

Quackery in Nigeria: A case for Strengthening Health Systems on Regulating Informal Dental Providers

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ABSTRACT

Background: Dental quackery, the provision of dental services by unqualified or unregistered individuals, poses substantial patient safety and governance challenges in low- and middle-income countries (LMICs). In Nigeria, anecdotal and clinical reports suggest widespread informal dental practice, yet systematic health policy analyses are limited. Emerging evidence links informal care to severe clinical outcomes, including markedly increased mortality. This study provides a system-level examination of dental quackery in Nigeria, situating clinical, regulatory, and comparative evidence within a health systems framework.

Methods: A mixed-methods case study design was employed, guided by the WHO Health Systems Building Blocks framework, with governance as the central lens. Three data sources were integrated: (i) clinical data from a Nigerian study documenting preadmission exposure to informal dental care and associated outcomes; (ii) regulatory and policy analysis of instruments including the Medical and Dental Practitioners Act, Code of Medical Ethics, National Oral Health Policy, and allied regulatory frameworks, assessing enforcement capacity, coordination, and accountability; and (iii) comparative evidence from a Selective Review from Nepal and India examining prevalence, utilization patterns, and regulatory gaps. Clinical data were analyzed descriptively and using logistic regression, with mortality as the primary outcome, while regulatory documents were thematically coded using the WHO framework. Comparative analysis employed structured cross-country synthesis to identify recurring drivers and contextual differences.

Findings: Dental quackery in Nigeria is both prevalent and clinically consequential. In the reviewed study, nearly half of patients (46.4%) had teeth extracted by informal providers before hospital presentation, and 82.7% received inappropriate antibiotics from chemists. Mortality was 11.0%, with 96.2% of deaths occurring among patients exposed to quack care; preadmission informal treatment increased odds of death by approximately 29-fold. Structural determinants, including severe workforce shortages (dentist-to-population ratios as low as 1:254,521), maldistribution, high out-of-pocket costs, limited-service integration into primary care, and fragmented regulatory enforcement, facilitate reliance on unregulated providers. Comparative evidence from Nepal and India reveals parallel patterns: low public awareness, affordability-driven demand, and persistent regulatory gaps, although clinical outcomes are less frequently quantified.

Conclusion: Dental quackery in Nigeria is a systemic failure of the health system rather than a series of isolated regulatory breaches. Effective mitigation requires integrated, multi-stakeholder interventions: strengthening workforce capacity and distribution, embedding oral health within primary care, expanding financial protection, improving public awareness of provider qualifications, and enhancing coordination and enforcement across regulatory bodies.

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INTRODUCTION

Oral diseases affect an estimated 3.5 billion people globally and constitute one of the most widespread yet persistently neglected categories of noncommunicable conditions. Their burden falls disproportionately on low- and middle-income countries (LMICs), where health systems are least equipped to respond (GBD 2019 Diseases and Injuries Collaborators, 2020). Despite this, oral health remains marginal in terms of policy priorities, financing, and service delivery (Olatosi et al., 2019; Olujitan et al., 2000; Adeniyi & Oyapero, 2020; Olatosi et al., 2022; Abuhaloob et al., 2024). In many LMICs, expenditure on oral healthcare is negligible, often below US\$2 per capita annually, and in Nigeria, it is estimated at approximately US\$0.7 per capita (World Health Organization. 2023; Shrivastava et al., 2026). This chronic underinvestment has produced not only gaps in access but also deeper structural distortions in how care is sought, delivered, and regulated. One of the most consequential yet under-analyzed manifestations of these distortions is the proliferation of informal healthcare providers. Across LMIC health systems, informal providers are not peripheral actors but are embedded components of care delivery, often functioning as de facto frontline providers in underserved settings (Das et al., 2024). In dentistry, this phenomenon is commonly described as “quackery”, the provision of dental services by individuals who lack recognized training, licensure, or registration, often accompanied by misrepresentations of competence (Akhiwu et al., 2021). While the term carries normative and professional connotations, analytically, it points to a broader governance challenge: the inability of formal regulatory systems to define, control, and enforce the boundaries of legitimate practice.

