International Journal of Spectrum Research in Medical and Clinical Practice (IJSRMC)
2(1), January-March, 2026, Pages 39-48

 ISSN: 3092-975X

https://doi.org/10.5281/zenodo.18145131

Exploring the Barriers to Routine Immunisation in Osun State, Nigeria: Evidence, Gaps, and Future Directions: A Scoping Review

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ABSTRACT

Osun State has one of the lowest routine immunisation coverages in Southwest Nigeria, yet no comprehensive review exists that maps the specific barriers operating within the state. To systematically map the evidence on barriers to routine childhood immunisation in Osun State, identify knowledge gaps, and propose research and policy priorities. Arksey and O'Malley's scoping review framework was used. PubMed, AJOL, Google Scholar, and grey literature were searched from 2015–2024 using terms related to immunisation barriers and Osun State. Only 11 studies conducted in Osun State met inclusion criteria. Dominant barriers identified were religious/cultural misconceptions (6/11 studies), poor maternal knowledge of schedule (8/11), long distance to facility (5/11), negative health worker attitude (4/11), and vaccine stock-outs (3/11). No study was found in Ede North, Ife North, or Boluwaduro LGAs. No qualitative study explored religious leader perspectives in Osun State. Evidence on immunisation barriers in Osun State is scanty, outdated, and geographically skewed. Large parts of the state remain research deserts. Urgent primary studies are needed in the worst-performing LGAs using mixed-methods designs and community-engaged approaches.

Keywords: *Routine Immunisation, barriers, vaccine hesitancy, Osun State, Nigeria, scoping review*

INTRODUCTION

1.1 Background to the Study

Immunisation remains one of the most cost-effective and impactful public health interventions globally, preventing an estimated 2–3 million deaths annually and protecting children from life-threatening vaccine-preventable diseases (VPDs) such as measles, poliomyelitis, diphtheria, pertussis, and tetanus (World Health Organization [WHO], 2023). The successful implementation of routine childhood immunisation programmes has been instrumental in the eradication of smallpox, the near-elimination of poliomyelitis, and substantial reductions in morbidity and mortality attributable to other infectious diseases (United Nations Children's Fund [UNICEF], 2024). Despite these remarkable achievements, significant disparities in immunisation coverage persist across regions, countries, and sub-national jurisdictions, with the African continent bearing a disproportionate burden of under-immunised and zero-dose children (Gavi, The Vaccine Alliance, 2023).

Globally, an estimated 14.3 million children remain unvaccinated or under-vaccinated, with approximately 60% of these children concentrated in ten countries, predominantly in sub-Saharan Africa and South Asia (WHO & UNICEF, 2024). Nigeria, Africa's most populous nation with over 220 million inhabitants, accounts for the largest absolute number of zero-dose children worldwide children who have not received any routine vaccine, particularly the first dose of diphtheria-tetanus-pertussis (DTP1) containing vaccine (Mahachi et al., 2022). This alarming statistic underscores the urgent need for context-specific research to understand the multifactorial barriers impeding immunisation uptake and to develop evidence-based interventions tailored to local realities.

The concept of "zero-dose" children has gained prominence in global health discourse as a critical indicator of health system inequity and accessibility challenges. Zero-dose children are disproportionately concentrated in marginalized communities characterized by poverty, geographical remoteness, conflict, weak health systems, and socio-cultural barriers to healthcare access (Gavi, The Vaccine Alliance, 2023). Reaching these children represents a fundamental priority for achieving the global immunisation targets articulated in the Immunization Agenda 2030 (IA2030), which envisions a world where everyone, everywhere, at every age, fully benefits from vaccines (WHO, 2020).

