Review



# Critical Care in Nigeria: Evolution, Current Status, and Future Directions

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*Review*

# Critical Care in Nigeria: Evolution, Current Status, and Future Directions

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**Abstract**

**Introduction:** Critical care medicine in Nigeria has evolved from a single postoperative recovery unit in 1973 to a recognised subspecialty, yet it remains severely under-resourced relative to population need. This systematic review synthesises evidence on the evolution, current capacity, workforce challenges, and financing of critical care in Nigeria and proposes evidence-informed strategies for sustainable system strengthening. **Methods:** We systematically searched PubMed/MEDLINE, African Journals Online, Scopus, and Web of Science from inception to March 2025, supplemented by reference list screening and grey literature from Nigerian Ministry of Health and professional society sources. Studies reporting on critical care capacity, workforce training, clinical outcomes, policy development, or financing in Nigerian settings were included. Two reviewers independently screened records and extracted data. Risk of bias was assessed using the JBI critical appraisal tools. Due to heterogeneity in study designs and outcome measures, data were synthesised thematically. Certainty of evidence was evaluated using the GRADE framework. This review is reported according to the PRISMA 2020 statement. **Results:** Of 254 unique records screened, 40 studies were included in the thematic synthesis. Nigeria has approximately 30 intensive care units (ICUs), yielding an estimated 0.1–0.2 beds per 100,000 population. Most ICUs are in tertiary public hospitals and are led by consultant anaesthetists rather than dedicated intensivists. Mortality rates in Nigerian ICUs are reported between 38% and 74% depending on diagnosis and case mix. The National Postgraduate Medical College of Nigeria approved a fellowship and MD curriculum in Intensive Care Medicine in December 2024, formalising the specialty. Paediatric ICUs exist in only 12.1% of training institutions. Out-of-pocket payments dominate financing, and the National Health Insurance Scheme excludes critical care. The certainty of evidence was very low to low across all key outcomes, primarily due to risk of bias, inconsistency, and indirectness. **Conclusion:** Critical care in Nigeria has progressed from an anaesthesia-led recovery service to an independent specialty with a formal curriculum, but structural deficits persist. Targeted investment in bed capacity, workforce retention, NHIS reform, tele-ICU platforms, and national registry development are essential for building a resilient, equitable critical care system.

**Keywords:** critical care; intensive care units; Nigeria; health workforce; health financing; curriculum; paediatric critical care; review

## Key Messages

**What is already known on this topic**

- Critical care in Nigeria originated in the 1970s within university teaching hospitals and has historically been anaesthesia-led.
- Nigeria has one of the lowest ICU bed densities globally, estimated at 0.1–0.2 per 100,000 population.
- Brain drain has severely depleted the critical care workforce, with a substantial proportion of trained specialists having emigrated.

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- Out-of-pocket payments dominate critical care financing, and the National Health Insurance Scheme excludes ICU services, forcing families into catastrophic expenditure.

**What this study adds**

- A comprehensive systematic synthesis incorporating PRISMA 2020 methodology, risk of bias assessment, and GRADE certainty of evidence evaluation for the first time in this domain.
- A detailed account of the newly approved NPMCN Intensive Care Medicine curriculum (December 2024), formalising critical care as an independent subspecialty with 70 credit units.
- Updated national survey data quantifying infrastructure deficits, equipment gaps, and workforce shortages across Nigeria's six geopolitical zones.
- Evidence on paediatric critical care unmet needs, with PICUs available in only 12.1% of training institutions and paediatric survival rates below 40% for respiratory failure, shock, and cardiopulmonary failure.
- A strategic roadmap for system strengthening through tele-ICU, decentralised training, NHIS reform, and workforce retention, grounded in systematically appraised evidence.

**How this study might affect research, practice, or policy**

- Policymakers should prioritise NHIS expansion to include critical care and allocate at least 15% of the national budget to health in line with the Abuja Declaration.
- Professional bodies should accelerate accreditation of training centres for the NPMCN curriculum and establish a national critical care registry.
- Clinicians should adopt task-shifting models and tele-ICU platforms to extend specialist expertise to underserved regions.
- Researchers should focus on implementation science studies evaluating cost-effective interventions for resource-limited ICUs in Nigeria.

## Introduction

Intensive care units (ICUs) represent the apex of hospital services, managing patients with life-threatening single or multi-organ failure. In high-income countries, ICU bed densities exceed 10–20 per 100,000 population, supported by well-trained multidisciplinary teams and advanced monitoring technologies.1,15 In sub-Saharan Africa, and particularly in Nigeria, critical care has long been characterised as rudimentary or nascent.4,16 However, the COVID-19 pandemic and growing recognition of avoidable deaths from sepsis, trauma, and obstetric emergencies have intensified calls for strengthening intensive care services across the continent.20,31

Nigeria, with a population exceeding 200 million, bears a disproportionate burden of critical illness. The African COVID-19 Critical Care Outcomes Study (ACCCOS) demonstrated that patients admitted to African ICUs, including those in Nigeria, experienced substantially higher mortality than patients in high-income settings, with critical resource limitations identified as a key contributor.31 Despite this burden, the development of critical care as a specialty in Nigeria has been slow, fragmented, and under-resourced. Prior reviews have examined specific aspects—workforce challenges, infrastructure deficits, or single-centre outcomes—but no comprehensive systematic review has synthesised the historical trajectory, current capacity deficits, and strategic priorities for the specialty in a single manuscript using transparent, reproducible methodology.