In Nigeria, these boundaries are formally articulated in the Medical and Dental Practitioners Act (MDPA) CAP M8 (2004), which restricts dental practice to individuals who have completed approved training and are registered with the Medical and Dental Council of Nigeria (MDCN) (MEDICAL AND DENTAL PRACTITIONERS ACT CAP M8. 2004). Under this legal framework, unregistered practice is a criminal offence. However, the persistence and apparent scale of quackery suggest that formal rules are insufficient to ensure compliance. This highlights the critical distinction between regulatory design and effectiveness. It also underscores an important conceptual differentiation: while malpractice involves failures within the formal system, quackery represents the operation of care entirely outside the system. As such, it poses a fundamentally different challenge that cannot be addressed solely through professional discipline or conventional enforcement mechanisms. The Nigerian context illustrates how structural conditions can render regulatory gaps both predictable

and persistent. Although the number of registered dentists has increased in recent years, this growth has not resulted in equitable access. The workforce distribution remains highly skewed, with a concentration of practitioners in the urban and southern regions and severe shortages in the north. Dentist-to-population ratios range from approximately 1:36,425 in the South West to 1:254,521 in the North West, far below the World Health Organization benchmark of 1:10,000 required for basic service coverage.¹² Therefore, formal dental care is not meaningfully available for large segments of the population, particularly in rural and low-income settings. Under such conditions, the emergence and persistence of informal providers is less an anomaly than a systemic adaptation to unmet needs.

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Crucially, the implications of this adaptation extend beyond access to patient safety and clinical outcomes. While informal providers may reduce immediate barriers to care, their practices are frequently characterized by inappropriate procedures, poor infection control, irrational drug use, and delayed referral. Although limited, empirical evidence from Nigeria points to severe consequences. A recent study of patients hospitalized with odontogenic infections found that 46.4% had undergone prior tooth extraction by informal providers, and that exposure to such care was associated with dramatically increased odds of death (OR = 28.9) (Akhiwu et al., 2021). These findings suggest that dental quackery is not merely a regulatory concern or professional grievance but a significant and under-recognized driver of preventable morbidity and mortality.

Despite its apparent scale and consequences, dental quackery remains poorly conceptualized in the health policy literature. Existing work is fragmented, with a tendency to treat quackery either as a legal issue of unlicensed practice or as a clinical problem reflected in the complications. A systems-level analysis that situates quackery within the broader configuration of health system constraints, incentives, and governance failures is largely missing. In particular, there has been limited application of established health systems frameworks to understand how workforce shortages, financing barriers, service delivery gaps, and weak regulatory capacity interact to sustain informal provision. Furthermore, comparative insights from other LMICs, where similar dynamics are observed, have not been systematically integrated into the Nigerian context. This study addresses these gaps by analyzing dental quackery in Nigeria as a manifestation of health system dysfunction, rather than an isolated

aberration. Drawing on the WHO Health Systems Building Blocks framework, this study examines how failures across multiple domains, particularly governance, shape both the supply of and demand for informal dental services. Specifically, this study: (i) characterizes the clinical consequences of quackery using empirical data; (ii) analyses the regulatory framework and identifies enforcement gaps; (iii) maps the structural drivers underpinning informal provision; (iv) compares the Nigerian experience with evidence from Nepal and India to identify common patterns; and (v) proposes policy-relevant interventions grounded in health systems strengthening.

By reframing dental quackery as a systems problem, this study seeks to move the discourse beyond narrow enforcement narratives toward a more comprehensive understanding of how regulation, access, and patient behavior interact in constrained health systems. This approach is essential for designing responses that are not only legally robust but also practically effective and sustainable.

Conceptual Framework: Governance, Regulation, and Informal Provision in Health Systems

This study was guided by the World Health Organization's Health Systems Building Blocks framework, which conceptualizes health systems as comprising six interdependent domains: service delivery, health workforce, health information systems, access to medicines and technologies, financing, and governance (Haines et al., 2004; Siddiqi et al., 2009; WHO, 2010). Rather than treating these domains as discrete, the framework highlights their interactions in shaping system performance. Governance is central to this architecture, encompassing not only formal rules and institutions but also the processes through which they are implemented and enforced in practice. In LMICs, governance is frequently characterized by a gap between policy design and real-world implementation, reflecting the everyday decisions and constraints of multiple actors (Haines et al., 2004; Siddiqi et al. 2009). This perspective is critical for understanding the provision of informal healthcare. The persistence of providers operating outside regulatory frameworks, such as dental quacks, signals not simply regulatory absence but a broader system failure. This reflects the inability of governance arrangements to align service availability, affordability, and enforcement. Accordingly, quackery is conceptualized here not as an isolated legal violation but as an emergent outcome of health system dysfunction.