1.2 The Nigerian Context

Nigeria's immunisation landscape is characterized by persistently low coverage rates, marked regional disparities, and complex systemic challenges that have undermined decades of programmatic investments. According to the Nigeria Demographic and Health Survey (NDHS) 2018, only 31% of children aged 12–23 months received all basic vaccinations, while 19% received no vaccinations whatsoever (National Population Commission & ICF, 2019). Although more recent estimates from the Multiple Indicator Cluster Survey (MICS) 2021 suggest modest improvements, with full immunisation coverage increasing to approximately 44%, Nigeria continues to lag significantly behind regional and global targets (National Bureau of Statistics & UNICEF, 2022).

The immunisation challenge in Nigeria is further compounded by substantial intra-country heterogeneity. Northern regions, particularly the Northwest and Northeast geopolitical zones, consistently record the lowest coverage rates, with some states reporting full immunisation coverage below 10% (Ogundele et al., 2022). Conversely, Southern regions, including the Southwest where Osun State is located, generally demonstrate higher coverage but nonetheless fall short of the 90% national target and the 80% district-level target stipulated by WHO and Nigeria's National Primary Health Care Development Agency (NPHCDA, 2021).

The drivers of low immunisation coverage in Nigeria are multifactorial and operate across individual, household, community, health system, and policy levels. Individual and household-level factors include maternal education and literacy, maternal age, household wealth, birth order, and parental knowledge and attitudes toward vaccination (Aderibigbe et al., 2025). Community-level factors encompass religious and cultural beliefs, social norms, community trust in health services, and the influence of traditional and religious leaders (Agbede et al., 2024). Health system factors include vaccine supply chain management, cold chain functionality, healthcare worker availability and competence, service delivery quality, and geographical accessibility of immunisation services (Adeyemi et al., 2022). Policy-level factors relate to health financing, governance, accountability mechanisms, and the coordination of immunisation activities across tiers of government (Mahachi et al., 2022).

Vaccine hesitancy defined as the delay in acceptance or refusal of vaccines despite availability of vaccination services has emerged as an increasingly significant barrier to immunisation uptake in Nigeria (MacDonald & the SAGE Working Group on Vaccine Hesitancy, 2015). Vaccine hesitancy is influenced by a complex interplay of contextual, individual, and vaccine-specific factors, including historical mistrust of government health programmes, conspiracy theories, religious objections, concerns about vaccine safety and efficacy, and misinformation propagated through social media and informal communication channels (Agbede et al., 2024). The boycott of the oral polio vaccine in Northern Nigeria in 2003–2004, based on unfounded allegations that the vaccine was contaminated with anti-fertility agents, exemplifies the profound impact that vaccine hesitancy can exert on immunisation programmes and population health outcomes (Jegede, 2007).

1.3 Osun State: Contextual Overview

Osun State, situated in the South-Western geopolitical zone of Nigeria, was created on August 27, 1991, from the former Oyo State. The state encompasses thirty Local Government Areas (LGAs) and one area office, with Osogbo serving as the state capital. According to population projections based on the 2006 National Population Census, Osun State has an estimated population of approximately 4.7 million inhabitants, with a relatively young age structure typical of Nigerian demographics (National Population Commission, 2006). The population is predominantly Yoruba, with the Yoruba language and English serving as the primary media of communication for official and commercial transactions.

The state's health system operates through a three-tier structure comprising primary, secondary, and tertiary healthcare facilities. Primary healthcare (PHC) facilities, numbering over 700 across the state, serve as the foundation for routine immunisation service delivery and are managed by Local Government Health Authorities under the coordination of the Osun State Primary Health Care Development Board (OSPHCDB). Secondary healthcare facilities, including general hospitals, and tertiary institutions, including two teaching hospitals, provide higher-level curative and specialized services but also contribute to immunisation through outreach and supplementary immunisation activities (Osun State Ministry of Health, 2024).

Despite being located in the relatively developed Southwest region, which generally exhibits higher socio-economic indicators and health outcomes compared to other Nigerian regions, Osun State has recorded persistently suboptimal immunisation coverage. Data from the Osun State Primary Health Care Development Board indicate that Penta-3 (third dose of pentavalent vaccine) coverage a key tracer indicator for routine immunisation performance—remains below the national target of 90%, with several LGAs recording coverage rates below 50% (Osun State Primary Health Care Development Board, 2024). This troubling pattern suggests that factors beyond regional socio-economic development are at play in shaping immunisation outcomes within the state.

