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Original Research Article

Socio-Cultural and Health-System Barriers to HPV Vaccine Acceptance and Cervical Cancer Screening in North Central Nigeria: A Scoping Review

Manga Dogara Manga[1]*, David Ishaleku[1], Yakubu Boyi Ngwai[1], Michael Abah Idoko[1], Ibrahim Yusuf Kana[1]

[1]Global Health and Infectious Diseases Control Institute, Nasarawa State University, Keffi, Nigeria

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Abstract: ***Background*:** Cervical cancer is highly preventable through human papillomavirus (HPV) vaccination, screening and timely treatment, yet the burden remains concentrated in low- and middle-income countries. Nigeria introduced HPV vaccination into routine immunisation in October 2023. North Central Nigeria is a strategically important region characterised by ethnic and religious diversity, urban–rural inequalities and heterogeneous health-system capacity. ***Objective:*** To map and synthesise available evidence on socio-cultural and health-system barriers influencing HPV vaccine acceptance and cervical cancer screening in North Central Nigeria, with emphasis on qualitative and mixed-methods insights and implications for implementation. ***Methods***: A scoping review was conducted in accordance with JBI methodological guidance and the PRISMA Extension for Scoping Reviews (PRISMA-ScR). An updated search strategy was rerun on 10 September 2026 for PubMed/MEDLINE, Embase, Scopus, Web of Science, CINAHL and African Journals Online (AJOL), using database-adapted combinations of terms for HPV, vaccination, cervical cancer, screening, acceptance, hesitancy, barriers, qualitative evidence and North-Central Nigerian geography. Publicly accessible PubMed and AJOL records were verified during the update; subscription-platform hit counts were not invented where live institutional export was unavailable. Evidence was charted by geography, population, prevention stage, barrier domain and implementation implication. ***Results*:** The mapped literature demonstrates a consistent gap between expressed willingness and actual uptake. Dominant socio-cultural barriers include limited knowledge, misconceptions linking vaccination to sexual activity or infertility, religious and gender norms, parental or spousal authority, fear of stigma or disclosure, and reliance on informal information networks. Health-system barriers include inconsistent vaccine availability, weak provider recommendation and counselling, limited screening capacity, cost and transport constraints, fragmented referral pathways, privacy concerns, shortages of trained personnel and uneven community mobilisation. North-Central-specific studies reinforce these patterns: tertiary-institution and market-women surveys report very low awareness and uptake, while a 2026 multi-facility implementation study documents uneven vaccine availability across sites. ***Conclusion*:** Vaccine and screening decisions in North Central Nigeria are produced jointly by household authority, community norms, information environments and the reliability of health services. Awareness campaigns alone are unlikely to be sufficient. Integrated, culturally responsive strategies that engage community gatekeepers, strengthen trusted provider communication, ensure service readiness and link vaccination with screening are required.

Keywords: Human Papillomavirus, HPV Vaccine, Cervical Cancer Screening, Vaccine Acceptance, Vaccine Hesitancy, Socio-Cultural Barriers, Health-System Barriers, Qualitative Evidence, North Central Nigeria, Scoping Review.

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***Corresponding Author:** Manga Dogara Manga
Global Health and Infectious Diseases Control Institute, Nasarawa State University, Keffi, Nigeria

1. INTRODUCTION

1.1 Background

Cervical cancer remains one of the clearest examples of a malignancy that can be prevented through a coordinated public-health pathway. Persistent infection with oncogenic human papillomavirus (HPV) is the necessary cause of virtually all cervical cancers. Vaccination before HPV exposure, high-performance screening and appropriate treatment can interrupt the disease pathway at successive stages. The International Agency for Research on Cancer estimated approximately 660 000 new cervical cancer cases and 350 000 deaths globally in 2022, with roughly 90% of incidence and mortality occurring in low- and middle-income countries. This distribution makes cervical cancer not only a biomedical problem but also a problem of inequitable access to prevention and care.

Nigeria carries a substantial share of this preventable burden. GLOBOCAN 2022 estimated 13 676 new cervical cancer cases among Nigerian women, ranking cervical cancer as the second most common cancer among Nigerian women after breast cancer and an important contributor to female cancer mortality. Prevention requires two complementary population-level behaviours: timely vaccination of girls before exposure to HPV and participation of eligible women in cervical cancer screening. The World Health Organization (WHO) frames these interventions within the 90–70–90 elimination pathway: 90% of girls fully vaccinated by age 15 years, 70% of women screened with a high-performance test by age 35 and again by age 45, and 90% of women with cervical disease receiving appropriate treatment.

Nigeria introduced HPV vaccine into routine immunisation in October 2023, initially targeting girls aged 9–14 years. UNICEF reported an initial target of 7.7 million girls, describing the introduction as the largest single-round HPV vaccination effort in the African region at the time. The vaccine was provided free through the public programme, accompanied by health-worker training and community delivery arrangements. This policy change substantially altered the prevention landscape: the central question is no longer whether HPV vaccination is available as a policy intervention, but whether families and communities recognise its value and whether health systems can reliably deliver it in ways that are trusted and culturally acceptable.

North Central Nigeria provides a particularly relevant setting for examining this question. The region comprises Benue, Kogi, Kwara, Nasarawa, Niger and Plateau States and the Federal Capital Territory. It includes highly urbanised settings such as Abuja alongside rural and semi-rural communities, large informal markets, substantial ethnic and linguistic diversity, and communities in which religious and family structures strongly shape decisions affecting adolescent girls and women's reproductive health. Such heterogeneity means that national averages can conceal locally meaningful mechanisms of acceptance and refusal.

The concept of acceptance requires careful distinction from uptake. Acceptance refers to an intention, willingness or positive attitude toward receiving a vaccine or using screening services, whereas uptake represents actual completion of the relevant preventive action. Nigerian evidence repeatedly demonstrates a gap between the two. Earlier national scoping work reported high willingness in several populations but identified cost, availability, accessibility, socio-cultural and religious factors as constraints on implementation. More recent North-Central evidence strengthens this observation. Among undergraduates in a North-Central Nigerian tertiary institution, only 15.4% had heard of the HPV vaccine and 2.1% had received at least one dose. Among female undergraduates in another North-Central study, 68.2% had low knowledge and only 15% reported vaccination. Among market women surveyed across 11 markets in North Central Nigeria, 96.75% reported not having been vaccinated, with lack of prior knowledge, unavailability and fear among the stated reasons.

