

Original Research Article

Prevalence, Prevention and Willingness to Vaccinate against Human Papillomavirus (HPV) among Women with Adolescent Daughters in Rivers State, Nigeria: A Cross-Sectional Study

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Abstract

Human papillomavirus (HPV) is a significant public health concern due to its association with cervical cancer. Understanding the prevalence of HPV vaccination, prevention practices, and the willingness to vaccinate among women with adolescent daughters is important for improving vaccination coverage. This study aims to assess the prevalence of HPV vaccination, knowledge of HPV prevention, and the willingness to vaccinate daughters among women attending outpatient clinics in Rivers State, Nigeria. A hospital-based descriptive, multi-centre, cross-sectional study was conducted from March to May 2021 at the University of Port Harcourt Teaching Hospital (UPTH) and Rivers State University Teaching Hospital (RSUTH). The study included 304 women with adolescent daughters, recruited through purposive sampling. Data were collected using a pretested self-administered questionnaire. Data analysis was performed using SPSS version 23, with results presented in frequencies and percentages. Of the 304 participants, 40% were aged 30-39 years, and 73.4% had tertiary education. Only 2.3% had previously vaccinated their daughters against HPV. The primary reasons for not vaccinating included insufficient information (54.2%) and lack of access to the vaccine (26.9%). Despite this, 70.4% of the respondents expressed willingness to vaccinate their daughters if provided with adequate information and access. The study highlights a low prevalence of HPV vaccination among adolescent girls in Rivers State, with significant barriers including lack of information and access. However, there is a high willingness to vaccinate, indicating the potential for increased vaccination rates through targeted educational and accessibility interventions.

Keywords: HPV, Vaccination, Adolescents, Prevalence, Prevention, Willingness

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INTRODUCTION

Human papillomavirus (HPV) is one of the most common sexually transmitted infections globally, with significant implications for women's health. It is the primary causative agent of cervical cancer, which is a leading cause of cancer-related morbidity and mortality among women worldwide (Bray et al., 2018). Despite the availability of effective vaccines, the prevalence of HPV remains high in many regions, particularly in sub-Saharan

Africa, including Nigeria (Bruni et al., 2019).

HPV infection is highly prevalent among sexually active individuals, with a notable impact on women. In Nigeria, studies have demonstrated a substantial burden of HPV, with varying prevalence rates across different states and populations (Akarolo-Anthony et al., 2014). Rivers State, situated in the Niger Delta region, has unique socio-cultural and economic dynamics that may

influence the epidemiology of HPV. Previous research indicates that awareness and screening for HPV are relatively low in this region, contributing to delayed diagnosis and treatment (Ogu et al., 2017).

Preventing HPV infection primarily involves vaccination, education, and regular screening. The introduction of the HPV vaccine has revolutionized the approach to preventing HPV-related diseases. The World Health Organization (WHO) recommends vaccinating girls aged 9-14 years before they become sexually active (WHO, 2020). However, vaccine uptake in Nigeria has been hindered by several factors, including limited awareness, cultural beliefs, and access to healthcare services (Obiajunwa et al., 2021). Understanding these barriers is vital for developing effective public health interventions in Rivers State.

Willingness to vaccinate against HPV among mothers of adolescent daughters is influenced by multiple factors, including knowledge of HPV and its associated risks, perceived benefits and safety of the vaccine, and socio-cultural attitudes (Holman et al., 2014). In Nigeria, studies have shown varying levels of acceptance, often shaped by educational background, religious beliefs, and the influence of healthcare professionals (Ezeanochie and Olagbuji, 2014). Investigating these factors in Rivers State will provide valuable insights for targeted vaccination campaigns.

Nigeria faces significant challenges in implementing effective HPV vaccination programs. The healthcare system is under-resourced, and there is a lack of consistent national policy and infrastructure to support widespread vaccine delivery (Adamu et al., 2019). Furthermore, socio-cultural barriers, including myths and misconceptions about vaccines, play a significant role in vaccine hesitancy (Abiodun et al., 2020). Rivers State, with its diverse population and economic activities, provides a unique setting to explore these issues.

This study is significant for several reasons. Firstly, it will provide current data on the prevalence of HPV among women in Rivers State, filling a gap in the existing literature. Secondly, it will explore the preventive measures currently being undertaken and identify gaps in knowledge and practice. Thirdly, by examining the willingness to vaccinate among mothers, the study will inform public health strategies to improve vaccine uptake. Understanding these dynamics is essential for reducing the burden of HPV-related diseases and improving women's health outcomes in Nigeria.