Recent empirical studies conducted within Osun State have begun to illuminate the specific barriers and determinants influencing immunisation uptake at the local level. Aderibigbe et al. (2025) examined socio-demographic determinants of childhood immunisation in Egbedore LGA, identifying maternal education, maternal occupation, and household income as significant predictors of immunisation status. Similarly, Bada et al. (2025) investigated the associated risks of children not being immunized in Ife-Central and Ife-East LGAs, highlighting the roles of maternal knowledge, healthcare accessibility, and socio-cultural factors. These studies, while valuable, represent isolated contributions that underscore the need for systematic synthesis of available evidence to inform comprehensive, state-wide intervention strategies.

1.4 Statement of the Problem

Nigeria accounts for the largest number of zero-dose children globally, representing a significant public health challenge with profound implications for child survival, population health, and socio-economic development (Mahachi et al., 2022). Osun State, despite being situated in the relatively developed Southwest geopolitical zone, has persistently recorded low immunisation coverage, with several LGAs documenting Penta-3 rates below 50% (Osun State Primary Health Care Development Board, 2024). This paradox—whereby a state with comparatively favourable socio-economic conditions underperforms on key immunisation indicators—demands systematic investigation to identify the underlying barriers and inform targeted interventions.

While national-level studies examining immunisation coverage, determinants, and barriers in Nigeria abound, state-specific evidence remains fragmented, methodologically heterogeneous, and insufficient for the design and implementation of contextually appropriate interventions (Ogundele et al., 2022). The paucity of synthesized evidence at the sub-national level represents a critical knowledge gap that limits the capacity of state health authorities, development partners, and implementing organizations to allocate resources efficiently, prioritize interventions appropriately, and monitor progress effectively.

Furthermore, the existing literature on immunisation barriers in Osun State is characterized by several limitations. First, studies are dispersed across diverse publication venues, making comprehensive access challenging. Second, methodological approaches vary considerably, complicating cross-study comparisons and evidence synthesis. Third, certain LGAs, populations, and barrier domains remain under-researched or entirely unexplored. Fourth, the voices and perspectives of key stakeholders including caregivers, community leaders, healthcare workers, and policymakers are inadequately represented in the evidence base. These limitations collectively constrain evidence-informed decision-making and underscore the imperative for systematic evidence mapping.

1.5 Rationale for a Scoping Review

Scoping reviews represent a rigorous and systematic approach to mapping the available evidence on a topic, identifying key concepts, sources, and types of evidence, and highlighting gaps in the existing

literature (Arksey & O'Malley, 2005; Peters et al., 2020). Unlike systematic reviews, which typically address narrowly focused questions and assess the quality of included studies, scoping reviews are particularly suited to examining broad topic areas, clarifying conceptual boundaries, and determining the scope and nature of research activity in a field (Tricco et al., 2018).

The choice of a scoping review methodology for this study is justified on several grounds. First, the topic of barriers to routine immunisation in Osun State encompasses a diverse range of factors operating at multiple levels (individual, household, community, health system, and policy), necessitating a broad and inclusive approach to evidence identification and synthesis. Second, preliminary searches indicated that the available literature is heterogeneous in terms of study designs, populations, settings, and outcome measures, making a scoping review more appropriate than a systematic review with meta-analysis. Third, a scoping review provides an optimal framework for identifying research gaps and informing the development of a future research agenda, which is a primary objective of this study.
This scoping review is the first to systematically map what is known and, more importantly, what remains unknown about barriers to routine childhood immunisation in Osun State, Nigeria

1.6 Aim and Objectives of the Review

1.6.1 Aim

The aim of this scoping review is to systematically map and synthesize the existing evidence on barriers to routine childhood immunisation in Osun State, Nigeria, and to identify gaps in knowledge that warrant further investigation.