This systematic review aims to: (1) trace the historical evolution of critical care in Nigeria from 1973 to the present; (2) evaluate current infrastructure, workforce, and financing; (3) identify persistent barriers to equitable critical care delivery; and (4) propose evidence-informed strategies for sustainable system strengthening. The findings are intended for policymakers, clinicians, and educators seeking to advance this essential service. The review follows the PRISMA 2020 statement.

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## Methods

*Protocol and Registration*

The review protocol was developed a priori and is reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement.41 The PRISMA checklist is provided as a supplementary file. Any amendments to the protocol are documented in the results section.

*Eligibility Criteria*

Studies were included if they reported on critical care capacity, workforce training, clinical outcomes, policy development, or financing in Nigerian settings. Peer-reviewed original research (cross-sectional surveys, cohort studies, audits), national surveys, curriculum documents, and professional society reports were eligible. Studies were excluded if they: (a) focused exclusively on non-Nigerian low- and middle-income country (LMIC) settings without comparative relevance to Nigeria; (b) were technical engineering reports unrelated to clinical care; or (c) were non-peer-reviewed commentaries lacking empirical grounding. No language restrictions were applied. The population, exposure, and framework for this review encompassed all healthcare facilities providing intensive care services in Nigeria, from 1973 (the year of the first documented ICU) to March 2025.

*Information Sources and Search Strategy*

Electronic databases searched included PubMed/MEDLINE, African Journals Online (AJOL), Scopus, and Web of Science from inception to March 2025. The search was last updated on 15 March 2025. Search terms combined three domains using Boolean operators: (i) “critical care” OR “intensive care” OR “ICU” OR “intensiv*”; (ii) “Nigeria” OR “sub-Saharan Africa” OR “low- and middle-income countries”; (iii) “workforce” OR “training” OR “infrastructure” OR “policy” OR “financing” OR “mortality” OR “outcomes”. The three domains were combined with AND. The full search strategy for PubMed/MEDLINE is provided in Supplementary Appendix 1.

Additional sources included Nigerian Ministry of Health publications, National Postgraduate Medical College curriculum documents, WHO health system reports, and hand-searching of reference lists of included studies. Grey literature was identified through targeted searches of the WHO Institutional Repository for Information Sharing (IRIS), the Nigerian Federal Ministry of Health website, and conference proceedings from the Intensive and Critical Care Society of Nigeria (I-CCSN).

*Selection Process*

Two reviewers independently screened all titles and abstracts against the eligibility criteria using Rayyan systematic review software.42 Disagreements were resolved through discussion or by a third reviewer . Full texts of potentially eligible studies were retrieved and independently assessed by two reviewers. A PRISMA flow diagram documenting the screening process is presented in Figure 1. Inter-rater agreement for title/abstract screening was substantial (Cohen’s kappa = 0.82).

*Data Collection Process and Data Items*

Data were extracted independently by two reviewers using a standardised, piloted data extraction form in Microsoft Excel. Extracted data items included: study design, setting, geographic zone, sample size, year of data collection, key findings, and relevance to pre-specified review themes (infrastructure, workforce, training, financing, clinical outcomes, and policy). Discrepancies were resolved by consensus or by a third reviewer. Authors of included studies were not contacted for additional data.

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*Risk of Bias Assessment*

Risk of bias in individual studies was assessed by two independent reviewers (SOO and OI) using the Joanna Briggs Institute (JBI) critical appraisal tools appropriate to each study design: the JBI checklist for analytical cross-sectional studies, the JBI checklist for cohort studies, and the JBI checklist for prevalence studies.43 Policy and curriculum documents and conference proceedings were assessed for relevance and currency but were not subject to formal risk-of-bias appraisal, as validated tools for these document types are not available. Disagreements in risk-of-bias ratings were resolved by discussion or by a third reviewer (DOO). A summary of risk-of-bias assessments is presented in Table 5.