METHODOLOGY

Study Design

This was a hospital-based descriptive, multi-centre, cross-sectional study.

Study Area

The study area was the outpatient clinics of the teaching hospitals in Rivers State, namely: University of Port Harcourt Teaching Hospital (UPTH) and Rivers' State University Teaching Hospital (RSUTH). These are major referral centres for all health facilities in Rivers State and its neighbouring states. These clinics operate from Monday to Friday every week and each clinic is run by a team consisting of consultants, resident doctors, house officers, nurses and other health workers. An average of 120 patients are seen on each of these clinics daily at both centres.

Study Population

The study was conducted among women seen at these outpatient clinics who had adolescent daughters. Those without adolescent daughters were excluded from this study.

Sample Size Determination

The sample size was determined using the Fisher's formula outlined by Chikezie et al. (2024) as follows:

$$n = \frac{Z^2(Pq)}{e^2}$$

where n = minimum sample size

Z = 1.96 at 95% confidence level,

P = known prevalence of HPV vaccination among adolescent females in Nigeria

e = error margin tolerated at 5% = 0.05

q = 1 - p

Where P is the prevalence HPV vaccination among adolescent females in a similar study done in Lagos State, which was 19.7%. The minimum sample size was thus calculated to be 245. However, a total of 304 patients were recruited into the study after obtaining informed written consent from those that met the inclusion criteria. The benefits of the study and confidentiality were explained to the women.

The inclusion criteria were all women met at these clinics, who have adolescent daughters at the period of this study which was March 2021 to May 2021.

A pretested self-administered, well-structured questionnaire was administered to these women. The structured questionnaire consisted of three sections: Section A contained questions on socio-demographic characteristics such as age, marital status, religion, occupation, educational level and number of adolescent girls. Section B had questions that assessed the prevalence of HPV and HPV vaccine, and Section C had questions related to the willingness to vaccinate daughters and factors influencing its uptake.

Data obtained was collated, entered into a spread sheet and analyzed using SPSS version 23. Results were

Table 1. Socio-demographic Variables of study participants

Socio-demographic Variables	Frequency (304)	Percentage (%)
Age group		
<30	105	34.5
30-39	123	40.5
40-49	59	19.4
50-59	14	4.6
≥60	3	1.0
Ethnic group		
Igbo	154	50.7
Hausa	14	4.6
Yoruba	16	5.3
Others	120	39.5
Religion		
Christian	275	90.5
Islam	6	2.0
Others	23	7.6
Educational status		
No formal education	3	1.0
Primary	10	3.3
Secondary	68	22.4
Tertiary	223	73.4
Occupation		
Unemployed	85	28.0
Unskilled	26	8.6
Skilled	114	37.5
Professional	79	26.0
Number of adolescent children		
1	168	55.3
2	99	32.6
3	27	8.9
4	6	2.0
5	4	1.3
Total	304	100.0

expressed in means and percentages and presented in tables and charts.

RESULTS

A total of 310 questionnaires were distributed but 304 (98.1%) were returned with complete information for analysis. The majority of the participants were 30-39 age group (40.5%), followed by those under 30 (34.5%), 40-49 (19.4%), 50-59 (4.6%), and 1.0% aged 60 or older (Table 1). Most participants were Igbo (50.7%), while other ethnic groups were less represented: Hausa (4.6%), Yoruba (5.3%), and others (39.5%). Regarding religion, Christians dominated at 90.5%, with Islam at 2.0% and other religions at 7.6%. Educationally, 73.4% had tertiary education, 22.4% had secondary education, 3.3% had primary education, and 1.0% had no formal education. Employment status showed 37.5% skilled, 28.0% unemployed, 26.0% professional, and 8.6%

