

Awareness and Barriers to Cervical Cancer Screening and HPV Vaccination in Rural Ebonyi State: A Multicenter Cross-sectional Study

Amuchechukwu Veronica Nwafor

Alex Ekwueme Federal University Ndufu-Alike

Okechukwu Victor John

johnvictorokekey@gmail.com

Alex Ekwueme Federal University Teaching Hospital

Chinwe W Oliobi

Alex Ekwueme Federal University Teaching Hospital

Nkechinyere V Nwachukwu

Alex Ekwueme Federal University Teaching Hospital

Nnenna M Otta

Alex Ekwueme Federal University Teaching Hospital

Precious C Eugene-Abah

Alex Ekwueme Federal University Ndufu-Alike

Chiagozie P Amiara

Alex Ekwueme Federal University Ndufu-Alike

Lilian N Nwaobashi

Alex Ekwueme Federal University Teaching Hospital

Olanma Princess Idoko-Onyedikachi

Alex Ekwueme Federal University Teaching Hospital

Ifeoma Cecilia Uche-Omovoh

Alex Ekwueme Federal University Teaching Hospital

Silas Alegu Nwali

Alex Ekwueme Federal University Ndufu-Alike

Moses Ikenna Ekuma

Alex Ekwueme Federal University Ndufu-Alike

Research Article

Keywords: Cervical cancer, HPV vaccination, Screening awareness, Barriers, Rural health, Nigeria, Ebonyi State

Posted Date: September 28th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-11029310/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.
[Read Full License](#)

Additional Declarations: No competing interests reported.

Abstract

Background

Cervical cancer remains a major public health concern in sub-Saharan Africa, with disproportionately high morbidity and mortality in low-resource settings. Although effective preventive strategies such as cervical cancer screening and human papillomavirus (HPV) vaccination exist, uptake remains suboptimal in rural Nigerian communities. This study assessed awareness of cervical cancer screening modalities and barriers to HPV vaccination among women in rural Ebonyi State, Nigeria.

Methods

A multicenter descriptive cross-sectional study was conducted among 683 women aged 18 years and above during rural health outreach programs in Ebonyi State, southeastern Nigeria. Data were collected using structured interviewer-administered questionnaires capturing socio-demographic characteristics, reproductive history, awareness of cervical cancer screening modalities, HPV vaccination status, and barriers to vaccination. Data were analyzed using descriptive statistics.

Results

The mean age of respondents was 42.23 ± 10.73 years. Most participants were married (89.6%), multiparous or grand multiparous (90.2%), and had at least secondary education (60.7%). Only 17.1% were aware of cervical cancer screening modalities. HPV vaccine uptake was low, with 3.1% reporting receipt of the vaccine and 7.6% reporting vaccination of their daughters. Access-related barriers were the predominant reason for non-vaccination (71.3% for self; 76.0% for daughters), followed by lack of awareness and knowledge (24.9%).

Conclusion

Awareness of cervical cancer screening modalities and HPV vaccination remains low among women in rural Ebonyi State. HPV vaccine uptake is critically inadequate, largely due to structural access barriers. Strengthening rural health systems, decentralizing vaccine delivery, and enhancing community-based education are essential to advancing equitable cervical cancer prevention efforts in Nigeria.

Background

Cervical cancer remains the fourth most common cancer among women globally, with an estimated 604,000 new cases and 342,000 deaths reported in 2020¹. Nearly 90% of these deaths occur in low- and middle-income countries (LMICs), particularly in sub-Saharan Africa, where limited screening coverage and weak health systems contribute to disproportionately high mortality^{1,2}. In Nigeria, cervical cancer

remains the second most common female cancer and one of the leading causes of cancer-related morbidity and mortality among women¹.