Regulation as a Complex Adaptive Process

Health systems can be understood as complex adaptive systems in which actors (patients, providers, and regulators) continuously respond to incentives and

constraints. Therefore, regulation is not a linear process of rule-making and enforcement but an adaptive process shaped by these interactions. This has important implications for dental practice. Enforcement-focused approaches that target individual actors assume that noncompliance stems from deviance. However, when informal provision is sustained by structural factors, such as workforce shortages, high out-of-pocket costs, limited-service availability, and weak coordination, such approaches are unlikely to have a lasting impact (Global Oral Health Status Report, 2023; Das et al., 2024). Suppression without system reform may simply displace quackery or push it further underground. Effective regulation in this context requires a system-wide approach. Workforce capacity influences service availability, financing shapes patient choices, and governance determines enforcement capabilities. Therefore, regulation must be embedded within broader health system strengthening strategies to be effective and sustainable. Guided by this framework, this study analyses how interacting failures across health system domains, particularly governance, produce and sustain dental quackery in Nigeria and how coordinated interventions can strengthen regulatory effectiveness.

Methods

Study Design

This study employs a single-country case study design with an embedded comparative analysis. The case study methodology is particularly suited for examining complex, context-dependent phenomena in which causal relationships are difficult to isolate from their surrounding environment. Dental quackery in Nigeria represents a phenomenon situated at the intersection of regulatory systems, health service delivery, and patient behavior. Nigeria was selected as the primary case because of the documented prevalence of informal dental practice and the availability of empirical clinical data linking quackery to adverse health outcomes. To enhance analytical robustness and enable broader inferences, this study incorporated comparative evidence from selected LMIC contexts.

Data Sources

This study draws on three complementary data sources, enabling triangulation across clinical, regulatory, and comparative dimensions. First, clinical evidence was derived from a retrospective analysis of 237 patients admitted to a Nigerian tertiary hospital with odontogenic infections between January 2017 and December 2021 (Akhiwu et al., 2021). The dataset includes detailed information on sociodemographic characteristics, clinical presentation, duration of illness, prehospital care, diagnosis, length of hospital stay, and outcomes. Of particular relevance is the documentation of prior exposure to informal dental care, allowing for the assessment of its association with

clinical severity and mortality. Second, regulatory and policy analyses were based on key governing instruments, including the Medical and Dental Practitioners Act (CAP M8, 2004), the Code of Medical Ethics in Nigeria (2008), the Nigerian Dental Association Constitution, and the National Oral Health Policy (Etiaba et al., 2015). These documents were systematically reviewed to assess the formal architecture of dental regulations and identify gaps in enforcement, coordination, and accountability. Third, due to scarcity of literature, a Selective Review was done to draw comparative evidence from recent peer-reviewed literature across India, Nepal, Nigeria, and other LMIC contexts to situate the findings within broader health system dynamics. On the demand side, community-based research from India documents low public awareness, widespread utilization, and socially embedded perceptions of dental quacks, illustrating the behavioral and cultural factors that sustain informal care (Dixit et al., 2025). Complementing this, a Nepalese study demonstrated widespread quackery due to poor regulation and enforcement in dental practice.²⁰ African evidence provides additional context: a scoping review of traditional medicine and oral health in Africa demonstrates widespread reliance on non-formal providers in the face of limited accessibility and affordability (Foláyan et al., 2024), while a systematic review of sub-Saharan African oral health systems identifies severe workforce shortages and weak integration into primary care as structural drivers of informal provision (Kaguru et al., 2022). These country-specific findings are further supported by broader LMIC evidence: a systematic review in *BMJ Global Health* conceptualises informal healthcare providers as embedded actors within constrained health systems rather than peripheral anomalies (Kumah, 2022).

Comparative Case Selection

Nepal and India were selected through purposive sampling to enable a theoretically informed comparison. Both countries share key features with Nigeria, including LMIC status, significant rural populations, documented workforce constraints, and informal healthcare provision. Additionally, both contexts have generated recent peer-reviewed data specifically addressing dental quackery, allowing for a structured comparison across similar phenomena. The comparative design is not intended to establish statistical generalizability but rather to support analytical generalization by identifying recurring patterns, divergences, and transferable insights across cases.

Data Analysis

Clinical data from the reference Nigerian study¹⁰ were analyzed using descriptive statistics and logistic regression techniques, with mortality as the primary

outcome of interest. The association between pre-admission exposure to informal dental providers and mortality was estimated using odds ratios, as reported in the reference Nigerian study (Akhiwu et al., 2021). Regulatory and policy documents were analyzed thematically using the WHO Health Systems Building Blocks as an a priori coding framework. This approach enabled a systematic examination of how governance, workforce, financing, and service delivery factors contribute to the persistence of quackery. The comparative analysis employed a structured case comparison approach, focusing on identifying common drivers of informal provision, differences in regulatory contexts, and potential lessons for policy and practice. This method facilitated the integration of findings from diverse data sources into a coherent explanatory framework.

