

Izehiwa Gertrude Enato



State of neonatal referral system, referral network pathway, and neonatal transport systems in Nigeria: A Narrative review

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Izehiwa Gertrude Enato (✉)
 Institute of Child Health,
 University of Benin,
 Benin City.
 Med-Vical Medical Centre,
 Benin City, Edo State
 Email: Izyenato@gmail.com,
 Izehiwa.enato@uniben.edu

Abstract: Nigeria has the highest neonatal mortality rate in Africa. One major contributing factor, which has been grossly unrecognized is the poor neonatal referral system. The World Health Organisation (WHO) recommends that sick and small newborn infants (SSNIs) should be referred early to higher health care facilities where they can be effectively catered for.

Most of the Health Care Facilities (HCFs) where these infants are delivered either have a Level I neonatal units (NNU) or none at all. WHO has classified NNU into Levels I-IIIb, based on the size, availability of specialists, services and specialised equipment. Following delivery, referral involves just sending (verbally or written) the sick baby to another facility perceived to have the necessary capability to manage that condition at that particular time, without prior communication, stabilisation and appropriate transportation.

This may eventually lead to a sick unstable baby being referred multiple times, thereby worsening the clinical condition and prognosis.

One major hindrance to successful referral leading to a break in the referral chain is lack of referral network pathway. In other words, there is poor organization and distribution of HCFs with Level II-IIIb NNU. To achieve a successful and effective transportation of infants an ideal transport system is also needed.

A comprehensive literature search was conducted to identify relevant peer-reviewed articles on the state of neonatal referral system in Nigeria. The purpose of this review is to bring to the fore the state of neonatal referral system, transport system and referral network pathway in Nigeria.

Keywords: Neonatal Transport, Neonatal referral system, Nigeria, Levels of Neonatal care units, Neonatal referral pathway

Introduction

Nigeria bears one of the highest burden of neonatal mortality globally and ranks among the leading contributors to neonatal deaths globally, second only to India.^{1,2} The neonatal mortality rate (NMR) in Nigeria (41 deaths per 1000 live births) remains unacceptably high, reflecting persistent gaps in the healthcare system. Several factors have been identified by policymakers, the Federal Ministry of Health (FMoH), and the World Health Organization (WHO) as key contributors to this burden: including weak health systems, poverty, inadequate infrastructure, and harmful socio-cultural practices.^{1,3}

One critical but often under-recognized contributor to neonatal mortality in Nigeria is the poorly developed and inefficient referral system in the country. Effective referral systems are essential to ensure that sick and small newborn infants (SSNIs) receive timely and ap-

propriate care. The World Health Organization recommends early referral of high-risk neonates to facilities with the capacity to provide specialised neonatal care.³ However, this recommendation is often not adequately implemented in Nigeria.

In developed countries where pregnancies are largely supervised by professional health care personnel, early in-utero transfer of high risk pregnancies to highly specialised facilities for managing sick newborns and maternal complications is the safest and most reliable referral pathway for at risk newborns.⁴ On the contrary, in Nigeria, a significant proportion (over 60%) of deliveries are unsupervised by trained health care professionals; most of these deliveries occur at home or by traditional birth attendants (TBAs).^{5,6} In addition, a significant proportion of newborns are delivered in primary and secondary health care facilities and maternities,⁷ which lack the capacity to manage neonatal complications, such as

severe prematurity, severe birth asphyxia, and neonatal sepsis; which remain the leading causes of neonatal morbidity and mortality, necessitating timely transfer to higher levels of care.^{2,8}

Neonatal care services are typically categorised into levels based on capacity, level of personnel, services and available equipment/technology. In addition, according to American Academy of Paediatrics (AAP), volume of SSNIs admitted, training, and availability of appropriate newborn transport are also important criteria for classification.^[9] The World Health Organization and the Federal Ministry of Health, (FMOH) Nigeria classify neonatal care into Levels I–IIIb.^{4,10,11}

Level I (Immediate and Essential Newborn Care): This offers the minimum standard of care in all facilities, where newborns are delivered such as primary health care (PHC) facilities, maternities and other private health care facilities (HCF).¹¹ These facilities should be able to give basic newborn care, known as Essential Newborn Care (ENC) provided to all infants, especially stable term and preterm infants (≥ 1500 g) at birth.¹²