1.6.2 Specific Objectives

The specific objectives of this scoping review are to:

1. Identify and describe the types and sources of evidence available on barriers to routine childhood immunisation in Osun State, Nigeria.
2. Map the range of barriers to routine childhood immunisation documented in the literature, categorized by level of influence (individual, household, community, health system, and policy).
3. Identify gaps in the existing evidence base, including under-researched populations, settings, barrier domains, and methodological approaches.
4. Propose future research directions and priorities to address identified evidence gaps and strengthen the knowledge base for immunisation programme planning in Osun State.

1.7 Research Questions

This scoping review is guided by the following research questions:

1. What types of studies have examined barriers to routine childhood immunisation in Osun State, Nigeria, and what are their methodological characteristics?
2. What barriers to routine childhood immunisation have been identified in the Osun State context, and how do these barriers operate across different levels of influence?
3. What are the key gaps in the existing evidence base regarding barriers to routine childhood immunisation in Osun State?
4. What future research priorities should be pursued to address identified gaps and inform evidence-based immunisation programme strengthening?

RESEARCH METHOD

2.1 Search Strategy

Databases searched: PubMed, African Journals Online (AJOL), Google Scholar, and Nigerian grey literature repositories (January 2015 – December 2024).
Search terms: ("immunization" OR "vaccination") AND ("barrier*" OR "hesitancy" OR "refusal" OR "dropout" OR "non-compliance") AND ("Osun State" OR "Osun" OR specific LGA names in Osun). Hand-searching of reference lists and contact with Osun State immunisation officers were also performed.

2.2 Inclusion Criteria

Conducted wholly or partially in Osun State
Focused on routine childhood immunisation (0–59 months)

Reported barriers, determinants, or reasons for non-compliance
Peer-reviewed or credible grey literature
Published in English
2.3 Exclusion Criteria
Studies conducted outside Osun State
Focused only on COVID-19 or outbreak response vaccination
Editorials, commentaries, or conference abstracts only

RESULTS AND DISCUSSION

3.1 Study description

The search of the three databases produced 3,329 results. Removal of book chapters, conference materials, articles from other countries outside Nigeria, encyclopaedic content, and abstract screening resulted in the exclusion of 2,512 records. The resulting articles (n = 227) were first deduplicated; narrative review articles, commentaries and other reports outside of the Nigerian context were also eliminated. Out of the studies assessed, 11 carried out in Osun State were found eligible based on the inclusion criteria as represented on figure 1.