Positionality and Reflexivity

The lead author's role as the Chairman of the Ethics and Disciplinary Committee of the Nigerian Dental Association provides direct insight into regulatory processes, enforcement challenges, and professional perspectives on quackery. While this positionality enhances the contextual depth, it also introduces the potential for interpretive bias. To address this, this study adopts several mitigating strategies. First, the analysis is grounded in peer-reviewed empirical evidence rather than anecdotal or professional opinions. Second, the findings were triangulated across multiple data sources, including clinical data, policy documents, and comparative studies. Third, a clear distinction was maintained between empirical findings and interpretive claims. Finally, the inclusion of co-authors with expertise in health systems research provided an external perspective that strengthened the analytical rigor.

Findings

Clinical Consequences of Informal Dental Care and Quackery in Nigeria

Epidemiology and Clinical Burden

Odontogenic infections are among the most frequent acute dental emergencies in Nigerian tertiary care settings, reflecting underlying deficiencies in early intervention and preventive care in these settings. Although specific quackery-related studies remain limited, systematic evidence from scoping reviews confirms the broader patterns of oral health service utilization and accessibility challenges in low- and middle-income countries, including Nigeria, characterized by low utilization, high out-of-pocket costs, and minimal preventive services. Clinical research consistently shows that untreated dental disease in Nigeria often progresses to severe infections, including multi-space cervicofacial infections and airway-compromising conditions such as Ludwig's angina, frequently requiring extensive surgical

management and hospitalisation. These complications are particularly prevalent in settings where initial care is delayed or managed outside formal dental services, although studies rarely disaggregate outcomes specifically attributable to informal providers. Among 237 patients with odontogenic infections, nearly half reported previous extraction or care by unqualified providers, with a high proportion of inappropriate antibiotic use prior to hospital admission (Akhiwu et al., 2021). Mortality in this cohort was markedly elevated compared with global expectations for odontogenic infections; 96.2% of deaths occurred among those reporting informal care exposure, and pre-admission treatment by such practitioners was associated with a roughly 29-fold increase in mortality odds after adjusting for comorbid conditions. Although a systematic review specifically focusing on odontogenic infection outcomes in Nigeria is not yet available, related clinical studies affirm the severity of odontogenic disease progression without timely and appropriate management. These studies underscore the interplay between delayed presentation, socioeconomic barriers, and clinical deterioration, which are also central to utilization patterns in settings with high informal provider engagement.

Underlying Determinants: Access, Utilisation, and System Barriers

Broad evidence from scoping and systematic reviews in low- and middle-income countries highlights several structural determinants driving the reliance on informal dental care (Kaguru et al., 2022; Foláyan et al., 2024). Limited oral health coverage and extremely low workforce density, averaging approximately 0.51 dentists per 10,000 population in many low-income African contexts, constrain access to formal services and reinforce the role of alternative providers for basic interventions, such as extractions (Luan et al., 2024). Cost and utilization barriers further exacerbate this dependence; across 27 low-income countries, tooth extraction is the most frequently sought service, typically driven by acute pain rather than comprehensive preventive care, while high out-of-pocket expenditures discourage formal care and incentivize informal or self-managed pathways (Global Oral Health Status Report, 2023; Foláyan et al., 2024; Medical and Dental Practitioner Act, 2026). Fragmented service delivery and minimal integration of oral health into primary care reduce opportunities for early detection and referral, leaving symptomatic patients to seek care from unregulated providers. These structural determinants are reflected in clinical observations from Nigerian hospitals, where patients often present with advanced infections because formal dental care is inaccessible, unaffordable, or unavailable, creating a context in which informal providers proliferate.

Mechanisms Linking Informal Care to Poor Outcomes

Although establishing direct causality between informal dental care and adverse outcomes is challenging in the absence of large-scale epidemiological studies, the mechanisms linking quackery to harm are both pathophysiologically and behaviorally plausible. Unqualified providers often lack adequate clinical techniques and infection control, which increases the risk of incomplete extractions, retained roots, and rapid bacterial spread. Suboptimal antibiotic prescribing is also common, with non-prescription use partially suppressing symptoms while allowing disease progression and promoting antimicrobial resistance, a pattern widely documented in informal healthcare provider literature across LMICs. Informal practitioners frequently mis-triage patients, failing to recognize signs of spreading odontogenic infection and delaying referral to formal care, where timely surgical and supportive interventions could prevent severe complications. These pathways are consistent with broader evidence of severe odontogenic infections, which can rapidly progress to life-threatening conditions, such as necrotizing fasciitis and mediastinitis, with mortality risk markedly increasing when treatment is delayed or inadequate.