Screening presents a related but distinct challenge. Screening involves intimate examination or self-sampling, interpretation of results and, when necessary, referral and treatment. Acceptability can therefore be affected by beliefs about cancer causation, modesty, gender of the provider, concerns about privacy, fear of a positive result, anticipated stigma and the practical reliability of the service. A qualitative Nigerian study involving Muslim and Christian women, with one site at the National Hospital in Abuja, identified religious and cultural obligations concerning modesty, provider gender, fear of disclosure, fear of nosocomial infection, lack of awareness, discrimination in hospitals and the need for spousal approval as barriers.

These barriers are not independent. A caregiver may be willing to vaccinate a daughter yet remain unable to do so because a service is unavailable, a health worker does not recommend it, or misinformation from family members creates uncertainty. Similarly, a woman may understand that screening prevents cervical cancer but postpone screening because she cannot afford transport, is concerned about privacy or anticipates an unsympathetic provider. A socio-ecological perspective therefore suggests that acceptance emerges from interactions among individual knowledge, family authority, community norms, service characteristics and wider policy environments.

Qualitative evidence is particularly valuable for this problem because barriers such as embarrassment, fear, religious concerns, distrust and family negotiation are difficult to reduce to predefined questionnaire categories. Qualitative research can illuminate the

language people use to describe HPV, cancer, vaccination and screening; identify who is trusted to provide information; explain why a formally available service remains unused; and reveal how decisions are negotiated within households. However, the literature is fragmented by population, state, prevention stage and study design. A focused scoping review can therefore map what is known, identify evidence gaps and clarify the mechanisms that should inform future primary research and implementation.

1.2 Rationale for the Review

The need for a North-Central-focused synthesis has increased since the introduction of routine HPV vaccination in Nigeria. Earlier literature was generated largely before national routine introduction and therefore often assessed hypothetical willingness, willingness to pay or knowledge rather than real-world programme experience. Newer evidence is beginning to capture implementation, caregiver exposure to vaccine messaging, actual vaccination and health-worker perspectives. A synthesis that places these newer findings alongside earlier qualitative evidence can distinguish enduring barriers from barriers created or amplified by programme implementation.

A second rationale is the linkage between primary and secondary prevention. Vaccination and screening are often researched separately, yet they are components of one cervical-cancer prevention continuum. A woman who was vaccinated in adolescence still benefits from age-appropriate screening, while screening remains essential for women who were never vaccinated. Health-system barriers such as trust, provider communication, availability, privacy and referral can influence both pathways. Examining them together can reveal common leverage points for intervention.

Finally, a scoping review is appropriate because the available evidence includes qualitative studies, cross-sectional surveys, mixed-methods implementation research, national policy documents and programme reports. JBI guidance emphasises that scoping reviews can accommodate heterogeneous evidence and map broad questions where the purpose is to describe the extent, nature and characteristics of evidence rather than calculate a single effect estimate.

1.3 Review Objective

The overall objective was to map and synthesise evidence concerning socio-cultural and health-system barriers to HPV vaccine acceptance and cervical cancer screening in North Central Nigeria, and to identify actionable implications for policy, service delivery, communication and future research.

1.4 Review Questions

1. What socio-cultural factors influence HPV vaccine acceptance and cervical cancer screening in North Central Nigeria?
2. What health-system factors influence access, trust, acceptance and uptake of HPV vaccination and cervical cancer screening?
3. How do family, religious, gender, community and information environments shape preventive decisions?
4. Which barriers appear common across vaccination and screening, and which are intervention-specific?
5. What evidence gaps remain across the seven North-Central jurisdictions and priority populations?

2. METHODS

2.1 Review Design and Reporting Framework

This review was designed as a scoping review using the methodological approach described by Arksey and O'Malley and subsequently refined by Levac and colleagues and the JBI Scoping Review Methodology Group. The reporting structure follows the PRISMA Extension for Scoping Reviews (PRISMA-ScR). The approach was selected because the review seeks to map heterogeneous evidence and clarify concepts and contextual mechanisms rather than estimate the effectiveness of a single intervention.

The review was conceptualised using a population–concept–context structure. The population included adolescent girls, parents and caregivers, women eligible for cervical screening, health workers, community members and relevant decision-makers. The concepts were HPV vaccine acceptance, vaccine hesitancy, vaccination uptake, cervical cancer screening, screening acceptability and barriers. The context was North Central Nigeria, with national Nigerian evidence retained where it provided transferable qualitative or implementation insights relevant to the region.

The information-source process was updated for this manuscript with a structured search framework covering PubMed/MEDLINE, Embase, Scopus, Web of Science, CINAHL and AJOL. Publicly accessible PubMed and AJOL records were independently verifiable during the update, whereas subscription-platform result counts require institutional database access and export. Accordingly, no unverified record counts are presented; the complete search strings, dates, limits and audit notes are provided in Appendix A.

2.2 Eligibility Criteria

Table 1: Eligibility criteria

Criterion	Included	Excluded
Population	Adolescent girls; parents/caregivers; women; health workers; community stakeholders; programme implementers	Studies unrelated to HPV vaccination or cervical screening
Concept	Acceptance, hesitancy, willingness, uptake, beliefs, stigma, norms, access, provider factors, service delivery, screening barriers	Purely clinical efficacy studies without acceptability or access content
Context	North Central Nigeria; national Nigerian studies with clearly transferable findings	Studies outside Nigeria unless used only for methodological or background context
Evidence type	Qualitative, mixed-methods, cross-sectional studies with barrier or acceptability data, reviews, policy and programme documents	Opinion pieces without evidence; duplicate reports
Language	English	Non-English evidence where no reliable translation was available
Time	Evidence available through 10 September 2026	Evidence published after the search cut-off

2.3 Search Strategy and Database Rerun (10 September 2026)

A structured, multi-database search was specified and rerun using a common Population–Concept–Context logic. The population/context block covered adolescent girls, parents or caregivers, women eligible for cervical screening, health workers and community stakeholders in North Central Nigeria. The concept block covered HPV vaccination, vaccine acceptance or hesitancy, uptake, cervical cancer screening, acceptability and socio-cultural or health-system barriers. The geography block included Nigeria, North Central, Abuja, Nasarawa, Plateau, Benue, Kogi, Kwara and Niger.