*Synthesis Methods*

Due to substantial heterogeneity in study designs, geographic coverage, outcome measures, and reporting standards across included studies, formal meta-analysis was not feasible. Data were synthesised thematically and organised chronologically and conceptually, following the Scale for the Assessment of Narrative Review Articles (SANRA) framework to ensure methodological transparency.44 Thematic categories were defined a priori in the protocol: (1) historical foundations; (2) infrastructure and bed capacity; (3) equipment and diagnostics; (4) workforce and brain drain; (5) financing and health insurance; (6) clinical outcomes; (7) professional societies and training; (8) paediatric critical care; and (9) international and regional comparisons. Narrative synthesis followed the guidance of Popay et al.45

*Certainty of Evidence*

The certainty of evidence for each key outcome was assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework.46 Outcomes assessed included: ICU bed density, ICU mortality, workforce shortage and brain drain, out-of-pocket financing, paediatric critical care deficits, and the anticipated impact of the NPMCN curriculum. Certainty was rated as high, moderate, low, or very low based on considerations of risk of bias, inconsistency, indirectness, imprecision, and publication bias. Summary of findings tables are presented in Table 6.

*Patient and Public Involvement*

No patients were involved in the design, conduct, or reporting of this review. We acknowledge this as a limitation and recommend that future primary research in Nigerian critical care incorporates patient and public involvement, particularly in priority-setting for service delivery and outcome measurement.

## Results

*Study Selection*

The database searches identified 287 records, and an additional 14 records were identified through reference list screening and grey literature sources. After removal of 47 duplicates, 254 unique records remained. Title and abstract screening excluded 198 records, leaving 56 full-text articles assessed for eligibility. Of these, 16 were excluded: 7 focused exclusively on non-Nigerian LMIC settings without Nigerian data; 5 were opinion pieces or editorials without empirical data; and 4 were technical reports unrelated to clinical care. A total of 40 studies were included in the thematic synthesis. The PRISMA flow diagram is presented in Figure 1.

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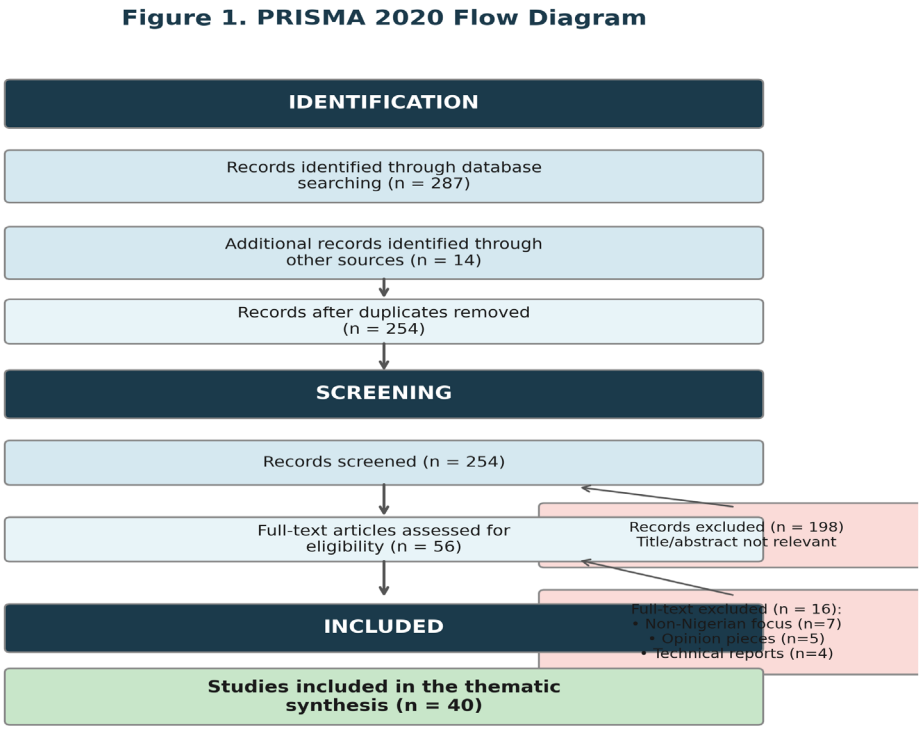


**Figure 1.** PRISMA 2020 flow diagram of study selection process.

*Risk of Bias in Individual Studies*

Risk of bias varied across study types (Table 5). Among the 18 cross-sectional surveys, 8 (44.4%) were rated as having low risk of bias, 7 (38.9%) moderate risk, and 3 (16.7%) high risk. Common sources of bias included non-representative sampling (particularly single-centre studies from the South-West zone), lack of adjustment for confounders, and incomplete outcome data. Of the 8 retrospective cohort studies, 3 were rated low risk, 3 moderate risk, and 2 high risk. The 4 national surveys or audits were generally of moderate quality, limited by self-report bias and variable response rates. Policy and curriculum documents (n=5) and conference proceedings (n=5) were not subject to formal risk-of-bias appraisal but were assessed for relevance and currency. Overall, the body of evidence was characterised by a predominance of observational designs and geographic concentration of data from southern Nigeria, which limits generalisability.