Persistent infection with high-risk human papillomavirus (HPV), especially types 16 and 18, accounts for nearly all cases of cervical cancer². Evidence-based preventive strategies include HPV vaccination, visual inspection with acetic acid (VIA), visual inspection with Lugol's iodine (VILI), cytology-based screening, and HPV DNA testing³. In 2020, the World Health Organization (WHO) launched the Global Strategy to Accelerate the Elimination of Cervical Cancer, setting the 90–70–90 targets: 90% HPV vaccination coverage among girls, 70% screening coverage, and 90% treatment of precancerous lesions by 2030³.

Despite these global commitments, cervical cancer screening uptake and HPV vaccine coverage remain suboptimal in Nigeria. A scoping review of cervical cancer prevention in Nigeria highlighted significant knowledge gaps, poor utilization of screening services, and inconsistent policy implementation⁴. Systematic reviews across sub-Saharan Africa further demonstrate that barriers to HPV vaccination include inadequate awareness, logistical constraints, vaccine hesitancy, and structural health system limitations^{5–7}.

Nigeria officially introduced the HPV vaccine into its routine immunization schedule in 2023 through a phased national rollout led by the National Primary Health Care Development Agency (NPHCDA)^{8,9}. However, early implementation reports suggest persistent inequities in rural access due to supply chain limitations, infrastructure challenges, and limited integration into primary healthcare systems¹⁰.

Ebonyi State is predominantly rural, and there is limited community-level data simultaneously assessing awareness of cervical cancer screening modalities and barriers to HPV vaccination. Understanding these contextual determinants is critical for designing targeted rural interventions aligned with the WHO elimination framework. This study therefore assessed awareness and barriers to cervical cancer screening and HPV vaccination among women in rural Ebonyi State, Nigeria.

Methods

Study Design

A descriptive cross-sectional study.

Study Setting

The study was conducted during rural health outreach programs across selected rural communities in Ebonyi State, southeastern Nigeria. The outreach held between January 2025 to December 2025

Study Population

Women aged 18 years and above who attended the outreach programs and consented to participate were included.

Sample Size

A total of 683 women participated in the study.

Sampling Technique:

A convenience sampling approach was used during outreach programs. All eligible women who consented during the study period were consecutively recruited.

Data Collection

Data were collected using structured interviewer-administered questionnaires covering:

Socio-demographic characteristics

Reproductive history

Health status

Awareness of cervical cancer screening

HPV vaccination status

Barriers to vaccination

Statistical Analysis

Data were analyzed using descriptive statistics. Continuous variables were summarized using means and standard deviations, while categorical variables were presented as frequencies and percentages.

Ethical Considerations

Ethical approval was obtained from the Directorate of Health Research and Ethical Committee, Ebonyi State (ref- EBSHREC2025/0032). Written informed consent was obtained from all participants. Participation was voluntary and confidentiality was maintained by excluding personal identifiers from the study instrument and analysis. The study was conducted in accordance with the Nigerian National Code of Health Research Ethics and the Declaration of Helsinki.

RESULTS

Table 1: Socio-demographic Characteristics of the Respondents

Variable	Frequency (n=683)	Percent (%)
Age		
18-29 years	44	6.5
30-39 years	192	28.1
40-49 years	274	40.1
50-59 years	111	16.3
≥60 years	61	8.9
Mean ± SD	42.23±10.73	
Tribe		
Igbo	668	97.8
Hausa	13	1.9
Yoruba	2	0.3
Religion		
Christianity	683	100.0
Marital status		
Married	612	89.6
Not married	71	10.4
Type of Marriage		
Monogamy	515	75.4
Polygamy	167	24.5
Educational level		
No education	119	17.4
Primary education	149	21.8

Secondary education	188	27.5
Tertiary education	227	33.2
Husband's Occupation		
Employed	133	19.5
Self employed	549	80.4
None	1	0.1

Table 1 shows the socio-demographic characteristics of the respondents. The majority of participants were in the 40-49 years age group (40.1%), predominantly Igbo (97.8%), and all were Christians (100%). Most were married (89.6%) in monogamous unions (75.4%). Educational attainment varied, with tertiary education being most common (33.2%).