The target bibliographic sources were PubMed/MEDLINE, Embase, Scopus, Web of Science, CINAHL and African Journals Online (AJOL). The search window was from 1 January 2015 through 10 September 2026. Searches were limited to human evidence and English-language records for consistency with the eligibility criteria. Database syntax was adapted to each platform while preserving the same four core concepts: HPV/vaccination; cervical cancer/screening; acceptance/barriers/qualitative evidence; and Nigeria/North-Central geography.

The updated search was designed to maximise sensitivity rather than to force all concepts into a single long query. The vaccine stream and the cervical-screening stream were therefore searched separately and combined during screening. Truncation and controlled vocabulary were used where supported. Citation chaining was retained as a supplementary identification method, including backward reference checking and forward citation searching for key Nigerian and North-Central studies.

Search execution and verification were documented conservatively. PubMed/MEDLINE and AJOL records were publicly verifiable during the update. Embase, Scopus, Web of Science and CINAHL are subscription interfaces; the exact strings for these platforms are provided in Appendix A, but live result counts were not asserted without a reproducible institutional export. This approach avoids fabrication of PRISMA-ScR counts and preserves an auditable path to final submission.

The update also identified important post-2023 evidence that strengthens the review, including a 2024 Plateau State student study, a 2025 North-Central undergraduate uptake study, a 2025 qualitative caregiver study spanning multiple Nigerian zones, and 2026 national evidence on parental acceptance and early HPV programme implementation. These records were incorporated into the narrative synthesis where they met the conceptual and geographic eligibility framework.

2.4 Study Selection and Data Charting

Titles and abstracts were screened for geographic and conceptual relevance, followed by full-text assessment where accessible. Data-charting fields were developed iteratively and included: author and year; state or geopolitical zone; population; study design; prevention intervention; sample or context; key socio-cultural barriers; key health-system barriers; enabling factors; and implications. Because scoping reviews primarily map evidence, no pooled effect estimate was calculated.

A formal risk-of-bias appraisal is not mandatory for all scoping reviews. Nevertheless, methodological credibility was considered when interpreting evidence. Greater interpretive weight was given to studies with transparent sampling, appropriate qualitative methods, explicit analytic procedures and clear contextual descriptions. The Consolidated Criteria for Reporting Qualitative Research (COREQ) principles were used as

a conceptual guide when assessing the completeness of qualitative evidence.

2.5 Data Synthesis

The evidence was synthesised using descriptive numerical mapping and thematic synthesis. Barriers were organised into six interrelated domains: (1) knowledge and information, (2) beliefs and meaning-making, (3) family, religious and gender norms, (4) trust and communication, (5) access and affordability, and (6) health-system readiness and continuity. Thematic interpretation focused on mechanisms linking barriers to behaviour rather than treating each barrier as an isolated variable.

3. RESULTS

3.1 Characteristics of the Evidence Base

The evidence base is heterogeneous and unevenly distributed. Earlier Nigerian work frequently examined knowledge and willingness, while post-2023 literature increasingly addresses actual vaccination and implementation. North-Central evidence remains concentrated in Kwara State (Ilorin) and broader multi-state samples that include Abuja or Nasarawa, with comparatively less qualitative evidence from Benue, Kogi, Niger and Plateau. This geographical imbalance is itself a major finding because it limits the ability to assume that barriers are identical across the region.

Table 2: Characteristics of key evidence sources

Evidence source	Population / context	Design	Key contribution
John-Akinola *et al*., (2022)	Nigerian evidence across six geopolitical zones	Scoping review	Mapped knowledge, utilisation, willingness, interventions and policy; identified cost, availability, accessibility, socio-cultural and religious barriers
Owoeye *et al*., (2016)	Muslim and Christian women; National Hospital Abuja included	Qualitative (FGDs)	Identified modesty, provider gender, disclosure, infection fears, discrimination, awareness and spousal approval barriers
Akande & Akande (2024)	Undergraduates, North Central Nigeria	Cross-sectional	Very low awareness and uptake; low willingness-to-pay
Onasoga *et al*., (2025)	Female undergraduates, North Central Nigeria	Cross-sectional	Low knowledge and 15% vaccination; behavioural and sexual-health variables associated with uptake
Osueke *et al*., (2025)	400 market women across 11 North-Central markets	Cross-sectional	Low knowledge; 96.75% unvaccinated; knowledge, availability and fear prominent
Caregiver study (2025)	4 830 caregivers; Abuja, Nasarawa, Adamawa	Cross-sectional	Higher vaccination in Nasarawa; motivation, ability, knowledge and exposure to messaging associated with uptake
Onaghinor *et al*., (2026)	Parents across Nigeria; HCW vs non-HCW	Cross-sectional	Highlights knowledge, attitudes and provider-related differences in parental acceptance
Olubayo *et al*., (2026)	52 facilities across five Nigerian states; HCWs	Mixed-methods	Documents inconsistent vaccine availability and contextual determinants of rollout
WHO / UNICEF / IARC	National and global programme context	Policy / programme	Defines elimination targets, vaccine schedules and Nigeria's programme introduction

3.2 Theme 1: Knowledge, Information and Health Literacy

Limited knowledge is the most consistent cross-cutting barrier. The North-Central studies among undergraduates and market women demonstrate that awareness of HPV and its vaccine can remain low even where general health information is relatively accessible. In the tertiary-student study by Akande and Akande (2024), only 15.4% had heard about HPV vaccination and only 2.1% reported receiving a dose. Onasoga *et al*., (2025) similarly found that 68.2% of female undergraduates had low knowledge. Among market women, Osueke *et al*., (2025) found very high non-vaccination alongside low awareness.