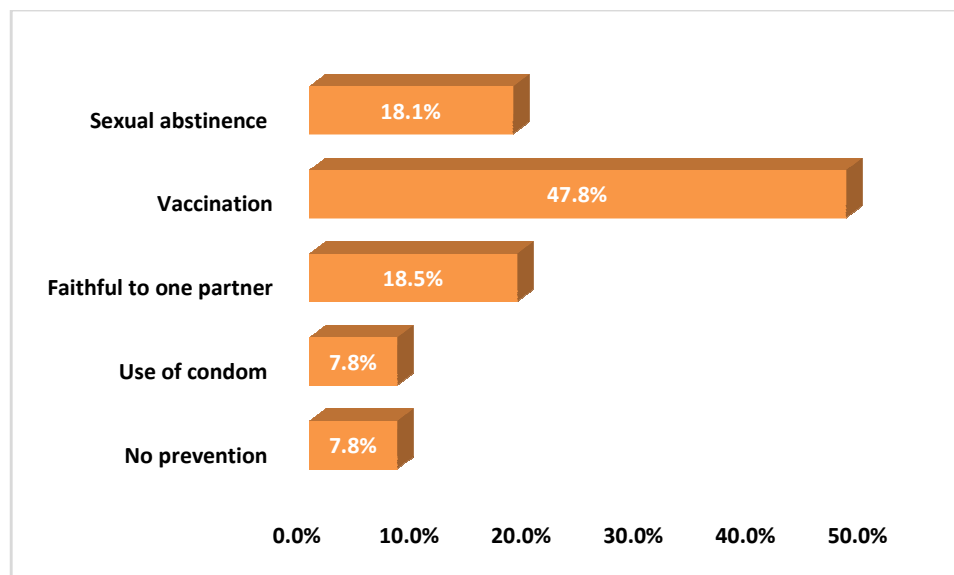
unskilled. The number of adolescent children per participant varied, with most having one (55.3%) or two (32.6%) children, and smaller percentages for three (8.9%), four (2.0%), and five (1.3%) children.

In terms of HPV vaccination, only 2.3% reported their adolescent daughters had been vaccinated, 74.7% said no, and 23.0% were unsure (Table 2). Among those vaccinated, 1.0% were vaccinated between ages 9-13 and 1.3% after age 13, with no responses from 97.7%. Knowledge of their daughter's sexual activity was not reported by 97.7%, with only 0.7% knowing and 1.6% unsure. Completion of vaccination doses was also predominantly unreported (97.7%), with 0.7% having completed doses, 0.3% not, and 1.3% unsure.

HPV infection prevention methods reported were vaccination (47.8%), being faithful to one partner (18.5%), sexual abstinence (18.1%), condom use (7.8%), and no prevention (7.8%) (Figure 1). The reasons for not vaccinating daughters included insufficient information (54.2%), lack of access to the vaccine (26.9%), cost

Table 2. Prevalence of HPV vaccination in adolescent daughters

Variable	Frequency	Percentage (%)
Previous vaccination of adolescent daughter		
Yes	7	2.3
No	227	74.7
Don't know	70	23.0
Age at vaccination		
No response	297	97.7
<9	0	0.0
9-13	3	1.0
>13	4	1.3
Knowledge of sexual activity		
No response	297	97.7
Yes	0	.0
No	2	.7
Don't know	5	1.6
Completed doses		
No response	297	97.7
Yes	2	0.7
No	1	0.3
Don't know	4	1.3
Total	304	100.0

**Figure 1.** Prevention of HPV Infection

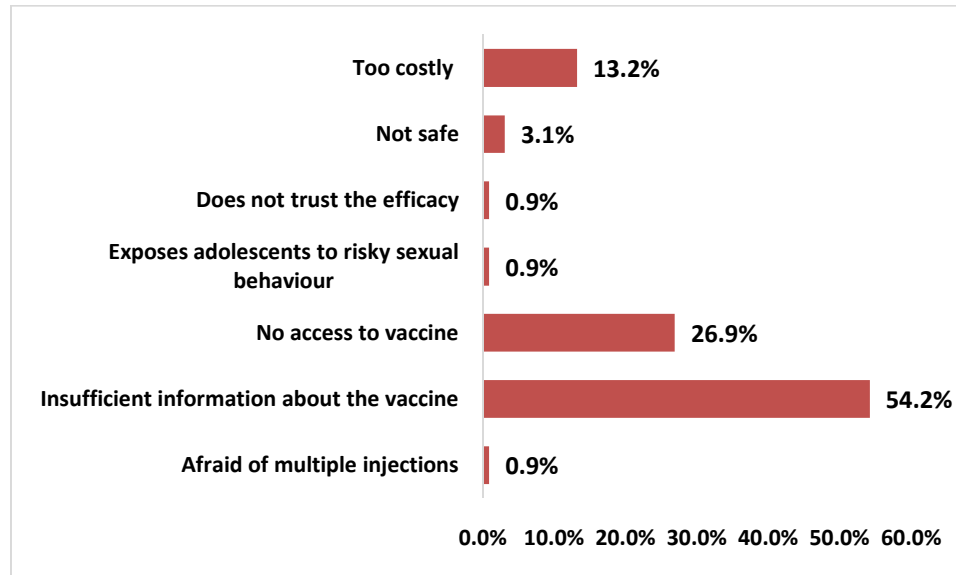


Figure 2. Reasons for not vaccinating daughter against HPV

Table 3. Willingness to vaccinate daughters

Willingness to vaccinate	Frequency	Percentage (%)
Yes	214	70.4
No	9	3.0
Don't know	81	26.6
Total	304	100.0

(13.2%), safety concerns (3.1%), distrust in efficacy (0.9%), fear of multiple injections (0.9%), and fear of promoting risky sexual behavior (0.9%) (Figure 2). Regarding willingness to vaccinate their daughters, 70.4% of participants were willing, 3.0% were not, and 26.6% were unsure (Table 3).