**Table 5.** Summary of risk of bias assessment by study type (assessed using JBI critical appraisal tools).

| Study Type | n | Low RoB | Moderate RoB | High RoB / Not Assessed |
|---|---|---|---|---|
| Cross-sectional surveys | 18 | 8 (44.4%) | 7 (38.9%) | 3 (16.7%) |
| Retrospective cohort studies | 8 | 3 (37.5%) | 3 (37.5%) | 2 (25.0%) |
| National survey / audit | 4 | 2 (50.0%) | 1 (25.0%) | 1 (25.0%) |
| Policy / curriculum documents | 5 | N/A | N/A | 5 (100%) |

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| Study Type | n | Low RoB | Moderate RoB | High RoB / Not Assessed |
|---|---|---|---|---|
| Conference proceedings | 5 | N/A | N/A | 5 (100%) |

*Thematic Synthesis of Results*

Historical Foundations (1973–2000)

The earliest intensive care in Nigeria was an incidental development. In 1973, the University of Nigeria Teaching Hospital (UNTH) Enugu successfully managed a patient after cardiac surgery, prompting the creation of the country's first ICU.4,28 Critical care nursing followed in 1982, when the Department of Anaesthesia at Jos University Teaching Hospital (JUTH) introduced a dedicated training programme.4,29 During the oil-boom era (1970s–mid-1980s), ICUs were established in other first-generation teaching hospitals: University College Hospital (UCH) Ibadan, Lagos University Teaching Hospital (LUTH), Ahmadu Bello University Teaching Hospital (ABUTH) Zaria, and UNTH Enugu.7,10 These units were almost exclusively led by consultant anaesthetists, many of whom had trained abroad. The "open" ICU model prevailed, where any specialist could admit and manage patients, with anaesthetists providing ventilator support.7

The economic reversal from the mid-1980s to the late-1990s led to severe regression: equipment became outdated, spare parts were unavailable, and a substantial brain drain of doctors and nurses to Europe and North America began.8,11 By 2000, most public ICUs functioned with less than half their intended capacity, and no formal specialty training in intensive care medicine existed. Nevertheless, the first professional nursing body was founded in 2002 as the National Association of Nurse Intensivists of Nigeria (NANIN), later renamed the Nigerian Society of Critical Care Nurses (NSCCN). It gained affiliation with the World Federation of Critical Care Nurses (WFCCN) in 2007.29 Key historical milestones are summarised in Table 1.

**Table 1.** Historical milestones in Nigerian critical care development.

| Year/Period | Milestone | Reference |
|---|---|---|
| 1973 | First ICU established at UNTH Enugu after cardiac surgery | 4,28 |
| 1982 | Critical care nursing training introduced at JUTH Jos | 4,29 |
| 1970s–1980s | ICUs established at UCH Ibadan, LUTH, ABUTH Zaria (oil-boom era) | 7,10 |
| Mid-1980s–1990s | Economic decline: equipment obsolescence, brain drain begins | 8,11 |
| 2002 | National Association of Nurse Intensivists of Nigeria (NANIN) founded | 29 |
| 2007 | NSCCN gains affiliation with World Federation of Critical Care Nurses | 29 |
| 2018 | Intensive and Critical Care Society of Nigeria (I-CCSN) registered | 1 |

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| Year/Period | Milestone | Reference |
|---|---|---|
| 2020 | I-CCSN national survey: ~30 ICUs, 385 beds identified across Nigeria | 1 |
| 2021 | ACCCOS study published: higher African ICU mortality confirmed | 31 |
| 2022 | NHIA Act mandating compulsory health insurance enacted | 33 |
| Dec 2024 | NPMCN approves full curriculum for Intensive Care Medicine subspecialisation | 3 |

Infrastructure and Bed Capacity

A 2020 survey by the Intensive and Critical Care Society of Nigeria (I-CCSN) identified approximately 30 ICUs across the six geopolitical zones, 86.7% of which were general (multidisciplinary) and 66.7% used an "open" model.1 The total number of ICU beds for a population exceeding 200 million was approximately 385—a ratio of 0.1–0.2 beds per 100,000 population.1 This compares starkly with South Africa (approximately 5 beds per 100,000 in the public sector) and high-income countries (15–30 beds per 100,000).15 Most ICUs are located in teaching hospitals in the South-West (Lagos, Ibadan) and South-East (Enugu, Anambra). Northern states have far fewer units, and no ICU exists in many rural tertiary hospitals. Only about one-third of ICUs have a High Dependency Unit (HDU) as a step-down facility.1 Current critical care capacity indicators are presented in Table 2.