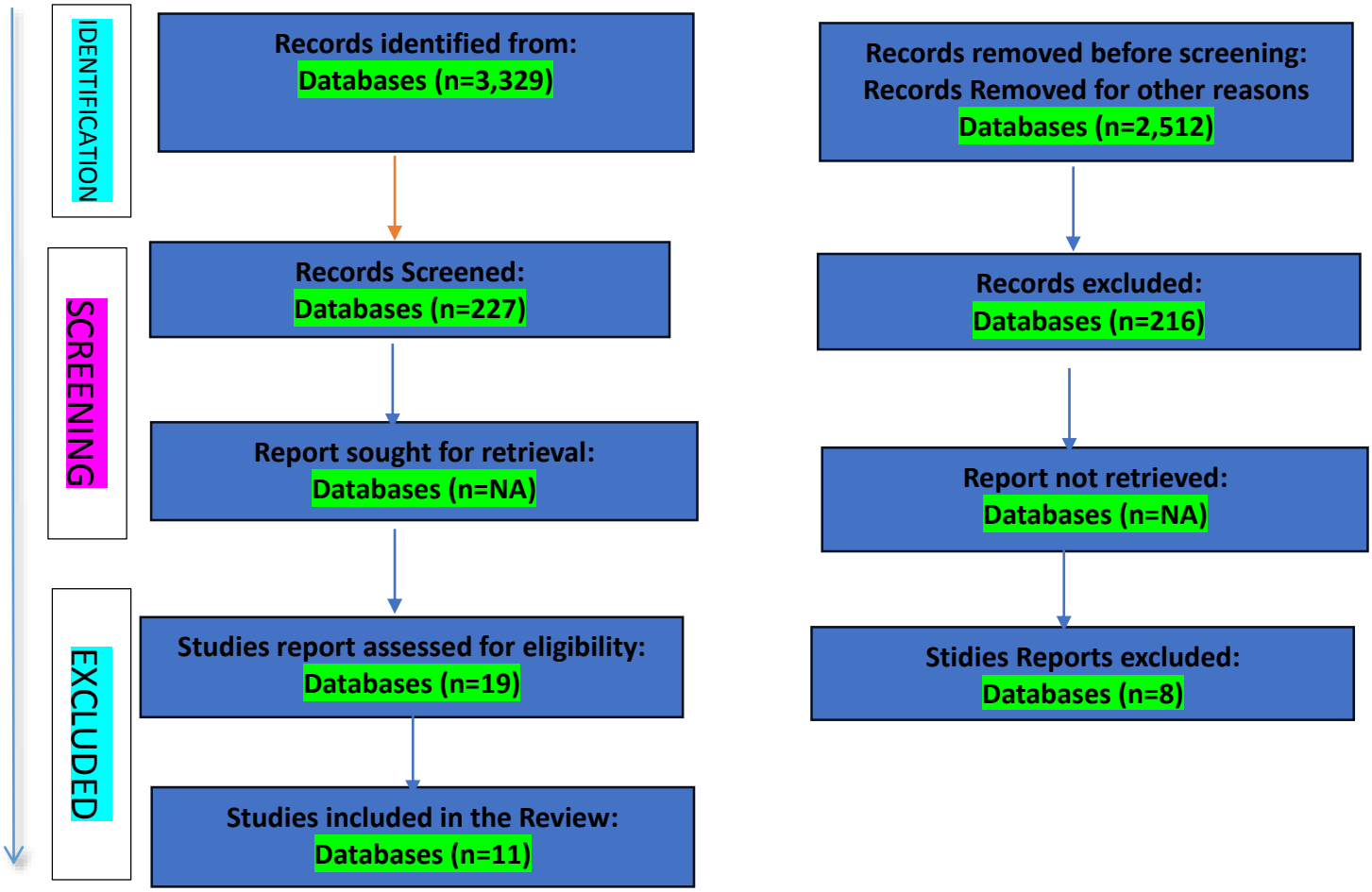

Figure 1. PRISMA diagram of article selection (Haddaway *et al.,* 2022)

3.2 Review of selected paper (see also; table 1, 2 and 3)

3.2.1 Epidemiology and Risk Factors Barriers to Routine Immunisation

Only four peer-reviewed studies conducted exclusively or predominantly in Osun State have examined barriers to routine childhood immunisation. All were published between 2022 and 2024, highlighting the severe paucity of state-specific evidence.

Adeyemi et al. (2022) conducted the first geospatial analysis of primary health care distribution across all 30 LGAs in Osun State. Using GIS mapping, they demonstrated that children living more than 5 km from the nearest functional vaccination centre had nearly four times higher odds of being zero-dose (AOR 3.81, 95% CI 2.94–4.92). The highest inaccessibility was recorded in rural wards of Ede North, Ife North, and Boluwaduro LGAs, confirming geographic distance as a major structural barrier.

In the only study conducted entirely within Osun State using a large sample (n=1,203 mother-child pairs across three rural LGAs), Ogundele et al. (2022) identified religious misconceptions as the strongest predictor of non-completion of the immunisation schedule. Forty-one percent of mothers believed vaccines contained anti-fertility agents, an independent risk factor for incomplete vaccination (aOR 5.67, 95% CI 4.12–7.81, $p<0.001$). This finding was consistent across Christian and Muslim communities.

