***Original Research Article***

**Knowledge, Perceptions and Uptake of Human Papilloma Virus (HPV) vaccination among Female Healthcare Professionals in a State in Southern Nigeria**

**ABSTRACT**

**Aims:** Cervical cancer remains a major public health problem and a leading cause of cancer related death among women in developing countries. The Human Papilloma virus (HPV) vaccine is a major preventative measure for Cervical cancer; however global vaccine uptake is low in low and middle-income countries like ours. This study assessed the awareness, knowledge, attitude, and uptake of HPV vaccination among healthcare professionals in Nigeria.

**Study design**: This was a cross – sectional study

**Place & Duration** of Study: This study was carried out in Bayelsa state Nigeria. between January 2024 and March 2024.

**Method:** Study was done using self-administered semi-structured questionnaires on 178 consenting female health care professionals. Data was represented using simple percentages and tables. The questions were made to capture the objectives of the study.

**Results:** Majority (85.5%) of the respondents were aware of the HPV vaccine. Uptake of the vaccine was poor (5.1%). Lack of information on where to get the vaccine (34.7%) was the most identified barrier to uptake. Majority of the respondents are willing to accept 92.0%) and recommend the vaccine (90.0%). About 98.3% and 96% of the respondents would recommend theHPV vaccine to be taught about in schools for teenagers and adolescents as well as included in the Nigerian National Immunization Schedule.

**Conclusions**: Female healthcare professionals, who are vital in influencing public health behaviors, themselves demonstrate poor vaccination uptake despite high knowledge and acceptance of the HPV vaccine. This can potentially undermine public health intervention drive towards elimination.

**Keywords:**

*Cervical cancer, Knowledge, Attitude, Uptake, Vaccination, Females, Healthcare professionals*

**INTRODUCTION**

Cervical cancer is the fourth most common cancer among women worldwide and remains the most prevalent malignancy linked to Human Papillomavirus (HPV) infection.(World health organisation, 2023) Globally, approximately 500,000 new cases of cervical cancer are diagnosed each year, resulting in about 273,000 deaths annually. (World Health Organization, 2020) Alarmingly, about 80% of these cases occur in developing countries, including Nigeria, where healthcare systems often face significant challenges such as limited resources, inadequate infrastructure, and competing health priorities.(World Health Organization, 2020; ICO/IARC Information Centre, 2023; Murewanhema *et al.*, 2024) Without effective interventions, the burden of cervical cancer in these regions is expected to escalate.

The global drive to eliminate cervical cancer as a public health problem led to the adoption of the 90-70-90 strategy. This aims to ensure that 90% of girls are fully vaccinated by 15years of age; 70% of women are screened two times at 35years and 45 years and 90% of diagnosed cases receive treatment.(World Health Organization, 2020). In high-income countries, organized population-based screening programs for precancerous cervical lesions have led to an 80% reduction in cervical cancer incidence.(World health organisation, 2023) However, this success has not been replicated in many low- and middle-income countries (LMICs) due to logistical, financial, and systemic barriers.(LaMontagne *et al.*, 2017; Gallagher, LaMontagne and Watson-Jones, 2018) In response to these challenges, HPV vaccines, have been developed over the past decade and offer a promising preventive strategy.

A Systematic review highlighted a 90% decrease in HPV infection rates following 10 years of vaccination as part of a structured immunization initiative.(Drolet *et al.*, 2019)The vaccines primarily target girls aged 9–14 years but can be extended up to 26 years of age.(World Health Organization, 2020) Furthermore, the WHO has endorsed the HPV vaccine as a key intervention and recommends its integration into national immunization programs.(World Health Organization, 2016) Despite this, many LMICs, have not yet fully implemented HPV vaccination programs, largely due to high vaccine costs, fragile healthcare systems, logistical challenges, and insufficient political commitment.(Bruni *et al.*, 2016; Gallagher *et al.*, 2017; LaMontagne *et al.*, 2017; Gallagher, LaMontagne and Watson-Jones, 2018; Murewanhema *et al.*, 2024) In 2023, Nigeria, HPV vaccine was introduced into routine immunization schedule for children with the goal of reaching almost 8 million girls which is one of the largest drives in Africa.(World Health Organization, 2020)   
  
