



Assessment of Knowledge and Acceptance of the Human Papillomavirus Vaccine among Caregivers in Ardo Kola LGA, Taraba State, Nigeria

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Article History	Abstract
Received: 13 May 2026 Accepted: 22 Jun 2026 Published: 03Aug 2026	Human papillomavirus (HPV) is a leading etiological agent in cervical cancer, which remains a major health problem of the population in Nigeria. Although an effective vaccine is available, its use remains insufficient, largely due to limited knowledge and caregiver reluctance. The purpose of the study is to assess the knowledge and acceptance of the HPV vaccine among the caregivers in the Ardo Kola Local Government Area in Taraba State, Nigeria. The design used was a descriptive, cross-sectional design, which considered a sample of 314 caregivers, who were chosen by simple random sampling. A structured questionnaire was used in data collection and covered demographics, knowledge level, and acceptance of vaccines. The SPSS software was used to perform statistical analysis and report the findings in terms of frequencies and percentages. Younger caregivers and individuals in the age range of 18–29 years had higher knowledge levels, and individuals with tertiary education had higher levels of knowledge. On the other hand, less educated caregivers who were older did not show such awareness. Most caregivers (56.4%) considered the vaccine very important, with marginally higher acceptance rates in females than in males. There was the least awareness among caregivers who had no formal education, pointing to the need for specific educational interventions. On the whole, the positive correlations were observed between young age and a high level of education, with better knowledge and acceptance of HPV vaccination. Community-based awareness campaigns, educating caregivers, and policy-based approaches that will help overcome misconceptions and increase access to the HPV vaccine should be prioritized by the community in terms of public health.
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Introduction

The Papillomaviridae is a family of non-enveloped DNA viruses (HPVs), which includes more than 200 different genotypes (Ryndock *et al.*, 2014). HPV is the most common etiological agent of cervical cancer that is the fourth most common malignancy in women on a global basis (Bray *et al.*, 2018). The incidence and mortality rates are highest in Africa, with these amounts being seven to ten times higher than the Western world (Gultekin *et al.*, 2020). Over 600,000 new cases of cervical cancer and approximately 300,000 deaths in 2020 alone demonstrate that the issue has a significant global impact on the public health situation (Akinsolu *et al.*, 2023). More than 80% percent of cervical cancer incidences and deaths are in low- and middle-income nations, specifically Sub-Saharan Africa, where the highest mortality rates are recorded (Sung *et al.*, 2021). The incidence rate of cervical cancer in Nigeria is stated to be age-adjusted 250 per 100,000 women, which, in its turn, underscores an endemic and pressing public health concern (Ezechi *et al.*, 2016). Although the evidence presented above has shown that cervical cancer screening programs can be effective in high-income countries, the purchase of the screening tests in Nigeria is low due to the absence of a coordinated national screening program. The existing screening methods are majorly opportunistic with an approximate coverage of only 8.7% (Umeh *et al.*, 2016; McBride *et al.*, 2022).

Human papillomavirus (HPV) is the leading cause of cervical cancer in the world (Akinsolu *et al.*, 2023). The HPVs are an old and adaptable type of virus, which has also co-evolved with its hosts to be able to replicate in specific anatomical niches of the stratified epithelium (Ekwunife *et al.*, 2017). In the case of the HPV vaccine, infection and subsequent development of cancer can be prevented, provided the vaccination is carried out before exposure to the virus. Women who are sexually active and young represent a highly vulnerable group, and many nations have also launched HPV vaccination programmes to prevent the disease (Lakneh *et al.*, 2022). The World Health Organization (WHO, 2018) suggests that girls between the ages of 9-14 should be the first target group in terms of HPV vaccination and the target group of girls aged 15 and above (WHO, 2018). Immunization of girls before sexual activity initiation is thus a significant primary prevention measure in an integrated cervical cancer control programme. Early vaccination is also essential because exposure to HPV at the time of adolescence and in the initial years of adulthood can trigger cervical cancer in the future (Lakneh *et al.*, 2022). Nigeria plans to introduce the HPV vaccine for girls aged 9-14 years into its national Expanded Programme on Immunization (EPI) during the third quarter of 2023 (Adejoro *et al.*, 2023). Although parents of Nigerian girls have low awareness about HPV and the vaccine, the desire to vaccinate their daughters