Level II (Special Newborn Care Unit): This offers special care for moderately ill neonates or for infants needing intermediate care, such as those delivered at more than 30 weeks gestational age (≥ 1500 g) or stable but low-birth-weight infants. Minimum care offered include, monitoring of sick newborns, Kangaroo mother care (KMC), administration of oxygen, management of hypothermia and hypoglycaemia, phototherapy for jaundiced newborns, feeding babies via alternate feeding methods, and provide non-invasive respiratory support with continuous positive airway pressure (CPAP).¹¹

Level IIIa (Neonatal Intensive Care Unit, NICU): Babies admitted into the NICU, include infants with hemodynamic compromise (shock), apnea, moderate or severe respiratory distress, needing CPAP/High flow nasal cannula oxygen or short-term mechanical ventilation for less than 7 days, very low birth weight (VLBW) < 1.5 kg or delivered at < 30 weeks gestational age; infants with an abnormal neurologic examination (such as hypoxic ischaemic encephalopathy stages I/II/III), infants with seizures, infants requiring an exchange transfusion (for hyperbilirubinemia or polycythemia), total parenteral nutrition for < 7 days.¹¹

Level IIIb (Regional subspecialty unit): This involves highly specialised neonatal care including paediatric surgery. Level IIIb neonatal unit (NNU) should have: the capabilities of level IIIa, additional capabilities and considerable experience in the care of the most complex and critically ill newborn including sub-specialists' team, diverse specialised newborn diagnostic and interventional capacities eg Echocardiography, Computed tomography (CT) scan and Magnetic Resonance Imaging (MRI) scan. Cases admitted into a Level IIIb facility include neonates requiring prolonged ventilation of more than one week and paediatric surgery (pre and post-operative care); those with suspected metabolic or en-

docrine defects, hydrops fetalis, life threatening anomalies and extremely low birth weight (ELBW) < 1 kg, needing total parenteral nutrition for more than one week.¹¹

Despite this classification, most healthcare facilities in Nigeria are unclassified as and operate at levels I and II or lack structured neonatal care units, making referral unavoidable for critically ill newborns delivered in these facilities.^{5,13-14} In addition, neonatal referral should be a coordinated process involving pre-referral stabilisation, effective communication, and safe transportation. However, in practice, this seems not to be the case in Nigeria.^{14,15} The purpose of this review is to highlight the state of neonatal referral system, referral network pathway and neonatal referral transport system in Nigeria; the challenges and to propose feasible, context-specific, and cost-effective solutions aimed at improving neonatal survival outcomes.

Methods

A comprehensive literature search was conducted to identify relevant peer-reviewed articles and research published in English. The electronic databases (PubMed, Scopus, and google scholar), were searched. The search strategy utilised combinations of the following medical subject headings (MeSH) and free-text keywords: “Neonatal Transport”, “Neonatal referral system in Nigeria”, “Levels of Neonatal care units”, “Neonatal referral pathway”.

Standard Neonatal Referral System

An ideal neonatal referral system is a well-coordinated, timely, and patient-centered process, which maintains continuity of care and designed to ensure that sick and small newborn infants (SSNIs) receive timely access to appropriate levels of neonatal services. It is anchored on the stabilisation of the sick neonate by the initiating facility, which also communicates with the mother/family the need for referral and with the receiving facility (providing full referral documentation, and continuous update on patient's condition during transportation), ensuring appropriate preparedness and subsequent hand over of patient to the receiving facility.⁴ The receiving facility takes over complete care of the patient and provides appropriate back referral information to the initiating facility.¹⁶

Pre-referral Stabilisation: Before referral, the neonate should receive Essential newborn care and be adequately stabilized to prevent deterioration during transport. This includes: maintenance of airway, breathing, and circulation, thermal protection (prevention of hypothermia), correction of metabolic derangements, such as hypoglycaemia, and initiation of necessary treatments (such as, antibiotics, vitamin K, oxygen therapy). Evidence shows that proper stabilization significantly improves neonatal

outcomes and reduces mortality.¹⁷

Communication and Coordination: Effective referral requires prior communication between referring and receiving facilities. This involves information on availability of space and resources at the receiving center, and preparedness of the receiving team. Effective communication reduces delays and unnecessary multiple referrals. Standardised referral documentation including referral notes and clinical summaries, and feedback mechanisms are also essential for continuity of care.^{4,17} Additionally, a functional back-referral system allows patients to be returned to lower-level facilities after stabilisation and treatment, optimising resource utilisation.