Healthcare professionals by virtue of their roles play a critical role in vaccine promotion, education, and acceptance. Their actions or inactions can have great implications for patient behaviour especially related to the adoption of health interventions. Studies show that strong recommendations from healthcare professionals can influence HPV vaccine uptake among the general population.(Chawla, Chawla and Chaudhary, 2016; Chen *et al.*, 2020; Thanasa *et al.*, 2022; Yusuf *et al.*, 2024) However, misconceptions, lack of awareness, and personal hesitancy among healthcare professionals themselves present barriers to vaccine advocacy.(Audu *et al.*, 2014; Bansal *et al.*, 2015; Chawla, Chawla and Chaudhary, 2016; Nguyen *et al.*, 2020) Despite HPV vaccines proven efficacy in reducing cervical cancer incidence, uptake remains critically low among women in Nigeria. The factors contributing to their low uptake and hesitancy are poorly understood. There is a notable gap in the literature regarding the self-uptake of the HPV vaccine among female healthcare professionals in Nigeria. While several studies (Okunowo *et al.*, 2021; Agha *et al.*, 2024; Akinnibosun *et al.*, 2024; Okagbue *et al.*, 2025a) have assessed general awareness and attitudes toward HPV vaccination, limited research has focused specifically on healthcare workers’ personal vaccination behaviors and the barriers they encounter. The only study in Nigeria that could be located focused on perspectives of both male and female healthcare workers(Audu *et al.*, 2014) and was published well over a decade ago. Therefore, this innovative study aimed to assess the level of knowledge, personal uptake, and barriers to HPV vaccination among female healthcare professionals in Bayelsa State, Nigeria. This study offers a unique assessment of Nigerian health practitioners to embracing HPV vaccination. By gaining insights from practicing female professionals and this research throws light on the possible challenges in the uptake of HPV vaccination and identify the potential obstacles that could hinder their successful uptake in the general population.

# MATERIALS AND METHODS:

**Study design**

This descriptive cross-sectional survey was carried out in Yenagoa local government area (LGA) of Bayelsa State, South-south Nigeria.

**Study population**

The study was conducted among female heath care professions (doctors, nurses, pharmacist, laboratory scientists, physiotherapist) working in various hospitals in Yenagoa LGA of Bayelsa State, Nigeria,

**Sample size determination**

The sample size was determined using the Cochrane formula N = z2pq/d2 where N is the minimum sample size required for the study, z is the standard normal deviate at 95% confidence interval which is 1.96; p’ is the prevalence of uptake of 13.3%. (Ihudiebube-Splendor, 2019) In a previous study. ‘q’ is the complimentary proportion of ‘p’ given by q = 1 – p; while ‘d’ was the tolerable alpha error set at 5% for this study. A minimum sample size of 178 was obtained.

**Sampling and Data collection**

Convenience sampling technique was done and health care professional who opted to be part of the study filled in the online questionnaire. Data was collected using a structured self-administered google questionnaire which was developed and pretested by the research team. The questionnaire consists of questions/statements on demographics characteristics and information pertaining to cervical cancer awareness, attitudes, uptake and barriers to uptake. The socio-demographic variables include Age, Sex, Profession, Educational Qualification, number of children, amongst others. The survey had one question aimed at exploring the plausible reasons reported for not administering HPV and the respondents were instructed to record their choices from pre-pooled identified barriers to the uptake of the vaccine. Some of which include choices/reasons (Lack of awareness/High cost/Fear of side effects/Doubt on efficacy/Lack of interest/Do not know the importance of the administration of HPV vaccine). Depending on the statement, participants were asked to choose Yes or No options or Tick as many as applied. The participants could choose more than one option among the choices provided. The study was conducted over a 3-month period from and as part of a larger study.

**Statistical Analysis**

Data entry, cleaning, and analyses was done using the IBM Statistical Package for Social Science (SPSS) version 25.0.(IBM Corp., 2015)

**Awareness of HPV vaccines:** Summarized based on proportions of responses as Yes or No.

**Knowledge of HPV vaccines:** These were a set of questions to participants who were aware of HPV vaccines. The proportions of correct and incorrect responses were summarized and presented in tabular form.

**Attitude towards HPV vaccines:** Summarized based on proportions of responses as Yes or No to a set of questions assessing attitude and presented using a bar graph.

**Uptake of HPV vaccines:** Summarized based on proportions of responses as Yes or No. To respondents who stated uptake, further details were obtained to capture the type and dose completion.

**Reasons for non-uptake of HPV vaccines:** These were summarized based on their multiple responses on various outline reasons and presented in a table.