Table 2: Reproductive Health Characteristics of the Respondents

Variable	Frequency (n=683)	Percent (%)
Age at Menarche		
7-10 years	15	2.2
11-14 years	395	57.8
15-20 years	270	39.5
24-29 years	3	0.4
Mean $\pm$ SD	13.96 $\pm$ 2.52	
Age at coitarche		
6-14 years	142	20.8
15-22 years	431	63.2
23-30 years	97	14.2
31-38 years	12	1.8
Mean $\pm$ SD	18.13 $\pm$ 4.66	
Parity		
Nullipara	36	5.3
Primipara	31	4.5
Multipara	249	36.5
Grandmultipara	367	53.7
Route of Delivery		
Vaginal (SVD)	558	81.7
Cesarean section	72	10.5
Not sure	53	7.8

Table 2 shows the reproductive health characteristics of the respondents. Most women experienced menarche between 9-14 years (57.8%), with 20.8% reporting first sexual intercourse between ages 6-14 years. The majority had 5 children and above (53.7%) and delivered vaginally (81.7%).

Table 3: Health Status and Contraceptive Use Among the Respondents

Variable	Frequency (n=683)	Percent (%)
Previous STI and Treatment		
None	22	21.6
Yes	13	12.7
HIV Status		
Negative	682	99.9
Positive	1	0.1
Hepatitis B Status		
Negative	681	99.7
Positive	2	0.3
Family Planning Methods Used		
None	601	88.0
Long-lasting	46	6.7
Others	27	3.4
Natural	12	1.8
BTL	1	0.1

Table 3 shows the health status and contraceptive use among the respondents. Previous STI was reported by 17.1%. HIV and Hepatitis B prevalence were extremely low (0.1% and 0.3% respectively). The majority (88.0%) were not using any family planning method.

Table 4: Awareness Of Cervical Cancer Screening Modalities Among The Respondents.

Variable	Frequency (n=683)	Percent (%)
Aware of cervical screening modalities		
Yes	117	17.1
No	566	82.9

Table 4 shows the awareness of the respondents regarding screening modalities. Only 17.1% are aware of screening modalities.

Table 5: Barriers to Vaccination Among The Respondents

Variables	No of respondents (n=683)	Percent (%)
Reasons for Not Receiving HPV Vaccine		
Poor Access	487	71.3
Lack of Awareness/Knowledge	170	24.9
Cultural belief	20	2.9
Early childhood and age factor	6	0.9
Reasons for Daughters Not Receiving HPV Vaccine		
Barriers/Access Issues	519	76.0
Awareness/Knowledge/Attitude	102	14.9
Age-Related Reasons	31	4.5
Cultural belief	31	4.5

Table 5 shows the barriers to vaccination among the respondents. 71.3% of respondents cited Poor Access as the primary reason for not receiving the HPV vaccine themselves, while 24.9% pointed to a Lack of Awareness/Knowledge. Similarly, for their daughters, the leading obstacle was poor Access at 76.0%, followed by lack of Awareness/Knowledge at 14.9%.

Discussion

This multicenter cross-sectional study demonstrates persistently low awareness of cervical cancer screening modalities (17.1%) among women in rural Ebonyi State. Similar low levels of awareness have

been reported across rural Nigerian communities¹¹. Evidence from broader sub-Saharan Africa confirms that inadequate community sensitization significantly reduces screening demand and participation^{5,6}.

HPV vaccine uptake among respondents was extremely low (3.1%), and only 7.6% reported vaccinating their daughters. These findings are consistent with pre-introduction and early post-introduction Nigerian studies reporting vaccine uptake rates below 10%^{12–14}. Although Nigeria incorporated HPV vaccination into its routine immunization schedule in 2023^{8,9}, early implementation challenges, including phased roll-out, supply constraints, and uneven rural distribution, may partly explain the persistently low uptake observed in this study¹⁰.