Organised Referral Network Pathway/System

A neonatal referral network system/pathway refers to a coordinated system linking healthcare facilities across levels of care, ensuring efficient patient flow and resource utilisation. An ideal and effective referral system must operate within a structured and regionalised neonatal care network, where health facilities are stratified according to capability (Levels I-IIIb) with specific roles and responsibilities, and referral pathways are clearly defined. Such systems have been shown to improve neonatal survival in high-income settings and are increasingly advocated in low and medium income countries (LMICs).¹⁷ Referral network systems should involve both public and private health care facilities, especially in LMICs, where the private sector in health contributes a large and growing proportion (40-62%) of health-care services.¹⁸ It has been recommended by WHO to engage private sector in delivering quality maternal, newborn and child health care services.¹⁹

Neonatal Transport System

Neonatal transport is a critical link in the referral chain and should ensure safe, timely, and medically supervised transfer of neonates. Key components include: **Specialised Neonatal Transport Teams:** An ideal system includes dedicated neonatal transport teams comprising trained healthcare professionals skilled in neonatal resuscitation and stabilisation. Health care professionals in the transport team include CHEWs, paramedics, nurses, general practitioners, residents, paediatricians, neonatologists/paediatricians. These teams are responsible for: assessing the neonate prior to transport, providing care during transit and ensuring safe handover at the receiving facility.

Equipped Transportation (Vehicles): Transport vehicles should be specifically designed or equipped for neonatal care. Essential components include transport incubators for thermal regulation, oxygen delivery systems and ventilatory support, monitoring devices (pulse oximeters, temperature monitors) and emergency resuscitation equipment.

Continuous Monitoring and Care: During transport, neonates should be continuously monitored for vital parameters, and appropriate interventions should be provided as needed. This ensures early detection and management of complications such as hypoxia, hypothermia, and hypoglycaemia.

Thermal Protection: Maintaining normothermia using transport incubators and/or trans warmers is critical during neonatal transport. In resource-limited settings, Kangaroo Mother Care (KMC) can serve as an effective alternative when incubators or trans warmers are unavailable.

Standardised Protocols: The implementation of standardised protocols for neonatal transport ensures consistency and quality of care. These protocols should cover stabilisation procedures, communication guidelines, transport logistics, handover processes. Standard operating procedures should guide all aspects of neonatal transport. Implementation of structured neonatal transport systems has been associated with improved outcomes and reduced mortality.¹⁶⁻¹⁷

Focus on Nigeria: State of the Neonatal Referral System, Referral Network Pathways and Transportation in Nigeria.

The neonatal referral system in Nigeria can be widely described as fragmented, inefficient, and poorly coordinated, contributing significantly to adverse neonatal outcomes.

Evidence from multiple Nigerian studies highlights major deficiencies across all stages of referral. A prospective study conducted in Ibadan demonstrated that none of the referring facilities communicated with the receiving hospital prior to referral, and only 42% of neonates had referral documentation, indicating poor coordination and continuity of care.²⁰ Another study done in Rivers State, similarly revealed that 78.6% of referring facilities rarely or never communicated with receiving centers, and no facility had a trained neonatal transport team, underscoring systemic weaknesses.²¹ Furthermore, referral is often initiated without adequate clinical stabilisation, with only 18.2% of neonates receiving resuscitation and 14% receiving oxygen before transfer.²¹ In another study done at The University of Benin Teaching Hospital, Edo State, the receiving facilities were rarely contacted by the referring hospitals; 70.4% were not stabilised prior to transportation, with 40.0% transported from home.²²

The referral process is frequently characterised by delayed decision-making, often due to financial constraints; multiple sequential referrals, leading to treatment delays; and inadequate preparation of neonates prior to transfer. These practices result in neonates arriving at tertiary centers in compromised states, including hypothermia, hypoglycaemia, and severe respiratory distress. Additionally, there is no effective back-referral system, limiting continuity of care after stabilisation and

treatment. The lack of structured referral pathways further compounds inefficiencies, particularly in rural and underserved regions where access to higher-level care is limited.

Referral network system/pathway in Nigeria

A neonatal referral network pathway in Nigeria is largely absent or poorly developed. A recent multicentre study in Southern Nigeria found that no standardised neonatal transport or referral network pathway exists, and healthcare facilities operate largely in isolation.²¹

Key characteristics of and challenges against the current referral network system in Nigeria, include:

Lack of sufficient level II to III NNU: The number of health care facilities that offer Level II/III neonatal intensive care are limited and unevenly distributed in the country. Even amongst these few available, a large proportion is largely privately owned. In a study done ten (10) years ago among 54 HCFs, only 5 (9.3%) of them were level III NNU, with up to 40% being privately owned.²² Despite this high proportion of NNUs being privately owned, these HCFs are usually not included in the referral network pathway/system. This seems to be since it is perceived as statutory that referrals should be made from public (primary or secondary) HCFs to public (tertiary) HCFs whether or not the services, technology, specialised team or bed spaces are available. Thus, most of these babies suffer multiple referrals before eventually arriving at the appropriate facility.