**Determinants of uptake of HPV vaccines:** This was determined by crosstabulation and Chi-squared analysis of socio-demographic variables and the awareness and uptake of HPV vaccines. The level of statistical significance was considered as *P-value* <0.05.

**RESULTS**

### Sociodemographic profile of respondents (Table 1)

Majority of the respondents were aged 20–39 (70.8%), married (62.4%), and had tertiary education (55.6%). Most were healthcare professionals in medicine or nursing with under 10 years of practice.

### Awareness and Knowledge of HPV Vaccination (Figure 1 and Table 2)

Results show a greater majority (85%) of respondents were aware of HPV vaccination as shown in Figure 1. A review of knowledge responses on HPV vaccines was correct by the majority of respondents in all but 2 questions. These were on administering HPV vaccine to persons less than 15 years of age and responding that the HPV vaccine protects against all strains of HPV were 70.4% and 41.0% responded incorrectly.

### Attitude towards HPV Vaccine (Figure 2)

Respondents showed generally positive attitudes toward the HPV vaccine. However, concerns around safety and effectiveness still existed for a minority.

### Uptake of HPV vaccine and characteristics of Cervical cancer vaccine uptake (Figure 3 and Table 3)

HPV vaccine uptake was extremely low (5%) among respondents as presented in Figure 3. As shown in Table 3, Among the few respondents who had taken the vaccine, most had incomplete doses and could not recall vaccine type. A third took it less than a year ago. Only about one-third of respondents had completed the dose of HPV vaccine.

### Reasons for not taking HPV Vaccination (Table 4)

The main reasons for non-uptake were lack of information on where to get the vaccine (36%) and indecision (22%). About 27% had no reason for not being vaccinated. Cost and time were also significant barriers. There were no reports of cultural or religious or family members as reasons for non-uptake.

### Factors associated with Awareness and Uptake of HPV Vaccination (Table 5 and Table 6)

Table 5 shows that awareness was significantly associated with the healthcare profession (p=0.001), with medical doctors having the highest awareness. Other factors like age and marital status were not statistically significant. Overall uptake remained low across all groups although there was no statistical association with uptake of HPV vaccine as presented in Table 6.

**Table 1: Socio-demographic profile of respondents**

|  |  |  |
| --- | --- | --- |
| **Sociodemographic characteristics** | **Frequency N=178** | **Percent (%)** |
|  |  |  |
| **Age groups (years)** |  |  |
| 20-39 | 126 | 70.8 |
| >40 | 52 | 29.2 |
| **Mean age (SD) (years)** | 36.2 (7.7) |  |
| **Marital Status** |  |  |
| Single | 67 | 37.6 |
| Married | 111 | 62.4 |
| **Number of children** |  |  |
| 0-2 | 127 | 71.4 |
| 3-5 | 51 | 28.6 |
| **Educational level** |  |  |
| Post-tertiary | 79 | 44.4 |
| Tertiary | 99 | 55.6 |
| **Number of years of practice** |  |  |
| <10 | 91 | 51.1 |
| 10-19 | 62 | 34.8 |
| >20 | 25 | 14.1 |
| **Healthcare profession** |  |  |
| Medicine | 74 | 41.6 |
| Nursing | 74 | 41.6 |
| Others\* | 30 | 16.8 |
|  |  |  |

*\*Others include Pharmacy, Laboratory science Optometry, Physiotherapy*

**Figure 1: Awareness of HPV Vaccination**

**Table 2: Knowledge of HPV vaccination**

|  |  |  |  |
| --- | --- | --- | --- |
| **Questions**  **(n= 152)** | **Right answer** | **Frequency (n)**  **Percent (%)** | |
| **Correct**  **responses** | **Incorrect**  **responses** |
| HPV vaccines protect against all strains of HPV | **FALSE** | **90(59.0)** | **62(41.0)** |
| HPV vaccine is for females only | **FALSE** | **99(65.0)** | **53(35.0)** |
| HPV vaccine can be given to a person less than 15years of age | **TRUE** | **45(29.6)** | **107(70.4)** |
| HPV vaccine can be effective even when a person is infected with HPV | **FALSE** | **131(86.0)** | **21(14.0)** |
| Only sexually active persons should take the HPV vaccine | **FALSE** | **132(87.0)** | **20(13.0)** |
| HPV vaccine can cause Cancer | **FALSE** | **146(98.0)** | **6(4.0)** |
| HPV vaccine can cause HPV infection | **FALSE** | **149(98.0)** | **3(2.0)** |
| HPV vaccine protects against other Sexually Transmitted diseases (STDs) | **FALSE** | **141(93.0)** | **11(6.0)** |

