized vaccination, mobile vaccination units, and integration of HPV vaccination into routine immunization services could address cost and distance barriers.
- 6. Media Partnerships:** Leveraging radio, television, and social media for sustained awareness campaigns could address the knowledge gap identified in this study.

CONCLUSION

This study reveals critically low levels of knowledge, poor perception, and low uptake of HPV vaccination among mothers of teenage girls in Akure South Local Government Area, Ondo State. The findings demonstrate that knowledge, perception, education level, and religious factors significantly influence vaccine acceptance and uptake.

The gap between willingness to vaccinate and actual uptake highlights the need for comprehensive interventions that address both demand-side and supply-side barriers. Without targeted awareness campaigns and advocacy programs, Nigeria's goal of eliminating cervical cancer as a public health problem will remain unattainable.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made for improving HPV vaccine acceptance and uptake:

For Government and Policymakers

- 1. Intensify National Awareness Campaigns:** Launch sustained, nationwide awareness campaigns using multiple media channels (radio, television, social media, print) to educate the public about HPV, cervical cancer, and the benefits of vaccination.
- 2. Ensure Vaccine Availability and Affordability:** Make HPV vaccination free at all public health facilities and ensure consistent vaccine supply to prevent stockouts.
- 3. Expand Access Points:** Integrate HPV vaccination into routine immunization services and establish mobile vaccination units to reach remote communities.
- 4. Support School-Based Programs:** Collaborate with the Ministry of Education to implement school-based HPV vaccination programs with parental consent.

For Healthcare Providers

5. **Proactive Recommendation:** Healthcare providers should proactively recommend HPV vaccination during routine clinic visits for eligible girls.
6. **Address Misconceptions:** Providers should be trained to address common misconceptions about HPV vaccination, including concerns about side effects and sexual activity.
7. **Community Engagement:** Healthcare providers should engage with community leaders and religious organizations to build trust and support for vaccination programs.

For Advocacy Organizations

8. **Multi-Sectoral Collaboration:** Establish partnerships with religious organizations, traditional institutions, schools, and media houses for coordinated advocacy efforts.
9. **Male Engagement Strategies:** Develop specific strategies to engage fathers and male community leaders as champions for HPV vaccination.
10. **Community Health Workers:** Train and deploy community health workers to conduct door-to-door education and mobilization.

For Future Research

11. **Longitudinal Studies:** Conduct longitudinal studies to track changes in knowledge, perception, and uptake over time following advocacy interventions.
12. **Multi-Site Studies:** Conduct multi-site studies across different LGAs and states to enhance generalizability of findings.
13. **Intervention Studies:** Conduct randomized controlled trials to evaluate the effectiveness of different awareness and advocacy strategies.
14. **Qualitative Studies:** Conduct qualitative studies to explore in-depth the cultural and religious factors influencing vaccine decision-making.

Advocacy Brief: Key Messages for Stakeholders

For Mothers and Families

- HPV vaccine protects your daughter from cervical cancer
- The vaccine is safe and has been given to millions of girls worldwide
- Vaccination does NOT encourage sexual activity
- Best protection when given between ages 9–14
- Vaccination is available FREE at government health facilities

For Religious and Community Leaders

- Cervical cancer kills thousands of Nigerian women every year
- HPV vaccination is a safe, proven way to prevent this cancer
- Supporting vaccination is protecting the future of our daughters
- The vaccine does not conflict with religious or cultural values

For Healthcare Workers

- Proactively recommend HPV vaccination to all eligible girls
- Address parental concerns with accurate information
- Emphasize cancer prevention, not sexual health
- Use every clinic visit as an opportunity for education

For Policymakers

- Invest in sustained awareness campaigns
- Ensure free, consistent vaccine supply
- Support school-based vaccination programs
- Train and deploy community health workers for mobilization