seems to be quite overall (Umeokonkwo and Azuogu, 2019). Further evidence brought about by a pilot school-based HPV vaccination programme showed that the acceptability of HPV vaccines among parents and adolescent girls in Nigeria was very high (Egbon *et al.*, 2022). This strong willingness and acceptability highlight the reason why HPV vaccination needs to be introduced nationwide (Okolie *et al.*, 2023). The purpose of the study is to assess the knowledge and the acceptance of the HPV vaccine among the caregivers in the Ardo Kola Local Government Area in Taraba State of Nigeria.

As the most populous country in Africa, Nigeria is placed 5th in the list of countries with the highest mortality rate of cervical cancer in the world after India, China, Brazil, and Bangladesh (Cervical Cancer Global Crisis Card) (Cervical Cancer Action, 2014). In 2020, there were 44,699 and 73,417 deaths and cases of the incident, respectively. These statistics translate to 12,075 new cases (9.7% of all new cancers diagnosed) and 7,968 deaths (10.1% of all cancer deaths), which makes cervical cancer the second most common malignancy after breast cancer (Bray *et al.*, 2018). Additionally, over 70% of patients with cervical cancer in Nigeria are found to present in higher levels of disease thus leading to ineffective clinical results (Awofeso *et al.*, 2018). The six geopolitical regions of Nigeria: South-East, South-South, South-West, North-East, North-West, and North-Central, face similar challenges with regards to accessing and using screening services of cervical cancer. So far, the country has not issued a comprehensive, structured screening guideline, and screening practices are mostly opportunistic, particularly on the primary care level; which is the opposite of the organized screening programmes seen in the developed world (Anyasi and Foss, 2021; Ekwunife and Lhachimi, 2017). Similar issues can be observed in sub-Saharan African nations, where limited resources and lack of overcoming barriers to implementation maintain global differences in cervical cancer prevention (Lim *et al.*, 2017).

Methodology

Design of the study: The current descriptive cross-sectional research was conducted to determine how caregivers in Ardo Kala Local Government Area, Taraba State, Nigeria, know and accept the human papillomavirus (HPV) vaccine. Such a methodological approach was chosen due to its ability to effectively record the levels of awareness and acceptance among a particular population at one point in time and provide a cost-effective and time-saving methodology of resolving the study objectives. Respondents were asked to answer a structured questionnaire in order to objectively assess their knowledge. Knowledge was described as high

knowledge (80 to 100%), moderate knowledge (50 to 79%), and low knowledge (less than 50%).

Population and sampling: The population under study was the caregivers living in the Ardo Kola region, and who were in charge of health and well-being of the children in the HPV-vaccination age group. The sample of 314 subjects was obtained through the traditional sample size calculation methods. Simple random sampling was used to select the participants so that they are included equally. The eligibility criteria were that the participants should be primary caregivers of children aged within the target age group, be residents of Ardo Kola, and have informed consent.

Data collection and analysis: Data were gathered by using a pretested, structured questionnaire, where the pretesting was carried out in a demographically similar community in order to test the clarity, validity and reliability. The measure gathered demographic factors, awareness regarding HPV and its immunization, and the level of acceptance. Cleaning, coding, and analysis of data were done using SPSS version 25. Descriptive statistics such as frequencies and percentages were used to summarize demographic data and distribution of knowledge and acceptance and results were presented in tables to enhance clarity. Binary logistic regression was used to study relationships between background variables and outcome variables. In this analysis, a score

of ≥ 80 0 -percent defined good knowledge and a score of 80 0 -percent and higher defined high acceptance. To identify the strength of associations, adjusted odds ratios (AORs), 95 percent confidence intervals (CIs), and subsequent p -values were provided.