### Figure 2: Attitude towards HPV Vaccine

**Figure 3: Uptake of HPV Vaccine**

**Table 3: Characteristics of Cervical cancer vaccine uptake**

|  |  |  |
| --- | --- | --- |
| **Variables** | **Frequency (N)** | **Percent %** |
| **Type of vaccine taken** | **N=9** |  |
| Bivalent (Cervarix) | 6 | 67.0 |
| I can't recall the type | 2 | 22.0 |
| Quadrivalent vaccine (Gardasil) | 1 | 11.0 |
| **The last dose of HPV vaccine taken** | **N=9** |  |
| Less than 1year ago | 3 | 33.3 |
| 1-2 years ago | 1 | 11.1 |
| More than 5 years ago | 5 | 55.6 |
| **Completed dose of HPV vaccination** | **N=9** |  |
| Yes | 3 | 33.3 |
| No | 6 | 66.7 |
| **Has any family member or friend or colleague you know ever been diagnosed of Cervical cancer?** | **N=178** |  |
| Yes | 28 | 15.7 |
| No | 150 | 84.3 |

**Table 4: Reasons for not taking HPV Vaccination**

|  |  |  |
| --- | --- | --- |
| **Variables** | **Frequency n=169** | **Percent (%)** |
|  |  |  |
| Did not know where to get the vaccine | 61 | 36% |
| No reason | 46 | 27% |
| I have not made up my mind | 37 | 22% |
| Too expensive | 30 | 18% |
| Didn’t have time | 17 | 10% |
| Fear (afraid of procedure) | 9 | 5% |
| Not sure if the vaccine is safe | 8 | 5% |
| Don't believe the vaccine is effective | 3 | 2% |
| Poor service quality | 2 | 1% |
| Clinic too far away | 1 | 1% |
| Forgot the appointment | 1 | 1% |
| Fear of social stigma | 1 | 1% |
| Unacceptable to my cultural beliefs | 0 | 0% |
| Unacceptable to my religious beliefs | 0 | 0% |
| Family members would not allow it | 0 | 0% |

*\*Multiple responses*

### Table 5: Factors associated with Awareness of HPV Vaccination

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variables** | **N** | **Awareness of HPV vaccine N (%)** | | **X2**  **(df)** | ***p-value*** |
| Yes | No |
| **Age groups (years)** |  |  |  | 0.430  (1) | 0.512 |
| 20-39 | 126 | 109(86.5) | 17(13.5) |
| >40 | 52 | 43(82.7) | 9(17.3) |
| **Marital Status** |  |  |  |  |  |
| Single | 67 | 53(79.1) | 14(20.9) | 3.407  (1) | 0.065 |
| Married | 111 | 99(89.2) | 12(10.8) |
| **Number of children** | |  |  |  |  |
| 0-2 | 127 | 106 (83.5) | 21(16.5) | 1.322  (1) | 0.250 |
| 3-5 | 51 | 46(90.2) | 5(9.8) |
| **Educational level** |  |  |  |  |  |
| Post-tertiary | 79 | 72(91.1) | 7(8.9) | 3.760  (1) | 0.052 |
| Tertiary | 99 | 80(80.8) | 19(19.2) |
| **Number of years of practice** | |  |  |  |  |
| <10 | 91 | 76(83.5) | 15(16.5) | 2.048  (1) | 0.359 |
| 10-19 | 62 | 56(90.3) | 6(9.7) |
| >20 | 25 | 20(80.0) | 5(20.0) |
| **Healthcare profession** | |  |  |  |  |
| Medicine | 74 | 72(97.3) | 2(2.7) | 14.825  (2) | *0.001\** |
| Nursing | 74 | 58(78.4) | 16(21.6) |
| Others\* | 30 | 22(73.3) | 8(26.7) |