Knowledge gaps are not simply deficits in facts. They concern causal understanding: whether HPV is sexually transmitted, whether infection can be asymptomatic, why vaccination is recommended before sexual debut, whether vaccination prevents all cervical cancers, and why screening remains necessary after vaccination. When these concepts are unclear, people may interpret vaccination through existing social narratives about sexuality and morality.

Information source matters. Evidence from Abuja, Nasarawa and Adamawa indicates that exposure to HPV vaccine messaging was strongly associated with vaccination, suggesting that communication reach can alter behaviour when combined with motivation and ability. Campaigns should therefore be evaluated not only by the number of people reached but also by comprehension, credibility, repetition and capacity to convert information into action.

3.3 Theme 2: Misconceptions, Fertility and Sexual Behaviour

HPV vaccination occupies an unusual position because it is routinely offered to adolescents before sexual exposure. This timing is epidemiologically appropriate but socially sensitive. Families may interpret a vaccine against a sexually transmitted infection as an indication that a girl is sexually active or may become sexually permissive. The Nigerian literature, including the 2022 national scoping review, reports concerns about sexual behaviour, infertility and related misconceptions.

These concerns can be understood as moral interpretations of biomedical information rather than simple ignorance. Where sexual-health discussions are constrained, the phrase "HPV vaccine" may be heard without sufficient explanation of the cancer-prevention rationale. Communication that begins with cervical-cancer prevention, uses age-appropriate language and explicitly states that vaccination does not cause sexual activity may be more acceptable than messages that emphasise sexually transmitted infection alone.

Fertility concerns deserve particular attention because reproductive capacity has high social value. Even when a vaccine is medically established as safe, rumours of infertility can rapidly reduce confidence. The most effective response is unlikely to be confrontation; it should combine transparent safety information, trusted clinicians, community leaders, parent-focused dialogue and rapid correction of misinformation.

3.4 Theme 3: Religion, Culture, Modesty and Gender

The qualitative Nigerian screening study provides particularly important evidence for North Central Nigeria because one study site was the National Hospital in Abuja. Participants described religious and cultural obligations concerning modesty, gender of healthcare providers and the acceptability of intimate examinations. Some participants also expressed concerns about disclosure of results and the behaviour of health workers.

Screening can therefore be perceived as a social encounter rather than a neutral technical procedure. For some women, a male provider, an unfamiliar environment or inadequate privacy may be sufficient to delay screening. These concerns interact with religious norms but should not be reduced to religion alone. Gender, age, marital status, previous experiences of healthcare and perceptions of professional respect can be equally important.

HPV vaccination is also embedded in family and religious networks. The decision-maker may be a mother, father, grandparent or other caregiver rather than the adolescent herself. Community and religious leaders may therefore function as either barriers or facilitators. Their role should be framed as trust-building and accurate referral rather than as a substitute for qualified health counselling.

3.5 Theme 4: Parental and Spousal Authority

Decision authority is a recurring mechanism across both interventions. Adolescents generally depend on caregivers for vaccination decisions, while married women may perceive spousal approval as relevant to reproductive-health services. The qualitative screening study specifically identified the need for spousal approval as a barrier.

Parental involvement can be constructive when caregivers receive accurate information and clear programme instructions. It becomes restrictive when uncertainty, misinformation or fear is concentrated in the person who controls consent. Programme design should therefore treat caregivers as a priority audience rather than as a passive administrative step.

Interventions should also recognise that women outside formal schooling or employment settings may be missed by school-centred vaccination approaches. The market-women evidence highlights the importance of informal-sector settings. Market associations, women's groups, faith-based organisations and community outreach can provide alternative routes to caregivers and eligible women.

3.6 Theme 5: Trust, Provider Recommendation and Communication

Trust operates at multiple levels: trust in the vaccine, trust in government, trust in healthcare providers and trust in the information source. Provider recommendation is especially important because the health worker is often the most immediate authoritative source available to a caregiver. Recent national evidence identifies provider recommendation and healthcare engagement as important influences on uptake.

The early implementation study by Olubayo *et al*., (2026) adds a system perspective. It found that 13 of 52 facilities did not record any HPV vaccine availability or uptake during the four-month observation period. Such gaps can undermine confidence even when national policy states that the vaccine is available. A caregiver who travels to a facility and is told that the vaccine is unavailable may attribute the problem to poor quality, government unreliability or hidden danger.

Provider communication should therefore be treated as a programme intervention. Health workers require not only technical training but also communication skills for addressing fertility fears, explaining pre-sexual-debut vaccination and linking vaccination with later screening. This is especially relevant in culturally diverse settings where a one-size-fits-all script may not be persuasive.

3.7 Theme 6: Availability, Affordability, Distance and Service Readiness

Availability is a decisive health-system barrier. The 2025 market-women study reported unavailability as one of the reasons for non-vaccination, while the 2026 implementation study documented facility-level variation in vaccine availability. This indicates that policy availability and point-of-care availability are not equivalent.

Although the Nigerian HPV vaccine programme provides vaccination free through the public system, households can still face indirect costs: transport, time away from work, repeated visits and the cost of seeking information. Screening is even more sensitive to direct and indirect costs because services may be concentrated in higher-level facilities and may require multiple visits.

Geographic access should be interpreted alongside service convenience. A service may technically exist within a state but remain inaccessible to a woman who cannot leave work, lacks transport, is caring for children or anticipates long waiting times. Market-based and community-based services can reduce these opportunity costs when linked to reliable referral and follow-up.

3.8 Theme 7: Privacy, Stigma and Fear of Diagnosis

Screening can generate anxiety because it may reveal a condition associated with sexual transmission or cancer. Fear of a positive result can paradoxically discourage preventive testing. The qualitative Nigerian evidence also identifies fear of disclosure and concerns about discrimination.

Privacy therefore has two meanings: physical privacy during the examination and informational privacy regarding results. Women need confidence that results will not be shared with partners, relatives or community members without permission. Facilities should provide private consultation spaces, clear confidentiality procedures and respectful communication.

Stigma can also influence vaccination. Although HPV vaccination is preventive, its association with sexual transmission may create moral judgement. A cancer-prevention framing, combined with normalisation of vaccination as part of routine adolescent health, can reduce the sense that HPV vaccination is a marker of sexual behaviour.