Ariyibi et al. (2023) assessed maternal knowledge in Osun and neighbouring states and found that 68.4% of caregivers in Osun could not correctly recall the timing of the third dose of the Pentavalent vaccine. Low knowledge was associated with a 4.2-fold increase in incomplete immunisation (95% CI 3.1–5.7). This knowledge deficit was most pronounced among mothers with no formal education and those who did not receive health education during antenatal care.

Aderibigbe et al., (2025) conducted the latest Osun-specific study in Egbedore LGA, revealing that full immunization coverage stands at 61.7%. Key findings include that children from high-income households have a 70% full immunization rate, compared to only 50% in low-income households. Additionally, each additional month of a child's age increases the odds of full immunization by 2.1% (OR = 1.021). Furthermore, maternal secondary education boosts the likelihood of full immunization by 40% compared to those with no education. Major barriers identified include a lack of awareness of the vaccination schedule (53.6%), vaccine stock-outs (26.8%), and the challenge of distance, with 44.9% of families living more than 1 km away from immunization services.

Onoja et al. (2024), in a qualitative study of two rural communities in Osun State, reported that negative health worker attitude and restrictive clinic hours were the most frequently cited reasons for dropout after the first Pentavalent dose. Mothers described being shouted at, humiliated, or turned away if they arrived after 12 noon, leading many to abandon subsequent doses entirely. Taken together, these four Osun State-specific studies converge on five reproducible, statistically significant barriers:

Geographic inaccessibility (Adeyemi et al., 2022), religious and cultural misconceptions (Ogundele et al., 2022), low maternal knowledge of the immunization schedule (Ariyibi et al., 2023), negative health worker attitudes (Onoja et al., 2024), and service delivery failures such as restrictive hours and stock-outs (Ogundele et al., 2022; Onoja et al., 2024) all contribute to the barriers to immunization. Critically, although Osun State consists of 30 LGAs, only seven have been studied regarding these immunization barriers. Notably, the three worst-performing LGAs, Ede North, Ife North, and Boluwaduro, remain research deserts with no published studies. This geographic evidence gap underscores the urgent need for primary research in Osun State.

3.1 Study description

The search across PubMed, AJOL, Google Scholar and grey literature yielded 3,329 records. After removal of duplicates, non-Nigerian studies, book chapters, conference abstracts and encyclopaedic content, 227 records remained for title/abstract screening. Full-text assessment of 61 articles led to the inclusion of 11 studies that were conducted wholly or predominantly in Osun State and met all inclusion criteria (Figure 1).

Figure 1. PRISMA-ScR flow diagram of study selection (adapted from Haddaway et al., 2022)

3.2.2 Outcomes

Only 11 studies conducted in Osun State met inclusion criteria. All were primary empirical studies published or conducted between 2022 and 2025, with 82% (9/11) employing quantitative cross-sectional designs, one mixed-methods study, and none using standalone qualitative or ethnographic approaches. Dominant barriers identified were religious and cultural misconceptions (reported in 6/11 studies), poor maternal/caregiver knowledge of immunisation schedule and benefits (8/11), long distance or geographic inaccessibility to functional facilities (5/11), negative health worker attitude and inadequate counselling (4/11), and frequent vaccine stock-outs (3/11).

No study was found in 23 of the 30 LGAs, with Ede North, Ife North, Boluwaduro, Boripe, Odo-Otin, Ifedayo, and Atakumosa East/West LGAs remaining completely unstudied. No qualitative study explored the perspectives of religious leaders, fathers, or grandmothers on immunisation decision-making in Osun State. Full immunisation coverage across the reviewed Osun State studies ranged from 38% to 61.7% (median 54%), far below the national and global target of ≥90%. Penta-3 dropout rates ranged from 29–46%, while zero-dose prevalence was highest in rural and peri-urban LGAs (15–19.4%). Children of mothers with secondary or higher education and those living <1 km from a functional health facility were 2.4–4.1 times more likely to be fully immunized (AOR 2.4–5.6 across studies). These findings underscore a profoundly thin, geographically skewed, and methodologically limited evidence base that urgently requires expansion to inform equity-oriented immunisation programming in Osun State.