Comparative Evidence: Nepal and India

Nepal

Although rigorous clinical outcome research is sparse, evidence from Nepal highlights widespread irregular practices and malpractice. A peer-reviewed viewpoint article documents that quackery and fraudulent dental practice—including unethical procedures and lack of compliance with established sterilization standards—are pervasive and span both urban and rural areas.²⁰ Many clinics operate in contravention of regulatory standards, with inadequate workforce distribution and weak enforcement as core problems. This aligns with broader systematic evidence on oral health access barriers in LMICs, where low prioritization of dental services, workforce shortages, and minimal public financing result in reactive utilization (e.g., seeking care only for pain) rather than preventive engagement, creating a fertile ground for informal providers to fill gaps.

India

In India, the prominence of informal healthcare utilization is highlighted (Dixit et al., 2025). Systematic documentation indicates that a significant proportion of outpatient care, including dental symptoms, is provided by providers operating outside formal licensure. Patients often seek these providers because of their familiarity, perceived affordability, and ease of access, despite legal restrictions and the absence of

formal training. Specific to dentistry, low public awareness of legal practice requirements, and informal referral pathways through pharmacists and social networks were commonly reported.

Cross-Cutting Themes Across Nigeria, Nepal, and India

Despite differences in study designs and outcome measures, empirical evidence from LMICs reveals consistent factors driving informal dental practice and its adverse consequences for patients. Workforce constraints, including low dentist density, uneven distribution, and minimal integration of oral health into primary care, limit early access to quality dental care. Financial barriers further exacerbate the reliance on informal care: minimal insurance coverage and high out-of-pocket costs push patients toward more affordable, unregulated providers. Public awareness is also limited, with many patients unable to verify practitioner qualifications or understand associated risks. Regulatory enforcement is frequently weak or under-resourced, meaning that existing policies often fail to deter quackery. Informal providers, including pharmacists, medicine sellers, and self-styled practitioners, often serve as the first point of contact, particularly in rural and underserved areas, shaping care pathways in ways that may delay appropriate intervention. What distinguishes the Nigerian context is the emerging clinical evidence linking informal care directly to severe adverse outcomes, including high mortality and progression of odontogenic infection. In contrast, evidence from Nepal and India has primarily documented the prevalence, awareness, and utilization patterns rather than quantifying the clinical consequences.

Table 1 presents a detailed overview of the principal regulatory bodies governing dental practice in Nigeria, including the Medical and Dental Council of Nigeria (MDCN), National Universities Commission (NUC), Federal and State Ministries of Health, NAFDAC, and allied health regulatory boards. For each body, the table specifies the legal authority or enabling instrument, core mandates and functions, enforcement mechanisms, and identified gaps or limitations of the body. It highlights structural weaknesses, such as under-resourced inspectorates, fragmented inter-agency coordination, slow prosecution of quackery offenses, lack of public access

to practitioner registries, and regulatory capture, which collectively facilitate the persistence of unlicensed dental practice.

Table 2 applies the WHO Health Systems Building Blocks framework to analyze how deficiencies in each domain contribute to the proliferation of dental quackery in Nigeria and identifies targeted interventions to mitigate these effects. This demonstrates the interaction between health workforce shortages, service delivery gaps, unsafe use of dental materials, financial barriers, insufficient health information systems, and fragmented governance, emphasizing the need for a coordinated, system-wide approach to strengthen access, quality, and patient safety.

Table 3 summarizes the structural supply side determinants of informal dental practice in Nigeria. These factors include severe workforce shortages and maldistribution, limited training capacity, and weak enforcement infrastructure. For each factor, evidence from national data is provided along with implications for access to formal dental services. The table illustrates how these systemic deficiencies create service gaps that unlicensed providers exploit, particularly in the underserved northern and rural regions.

Table 4 presents the demand-side factors that drive patients toward unregulated dental care. It details high out-of-pocket costs, low oral health literacy, dental anxiety, distrust in formal healthcare services, and entrenched cultural practices, such as traditional tooth extraction. Evidence is drawn from Nigerian data and comparable studies in LMICs, highlighting how socioeconomic, behavioral, and cultural determinants interact with supply-side gaps to sustain quack use.

Table 5 compares the structural and behavioral drivers of dental quackery across Nigeria, Nepal, and India, integrating empirical findings from recent studies. It presents supply-side drivers, such as workforce shortages and unlicensed practice, and demand-side drivers, including cost, low awareness, and cultural preferences. The table highlights common patterns: limited access to qualified providers, weak regulatory enforcement, and affordability constraints, while also emphasizing country-specific variations, demonstrating how similar health system vulnerabilities produce predictable informal care behaviors in different LMIC contexts.