DISCUSSION

The prevalence, prevention, and willingness to vaccinate against Human Papillomavirus (HPV) among women with adolescent daughters in Rivers State, Nigeria, present a critical public health concern. This cross-sectional study aims to shed light on the current status of HPV vaccination uptake, factors influencing vaccination decisions, and potential strategies for improving vaccination rates.

The age distribution indicates a relatively young cohort, with 75% of participants under the age of 40. This age distribution aligns with the findings from similar studies conducted in Nigeria, which also reported a predominance of younger women participating in health-related research (Ezechi et al., 2014; Olusola et al., 2019).

The ethnic composition shows a majority of Igbo participants (50.7%), with significant representation from other ethnic groups (39.5%). This distribution reflects the ethnic diversity of Rivers State, as reported by Ezechi et al. (2014). The high percentage of Christians (90.5%) among the participants is consistent with the religious demographics of southern Nigeria, where Christianity is the dominant faith (Ezechi et al., 2014).

The educational attainment of the participants is notably high, with 73.4% having tertiary education. This is significantly higher compared to national statistics, which indicate lower overall tertiary education rates among women in Nigeria (National Bureau of Statistics, 2020). The high education level among the participants may influence their health-seeking behaviors, including attitudes towards HPV vaccination.

Regarding employment, 37.5% of participants are in skilled occupations, and 26.0% are professionals. This relatively high employment in skilled and professional jobs is indicative of the urban setting of the study and aligns with findings from studies in other urban Nigerian settings (Olusola et al., 2019).

The high level of tertiary education and professional employment among the study participants suggests a potentially higher awareness and acceptance of HPV

vaccination. Previous studies have established a positive correlation between educational status and health awareness, including the uptake of preventive measures like vaccinations (Olowokere et al., 2017).

Studies such as that by Ezechi et al. (2014) have shown that awareness of HPV and its vaccine is relatively low in Nigeria. However, the willingness to vaccinate, once informed, tends to be high, reflecting a gap in awareness rather than acceptance. This study likely benefited from the high educational level of participants, possibly resulting in higher awareness and a greater willingness to vaccinate their daughters against HPV.

In comparing these results with other studies, we see similarities and differences. For instance, Olusola et al. (2019) reported that educational status significantly influences HPV vaccine uptake. This study's finding of a high proportion of tertiary-educated participants aligns with this, suggesting that educational campaigns could effectively increase HPV vaccination rates.

However, the high percentage of unemployed participants (28.0%) contrasts with some previous studies where employment status was more balanced. This discrepancy might be due to regional economic variations or differing study methodologies (Okunade et al., 2020).

The prevalence of HPV vaccination among adolescent daughters in Rivers State is alarmingly low, with only 2.3% of respondents reporting previous vaccination. This finding is consistent with previous studies indicating suboptimal HPV vaccination rates in Nigeria and other low- and middle-income countries (LMICs). For instance, a study by Oluwole et al. (2020) found similarly low HPV vaccination coverage among adolescent girls in Nigeria, citing factors such as lack of awareness, vaccine cost, and vaccine hesitancy as barriers to uptake.

Moreover, the majority of respondents (74.7%) reported that their daughters had not received the HPV vaccine, highlighting a significant gap in preventive healthcare services. This finding aligns with the findings of studies conducted in other LMICs, such as Kenya and India, where HPV vaccine coverage remains below target levels (Machalek et al., 2019; LaMontagne et al., 2015). These studies have identified various barriers to HPV vaccination, including limited access to healthcare facilities, cultural beliefs, and misinformation about the vaccine's safety and efficacy.

Regarding the age at vaccination, the majority of respondents did not provide a response (97.7%), indicating a lack of awareness or uncertainty about the appropriate age for HPV vaccination. Among those who did provide a response, only a small proportion reported vaccination during the recommended age range of 9-13 years (1.0%), while an even smaller proportion reported vaccination after the age of 13 (1.3%). This finding underscores the need for targeted educational interventions to increase awareness of the recommended age for HPV vaccination and the importance of timely immunization.