Ethical considerations: The informed consent was obtained in advance before the data was collected. There was strict maintenance of confidentiality and anonymity and the subjects were made aware of their right to withdraw without any penalty. The State Ministry of Health Ethical Committee granted the ethical approval (TRSHREC/2024/045).

Results

The demographic characteristics of caregivers in Ardo Kola are outlined in Table 1: it can be seen that the population is characterized by a large number of young individuals. Most participants (44.6 0 -29 years) were in the 18-29-year cohort (38.9 -30 49 years), and 16.5 -50 years and older. In regard to the education level, 39.2% were secondary, 29.9% tertiary, 22.0% primary and 8.9% indicated no education indicating a fairly high level of literacy in general among the respondents. The gender ratio was relatively equal, with males representing 51.3% and females 48.7%, thus making both sexes equally represented.

Table 1: Demographic characteristics of respondents

Variables	Group	Frequency	Percentage (%)
Age Group	18 to 29	140	44.6
	30 to 49	122	38.9
	50 and above	52	16.5
	Total	314	100.0
Educational Qualification	Non formal Education	28	8.9
	Primary	69	22.0
	Secondary	123	39.2
	Tertiary	94	29.9
	Total	314	100.0
Gender	Female	153	48.7
	Male	161	51.3
	Total	314	100.0

HPV vaccine knowledge was found to vary in terms of age (Table 2). Relatively higher levels of awareness were observed among younger caregivers, 21.7% of participants aged 18-29 years of age reported high knowledge in comparison with 16.6% of respondents aged 30-49 years of age, and with 6.4% of the

participants aged 50 years of age and above. The moderate level was the most common (18.5%) in general and the 30-49 cohort in particular (15.2%). The level of low knowledge was relatively rare but somewhat more intense among the participants aged 50 years and above (3.2%).

Table 2: Knowledge of Human Papillomavirus Vaccine among Caregivers in Ardo Kola LGA based on age

Knowledge Level	18–29	30–49	50+	Total
High Knowledge	68 (21.7%)	52 (16.6%)	20 (6.4%)	140 (44.6%)
Moderate Knowledge	64 (20.4%)	58 (18.5%)	23 (7.3%)	145 (46.2%)
Low Knowledge	8 (2.6%)	11 (3.5%)	10 (3.2%)	29 (9.2%)
Total	140 (44.6%)	121 (38.5%)	53 (16.9%)	314 (100.0%)

Binary Logistic Regression Analysis (Outcome: Good Knowledge vs. Poor Knowledge)

Good knowledge = High

Poor knowledge = Moderate + Low

Reference group = Age 18–29

Knowledge regarding the HPV vaccine was greatly related to the level of education (Table 3). Caregivers with high knowledge (16.2%) were the highest proportion of those who had a tertiary education, followed by those who had secondary (11.5%) and primary education (8.3%). Conversely, 1.6% of those with no formal education indicated that they have high knowledge. The most common moderate knowledge was found in those who were having secondary education (23.3%). Low knowledge was also noted to be the highest among caregivers with no formal education (2.6%), which highlights the high correlation between health literacy and education. The HPV vaccine was

widely accepted among the caregivers in this study (Table 4). More than 56.4% of caregivers considered the vaccine to be very important. There was a slightly higher acceptance of caregivers who were females, with 31.8% rating it as very important, as opposed to 24.8% of caregivers who were males. Secondly, 38.2% of the surveyed participants viewed the vaccine as somewhat important and males (20.7%) were marginally more uncertain than females (17.5%). A minor percentage (5.4%) perceived the vaccine to be not important, and the percentage was slightly higher in males (2.9%) compared to females (2.6 %).