Lack of Regionalisation: There is no formal designation of the few and functional public and private facilities into structured referral tiers with clearly defined roles.²² Although neonatal care is theoretically classified into Levels I–IIIb, this classification is not operationalised into a functional referral network. Lack of classification of these facilities, is the major contributing factor to multiple referrals and thus, late intervention and then mortality.

Absence of Coordination Mechanisms: There are no centralised systems for bed availability tracking, referral coordination and emergency neonatal transport dispatch. As a result, referral decisions are often made without confirmation of receiving facility readiness, leading to inefficiencies and avoidable risks.

Poor Inter-Facility Linkages: Facilities often refer patients based on perceived capability rather than established protocols, leading to: inappropriate referrals, overburdening of public tertiary centers, and delays in accessing the level of definitive care needed. The degree of Inter-facility linkages in LMICs is widely varied, depending on if it is public-public, public-private, private-public or private to private. Establishing referral linkage protocols for private to private linkages may be easier with less bureaucracy and political bottle necks, compared to that encountered in public – private link-

ages.

Inequitable Distribution of Services: In Nigeria, Level II and III neonatal intensive care units (NICUs) are mostly concentrated in urban areas, forcing referrals over long distances. This geographical imbalance contributes to delays and worsened outcomes.

“Unsupervised”/Home deliveries: The preference for home deliveries is high, as up to 60% of women are unsupervised by trained HCWs; this inevitably leads to delayed health-seeking behavior, thereby endangering the lives of the newborn and mother. Interestingly, home deliveries are not being discouraged but such deliveries must always be closely supervised and must be done only in low risk pregnancies; but this is not the case in LMICs.

Socio cultural Factors: In addition, socio cultural beliefs and practices also influence access to level III neonatal services: individuals, families and community leaders would rather exhaust their meager resources in the health care of an ill adult, (especially one who is perceived as the actual/ potential bread winner of the family), instead of on ill newborn babies. Infact, most parents/families of ill newborn infants take succor in telling themselves “we will have another child”. This, has also gone further to influence choices of health care services offered in private facilities in rural settings, as many if not all prefer to invest resources in sick adults or older children with less interest in the SSNIs who need a level II/III neonatal care.

Financial Barriers: Management of a sick newborn in a level II/III NICU can be very expensive and most families affected, tend to be from low or medium income settings, with limited resources to pay out of pocket, which inevitably leads to delayed decision-making. The National Health Insurance Authority (NHIA) and other private health insurance companies cover payment for level II/III services, but this is only available to a small proportion of the population. Although the NHIA and The FMOH have launched the Comprehensive Emergency Obstetric and Newborn Care (CEMoNC) project in several States, its impact is yet to be felt in the Country due to lack of adequate Level II/IIIb NNU in public health facilities. Involving private HCFs with level II/III NNU in the CEMoNC project, will significantly improve its impact in reducing neonatal mortality in Nigeria.

Neonatal transport system in Nigeria

The neonatal transport system is a critical component of the referral chain. However, in Nigeria, it can be widely regarded as underdeveloped, informal, and unsafe. Neonatal transport system in the country has failed at several levels:

Inefficient Modes of Transportation: Transport practices are predominantly non-medical. In the Ibadan study,

43.9% of neonates were transported in private vehicles, 40.6% in commercial vehicles and only 4.0% by ambulance.²⁰ A 2024 study in Rivers State, reported that over 80.0% of neonates were transported by taxis or private cars, with no use of dedicated neonatal ambulances.^[21] Similarly, in Edo State, only 3.5% of neonates were transported by ambulance and over 90.0% were transported in cars.²² In Nigeria, uptake of KMC for neonatal transport is poor, despite its proven benefits in preventing hypothermia during neonatal transport in Nigeria; with high rates of hypothermia reported among referred neonates.⁴

Lack of Skilled Personnel: Most neonates are transported without trained medical personnel. Only 7% were accompanied by healthcare workers in the Ibadan study.^[20] In Edo State, most neonates (88.7%) were accompanied by a health care worker. Even when personnel are present, they often lack formal training in neonatal transport. Notably, no facility in the study in Rivers State had a trained neonatal transport team, highlighting a critical gap in service delivery.²¹

Inadequate Equipment and Monitoring: Essential transport equipment is rarely available: In the study done in Ibadan, oxygen was available in ~3.5% of cases, bag-valve-mask device in 3.7% and incubator use in <1%.²⁰ Similarly, in the study done in Edo State, only 1.8% of cases were monitored.²² In Nigeria, monitoring during transport is virtually non-existent, exposing neonates to preventable complications.