Additionally, the data reveal a concerning lack of knowledge about sexual activity among respondents, with the majority either providing no response (97.7%) or indicating uncertainty (1.6%). This finding is consistent with studies conducted in similar settings, which have highlighted low levels of knowledge about HPV and its association with sexual activity among parents and caregivers (Francis et al., 2018; Bansal et al., 2016). Improving knowledge about HPV transmission and prevention is crucial for increasing vaccination acceptance and uptake among adolescent girls and their caregivers.

Furthermore, the completion rate of HPV vaccine doses is suboptimal, with the majority of respondents either providing no response (97.7%) or indicating uncertainty (1.3%). This finding suggests a need for improved monitoring and follow-up mechanisms to ensure that adolescent girls receive the recommended number of vaccine doses for optimal protection against HPV-related diseases.

The findings illustrated in Figure 1 show varied methods employed by women to prevent HPV infection. Notably, 47.8% of participants recognize vaccination as a preventive measure, which is promising compared to studies in other regions. For example, a study conducted in Ibadan, Nigeria, reported lower awareness and utilization of the HPV vaccine among women (Ojediran et al., 2020). The recognition of vaccination as a key preventive measure is higher than what was observed in other African studies where awareness levels are often below 40% (Kenton et al., 2019).

However, the reliance on methods like faithfulness to one partner (18.5%) and sexual abstinence (18.1%) indicates a considerable gap in comprehensive sexual health education. In contrast, a study in South Africa found a higher reliance on condoms (32.1%) and vaccination (41.2%) (Mbulawa et al., 2018). The relatively low percentage (7.8%) of condom use as a preventive measure in Rivers State could be indicative of cultural or informational barriers that need to be addressed through targeted public health interventions.

The predominant reason, insufficient information about the vaccine (54.2%), aligns with findings from other studies in low- and middle-income countries (LMICs), where lack of awareness is a significant barrier (Kessels et al., 2012). Access issues (26.9%) and cost concerns (13.2%) further complicate vaccination efforts. This mirrors findings in Kenya, where logistical and financial barriers were also significant (Nguyen et al., 2018).

Interestingly, concerns about safety and efficacy, often prominent in vaccine hesitancy literature (Dubé et al., 2013), were minimally reported in this study (3.1% and 0.9%, respectively). This contrasts with a study from the United States, where distrust in vaccine safety and efficacy was much higher (Marlow et al., 2009). The minimal concern in Rivers State could be attributed to either a lack of detailed knowledge about the vaccine or a

cultural difference in how medical advice is perceived.

The data from Table 3 indicates a high willingness to vaccinate daughters against HPV (70.4%), which is higher than the global average found in a systematic review where willingness ranged from 48% to 69% (Lazcano-Ponce et al., 2017). This high willingness in Rivers State suggests that once informational and access barriers are removed, the uptake could be substantial.

However, the 26.6% of respondents who were unsure about vaccinating their daughters highlights an opportunity for public health initiatives to provide more comprehensive information and reassurance about the vaccine's benefits and safety. This aligns with findings from a study in Ghana, where educational interventions significantly improved vaccine acceptance (Boateng et al., 2020).

The findings from Rivers State align with broader trends observed in HPV vaccination research, particularly in LMICs. The high recognition of vaccination as a preventive measure and the substantial willingness to vaccinate once informed reflect positively on public health campaigns' potential efficacy. However, the significant barriers related to information and access highlight critical areas needing improvement.

Studies from various regions, including Kenya, South Africa, and Ghana, similarly emphasize the importance of increasing awareness and accessibility to improve vaccination rates (Nguyen et al., 2018; Mbulawa et al., 2018; Boateng et al., 2020). These barriers are often rooted in systemic issues within healthcare infrastructure and socio-cultural factors influencing health behaviors (Kessels et al., 2012; Dubé et al., 2013).

Moreover, the minimal concern about vaccine safety and efficacy in Rivers State contrasts with higher concerns reported in Western countries, suggesting different focal points for health communication strategies. In Rivers State, emphasizing the vaccine's benefits and addressing logistical barriers may be more effective than campaigns focusing solely on safety and efficacy reassurance.

CONCLUSION

The study highlights a low prevalence of HPV vaccination among adolescent girls in Rivers State, with significant barriers including lack of information and access. However, there is a high willingness to vaccinate, indicating the potential for increased vaccination rates through targeted educational and accessibility interventions.

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