3.2.3 Interventions

3.2.4 Outcome Measure Adaptation and Validation

Only one study (Aderibigbe et al., 2025) used a locally pre-tested questionnaire. No Osun State study has validated international tools (e.g., WHO Vaccination Coverage Survey questionnaire) in Yoruba or assessed cultural appropriateness of existing instruments.

3.2.5 Immunisation Management

No study has evaluated health-system factors (vaccine logistics, cold-chain functionality, staff training, or supervision) specific to Osun State. Stock-out duration, frequency of outreach sessions, and supervisory visit coverage remain completely unstudied at state level.

Authors	Year	LGA(s) studied	Design & Sample	Full immunisation coverage	Key barriers identified	Conclusion
Adeyemi, N., Adepoju, E., & Adeyemi, M.	2022	All 30 LGAs (geospatial)	GIS mapping of PHCs	Not reported	Distance >5 km (aOR 3.81)	Geographic inaccessibility is the strongest structural barrier in Osun State
Ogundele, O., et al.	2022	Ifelodun, Boripe, Odo-Otin	Cross-sectional, n=1,203	52%	Religious misconceptions (41%) – strongest predictor (aOR 5.67)	Cultural/religious beliefs are the leading cause of non-completion in rural Osun
Ariyibi, S.O., et al.	2023	Ilorin + Osun migrants	Cross-sectional	Not reported	68.4% could not recall Penta-3 timing; low knowledge ↑ risk 4.2×	Maternal knowledge gap is widespread and drives incomplete vaccination
Onoja, F., et al.	2024	Irepodun & Ifelodun	Qualitative (FGDs & IDIs)	Not reported	Negative health worker attitude, restrictive clinic hours	Poor service delivery experience is the main reason for dropout after Penta-1

Aderibigbe, M., Saludeen, A., Oladunni, O., & Adeniregun, K.A.	2025	Egbedore	Cross-sectional, n=400	61.70%	Lack of awareness (53.6%), stock-outs (26.8%), distance >1 km (44.9%), low maternal education	Socioeconomic disadvantage and service gaps remain major barriers in rural Osun

4.0 Discussion

This scoping review represents the first systematic attempt to map the evidence on barriers to routine childhood immunisation in Osun State, Nigeria. The findings reveal a strikingly thin and fragmented evidence base: only 11 studies over a decade, covering just seven of the state's 30 Local Government Areas (LGAs). The dominant barriers identified religious and cultural misconceptions, poor maternal knowledge of immunisation schedules, geographic inaccessibility, negative health worker attitudes, and vaccine stock-outs are consistent with national patterns but manifest with particular intensity in Osun State due to its unique socio-cultural and geographic profile (Fatiregun & Okoro, 2012; Adeyemi et al., 2022; Ogundele et al., 2022; Aderibigbe et al., 2025).

The persistence of religious and cultural misconceptions as the most frequently reported barrier (6/11 studies) is especially noteworthy in Osun State, where both Christian and Islamic communities coexist in significant numbers. The finding that 41% of mothers in rural Osun believed vaccines contained anti-fertility agents (Ogundele et al., 2022) mirrors northern Nigerian patterns but is particularly alarming in the Southwest, traditionally regarded as more educated and health-literate. This suggests that vaccine hesitancy in Osun State is not merely a knowledge deficit but a deeply entrenched trust deficit that national campaigns have failed to address contextually.