3.9 Theme 8: Urban–Rural and Population Inequities

North Central Nigeria should not be treated as a single homogeneous population. Abuja has relatively dense health and media infrastructure, while rural areas in other states may face longer travel distances, fewer trained providers and weaker information networks. Informal workers such as market women may be missed by school- and facility-based campaigns.

The caregiver study involving Abuja and Nasarawa demonstrates that within-region differences can be substantial. Reported vaccination was higher in Nasarawa than in Abuja and Adamawa, and exposure to messaging showed a large association with vaccination. These findings suggest that programme performance is shaped not simply by urbanicity but by how motivation, information and service access interact.

Future implementation should therefore use micro-planning at ward level, identify missed communities and track vaccination and screening participation by locality, sex, age, schooling status and other meaningful equity indicators. Community mobilisation should be designed around actual patterns of movement and trust rather than administrative boundaries alone.

3.10 Cross-Cutting Synthesis: Why Acceptance Does Not Become Uptake

The central finding of this review is a recurring acceptance–uptake gap. Individuals may express positive attitudes while failing to vaccinate or screen because behaviour is constrained by interacting social and system conditions. A useful conceptual pathway is: information exposure → interpretation and trust → household or community negotiation → perceived benefit and risk → service availability → ease of access → provider encounter → completion and follow-up. A failure at any point can interrupt the pathway.

Table 3: Cross-cutting barrier domains, mechanisms and potential interventions

Barrier domain	Vaccination mechanism	Screening mechanism	Potential intervention
Knowledge / information	Uncertainty about HPV, timing, safety	Uncertainty about purpose, eligibility and procedure	Repeated plain-language education; trusted messengers
Family / religious norms	Parental approval; sexual-behaviour concerns	Spousal approval; modesty expectations	Caregiver and faith dialogue; gender-sensitive counselling
Trust	Mistrust, rumours, weak provider recommendation	Fear of disclosure or poor treatment	Transparent counselling; confidentiality; respectful care
Availability	Stock-outs; unclear vaccination points	Limited screening sites or equipment	Micro-planning; stock monitoring; integrated outreach

Barrier domain	Vaccination mechanism	Screening mechanism	Potential intervention
Affordability / access	Transport and time costs despite free vaccine	Fees, transport, repeated visits	Decentralised services; community delivery; referral navigation
Fear / stigma	Side-effect and infertility fears	Fear of diagnosis and stigma	Risk communication; peer support; cancer-prevention framing
Continuity	Missed opportunities and weak records	Poor referral or follow-up after positive screen	Defaulter tracing; linked records; clear referral pathways

3.11 Updated Database-Search Evidence

The updated search identified and confirmed additional evidence that materially strengthens the North-Central synthesis. In Plateau State, Rume, Morhason-Bello and Oladokun (2024) reported very low general HPV knowledge among tertiary students, with only 5% demonstrating good knowledge. In another North-Central tertiary study, Onasoga *et al*., (2025) reported low knowledge and 15% prior vaccination among female undergraduates. These findings reinforce the review's central observation that awareness and uptake remain disconnected even in educated populations.

The update also adds newer post-rollout qualitative and implementation evidence. Asaolu *et al*., (2025) found that parents and school administrators viewed HPV vaccination positively for cancer prevention but that misconceptions about transmission and susceptibility persisted. Olubayo *et al*., (2026) documented implementation problems involving facility-level availability and showed that improving coverage requires reliable access, responsive delivery models and socially grounded communication. A 2026 systematic review by Aminu *et al*., synthesised Nigerian evidence and similarly found that limited knowledge, fear of side effects, misconceptions, provider engagement, parental approval, religious or cultural norms, cost and availability were recurrent determinants.

The direction of evidence therefore remains coherent after the update: the principal barriers are neither purely informational nor purely structural. Instead, acceptance is translated into uptake through a pathway involving information, interpretation, household negotiation, provider communication, service readiness, geographic access and follow-up. This reinforces the review's recommendation that North-Central implementation should combine demand-side communication with dependable service delivery rather than treating hesitancy as an isolated individual trait.

Table 5: Additional evidence identified or confirmed in the 10 September 2026 search update

Evidence source	Setting / population	Design	Updated contribution
Rume *et al*., (2024)	Plateau State tertiary institutions; 425 students	Cross-sectional	Only 5% demonstrated good HPV knowledge; low awareness of HPV vaccination.
Onasoga *et al*., (2025)	Female undergraduates, North-Central Nigeria; n=380	Cross-sectional	68.2% had low knowledge; 15% had received HPV vaccine; predictors included age, study level, sexual activity and knowledge.
Asaolu *et al*., (2025)	Parents/caregivers and school administrators; 9 sites in 5 Nigerian zones	Qualitative	Support for cancer-prevention rationale, but persistent misconceptions about transmission and susceptibility.
Aminu *et al*., (2026)	Nigeria; 16 studies, 10,764 participants in systematic review	Mixed-methods systematic review	Acceptance remained much higher than uptake; knowledge, side-effect fears, provider engagement, parental approval, culture, cost and availability were recurrent determinants.
Olubayo *et al*., (2026)	52 facilities in five Nigerian states; health workers and programme data	Mixed-methods	Implementation was affected by facility readiness, availability and delivery context; reliable access and trusted communication were emphasised.

4. DISCUSSION

This scoping review demonstrates that HPV vaccine acceptance and cervical cancer screening in North Central Nigeria are best understood as social and health-system processes rather than isolated individual choices. The findings are consistent with the broader Nigerian literature but add value by bringing together the post-2023 vaccination environment, North-Central-specific studies and qualitative evidence about screening.

The persistent knowledge gap is particularly important. Earlier national evidence already identified low awareness and a mismatch between willingness and practice, while recent North-Central studies continue to report low knowledge and low uptake. The persistence of this pattern after the introduction of a free national vaccine suggests that information alone is necessary but insufficient. If the programme is available but poorly understood, awareness campaigns must be paired with trusted counselling and reliable access.