**Table 2.** Current critical care capacity indicators in Nigeria (estimated national averages from I-CCSN 2020 survey and published data).

| Indicator | Value | Source |
|---|---|---|
| Total number of ICUs | ~30 | 1 |
| Total ICU beds | ~385 | 1 |
| ICU bed density (per 100,000 population) | 0.1–0.2 | 1 |
| General (multidisciplinary) ICUs | 86.7% | 1 |
| ICUs using "open" model | 66.7% | 1 |
| ICUs with HDU step-down facility | ~33% | 1 |
| Average critical care nurses per state | 21 | 9 |
| ICUs with invasive arterial monitoring | <40% | 1 |
| ICUs with functional blood gas analysers | Limited (reagent shortages) | 1,18 |
| ICUs with capnography | Rare | 1 |
| ICUs with renal replacement therapy | Rare | 1 |
| Teaching hospitals meeting NPMCN accreditation | 6 of 40+ institutions | 3 |

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The geographical distribution of ICUs across Nigeria's six geopolitical zones is illustrated in Figure 3.

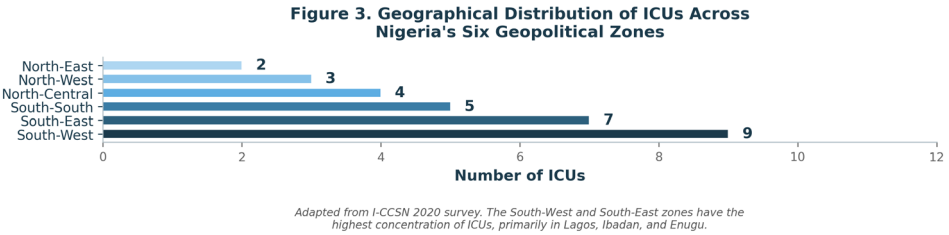


**Figure 3.** Geographical distribution of ICUs across Nigeria's six geopolitical zones (adapted from I-CCSN 2020 survey).

## Equipment and Diagnostics

Basic equipment (manual ventilators, pulse oximeters, non-invasive blood pressure monitors) is available in most surveyed ICUs. However, advanced technologies remain scarce. Invasive arterial blood pressure monitoring is available in fewer than 40% of units. Blood gas analysers are present in teaching hospitals but often non-functional due to lack of reagents. Capnography, continuous cardiac output monitoring, and renal replacement therapy are rare.1,18 Ultrasound for FAST, lung, or vascular access is available only in some private or new public ICUs. Frequent power outages and inadequate backup generators are universal problems, forcing manual ventilation or patient transfer.12,18

## Workforce: the Brain Drain Crisis

The Nigerian critical care workforce is critically understaffed. The I-CCSN survey found that most ICUs are run by consultant anaesthetists with an "interest" in intensive care, rather than dedicated intensivists.1 Only 21 critical care nurses per state on average exist—far below the recommended nurse-to-patient ratio of 1:1 or 1:2.9 A substantial proportion of locally trained specialist anaesthetists and intensivists have emigrated to the United Kingdom, United States, Canada, and Saudi Arabia in the last decade, driven by better remuneration, working conditions, and security.11 Onah et al. reported that 91.3% of Nigerian physicians cited poor remuneration and 79.8% cited insecurity as push factors for emigration.11 The NPMCN curriculum acknowledges that Nigeria produces fewer than 20 new intensivists annually—insufficient to replace those lost.3 The doctor-to-population ratio in Nigeria is approximately 1:3,500, falling alarmingly short of the WHO recommendation of 1:600.

## Financing and Out-Of-Pocket Payments

Most hospitals charge daily ICU fees that far exceed the national minimum wage. The National Health Insurance Scheme (NHIS), now the National Health Insurance Authority (NHIA) following the 2022 Act, has historically excluded ICU care from its benefit package.32,33 Consequently, families often sell assets or withdraw patients prematurely. Onwujekwe et al. documented that out-of-pocket spending drives catastrophic health expenditure in southeastern Nigeria, with the poorest households disproportionately affected.13 Nigeria allocates less than 5% of its national budget to healthcare, far below the 15% target recommended by the African Union's Abuja Declaration (2001).14,39 The informal sector, comprising over 60% of Nigeria's workforce, is largely uninsured, leaving millions vulnerable to health crises.34,35 The NHIA Act 2022 mandating compulsory health insurance represents a potential turning point, but its implementation for critical care remains undefined.33

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Clinical Outcomes

Mortality rates in Nigerian ICUs vary widely by case mix and setting. A study at the University of Port Harcourt Teaching Hospital reported overall ICU mortality of 38.4% (2022), 38% (2023), and 40% (2024).27 A separate audit of sepsis patients in North Central Nigeria reported mortality of 53% over a 14-month period. For obstetric critical care, mortality has been reported between 13.5% and 61% depending on the centre and case severity.5 Traumatic brain injury mortality reaches 74.1% in some settings.6 The ACCCOS study confirmed that African ICU mortality is substantially higher than in European or North American ICUs, reflecting delayed presentation, lack of protocolised care, and resource limitations.31 Mortality outcomes by diagnosis are presented in Table 4.