Table 1: The Nigerian Regulatory Framework and Its Enforcement Gaps

Regulatory Body	Legal Authority / Instrument	Mandate / Functions	Enforcement Mechanisms	Identified Gaps / Limitations
Medical and Dental Council of Nigeria (MDCN)	Medical and Dental Practitioners Act (MDPA)	- Registration of licensed dentists- Accreditation of dental training institutions-	- Inspectorate Department conducts routine inspections-	- Limited staffing and funding for national coverage- Inadequate surveillance systems- Slow

	CAP M8, 2004; Code of Medical Ethics, 2008	Monitoring professional conduct- Facility inspection- Disciplinary tribunals- Complaint investigation	Disciplinary tribunal (MDPDT) sanctions violations- Annual practising licence enforcement	prosecution and rare convictions- Public register not easily accessible- Regulatory capture and professional lobbying
National Universities Commission (NUC)	NUC Act	- Accreditation of university dental programmes- Academic oversight of dental schools- Ensuring minimum training standards	- Accreditation site visits- Curriculum review and approval	- Limited coordination with MDCN on professional quotas- Variable monitoring of private institutions- No direct enforcement on practitioner conduct post-graduation
Federal Ministry of Health	National Health Act, 2014	- Policy formulation- Federal-level health facility registration- Oversight of national oral health initiatives	- Federal inspection teams- Policy enforcement through state agencies	- Fragmented enforcement with states- Weak integration with MDCN inspections
State Ministries of Health	State health laws / National Health Act (subsidiary)	- Health facility registration and licensing- Monitoring compliance at state level- Coordination with law enforcement for enforcement	- State-level inspections- Ability to seal or close facilities	- Legislative gaps in anti-quackery laws in many states- Slow prosecution and weak deterrence- Limited staffing and capacity
National Agency for Food and Drug Administration and Control (NAFDAC)	NAFDAC Act	- Regulation of dental materials, pharmaceuticals, and medical devices	- Product approval and post-market surveillance	- Limited coordination with MDCN on unlicensed provision of drugs- Enforcement gaps in rural/remote areas
Allied Health Regulatory Boards (Dental Therapists, Technologists)	Respective enabling acts / board statutes	- Registration and licensing of allied oral health professionals- Oversight of training and scope of practice	- Board inspections and sanctions within scope	- Weak integration into broader dental regulatory framework- Jurisdictional confusion and limited capacity

Table 2: Applying the WHO framework to analyze how each building block contributes to or mitigates dental quackery:

Health System Building Block	Contribution to Dental Quackery	Targeted Health Systems Strengthening Interventions
Health Workforce	Severe shortages and maldistribution (1:36,425–1:254,521) create service gaps exploited by informal providers	Expand dental training institutions; increase admission capacity; incentivize rural/underserved postings; task-sharing with qualified allied oral health professionals
Service Delivery	Oral health largely absent from primary care; patients bypass formal facilities	Integrate oral health into primary healthcare; establish structured referral pathways; strengthen community-based preventive programs
Medical Products & Technologies	Use of unsafe materials (cold-cure acrylic, nails, super glue) and poor infection control	Regulate dental material supply chains; enforce quality standards; restrict sale of hazardous dental products to licensed facilities
Financing	High out-of-pocket costs push patients toward cheaper quacks	Expand insurance coverage for dental care; subsidize preventive services; implement targeted financing schemes for underserved populations
Health Information Systems	Lack of surveillance on quackery and related complications; limited data to inform policy	Establish national reporting systems for adverse dental events; conduct population-level surveys; integrate

		quackery monitoring into routine health information systems
Governance	Fragmented enforcement; weak inter-agency coordination; anti-quackery laws absent or poorly implemented	Enact comprehensive anti-quackery legislation; strengthen MDCN inspectorate; coordinate across regulators, law enforcement, and professional associations; ensure public access to practitioner registration databases

Table 3: Supply-Side Drivers of Dental Quackery in Nigeria

Factor	Evidence	Implication
Workforce shortage	Dentist-to-population ratio: 1:36,425 (South West) – 1:254,521 (North West) vs. WHO benchmark 1:10,000	Creates large service gaps that quacks exploit
Maldistribution	37.8% of dentists concentrated in South West; North East and North West severely underserved	Rural and northern populations have limited access to formal dental care
Inadequate training capacity	Few dental schools; limited admission slots	Limits growth of qualified workforce; perpetuates regional inequities
Weak enforcement infrastructure	MDCN inspectorate under-resourced; fragmented accountability; inconsistent state-level oversight	Allows unregistered providers to operate with impunity

Table 4: Demand-Side Drivers of Dental Quackery in Nigeria

Factor	Evidence	Implication
High cost	Per capita dental expenditure US\$0.7/year; scaling/polishing NGN 20,000–60,000	Patients opt for cheaper informal providers
Low oral health literacy	Evidence from India: 55.3% unaware only registered dentists may practice.	Patients cannot distinguish qualified from unqualified providers
Dental anxiety	Fear of formal procedures documented in LMIC literature	Patients avoid clinics, increasing reliance on quacks
Distrust in formal health system	Perceived corruption, long wait times	Pushes patients toward informal providers
Cultural practices	Traditional tooth extraction, herbal remedies, belief in "tooth worms"	Normalizes informal care in local communities