The finding that messaging exposure is associated with uptake provides a practical bridge between communication and service delivery. However, communication must be credible and repeated. Messages should explicitly explain why girls aged 9–14 years are targeted, that vaccination prevents future HPV-related cancers, that it does not cause sexual activity, and that vaccinated women still need cervical screening later in life. Communication should also anticipate the most common local rumours rather than simply list benefits.

Socio-cultural barriers should not be interpreted as irrational resistance. Concerns about fertility, modesty, sexual behaviour and family authority are rooted in legitimate social values. Public-health interventions become more effective when they work within these values. For example, positioning HPV vaccination as routine cancer prevention and using respected community and religious leaders to endorse preventive health can reduce the perceived conflict between biomedical recommendations and community norms.

The screening findings point to a different but connected challenge. Even a woman who accepts the principle of screening may decline an actual examination if the facility is perceived as unsafe, embarrassing or disrespectful. Gender of provider, privacy, confidentiality and spousal approval can therefore be treated as service-design variables. This implies that screening programmes should monitor client experience alongside screening coverage.

The health-system findings are especially important after the 2023 vaccine introduction. The 2026 implementation study demonstrates that national policy does not guarantee uniform facility readiness. The observation that a substantial minority of sampled facilities recorded no vaccine availability or uptake during the monitoring period indicates that stock management and service readiness can directly influence trust and demand. A community campaign that successfully creates demand may actually damage confidence if people then encounter an unavailable service.

Another implication is the need to integrate vaccination with cervical screening rather than constructing separate vertical programmes. Adolescents and caregivers need information about vaccination; adult women need information about screening; and health workers need to communicate the life-course relationship between the two. The WHO elimination strategy explicitly treats vaccination, screening and treatment as complementary pillars. A Nigerian implementation strategy should similarly connect them through referral, communication and shared community platforms.

The evidence also reveals an important research gap: there are relatively few in-depth qualitative studies conducted across the individual North-Central states. Existing evidence is stronger in Kwara/Ilorin and Abuja/Nasarawa than in Benue, Kogi, Niger and Plateau. Quantitative surveys can identify associations, but they cannot fully explain why similar levels of knowledge produce different decisions across communities. Multi-site qualitative studies using purposive maximum-variation sampling would be valuable.

The review further supports a shift from "vaccine hesitancy" as a broad label toward a more precise distinction among demand barriers, supply barriers and relational barriers. Demand barriers include fear and misinformation. Supply barriers include stock-outs and service availability. Relational barriers include poor provider communication, lack of privacy and household decision-making. Each requires a different intervention. Labelling all of them as hesitancy risks placing responsibility on individuals for failures that are partly produced by the health system.

Finally, equity should be a central implementation principle. The market-women study illustrates the risk of excluding women outside formal educational and institutional settings. School-based approaches can reach many eligible girls but may miss out-of-school adolescents and their caregivers. Community, market and faith-based platforms can complement school and facility delivery, provided they are connected to verified vaccination points and accurate information.

5. Implications for Policy and Practice

5.1 Community and Family Engagement

- Develop state-specific communication packages in locally understood language and culturally appropriate formats, with messages tested through formative qualitative research.
- Engage parents and caregivers before vaccination days, not only when consent is requested.
- Use religious and community leaders as trusted amplifiers of accurate information, while keeping clinical counselling under qualified health professionals.
- Create market, women's-group and community outreach channels to reach caregivers and women outside formal institutions.

5.2 Health-Worker Capacity

- Train providers in HPV vaccine counselling, myth management, respectful adolescent communication and confidentiality.
- Require routine provider recommendation of HPV vaccination during eligible contacts with caregivers and adolescents.

- Train screening providers in privacy, gender sensitivity, trauma-informed communication and clear explanation of results.
- Use supportive supervision and simple job aids to standardise counselling.

5.3 Service Readiness and Access

- Monitor HPV vaccine availability at facility and ward level and rapidly respond to stock-outs.
- Publish or communicate reliable vaccination points and schedules so caregivers do not make unnecessary trips.
- Integrate vaccination outreach with existing immunisation, school-health, maternal-health and community platforms.
- Decentralise screening through appropriate primary-care and outreach models where quality assurance and referral are available.
- Strengthen referral navigation and follow-up after abnormal screening results.

5.4 Communication Strategy

- Use a cancer-prevention frame alongside HPV information.
- Address infertility and sexual-behaviour misconceptions directly and respectfully.
- Use radio, community dialogue, social media and interpersonal communication rather than relying on a single channel.
- Measure communication effectiveness by knowledge, confidence, service utilisation and completion—not exposure alone.

6. Research Gaps and Future Agenda

Table 4: Priority research gaps and recommended designs

Priority gap	Why it matters	Recommended design
Few deep qualitative studies across all North-Central states	Local meanings and barriers may vary by culture, religion and health-system context	Multi-site focus-group discussions and in-depth interviews with maximum-variation sampling
Limited evidence after routine vaccine introduction	Pre-2023 willingness may not reflect real programme experience	Implementation-focused longitudinal qualitative studies
Under-representation of out-of-school girls and informal workers	School-centred strategies may miss vulnerable groups	Community-based participatory research
Limited provider and policy perspectives in North Central	Service barriers may be misclassified as individual hesitancy	Interviews with vaccinators, primary-health-care staff and programme managers
Weak linkage between vaccination and screening research	Life-course prevention is often studied in silos	Integrated cervical-cancer prevention studies
Limited evidence on misinformation pathways	Rumours evolve rapidly across social networks	Digital ethnography combined with social-network-informed qualitative research

7. Strengths and Limitations

The principal strength is the integration of North-Central-specific evidence with national Nigerian and international policy evidence, allowing the review to identify both local mechanisms and system-level determinants. A second strength is the inclusion of evidence generated before and after the 2023 routine HPV vaccine introduction, which helps distinguish longstanding barriers from emerging implementation problems. A third strength is the use of a socio-ecological thematic framework that connects individual beliefs with family, community and service-delivery conditions.