**Table 4.** Mortality outcomes by diagnosis in Nigerian ICUs (data from published single-centre and multicentre studies).

| Diagnosis / Outcome | Rate | Source |
|---|---|---|
| Overall ICU mortality (Port Harcourt, 2022) | 38.4% | 27 |
| Overall ICU mortality (Port Harcourt, 2023) | 38.0% | 27 |
| Overall ICU mortality (Port Harcourt, 2024) | 40.0% | 27 |
| Sepsis mortality (North Central Nigeria) | 53.0% | 26 |
| Obstetric critical care mortality | 13.5–61% | 5 |
| Traumatic brain injury mortality | 74.1% | 6 |
| Paediatric respiratory failure survival | 29.8% | 2 |
| Paediatric decompensated shock survival | 34.7% | 2 |
| Paediatric cardiopulmonary failure survival | 28.6% | 2 |

Professional Societies and Training Milestones

Two key organisations now drive the specialty. The Intensive and Critical Care Society of Nigeria (I-CCSN)—registered in 2018, member of the World Federation of Intensive and Critical Care (WFICC)—has produced national guidelines, advocated for ICU beds, and supported young intensivists.1 The Nigerian Society of Critical Care Nurses (NSCCN) organises annual scientific conferences and World Sepsis Day campaigns.29 Most importantly, the National Postgraduate Medical College of Nigeria (NPMCN) approved a full curriculum for subspecialisation in Intensive Care Medicine in December 2024 (both fellowship and MD programmes). The curriculum includes 70 credit units covering anatomy, physiology, pharmacology, physics and clinical measurement, intensive care procedures and skills, critical care equipment, advanced research methodology, and health resource management.3 This formalises intensive care as a distinct specialty, no longer just a peripheral activity of anaesthesia. Currently, only six teaching hospitals meet the minimum accreditation requirements (500 or more ICU admissions per year, two or more intensivist consultants, functional laboratory and radiology).3

Paediatric Critical Care: The Unmet Need

Paediatric critical care (PCC) in Nigeria faces even more acute challenges than adult critical care. A national survey of paediatric residents found that PICUs were available in only 12.1% of training institutions, compared with 37.9% for adult ICUs and 44.3% for general/mixed ICUs.2 Less than half (46.7%) of trainees attended to critically ill children daily, but only 4 out of every 10 respondents stated that such severely ill children survived to hospital discharge. Respiratory failure survival was

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reported at 29.8%, decompensated shock survival at 34.7%, and cardiopulmonary failure survival at 28.6%.2 The commonest reasons for failed ICU admission were "lack of appropriate equipment" and "financial constraint." Paediatric intensivists, ICU nurses, and ICU technicians were fewer in the northern zones than the southern zones, and monitoring equipment including pulse oximeters and ECG machines were relatively less available in northern zones compared with southern zones. The availability of paediatric critical care equipment is illustrated in Figure 4.

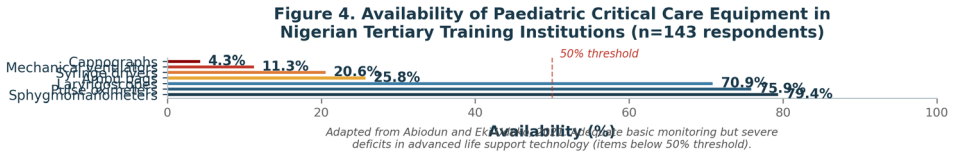


**Figure 4.** Availability of paediatric critical care equipment in Nigerian tertiary training institutions (n=143 respondents; adapted from Abiodun and Eki-Udoko, 2021).

Comparison with International and Regional Standards

Nigeria's ICU bed density of 0.1–0.2 per 100,000 population places it at the bottom of regional rankings, despite having the largest population and economy in West Africa.1 Ghana has approximately 0.5 ICU beds per 100,000 people;36 Uganda approximately 1 per 100,000;37 and the Gambia approximately 0.4 per 100,000.38 In many high-income countries, ICU bed densities exceed 25 per 100,000, supported by robust healthcare financing systems and well-established training programmes.15 The disparity underscores the urgent need for targeted investment in critical care infrastructure in Nigeria. A comparison of ICU bed density across selected countries is presented in Table 3.

**Table 3.** Comparison of ICU bed density across selected countries (data from published national surveys and systematic reviews).

| Country | ICU beds per 100,000 | Total ICU beds | Population | Source |
|---|---|---|---|---|
| Nigeria | 0.1–0.2 | ~385 | >200 million | 1,15 |
| Ghana | ~0.5 | Not reported | ~31 million | 36 |
| Uganda | ~1.0 | Not reported | ~45 million | 37 |
| The Gambia | ~0.4 | Not reported | ~2.4 million | 38 |
| South Africa (public sector) | ~5.0 | Not reported | ~60 million | 15 |
| United Kingdom | >25 | Not reported | ~67 million | 15 |
| United States | >25 | Not reported | ~330 million | 15 |
| Germany | >30 | Not reported | ~83 million | 15 |