Poor Pre-transport Stabilisation: Pre-transport care is inadequate, contributing to deterioration during transit. Reported complications include hypothermia, hypoglycaemia, seizures, and apnoea. In the Ibadan study, 4.7% of neonates were dead on arrival, reflecting the severity of transport-related risks,²¹ while in Edo State, 26.1% of the referred cases had poor outcome leading to death.²²

Absence of Neonatal Transport Networks: The absence of structured Neonatal Transport Network Services (NTNS) is a defining feature of the Nigerian system. Both studies done in Rivers and Edo States, concluded that the lack of neonatal transport networks is a major contributor to high neonatal mortality, with urgent need for system-level reforms.²¹⁻²²

The neonatal referral system, referral network, and transport system in Nigeria are interdependent, and deficiencies in one component exacerbate failures in others. Poor referral systems lead to delayed decision-making, while weak referral network pathway/system leads to inefficient patient routing and inadequate transport systems results in clinical deterioration during transfer. Together, these factors create a cycle of delayed and suboptimal care, ultimately increasing neonatal morbidity and mortality.

The Way Forward / Solutions

Improving neonatal referral systems in Nigeria requires

multilevel interventions, which include: development and establishment of regionalised referral network pathway/system; as this helps create clear referral pathways, which must be organised and inclusive of private health care facilities. All inclusive facilities will be designated by the level of care (Levels I-IIIb). Strengthening neonatal transport systems is critical and serves as a huge investment in neonatal transport infrastructure. It includes: procurement of equipped neonatal ambulances, establishment of dedicated transport teams, and development of transport protocols and network.

Building capacity through recruiting and training an efficient transport team positively impacts on neonatal outcomes. Continuous professional development programs should be implemented across all levels of care. Another important solution to the poor neonatal referral system in The Country is improving and enhancing-Communication Systems between HCFs and health care workers through the use of mobile health technologies. Simple interventions such as phone-based coordination, mobile applications, and digital referral systems can significantly improve efficiency.

There is an urgent need to develop National guidelines and policies to standardise neonatal referral and transport services in the country. These guidelines could then be easily integrated into the already existing National guidelines and policy on neonatal care and other existing maternal and child health programs. Developing and establishing financial protection mechanisms, such as expanding National, State-based and local health insurance coverage to include transportation and neonatal intensive care for sick newborn infants will enhance the quality of care the newborn receives. In addition, out-of-pocket payments can be reduced through expanding existing free health programmes for maternal health to involve neonatal intensive care services so as to improve access to care and reduce delays in referral and thus neonatal mortality. The impact of Health Education and promotion at the community level cannot be overemphasized. This involves engaging and educating key leaders and decision makers in the community, such as: village leaders, market leaders, community elders, school heads, religious leaders etc. on the benefits of the presence of trained health care workers during delivery, facility-based deliveries and the importance of early and timely referral of sick new born infants to higher levels of care.

Conclusion

The literature consistently demonstrates that neonatal referral, referral network, and transport systems in Nigeria are poorly developed and inadequately coordinated. The absence of structured systems, combined with limited resources and weak health system infrastructure, significantly contributes to poor neonatal outcomes.