The principal limitation is that live result counts from subscription databases could not be independently exported in this environment. The updated manuscript therefore does not invent numbers for records identified, screened or excluded. The exact database-specific search strings, search date and execution status are documented in Appendix A, and the final PRISMA-ScR flow diagram should be populated from the institutional exports for Embase, Scopus, Web of Science and CINAHL. A second limitation is that some North-Central evidence is quantitative rather than qualitative; it is included because it identifies contextual patterns that help interpret the qualitative findings. Finally, heterogeneity in populations and outcomes prevents quantitative pooling, which is consistent with the purpose of a scoping review.

8. CONCLUSION

The evidence indicates that HPV vaccine acceptance and cervical cancer screening in North Central Nigeria are shaped by an interconnected set of socio-cultural and health-system conditions. Knowledge deficits, misinformation, fertility and sexual-behaviour concerns, modesty, gender norms, family authority, stigma and trust interact with vaccine availability, provider communication, privacy, affordability, distance and referral continuity. The most important policy lesson is that acceptance cannot be separated from service reliability. Communities cannot be expected to trust a prevention programme that is difficult to access or inconsistently delivered.

North Central Nigeria therefore requires a combined demand-and-supply strategy: culturally responsive communication, active caregiver engagement, trusted community partnerships, trained and respectful providers, reliable vaccine availability, accessible screening and strong referral systems. Future qualitative research should move beyond generic measures of hesitancy and examine how decisions are negotiated within households and communities and how health-system experiences reinforce or weaken trust. Such an approach is essential if Nigeria is to translate the promise of HPV vaccination and cervical screening into equitable progress toward cervical-cancer elimination.

DECLARATIONS

Ethics Approval and Consent to Participate: Not applicable. This manuscript is a review of published and publicly available evidence and does not involve new human participants.

Consent for Publication: Not applicable.

Competing Interests: The authors should declare any actual or potential competing interests before submission.

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Data Availability: The data underlying this review are derived from published and publicly accessible sources. The manuscript now includes the complete database-specific search strings and audit log in Appendix A; the final submission should also retain the exported screening log, deduplication file and data-charting file as supplementary material where permitted.

Author Contributions: To be completed according to the target journal's taxonomy (e.g., CRediT).

Protocol Registration: No protocol registration is claimed in this manuscript. If the authors prospectively register the final review protocol, the registration identifier should be added before submission.

PRISMA-ScR Reporting Note

The manuscript is structured to address the PRISMA-ScR domains: title, structured abstract, rationale, objectives, eligibility criteria, information sources, search, selection, data charting, synthesis, results, limitations and implications. The final submission should attach the official 22-item PRISMA-ScR checklist and populate page numbers after the manuscript is formatted to the target journal's style.

Appendix A: Complete Multi-Database Search Strategies and Execution Log

Search update date: 10 September 2026. Coverage: 1 January 2015 to 10 September 2026. Language: English. Population: human. Geography: Nigeria with emphasis on North-Central Nigeria. The strings below are the reproducible database-adapted versions of the four search concepts used in the review.

A1: PubMed/MEDLINE

(("Papillomavirus Vaccines"[MeSH Terms] OR "human papillomavirus"[Title/Abstract] OR HPV[Title/Abstract]) AND (vaccin*[Title/Abstract] OR immuni*[Title/Abstract]) AND (accept*[Title/Abstract] OR hesitan*[Title/Abstract] OR uptake[Title/Abstract] OR willingness[Title/Abstract] OR barrier*[Title/Abstract] OR attitude*[Title/Abstract] OR belief*[Title/Abstract] OR knowledge[Title/Abstract]) AND ("Nigeria"[MeSH Terms] OR Nigeria[Title/Abstract] OR "North Central"[Title/Abstract] OR Abuja[Title/Abstract] OR Nasarawa[Title/Abstract] OR Plateau[Title/Abstract] OR Benue[Title/Abstract] OR Kogi[Title/Abstract] OR Kwara[Title/Abstract] OR Niger[Title/Abstract])) OR (("Uterine Cervical Neoplasms"[MeSH Terms] OR "cervical cancer"[Title/Abstract] OR "cervical neoplasm*"[Title/Abstract]) AND ("Mass Screening"[MeSH Terms] OR screen*[Title/Abstract] OR prevention[Title/Abstract]) AND (barrier*[Title/Abstract] OR accept*[Title/Abstract] OR attitude*[Title/Abstract] OR belief*[Title/Abstract] OR stigma*[Title/Abstract] OR qualitative[Title/Abstract] OR "focus group"[Title/Abstract] OR interview*[Title/Abstract]) AND ("Nigeria"[MeSH Terms] OR Nigeria[Title/Abstract] OR "North Central"[Title/Abstract] OR Abuja[Title/Abstract] OR Nasarawa[Title/Abstract] OR Plateau[Title/Abstract] OR Benue[Title/Abstract] OR Kogi[Title/Abstract] OR Kwara[Title/Abstract] OR Niger[Title/Abstract]))

A2: Embase

(('human papillomavirus'/exp OR 'human papillomavirus':ti,ab,kw OR HPV:ti,ab,kw) AND ('vaccination'/exp OR vaccin*:ti,ab,kw OR immuni*:ti,ab,kw) AND (accept*:ti,ab,kw OR hesitan*:ti,ab,kw OR uptake:ti,ab,kw OR willingness:ti,ab,kw OR barrier*:ti,ab,kw OR attitude*:ti,ab,kw OR belief*:ti,ab,kw OR knowledge:ti,ab,kw) AND ('Nigeria'/exp OR Nigeria:ti,ab,kw OR 'north central':ti,ab,kw OR Abuja:ti,ab,kw OR Nasarawa:ti,ab,kw OR Plateau:ti,ab,kw OR Benue:ti,ab,kw OR Kogi:ti,ab,kw OR Kwara:ti,ab,kw OR Niger:ti,ab,kw)) OR (('cervical cancer'/exp OR 'cervical neoplasm*':ti,ab,kw) AND ('screening'/exp OR screen*:ti,ab,kw OR prevention:ti,ab,kw) AND (barrier*:ti,ab,kw OR accept*:ti,ab,kw OR attitude*:ti,ab,kw OR belief*:ti,ab,kw OR stigma*:ti,ab,kw OR qualitative:ti,ab,kw OR 'focus group':ti,ab,kw OR interview*:ti,ab,kw) AND ('Nigeria'/exp OR Nigeria:ti,ab,kw OR 'north central':ti,ab,kw OR Abuja:ti,ab,kw OR Nasarawa:ti,ab,kw OR Plateau:ti,ab,kw OR Benue:ti,ab,kw OR Kogi:ti,ab,kw OR Kwara:ti,ab,kw OR Niger:ti,ab,kw))) AND [humans]/lim AND [english]/lim AND [2015-2026]/py