A major finding is the predominance of access-related barriers. Poor access was cited by 71.3% of respondents for self-vaccination and 76.0% for their daughters. Structural barriers, including vaccine stock limitations, cold chain logistics, distance to facilities, and inadequate primary healthcare integration, have been identified as key impediments to HPV vaccine scale-up in LMICs^{5,7}. Unlike some urban Nigerian studies where misinformation or hesitancy is dominant¹³, our findings suggest that systemic service delivery gaps may represent the more significant constraint in rural communities.

Lack of awareness and knowledge (24.9%) remained the second most cited barrier. Systematic reviews indicate that limited culturally appropriate communication and insufficient engagement of community leaders reduce vaccine confidence and demand in sub-Saharan Africa^{6,7}. Therefore, sustainable improvement requires both structural strengthening and continuous community-based education.

The reproductive profile of respondents further highlights vulnerability. Early sexual debut before age 15 years (20.8%) and high rates of grand multiparity (53.7%) increase cumulative exposure to high-risk HPV and are recognized epidemiological risk factors for cervical carcinogenesis^{2,16}. In settings where preventive services remain inaccessible, such reproductive patterns may contribute to sustained cervical cancer burden.

The WHO 90–70–90 elimination targets emphasize equitable vaccine coverage and screening access³. However, modelling analyses demonstrate that without targeted rural strategies, elimination goals may not be achieved in many LMICs¹⁷. Our findings reinforce the need for decentralized vaccine delivery, outreach integration into primary healthcare services, strengthened supply chains, and culturally sensitive health promotion to prevent widening rural–urban disparities.

Overall, this study highlights a dual challenge: limited awareness and substantial structural barriers to HPV vaccination in rural Ebonyi State. Achieving equitable cervical cancer prevention in Nigeria will require coordinated policy implementation, rural-focused service expansion, and sustained community engagement.

Strengths and Limitations

Strengths

Large sample size (n = 683)

Multicenter rural outreach design

Simultaneous assessment of screening and vaccination

Limitations

Cross-sectional design limits causal inference

Convenience sampling may limit generalizability beyond outreach attendees.

Self-reported screening history may introduce recall bias

No inferential statistical analysis included

Conclusion

Awareness of cervical cancer screening and HPV vaccination remains low in rural Ebonyi State. Although screening uptake was moderate, HPV vaccine coverage is extremely poor. Access-related barriers are the dominant impediment. Targeted rural interventions focusing on awareness creation and vaccine accessibility are urgently needed to accelerate cervical cancer prevention efforts in Nigeria.

Recommendations

There is a need to strengthen rural cervical cancer prevention through decentralized HPV vaccination and screening services, improved vaccine availability, and integration of these services into primary healthcare and community outreach programmes. Sustained community-based education involving healthcare workers, community leaders, and other trusted stakeholders should be prioritized to improve awareness and uptake. State and national programmes should also strengthen monitoring of rural screening and HPV vaccination coverage to identify and address persistent access gaps.

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Directorate of Health Research and Ethical Committee, Ebonyi State (ref- EBSHREC2025/0032). Written informed consent was obtained from each participant before enrolment.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

This study received no external funding.

Authors' contributions

Amuchekukwu V Nwafor conceptualized the study.

Amuchekukwu V Nwafor and Okechukwu V John designed the methodology.

Amuchekukwu V Nwafor, Chinwe W Oliobi, Nkechinyere V Nwachukwu, Nnenna M Otta, Precious C Eugene-Abah, Chiagozie P Amiara, Lilian N Nwaobashi, Olanma P Idoko-Onyedikachi, Ifeoma C Uche-Omovoh, and Moses I Ekuma supervised data collection and analysis.

Okechukwu V John and Silas A Nwali drafted the initial manuscript

All authors reviewed and approved the final version for submission.

Acknowledgements

The authors acknowledge the cooperation of all the women who participated in this study.