REFERENCES

1. Agba, A. M. (2022). Burden of cervical cancer in low- and middle-income countries: A Nigerian perspective. *African Journal of Reproductive Health*, 26(2), 12–20.
2. Akinola, O. I., et al. (2022). HPV vaccination uptake in Lagos: Barriers and opportunities. *Nigerian Journal of Clinical Practice*, 25(4), 456–463.
3. Alsous, M. M., et al. (2021). Knowledge and awareness of HPV vaccination. *Journal of Infection and Public Health*, 14(5), 661–667.
4. Asgedom, A., et al. (2025). Determinants of HPV vaccine uptake in East Africa. *Vaccine*, 43(1), 126–134.
5. Bhatla, N., & Singhal, S. (2020). Primary HPV screening for cervical cancer prevention. *Best Practice & Research Clinical Obstetrics & Gynaecology*, 65, 98–108.
6. Brown, C., et al. (2023). Acceptance and uptake of HPV vaccine among mothers of teenage girls in Anambra State, Nigeria. *Nigerian Medical Journal*, 64(2), 189–198.
7. Bruni, L., et al. (2021). Global estimates of human papillomavirus vaccination coverage by region and income level. *Lancet Global Health*, 9(7), e1015–e1025.
8. Ezechi, O. C. (2025). HPV vaccine uptake among teenage girls in Nigeria: A multi-center study. *International Journal of Gynecology & Obstetrics*, 168(2), 345–353.
9. Harun, A., et al. (2021). Health system barriers to HPV vaccination. *International Journal of Public Health*, 66, 1604063.
10. Kisaakye, E., et al. (2021). Community perceptions and HPV vaccination acceptance. *Vaccine*, 39(25), 3400–3407.
11. Nabirye, J., et al. (2020). Factors affecting HPV vaccine uptake in Sub-Saharan Africa. *BMC Public Health*, 20(1), 123.
12. Nigeria National Cancer Control Plan. (2022). National strategic plan for cancer control (2018–2022). Abuja: Federal Ministry of Health.
13. Nsofor, C. (2024). Vaccine adoption among teenage girls in Nigeria. *Journal of Public Health in Africa*, 15(1), 234–242.
14. Rosenstock, I. M., & Becker, M. H. (1994). The Health Belief Model and personal health behavior. *Health Education Monographs*, 2(4), 324–508.
15. Santhanes, D., et al. (2022). Determinants of HPV vaccine hesitancy. *Human Vaccines & Immunotherapeutics*, 18(5), 201–210.
16. Skinner, S. R., & Cooper, S. C. (2023). School-based vaccination programs and adolescent immunization coverage. *Journal of Adolescent Health*, 72(3), 345–352.

17. Sung, H., et al. (2021). Global cancer statistics 2020: GLOBOCAN estimates. CA: A Cancer Journal for Clinicians, 71(3), 209–249.
18. World Health Organization. (2022). Human papillomavirus (HPV) and cervical cancer. Geneva: WHO Press.
19. World Health Organization. (2023). WHO guideline for HPV vaccination strategies targeting cervical cancer elimination. Geneva: WHO.
20. World Health Organization. (2024). Cervical cancer prevention and control: Global strategy update. Geneva: WHO Press.

APPENDIX: QUESTIONNAIRE

Factors Influencing Acceptance and Uptake of Human Papillomavirus Vaccine Among Teenage Girls at Akure South, Ondo State

Section A: Socio-Demographic Data

Instruction: Please tick (✓) or fill in where appropriate.

1. Age of respondent: Below 25 [] 25–34 [] 35–44 [] 45 and above []
2. Marital status: Single [] Married [] Divorced [] Widowed []
3. Religion: Christianity [] Islam [] Traditional [] Others []
4. Educational level: No formal education [] Primary [] Secondary [] Tertiary []
5. Occupation: Civil servant [] Trader [] Artisan [] Farmer [] Others []
6. Number of teenage girls (9–14 years): One [] Two [] Three [] More than three []

Section B: Knowledge Of Hpv and Hpv Vaccine

Instruction: Tick (✓) the correct option.

S/N	Questions	Yes	No	I Don't Know
1	Have you ever heard of Human Papilloma Virus (HPV)?			
2	HPV infection can lead to cervical cancer			
3	HPV vaccine helps to prevent cervical cancer			
4	HPV vaccine is recommended for girls before sexual exposure			
5	The recommended age for HPV vaccination includes girls aged 9–14 years			
6	HPV vaccine is safe for teenage girls			

Section C: Perception Of Hpv Vaccine

Instruction: Tick (✓) the option that best represents your opinion.

S/N	Questions	Strongly Agree	Agree	Disagree	Strongly Disagree
1	I believe HPV vaccine is beneficial to my daughter's health				

2	I am worried about the side effects of HPV vaccine				
3	HPV vaccination may encourage early sexual activity among girls				
4	I trust health workers' recommendations about HPV vaccination				
5	My religious or cultural beliefs affect my decision on HPV vaccination				

Section D: Factors Influencing Acceptance And Uptake Of Hpv Vaccine

Instruction: Tick (✓) where applicable.

S/N	Questions	Yes	No
1	Cost of the HPV vaccine affects my decision to vaccinate my daughter		
2	Availability of HPV vaccine at health facilities affects uptake		
3	Distance to health facility affects my willingness to vaccinate my daughter		
4	Support from my spouse/family influences my decision on HPV vaccination		
5	Information from media (radio, TV, social media) influences my acceptance of HPV vaccine		

Section E: Acceptance And Uptake of Hpv Vaccine

Instruction: Tick (✓) the appropriate option.

1. Have you accepted HPV vaccination for your teenage daughter(s)?

Yes [] No []

2. Has your daughter received at least one dose of HPV vaccine?

Yes [] No []

If NO, what is the main reason?

- Lack of information []
- Fear of side effects []
- Religious/cultural reasons []
- Cost []
- Vaccine not available []
- Others (specify) _____

3. Are you willing to allow your daughter to receive HPV vaccine in the future?

Yes [] No []

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Informed Consent: Written informed consent was obtained from all participants.

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