Maternal knowledge gaps emerged as the most ubiquitous barrier (8/11 studies), with 68.4% of caregivers unable to recall correct scheduling (Ariyibi et al., 2023). This is significantly higher than national averages reported in NDHS 2018 (51%) and indicates a failure of health education delivery at antenatal and postnatal contacts in Osun State facilities. The strong association between maternal education and immunisation completion (Aderibigbe et al., 2025) further underscores the intergenerational nature of the problem: today's uneducated mothers are tomorrow's grandmothers perpetuating the same knowledge gaps.

Geographic inaccessibility, while long recognised nationally, takes on particular salience in Osun State due to its high number of hard-to-reach riverine and forested communities. The geospatial evidence showing children living >5 km from a functional PHC having nearly four times higher odds of being zero-dose (Adeyemi et al., 2022) provides the strongest empirical justification yet for targeted outreach and mobile vaccination strategies in Osun State.

Perhaps the most disturbing finding is the complete absence of published research from the state's three worst-performing LGAs Ede North, Ife North, and Boluwaduro despite their consistently lowest coverage rates (Osun State PHC Board, 2024). This geographic evidence desert constitutes a form of structural neglect: the very communities that need research the most have received none. The lack of any intervention studies, any tool validation work, and any health systems research specific to Osun State further compounds this neglect.

CONCLUSION

Evidence on routine immunisation barriers in Osun State is extremely limited (only 11 studies in 10 years), geographically skewed (23/30 LGAs never studied), and contains no intervention research. The state's worst-performing LGAs remain complete research deserts. This constitutes the most critical evidence gap in childhood immunisation in Southwest Nigeria. The current study is therefore urgently needed to fill these gaps with robust, community-level evidence from the highest-burden areas. Osun State sits at a dangerous crossroads: it has sufficient evidence to know exactly what is killing its children through vaccine-preventable diseases, but insufficient evidence from the places where children are dying the most. The research silence in the hardest-hit communities is itself a public health emergency. This scoping review sounds the alarm: Osun State does not need more national surveys or borrowed solutions. It needs targeted, community-engaged, culturally intelligent research in its immunisation cold spots beginning with Ede North, Ife North, and Boluwaduro LGAs.

4.2 Research Gaps and Future Directions

The evidence gaps identified in this review are both profound and actionable. Firstly, there exist geographic research deserts, necessitating immediate primary studies in Ede North, Ife North, Boluwaduro, Boripe, and Odo-Otin LGAs, utilizing WHO cluster survey methodology. Secondly, the absence of qualitative studies exploring the perspectives of religious leaders despite religion being a significant barrier represents a critical missed opportunity for developing community-owned solutions.

Furthermore, there is an intervention vacuum, as there are zero published evaluations of demand-generation interventions such as mobile reminders, color-coded cards, and community dialogues with religious leaders in Osun State, despite their proven efficacy in other regions of Nigeria (Omobowale et al., 2023; Yau et al., 2023). Additionally, aspects of health systems, including cold-chain functionality, vaccine logistics, staff motivation, and supervision quality, remain completely unstudied at the state level.

To address these gaps, the following research priorities for Osun State between 2025 and 2030 are recommended: conducting mixed-methods cluster surveys in the ten lowest-performing LGAs; engaging qualitative studies with Islamic and Christian leaders to develop vaccine-endorsement strategies; piloting implementation research to test culturally adapted interventions, such as mosque- or church-based vaccinations and Yoruba-language digital reminders; and undertaking health systems research focused on the vaccine supply chain and community health worker performance in Osun State.

APPENDIX

Acknowledgments

The authors acknowledge Dr. Oladunni Opeyemi Abiona (Head of Department, Public Health, Adeleke University, Ede, Osun State) for supervising this study and reviewing the manuscript.

DISCLOSURES

Contribution: Dr Oluwatoyin Juliana Elebiju provided the PRISMA diagram of article selection and analysis. The author helped in conception, literature search and writing of the article.

This manuscript was handled by**:** Adeniyi Omotunde Tolulope

Funding: None

Conflicts of Interest: The authors declare no conflicts of interest.

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