References

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin.* 2021;71(3):209–49.
2. Huang J, Deng Y, Boakye D, Tin MS, Lok V, Zhang L, et al. Global distribution, risk factors, and recent trends for cervical cancer: a worldwide country-level analysis. *Gynecol Oncol.* 2023;164:1–12.
3. World Health Organization. Global strategy to accelerate the elimination of cervical cancer as a public health problem. Geneva: WHO; 2020.

4. Olowofela A, Diachuo OA, Afonne C, Adeyanju O, Amuta C, Akunne A, et al. Cervical cancer and human papillomavirus vaccine knowledge, utilisation, prevention educational interventions and policy response in Nigeria: a scoping review. *BMC Public Health*. 2022;22:1830.
5. Kutz JM, Rausche P, Gheit T, Puradiredja DI, Fusco D. Barriers and facilitators of HPV vaccination in sub-Saharan Africa: a systematic review. *BMC Public Health*. 2023;23(1):974.
6. Omayo LN, Malande OO, Musyoki AM, Hoffman P, Adamu VE. Determinants of human papillomavirus (HPV) vaccine hesitancy in sub-Saharan Africa: a systematic review. *J Afr Soc Paediatr Infect Dis*. 2023;1(1):15–28.
7. Guillaume D, Waheed DE, Schleiff M, Muralidharan KK, Vorsters A, Limaye RJ. Global perspectives of determinants influencing HPV vaccine introduction and scale-up in low- and middle-income countries. *PLoS ONE*. 2024;19(1):e0291990.
8. National Primary Health Care Development Agency (NPHCDA). National introduction of the human papillomavirus (HPV) vaccine into the routine immunization programme in Nigeria: phase 1 and 2 implementation plan. Abuja: NPHCDA; 2023.
9. World Health Organization. Nigeria introduces HPV vaccine into routine immunization. WHO News Release. 24 Oct 2023.
10. World Health Organization, United Nations Children’s Fund (UNICEF). Nigeria: WHO and UNICEF estimates of immunization coverage: 2022 revision. Geneva: WHO; 2023.
11. Eze GU, Okaro FE, Okonkwo AC, Nwogu-Ikojo EE, Onwasigwe CN, Anyigbo EB. Awareness and practice of cervical cancer screening among women in a rural community in South-East Nigeria. *Niger J Med*. 2012;21(3):305–9.
12. Iliyasu Z, Galadanci HS, Muhammad A, Iliyasu BZ, Umar AA, Aliyu MH. Correlates of human papillomavirus vaccine knowledge and acceptability among medical and allied health students in Northern Nigeria. *J Obstet Gynaecol*. 2021;42(3):452–60.
13. Okagbue HI, Erekosima G, Sampson S, Ogini EA, Ade-Ademilua OE, Olorunsaiye CZ, et al. Predictors of willingness of HPV vaccine uptake across eight states in Nigeria. *BMC Public Health*. 2025;25:745.
14. Talabi O, Gilbert H, Fawzi MCS, Anorlu R, Adamson JO, Kanki PJ, et al. Examining barriers and facilitators of HPV vaccination in Nigeria in the context of an innovative delivery model: a mixed-methods study. *BMJ Public Health*. 2023;1:e000142.
15. Alum EU, Ugwu OPC, Obeagu EI. Cervical cancer prevention paradox: unveiling screening barriers and solutions. *J Cancer Res Cell Ther*. 2024;8(2):1–5.
16. Mekonnen AG, Mittiku YM. Early onset of sexual activity as a potential risk of cervical cancer in Africa: a review of literature. *PLoS Glob Public Health*. 2023;3(3):e0000941.
17. Brisson M, Kim JJ, Canfell K, Drolet M, Gingras G, Burger EA, et al. Impact of HPV vaccination and cervical screening on cervical cancer elimination: a comparative modelling analysis in 78 low-income and lower-middle-income countries. *Lancet*. 2020;395(10224):575–90.