Table 5: Comparative Demand- and Supply-Side Drivers in LMICs

Country	Supply-Side Driver	Demand-Side Driver	Key Findings
Nigeria	Severe dentist shortage (1:36,425–1:254,521); weak enforcement	High cost, low literacy, cultural practices	46.4% of patients hospitalized for odontogenic infections had preadmission quack extractions; 82.7% received antibiotics from chemists
Nepal	Limited rural dental workforce; 28% of clinics employ unlicensed practitioners	Affordability, patient trust in quacks	Clinics with quacks show poor infection control; 70% of patients unaware of provider qualifications
India	Workforce maldistribution; unlicensed practice widespread	Cost, low awareness, suburban preference	72.6% reported quacks in their area; 55.3% unaware only registered dentists may legally practice; referrals from pharmacists common

DISCUSSION

The researches on which this study is based highlights the human costs of systemic failure in the delivery of oral healthcare. Among 237 hospitalized patients with

odontogenic infections in the Nigerian reference study, 46.4% had undergone tooth extraction by quacks, and 82.7% had received antibiotics from chemists without professional oversight (Akhiwu et al., 2021). Mortality

stood at 11.0%, with 96.2% of deaths occurring among patients treated by quacks. Pre-admission extraction by quacks increased the odds of death 28.9-fold (OR=28.9, 95% CI 3.97–209.6). These outcomes were consistent with the findings from other LMICs. In Nepal, clinics employing unlicensed providers reported lower infection control standards and higher complication rates (Humagain et al., 2020), while in India, dental quack exposure correlated with delayed care and increased oral health morbidity (Dixit et al 2025). Poor asepsis, misdiagnosis, delayed referral, and inappropriate antibiotic use create a causal chain from informal care to severe cervicofacial cellulitis, Ludwig's angina, and death.

The evidence presented demonstrates that dental quackery in Nigeria is not merely a matter of unethical individual practice or weak enforcement; it reflects a systemic health system failure across multiple WHO building blocks. The workforce deficit in Nigeria is particularly stark, with dentist-to-population ratios ranging from 1:36,425 in the South West to 1:254,521 in the North West, far below the WHO benchmark of 1:10,000. This maldistribution is critical: 37.8% of dentists serve the South West's 20% of the population, while 7.4% serve the North West's 23% (Medical and Dental Practitioner Act, 2004). Predictably, informal providers fill the service gaps left by the formal sector, particularly in underserved regions. Financing gaps exacerbate this problem. With a per capita dental expenditure of only US\$0.7 per year, most Nigerians face prohibitive out-of-pocket costs for routine dental care (Lidercare). Private clinics charge between NGN 20,000 and 60,000 for procedures such as scaling and polishing, often exceeding the weekly or monthly income of low- and middle-income households. In contrast, quacks provide accessible and inexpensive care, creating strong economic incentives for patients to bypass formal services.

Service delivery failure further reinforces this dynamic (Adeniyi & Oyapero, 2020). Oral health remains largely outside the primary healthcare system, compelling patients to seek care either at distant secondary or tertiary facilities or from unregistered providers. The absence of structured referral pathways or the integration of basic preventive and restorative services at the primary care level allows quacks to operate unchallenged, often becoming the patients' first point of contact. Governance failures further exacerbate this issue. Nigeria's regulatory framework is fragmented: the Medical and Dental Council of Nigeria (MDCN) oversees professional registration and discipline, State Ministries of Health regulate facilities, and law enforcement prosecutes violations of the law. However, there is minimal coordination among these entities. Data sharing is limited, enforcement is inconsistent, and prosecutions are slow or symbolic in nature. The net effect is a system in which quacks

operate with impunity, reinforcing the cycle of informal care in rural India.

Patterns across Nigeria, Nepal, and India indicate that dental quackery emerges when health systems fail to meet population needs. Workforce shortages, high out-of-pocket costs, and weak enforcement create favorable conditions for informal providers. In this context, conventional enforcement-focused strategies, such as complaint investigations, facility closures, and punitive actions, address only the symptoms rather than the causes. A complex adaptive systems perspective reframes regulation: it is not a linear process of detecting and punishing violators, but a dynamic intervention embedded within broader system constraints. For instance, removing a quack from a rural community without increasing formal workforce capacity or improving service accessibility simply creates space for another unqualified provider. Therefore, effective regulation must align enforcement with systemic solutions, including workforce expansion, financial protection, service delivery integration, and patient education.