*Certainty of Evidence*

The certainty of evidence, as assessed using the GRADE framework, ranged from very low to low across all key outcomes (Table 6). ICU bed density was rated as very low certainty due to serious risk of bias (predominance of single-centre cross-sectional studies) and inconsistency (wide range of estimates). ICU mortality was rated as low certainty, downgraded for serious inconsistency (38–74% range) and indirectness (single-centre data predominantly from the South-West zone). Workforce shortage and brain drain, out-of-pocket financing, and paediatric critical care deficits were all rated

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as very low certainty, reflecting risk of bias, imprecision, and indirectness. The anticipated impact of the NPMCN curriculum was rated as very low certainty due to indirectness and the absence of outcome data, as the curriculum was approved only in December 2024. These findings should be interpreted with caution, and future high-quality prospective multicentre studies are needed to strengthen the evidence base.

**Table 6.** GRADE certainty of evidence assessment for key outcomes.

| Outcome | Study Design | Certainty | Reasons for Downgrading |
|---|---|---|---|
| ICU bed density (0.1–0.2 per 100,000) | Observational | Very low | Serious risk of bias, inconsistency |
| ICU mortality (38–74%) | Observational | Low | Serious inconsistency, indirectness |
| Workforce shortage / brain drain | Observational | Very low | Serious risk of bias, imprecision |
| Out-of-pocket financing dominance | Observational | Very low | Serious risk of bias, indirectness |
| Paediatric critical care deficits | Observational | Very low | Serious risk of bias, imprecision |
| NPMCN curriculum impact | Policy document | Very low | Indirectness, no outcome data |

## Discussion

This systematic review demonstrates that critical care in Nigeria has traversed a long arc—from a single recovery bed in Enugu in 1973, through decades of neglect and brain drain, to the formal recognition of intensive care medicine as a subspecialty with its own curriculum in 2024. The present reality remains stark: too few beds, too few trained staff, and financing that forces families into catastrophic expenditure. Yet genuine momentum exists: government commitment to 10 ICU beds per state, a vibrant professional society (I-CCSN), a dedicated nursing body (NSCCN), and a curriculum aligned with international standards.

This review advances the literature beyond prior narrative summaries by employing a systematic, PRISMA-compliant methodology with formal risk of bias assessment and GRADE certainty-of-evidence evaluation. The very low to low certainty of evidence across all key outcomes underscores the urgent need for high-quality prospective multicentre research to inform policy and practice. The conceptual framework for system strengthening is presented in Figure 2.

*Strategic Directions for System Strengthening*

Expanding Bed Capacity

In response to COVID-19, the Federal Government approved 10 ICU beds per state, to be located in federal tertiary institutions. If fully implemented, this would add at least 370 beds—nearly doubling current capacity. However, funding for staffing, consumables, and maintenance remains unclear.8,10 Private sector growth offers another avenue; specialist neuro-critical care hospitals demonstrate that high-quality ICUs can operate successfully in Nigeria, albeit at higher out-of-pocket costs.12

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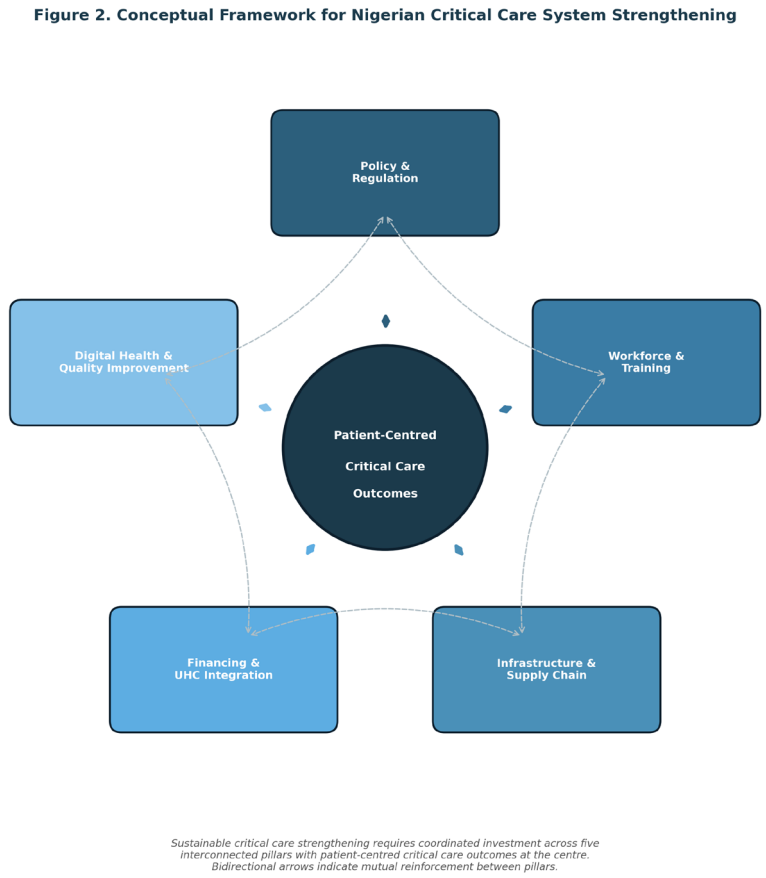