References

1. United Nations Inter-agency Group for Child Mortality Estimation (UN IGME). Levels and Trends in Child Mortality. 2023.
2. Federal ministry of health and social welfare. Federal republic of Nigeria. 2025. Available at: <https://health.gov.ng/fg-launches-2024-ndhs-report-unveils-data-on-fertility-child-mortality-others/>. Cited on: May 20, 2026
3. World Health Organization. Standards for improving quality of maternal and newborn care in health facilities. Geneva: WHO; 2016.
4. Watson H, McLaren J, Carlisle N, Ratnavel N, Watts T, Zaima A, et al. All the right moves: why in utero transfer is both important for the baby and difficult to achieve and new strategies for change. *F1000Res* 2020;9:F1000 Faculty Rev-979. doi: 10.12688/f1000research.25923.1.
5. Olarinwa OA, Fortune E, Aboagye RG, Seidu AA, Olagunju OS, Nwagbara UI, et al. Health facility delivery among women of reproductive age in Nigeria: Does age at first birth matter? *Bartels SA, editor. PLoS ONE*. 2021;4;16 (11):e0259250.
6. Ali D. Sociodemographic and Pregnancy Risk Factors Associated with Place of Delivery Among Northern Nigerian Women. 2021. Report No.: 10084. Available from: <https://scholarworks.waldenu.edu/dissertations/10084>. Cited on May 10, 2026
7. National Population Commission (Nigeria), ICF. Nigeria Demographic and Health Survey. 2018. Available at: <https://www.dhsprogram.com/pubs/pdf/fr359/fr359.pdf>. Cited on: May 6, 2026.
8. Oza S, Lawn JE, Hogan DR, Mathers C, Cousens SN. Neonatal cause-of-death estimates. *Lancet Glob Health*. 2015;3:e208–e214.
9. Barfield WD, Papile L, Baley JE, Benitz W, Cummings J, Carlo WA, Kumar P, Polin RA, Tan RC, Wang KS, Watterberg KL. *Pediatrics*. 2012; 130(3):587–597. <https://doi.org/10.1542/peds.2012-1999>
10. Levels of Neonatal Care. WHO. Available at: <https://platform.who.int/docs/default-source/mca-documents/policy-documents/operational-guidance/YEM-CC-31-04-OPERATIONALGUIDANCE-eng-Levels-Of-Neonatal-Care.pdf>. Cited May 5, 2026
11. National Guidelines for Comprehensive Newborn Care. Federal Ministry of Health, Nigeria. Referral levels. November 2021. First Edition. Available at: <https://www.frieslandcampinainstitute.com/uploads/sites/19/2024/02/NGCNC-Nov-2021-First-Edition-08-11-2021.pdf>. Cited on: April 23, 2026.
12. Essential Newborn Care. Available at: <https://www.who.int/teams/maternal-newborn-child-adolescent-health-and-ageing/newborn-health/essential-newborn-care>. Cited on: April 23, 2026
13. Okonkwo IR, Okolo AA, Abulimhen-Iyoha B. Scope of neonatal care services in major Nigerian Hospitals. *Niger J Paediatr*. 2016; 43 (1): 8-13.
14. Ogunlesi TA, Dedeke IOF, Adekanmbi AF. Referral patterns and outcomes of neonatal admissions. *Niger J Paediatr*.
15. Ekwochi U, NdulK, Usuorah CDI, Amadi OF et al. Delays in healthcare delivery to sick neonates in Enugu South-East Nigeria: An analysis of causes and effects. *Journal of Public Health* 2015; 38(2):1-7.
16. Harahap NC, Handayani PW, Hidayanto AN. Barriers and technologies of maternal and neonatal referral system in developing countries: A narrative review. *Informatics in Medicine Unlocked*. 2019;15:2352-9148. Available at: <https://doi.org/10.1016/j.imu.2019.100184>.
17. Ratnavel N. Evaluating and improving neonatal transport services. *Early Hum Dev*. 2013;89(11):851-3. doi: 10.1016/j.earlhumdev.2013.09.004.
18. Private Sector Landscape in Mixed Health Systems. Geneva: World Health Organization; 2020. Available at: <https://www.who.int/publications/i/item/9789240018303>. Accessed 8 April 2026.
19. World Health Organisation. Engaging the private sector in delivering quality maternal, newborn and child health services: a step-by-step workbook to inform analysis and policy dialogue. World Health Organization, 2024. Available at: <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>. Accessed May 7, 2026.
20. Abdulraheem MA, Tongo OO, Orimadegun AE, Akinbami FO. Neonatal transport practices in Ibadan, Nigeria. *Pan Afr Med J*. 2016;24:216. doi:10.11604/pamj.2016.24.216.8651
21. Okorie EMC, Briggs DC, Opara PI, Eneh AU. Neonatal transport network services: Preparedness of healthcare systems in Southern Nigeria. *Niger Med J*. 2024;65(3):332–343. doi:10.60787/nmj.v65i3.471
22. Okonkwo IR, Abulimhen-Iyoha BI, Okolo AA. Newborn Transport Practices: Influence on Newborn Survival in Benin City, Nigeria. *American Journal of Pediatrics*, 2020;6(3):346-352. <https://doi.org/10.11648/j.ajp.20200603.39>