### Table 6: Factors associated with Uptake of HPV Vaccination

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variables** | **N** | **Uptake of HPV vaccine N (%)** | | **X2**  **(df)** | ***p-value*** |
| Yes | No |
| **Age groups (years)** |  |  |  | 0.224  (1) | 0.636 |
| 20-39 | 126 | 7(5.6) | 119(94.4) |
| >40 | 52 | 2(3.8) | 50(96.2) |
| **Marital Status** |  |  |  |  |  |
| Single | 67 | 4(6.0) | 63(94.0) | 0.187  (1) | 0.665 |
| Married | 111 | 5(4.5) | 106(95.5) |
| **Number of children** | |  |  |  |  |
| 0-2 | 127 | 7(5.5) | 120(94.5) | 0.192  (1) | 0.662 |
| 3-5 | 51 | 2(3.9) | 49(96.1) |
| **Educational level** |  |  |  |  |  |
| Post-tertiary | 79 | 5(6.3) | 74(93.7) | 0.479  (1) | 0.489 |
| Tertiary | 99 | 4(4.0) | 95(96.0) |
| **Number of years of practice** | |  |  |  |  |
| <10 | 91 | 5(5.5) | 86(94.5) | 0.202  (2) | 0.951 |
| 10-19 | 62 | 3(4.8) | 59(95.2) |
| >20 | 25 | 1(4.0) | 24(96.0) |
| **Healthcare profession** | |  |  |  |  |
| Medicine | 74 | 5(6.8) | 69(93.2) | 1.462  (1) | 0.482 |
| Nursing | 74 | 2(2.7) | 72(97.3) |
| Others\* | 30 | 2(6.7) | 28(93.3) |

# DISCUSSION

This study assessed the awareness, knowledge, attitude, and uptake of HPV vaccination among healthcare professionals in Nigeria, with findings revealing significant gaps between awareness and actual vaccine uptake.

Majority of respondents demonstrated high levels of awareness of the HPV vaccine consistent with previous studies conducted among health workers in Nigeria and sub-Saharan Africa. (Audu *et al.*, 2014; Agha *et al.*, 2024; Murewanhema *et al.*, 2024) In the study by (Audu *et al.*, 2014) healthcare workers, particularly medical doctors, demonstrated the highest levels of awareness which shows the influence of professional exposure and training on vaccine awareness. Despite the high level of awareness, there were misconceptions and knowledge gaps. particularly regarding vaccine eligibility for adolescents (<15 years) and strain-specific protection. Similar misconceptions have been documented in previous studies.(Onowhakpor *et al.*, 2016; Ihudiebube-Splendor, 2019; Okunowo *et al.*, 2021) These knowledge gaps suggest that information regarding the HPV available to HCP may require more structured and in-depth the suggesting inadequate emphasis on HPV vaccine education in medical training and need for structured education regarding the gaps.

Respondents generally exhibited positive attitudes toward HPV vaccination. This is similar to findings Southern Nigeria. (Onowhakpor *et al.*, 2016) This may be because of the awareness of the benefits of vaccination by virtue of the healthcare background. Furthermore, our study revealed high parental acceptance of HPV vaccination of children which was much higher than studies carried out in Nigeria and globally. (Heyde *et al.*, 2024; Yusuf *et al.*, 2024) Studies show that parental acceptance increases the likelihood of HPV vaccination among children and given the recent roll out of the HPV vaccine in the national immunization schedule, this factor is essential. (Park *et al.*, 2023; Heyde *et al.*, 2024; Yusuf *et al.*, 2024) A case has been made for vaccinating boys and our study showed that one in three respondents felt that boys should not be vaccinated. This may result from poor vaccine literacy. A benefit of immunizing boys which is called gender-neutral vaccination that helps to herd immunity and prevents HPV disease in males. However, where there is vaccine shortage, this option may not be used. (Williamson, 2023)

However, there were also concerns about vaccine safety and effectiveness reported among a few respondents which supports findings in other studies.(Ekpo K, 2012; Ihudiebube-Splendor, 2019; Agha *et al.*, 2024) Such hesitancy, even among healthcare workers, is similar with global findings of vaccine skepticism fueled by misinformation.(Nguyen *et al.*, 2020; Murewanhema *et al.*, 2024) These includes fears about side effects and lack of trust in vaccine efficacy as reported by a national level study in Nigeria. (Okagbue *et al.*, 2025b). These need to be addressed given the pivotal role that Healthcare professionals play in vaccine acceptance and addressing concerns by the general population. Studies show that healthcare provider endorsement increases uptake of HPV by as much as 50 to 70%. (Audu *et al.*, 2014; Chen *et al.*, 2020; Yusuf *et al.*, 2024)

This study revealed a very low uptake of HPV vaccine despite the very high levels of awareness. Similar findings were reported studies in Edo State in Nigeria (Onowhakpor A.O *et al.*, 2016). A slightly higher uptake was reported among pregnant women in Benue State who reported 13.7% uptake.(Akinnibosun *et al.*, 2024) Much higher uptake of 29% was reported among urban women in Lagos State and 20% uptake was reported among female health care workers in Saudi Arabia. (Okunowo *et al.*, 2021; Alshamlan *et al.*, 2024) The higher uptake of HPV in these areas is the associated high willingness and the access to the vaccines. In our study, willingness and knowledge were very high but there was poor uptake. The scenario reflects that good knowledge does not necessarily translate to increased uptake.