Table 3: Knowledge of Human Papillomavirus Vaccine among caregivers in Ardo Kola LGA based on educational qualification

Knowledge Level	Non-formal	Primary	Secondary	Tertiary	Total
High Knowledge	5 (1.6%)	26 (8.3%)	36 (11.5%)	51 (16.2%)	118 (37.6%)
Moderate Knowledge	14 (4.5%)	31 (9.9%)	73 (23.3%)	33 (10.5%)	151 (48.1%)
Low Knowledge	8 (2.6%)	7 (2.2%)	8 (2.6%)	7 (2.2%)	30 (9.6%)
Total	27 (8.6%)	64 (20.4%)	117 (37.3%)	91 (29.0%)	314 (100.0%)

AOR = Adjusted Odds Ratio; CI = Confidence Interval

*p < 0.05 indicates statistical significance

Descriptive analysis from table 3 indicates that caregivers were strongly more probable to hold good knowledge of the HPV immunization compared to non-formal caregivers (AOR= 5.25, p=0.006). Similarly, percentage of respondents with high level of knowledge (16.2%), only 1.6% of respondents with non-formal education achieved high level of knowledge. Binary logistic regression models showed that tertiary education demonstrated statistically significant association (AOR=3.53, p= 0.031).

Table 4: Level of Acceptance of Human Papillomavirus Vaccine among caregivers in Ardo kola LGA based on gender

Acceptance Level	Male	Female	Total
Very Important	78 (24.8%)	99 (31.8%)	177 (56.4%)
Somewhat Important	65 (20.7%)	55 (17.5%)	120 (38.2%)
Not Important	9 (2.9%)	8 (2.6%)	17 (5.4%)
Total	152 (48.4%)	162 (51.6%)	314 (100.0%)

Binary Logistic Regression Analysis

High acceptance = Very Important

Low acceptance = Somewhat Important + Not Important

Reference group: Male

Descriptive statistics from table 4 showed that 31.8% of female caregivers considered the HPV vaccine very important, but 24.8% of male caregivers considered it very important, suggesting that females had higher awareness of the vaccine. The odds of female caregivers compared to male caregivers showing a high level of acceptance of the HPV vaccine was 1.48 times more likely based on logistic regression; however, this was statistically non-significant ($p = -0.090$). The findings indicate a positive (although not significant) tendency towards higher acceptance among female caregivers.

Discussion

The results of the current research are consistent with the existing literature on HPV vaccine knowledge and acceptance of caregivers in sub-Saharan Africa. There is a higher level of knowledge in younger caregivers and those with high education levels. This is in line with the results of previous studies and emphasize the importance of education and access to information in the determination of health literacy and vaccine awareness (Kumar *et al.*, 2022). The researchers found out that caregivers between the ages of 18-29 years had a higher level of knowledge about HPV vaccination compared to their older counterparts. The observation is consistent with similar studies that show that younger adults have greater awareness of HPV and its vaccines due to greater exposure to health information through social media, educational institutions, and peer groups (Abubakar *et al.*, 2021). The results of the current study are also similar to the findings of Muindi *et al.*, 2021, who reported increased vaccination awareness in younger people than older adults, who had low awareness rates because they were less exposed to digital health communication tools in Kenya. These findings highlight the possible effectiveness of youth-based interventions, such as social media campaigns, online-based platforms, and peer-to-peer education, in enhancing the knowledge on HPV vaccines. Education became a stronger predictor of the knowledge of HPV vaccine. Caregivers with

tertiary education demonstrated the best level of knowledge, and the results were supported by the findings in Nigeria, as people with higher education were more knowledgeable about HPV transmission, pathogenesis, and the benefits of immunization (Okunade *et al.*, 2021; Babylon *et al.*, 2025). A similar study in Ethiopia, reported by Gebremariam *et al.*, 2019 also recorded that more educated women had a better understanding of HPV vaccination than less educated women. The mentioned data emphasize the critical role of formal education in increasing the level of vaccine literacy. On the other hand, the least-educated caregivers showed the lowest levels of knowledge and thus community-based interventions like local radio programming and awareness campaigns that were culturally sensitive and conducted in local languages were necessary. This pattern aligns with what is happening in the rest of low- and middle-income states, where the education level significantly contributes to HPV-related knowledge, which proves the continuation of global inequality in vaccine knowledge (Healy *et al.*, 2016). Moreover, strong awareness of HPV and positive beliefs on vaccination have been associated with increased parental approval (Larebo *et al.*, 2022). Generally, the study population showed a high rate of HPV vaccine acceptance with females showing slightly higher levels of vaccine acceptance compared to males. In Ghana, corresponding results were as well reported, as mothers were more willing to support HPV vaccination because they are the decision-makers of child-healthcare (Adanu *et al.*, 2022). On the same note, another study in the Ugandese setting found that maternal caregivers showed a greater degree of support in HPV vaccination campaigns as compared to their male counterparts due to the close connection they have with healthcare providers (Nabirye *et al.*, 2020). Conversely, a study, conducted in South Africa, showed that the hesitancy levels among male caregivers were higher, which can often be explained by the fact that they tend to assume that HPV is an issue exclusive to females (Makwakwa *et al.*, 2021). The findings highlight the need to actively involve male