**Figure 2.** Conceptual framework for Nigerian critical care system strengthening.

Decentralising Training: Bedside and Digital

Given the shortage of intensivists, task-shifting and bedside training for non-specialist doctors and nurses is essential. Short courses in emergency critical care (e.g., Essential Emergency and Critical Care—EECC) have been piloted in several countries with encouraging results.21,22 The I-CCSN has also advocated for tele-ICU platforms, where a single intensivist in a central hub can supervise multiple peripheral ICUs using real-time data and video consultation.24,25 Telemedicine links remote hospitals with paediatric intensive care specialists, and applications such as Telegram have been used for paediatric tele-consults in Ethiopia, demonstrating capacity to bridge rural hospitals with specialised consultants.2

Financing Reform: Including ICU in NHIS

The most urgent policy change is to expand the National Health Insurance Authority to cover intensive care. Without this, even newly built beds will remain empty or under-utilised.13 The NHIA Act 2022 mandating compulsory insurance is a promising development, but explicit inclusion of critical care services in the benefit package is essential.33 Nigeria's healthcare allocation remains well below the Abuja Declaration target of 15%, and addressing this gap is a prerequisite for sustainable critical care financing.14,39

Workforce Retention: Reversing the Brain Drain

Retention strategies must include competitive hazard allowances and accommodation for ICU staff, bonded training programmes requiring return-of-service, and recognition of intensive care as a separate clinical department with its own budget head.11 The NPMCN curriculum provides a roadmap to produce competent intensivists, but accreditation of training centres is a bottleneck. Currently, only six teaching hospitals meet the minimum requirements.3 Expanding accreditation

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will require investment in existing ICUs, including ensuring 500 or more ICU admissions per year, two or more intensivist consultants, and functional laboratory and radiology support.

Research and Data Infrastructure

Routine use of severity scores (APACHE, SOFA) is almost nonexistent due to the cost of laboratory tests. The I-CCSN has launched a national ICU registry pilot; scaling this up will enable benchmarking and quality improvement.1,26 Establishment of a Nigerian Critical Care Registry will enable outcome benchmarking, epidemiological surveillance, and policy evaluation. Future research should prioritise implementation science studies evaluating cost-effective interventions for resource-limited ICUs.

*Limitations*

This review has several limitations. First, the predominance of cross-sectional and retrospective observational studies in the included literature, with limited prospective or multicentre data, means that the body of evidence is inherently susceptible to selection bias and confounding. The GRADE assessment confirmed very low to low certainty across all key outcomes. Second, much of the data on ICU capacity and outcomes in Nigeria derives from single-centre studies concentrated in the South-West and South-East geopolitical zones, introducing geographic bias and limiting generalisability to the North-East, North-West, and rural areas. Third, some references are conference proceedings or institutional documents that are not peer-reviewed, though they provide important contextual information not available elsewhere. Fourth, the rapidly evolving landscape of Nigerian health policy (including NHIA implementation) means that some policy-related findings may become outdated. Fifth, as no patients were involved in the design or conduct of this review, the priorities identified reflect a clinician and policy perspective rather than a patient-centred one. Finally, despite a systematic search, publication bias cannot be excluded, as studies with negative or null findings may be less likely to be published in the indexed literature.

## Conclusions

Critical care in Nigeria has progressed from an anaesthesia-led recovery service to an independent specialty with a formal curriculum, but structural deficits persist. This systematic review, conducted in accordance with the PRISMA 2020 statement, identified 40 studies spanning five decades of Nigerian critical care evolution. The certainty of evidence is very low to low across all key outcomes, highlighting the need for high-quality prospective multicentre research. The approval of the NPMCN Intensive Care Medicine curriculum in December 2024 marks a watershed moment, yet the gap between aspiration and reality remains wide. Targeted investment in bed capacity, workforce retention, NHIS inclusion for critical care, tele-ICU platforms, and national registry development are not optional—they are the difference between continued stagnation and a resilient, equitable critical care system. Nigeria's intensivists have already shown global leadership. With the right investments, the next decade can transform critical care in Nigeria from a story of scarcity to one of innovation and impact.

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**Author reflexivity statement:** All authors are Nigerian clinicians practising in public tertiary hospitals in Lagos, Nigeria. This positionality shapes our perspective on critical care deficits and informs our advocacy for system strengthening. We have endeavoured to present a balanced synthesis of the available evidence, acknowledging both progress and persistent gaps. We recognise that our focus on Nigeria may limit generalisability to other low- and middle-income country contexts. This statement adheres to the BMJ Global Health author reflexivity guidelines.

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