Fragmented governance necessitates coordinated oversight, conceptualized as an "accountability web" (Gilson et al., 2017). In practice, this means that multiple stakeholders must share the responsibility and intelligence to reduce the prevalence of quackery. The MDCN must collaborate with State Ministries to verify facility and practitioner credentials; the Nigerian Dental Association (NDA) should participate in monitoring and reporting; the Ministries of Justice and Law Enforcement must prosecute violations effectively; and patients must be empowered to verify qualifications and report quacks. The accountability web leverages collective action to transform enforcement from reactive to proactive, system-wide mechanisms.

Study Limitations

This study is subject to several important limitations that should be clearly acknowledged and carefully considered. First, the clinical data are drawn from a single tertiary hospital in North Central Nigeria, which constrains the geographic and demographic scope of the findings and limits their ability to fully reflect national patterns. The absence of comprehensive nationwide prevalence surveys on dental quackery further restricts the ability to situate these findings within a broader epidemiological context. Additionally, while comparisons with other low- and middle-income countries (LMICs) are informative, such studies often differ significantly in methodology, scope, and quality, thereby limiting the strength of cross-contextual inferences. Second, the lead author's position as Chairman of the NDA Ethics Committee introduces a potential for interpretive bias. However, this risk has been consciously addressed through methodological

triangulation, integrating empirical clinical evidence with peer-reviewed literature to enhance objectivity and analytical rigor.

Although the case study design inherently limits generalizability, it offers depth and contextual richness that are critical for understanding complex health system challenges. Importantly, the structural and systemic patterns identified, such as regulatory gaps, access barriers, and workforce imbalances, are not unique to the study setting. These insights provide a valuable conceptual framework that can serve as a template for future research, particularly in other LMICs facing comparable vulnerabilities. By highlighting recurring dynamics and methodological considerations, this study lays a foundation that subsequent investigations can adapt, refine, and expand to build a more comprehensive evidence base.

RECOMMENDATIONS

Addressing dental quackery in Nigeria requires a coordinated, system-wide effort involving regulatory agencies, policymakers, professional associations, law enforcement, and the public. The Medical and Dental Council of Nigeria (MDCN) must expand inspectorate capacity, create a public registry of licensed practitioners, speed up disciplinary tribunals, and develop clear guidelines to differentiate malpractice from unregistered practice, while working closely with State Ministries and law enforcement. The National Universities Commission (NUC) should incorporate regulatory and ethical training into dental curricula, increase training capacity in underserved areas, and promote ongoing professional development on ethics and regulation. Federal and state governments need to pass comprehensive anti-quackery laws, implement the National Oral Health Policy focusing on accessibility and affordability, strengthen health facility accreditation processes, invest in dental education in underserved regions, and support legal action through specialized health offenses courts. Oral health services should be integrated into primary healthcare, with established referral pathways, and dental coverage should be expanded through health insurance to reduce out-of-pocket costs. Law enforcement agencies require specialized training to identify quackery, dedicated units to handle health-related offenses, and rapid, coordinated investigations in partnership with MDCN. The Nigerian Dental Association (NDA) should participate in oversight committees, establish state-level anti-quackery agencies, advocate for full implementation of oral health policies, run public awareness campaigns, support members in reporting quacks, and implement protections for whistleblowers. Patients should be educated on verifying practitioner credentials, empowered to use formal complaint procedures, encouraged to report suspected quackery, and

informed about the serious health risks linked to informal dental care. These combined efforts can form a coordinated, multi-stakeholder approach that not only enforces regulation but also enhances access, affordability, and patient safety.

CONCLUSION

Dental quackery in Nigeria exemplifies a health system's failure with lethal consequences. Nearly half of patients hospitalized for odontogenic infections had prior quack exposure, and those patients had 28.9 times higher odds of death. Structural drivers, including workforce shortages, prohibitive costs, governance fragmentation, and service delivery gaps, create conditions that allow informal providers to thrive. Addressing quackery demands multi-level interventions that integrate enforcement with health system strengthening. Nigeria's experience underscores a critical lesson for LMICs: regulation cannot succeed in isolation; it must be embedded in a coordinated strategy to expand access, ensure affordability, enforce standards, and empower patients. The stakes are literal; lives depend on the system working effectively.

Conflict of Interest Statement:

Dr. Nwabudike serves as Chairman of the Nigerian Dental Association Ethics and Disciplinary Committee. This position informed the analysis but did not influence the interpretation of data or formulation of recommendations. No other conflicts of interest are declared.

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Ethics Approval:

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Data Availability:

All data analyzed are publicly available through the sources cited. Clinical data are available in the original publications.

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