A3: Scopus

TITLE-ABS-KEY((("human papillomavirus" OR HPV) AND (vaccin* OR immuni*) AND (accept* OR hesitan* OR uptake OR willingness OR barrier* OR attitude* OR belief* OR knowledge) AND (Nigeria OR "North Central" OR Abuja OR Nasarawa OR Plateau OR Benue OR Kogi OR Kwara OR Niger)) OR (("cervical cancer" OR "cervical neoplasm*") AND (screen* OR prevention) AND (barrier* OR accept* OR attitude* OR belief* OR stigma* OR qualitative OR "focus group" OR interview*) AND (Nigeria OR "North Central" OR Abuja OR Nasarawa OR Plateau OR Benue OR Kogi OR Kwara OR Niger))) AND PUBYEAR > 2014 AND PUBYEAR < 2027

A4: Web of Science Core Collection

TS=(("human papillomavirus" OR HPV) AND (vaccin* OR immuni*) AND (accept* OR hesitan* OR uptake OR willingness OR barrier* OR attitude* OR belief* OR knowledge) AND (Nigeria OR "North Central" OR Abuja OR Nasarawa OR Plateau OR Benue OR Kogi OR Kwara OR Niger)) OR TS=(("cervical cancer" OR "cervical neoplasm*") AND (screen* OR prevention) AND (barrier* OR accept* OR attitude* OR belief* OR stigma* OR qualitative OR "focus group" OR interview*) AND (Nigeria OR "North Central" OR Abuja OR Nasarawa OR Plateau OR Benue OR Kogi OR Kwara OR Niger))

A5: CINAHL (EBSCOhost)

((MH "Papillomavirus Vaccines" OR TI "human papillomavirus" OR AB "human papillomavirus" OR TI HPV OR AB HPV) AND (TI vaccin* OR AB vaccin* OR TI immuni* OR AB immuni*) AND (TI accept* OR AB accept* OR TI hesitan* OR AB hesitan* OR TI uptake OR AB uptake OR TI barrier* OR AB barrier* OR TI attitude* OR AB attitude* OR TI belief* OR AB belief* OR TI knowledge OR AB knowledge) AND (TI Nigeria OR AB Nigeria OR TI "North Central" OR AB "North Central" OR TI Abuja OR AB Abuja OR TI Nasarawa OR AB Nasarawa OR TI Plateau OR AB Plateau OR TI Benue OR AB Benue OR TI Kogi OR AB Kogi OR TI Kwara OR AB Kwara OR TI Niger OR AB Niger)) OR ((MH "Cervical Cancer" OR TI "cervical cancer" OR AB "cervical cancer") AND (MH "Mass Screening" OR TI screen* OR AB screen* OR TI prevention OR AB prevention) AND (TI barrier* OR AB barrier* OR TI accept* OR AB accept* OR TI attitude* OR AB attitude* OR TI belief* OR AB belief* OR TI stigma* OR AB stigma* OR TI qualitative OR AB qualitative OR TI "focus group" OR AB "focus group" OR TI interview* OR AB interview*) AND (TI Nigeria OR AB Nigeria OR TI "North Central" OR AB "North Central" OR TI Abuja OR AB Abuja OR TI Nasarawa OR AB Nasarawa OR TI Plateau OR AB Plateau OR TI Benue OR AB Benue OR TI Kogi OR AB Kogi OR TI Kwara OR AB Kwara OR TI Niger OR AB Niger))

A6: African Journals Online (AJOL)

(("human papillomavirus" OR HPV) AND (vaccin* OR immuni*) AND (accept* OR hesitan* OR uptake OR willingness OR barrier* OR attitude* OR belief* OR knowledge) AND (Nigeria OR "North Central" OR Abuja OR Nasarawa OR Plateau OR Benue OR Kogi OR Kwara OR Niger)) OR (("cervical cancer" OR "cervical neoplasm") AND (screen* OR prevention) AND (barrier* OR accept* OR attitude* OR belief* OR stigma* OR qualitative OR "focus group" OR interview*) AND (Nigeria OR "North Central" OR Abuja OR Nasarawa OR Plateau OR Benue OR Kogi OR Kwara OR Niger))

A7: Database execution and audit log

Database	Platform / source	Update date	Verification status	Notes
PubMed/MEDLINE	PubMed / NLM	10 Sep 2026	Publicly verifiable	Relevant Nigerian and North-Central records were confirmed; search logic mapped to Appendix A.
Embase	Elsevier Embase	10 Sep 2026	Institutional export required	Exact database-adapted string documented; live hit count intentionally not fabricated.
Scopus	Elsevier Scopus	10 Sep 2026	Institutional export required	TITLE-ABS-KEY syntax documented; Scopus supports Boolean and proximity operators and field codes.
Web of Science	Clarivate Web of Science Core Collection	10 Sep 2026	Institutional export required	TS (Topic) syntax documented; final hit count should be copied from the database history.
CINAHL	EBSCOhost CINAHL	10 Sep 2026	Institutional export required	Subject-heading and title/abstract syntax documented; final hit count should be exported.
AJOL	African Journals Online	10 Sep 2026	Publicly verifiable	Relevant Nigerian/African records were confirmed; exact search logic documented.

A8: Reproducibility note for final PRISMA-ScR reporting

The manuscript intentionally does not invent database hit counts. For journal submission, the exported results from Embase, Scopus, Web of Science and CINAHL should be imported into the reference-management/screening environment, deduplicated, screened independently by at least two reviewers, and used to populate the final PRISMA-ScR flow diagram. PubMed/MEDLINE and AJOL records can be rechecked against the public search histories on the stated date. The final supplementary file should retain the search strings, database names, dates, filters, export files and screening decisions.

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