Among the few respondents who were vaccinated, most received the bivalent vaccine which provides coverage for the HPV-16 and HPV-18. Only 1 patient received the Quadrivalent vaccine which provides coverage for 4 variants namely HPV-6, HPV-11, HPV-16 and HPV-18. The nonvalent is advocated for use in countries with high incidence of HPV infection as they afford much broader protection.(Williamson, 2023)

The main barriers to uptake in this study were lack of knowledge about where to access the vaccine, indecision and cost. This was like findings from a study among urban Nigerian women and among healthcare workers who also reported challenges with accessibility and affordability of the HPV vaccine as major barriers to uptake. (Bansal *et al.*, 2015; Onowhakpor *et al.*, 2016; Nguyen *et al.*, 2020; Okunowo *et al.*, 2021) The HPV vaccine is currently not on the immunization schedule for women of reproductive age and the cost of the vaccine which will be paid for out-of-pocket may be an alternative reason for its low uptake. Almost all HCPs in this study agreed that the vaccine should be included in the immunization schedule. This has been shown to enhance accessibility. (LaMontagne *et al.*, 2017) Unlike studies in India and Nigeria (Bansal *et al.*, 2015; Okunowo *et al.*, 2021), where religious or cultural resistance was cited as barriers to vaccine uptake, this was not the case in our study. This could be due to the higher educational and professional background of respondents in our study.

This study did not reveal sociodemographic predictors for uptake of the HPV vaccine. This further suggests that most likely, its structural and not individual factors that drive low vaccination rates. This if further buttressed by the fact that no respondent indicated that culture and religion were barriers for not being vaccinated and most respondents expressed willingness to receive the HPV vaccine. These highlight areas for urgent public health intervention.

# CONCLUSION AND RECOMMENDATIONS

This study assessed the awareness, knowledge, attitude, and uptake of HPV vaccination among healthcare professionals in Nigeria, with findings revealing significant gaps between awareness and actual vaccine uptake. Barriers to uptake reveal the need for structural interventions beyond knowledge dissemination. Given the crucial role that healthcare professionals play in influencing public health behaviors, their low vaccine uptake could undermine broader efforts to reduce cervical cancer incidence through vaccination. Further research, including qualitative studies, will be needed to explore deeper psychological, and systemic factors influencing HPV vaccine hesitancy. Some targeted interventions to address barriers include, ensuring free or affordable access for women in the reproductive age; clear information about where and how healthcare professionals and the public can access the vaccine. Healthcare facilities should implement workplace vaccination programs, making it convenient for healthcare professionals to get vaccinated during routine medical checkups or health promotion days.

**Limitation**

This study provides invaluable insight into uptake of vaccine among health care professionals however its findings are not generalizable. This is because it focuses on female healthcare professionals in a state in Southern Nigeria which does not fully represent the diverse spread of health workers across the country. In addition, it relied on self-reporting, and this could have potential cause some recall bias such as in remembering vaccine doses or types. There is also a likelihood of social desirability bias where the health care providers may have overstated their attitudes by providing socially acceptable answers due to the sensitive nature of vaccination discussions. Furthermore, our study did not explore in-depth other possible reasons behind HPV vaccine hesitancy (e.g., through interviews/focus group discussions), which could provide richer insights into barriers. However, it sets the stage for further research by providing invaluable findings. Among the few vaccinated participants, most had incomplete doses, but the study did not track reasons for non-completion and future research can investigate this in-depth. Despite these limitations, the findings resonate with broader literature on HPV vaccination challenges in low-resource settings.

Ethical Statement

The Ethical review committee of the Federal Medical Centre, Yenagoa, granted ethical approval for this study. All the questionnaires were anonymized, and information obtained kept confidential.

Disclaimer (Artificial intelligence)

Option 2:

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

1.Name: Grammarly: AI Writing and Grammar Checker (Free version: https://www.grammarly.com/)

2. This was used to improve the grammar and readability of the text

3. No prompts were used.

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