caregivers in HPV sensitization activities in order to bust the myths, address the cultural prejudices, and counter the gendered myth that can hinder the uptake of the vaccine.

The obstacles to HPV vaccine adoption in low- and middle-income countries, such as Nigeria, are well presented. They include system issues including inadequate financing, the lack of proper medical facilities, disrupted supply chains of vaccines, and lack of skilled human resources to carry out mass immunization campaigns. Also, vaccine safety, myths, ignorance, and vaccine price can be additional barriers to uptake (Babylon et al., 2025). The communities that are underserved and rural are disproportionately impacted, thus contributing to inequities in vaccine access. In addition, misinformation and sociocultural resistance are also major contributors to vaccine hesitancy and insufficient involvement. According to these results, evidence-based and context-specific interventions are urgently needed. Firstly, the government (both national and local) should intensify training of healthcare workers to express communications skills and combat vaccine hesitancy on the community level. Secondly, coverage and access could be enhanced through the subsidization or complete funding of HPV vaccinations by the public health schemes. Thirdly, the HPV education as part of the school health programmes, and the cooperation with the local leaders, such as religious and traditional authorities, can help to develop a sense of trust and increase the public acceptance. Lastly, effective monitoring and evaluation mechanisms are needed to measure vaccine coverage and mitigate arising impediments on a real-time basis. There are a number of limitations of this study. Firstly, the sample size ($n=314$) is rather small; this and the convenience sampling method could lead to sampling bias and, thus, limit the external validity of the results to caregivers in Ardo Kola LGA and in other regions of Taraba State and Nigeria in general. More available or willing participants might also differ systematically, resulting in a skewed finding of those who were not available or willing to participate, and they might be more inclined towards those with higher health-seeking behaviour or interest in vaccination. Secondly, self-reported data was used in data collection, which is prone to recall bias. The knowledge and knowledge acceptance of the participants may have been overreported or underreported because of social desirability or poor understanding of the questions. The responses therefore may not necessarily reflect the actual level of knowledge or real-life practices of vaccination.

Conclusion

According to the findings of the current study, the current age, education and gender are the determinants of

knowledge and acceptance of HPV vaccine among caregivers in Ardo Kola LGA of Taraba State. Younger caregivers and those with higher education level exhibited a lot more knowledge on HPV vaccine. The vaccine was widely accepted with most of these perceiving it to be very important and the female caregivers having a slightly higher acceptance rate than male ones. Uneducated caregivers were always the least educated and least accepting, and special educational and awareness education should be provided.

Recommendations

- i. Targeted educational interventions must be developed by the health workers targeting caregivers with low or no formal education to enhance their knowledge on HPV vaccinations through culturally relevant and clear language and community outreach.
- ii. The health workers ought to come up with age-specific awareness programs that involve both the young and old caregivers and focus on their respective levels of information needs and concerns in order to enhance knowledge and acceptance.
- iii. Healthcare providers and community leaders should be encouraged by government and non-governmental organizations to provide robust, clear, and consistent HPV vaccination recommendations and use trusted avenues to establish caregiver trust and publicize vaccine acceptance among male caregivers in order to create gender balanced acceptance.

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Conflict of Interest

The researchers indicate that they do not have any conflict of interest.

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