

Herbal medicine in Nigeria: a scoping review of the pathway to achieving a holistic healthcare system, health and wellness, and Sustainable Development Goals

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Abstract

Herbal medicine, a cornerstone of traditional medicine (TM) in Nigeria, offers a culturally congruent approach to healthcare that aligns with holistic principles encompassing physical, mental, and spiritual well-being. In Nigeria, orthodox healthcare access remains limited, and herbal medicine integration into the national healthcare system faces regulatory, safety, and evidence gaps. This scoping review examined the role of herbal medicine in advancing Nigeria's holistic healthcare, wellness, and Sustainable Development Goals (SDG) attainment. Objectives included mapping prevalence, patterns, integration efforts, and policy implications. Following PRISMA-ScR guidelines, searches across PubMed, Scopus, ScienceDirect, Frontiers, BMC, and African Journals Online (2010-2025) using terms such as "herbal medicine Nigeria", "traditional medicine integration", and "herbal medicine SDG" identified 5 primary studies meeting inclusion criteria (English-language, Nigeria-focused empirical research on use, regulation, or integration). Data were narratively synthesized into themes, with risk of bias assessed *via* Joanna Briggs Institute tools. Results revealed high lifetime prevalence (66.8-85%), driven by perceived effectiveness, affordability, and cultural alignment. Key themes encompassed widespread use patterns, safety and regulatory challenges, partial policy progress (*e.g.*, 2007 National Traditional Medicine Policy), and untapped contributions to UHC and SDG 3 through accessible, community-based care. Included studies consistently highlighted low disclosure to orthodox providers (up to 82%) and incoherent integration. In conclusion, herbal medicine represents a viable pathway to holistic healthcare in Nigeria when standardized and evidence-based. Recommendations include accelerated research into efficacy, strengthened National Agency for Food and Drug Administration and Control regulation, practitioner training, and digital documentation for integration. Realizing this potential could accelerate SDG progress while preserving indigenous knowledge.

Key words: herbal medicine, traditional and complementary medicine, Nigeria, holistic healthcare, SDG goals, healthcare system.

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Introduction

Globally, traditional and complementary medicine (T&CM) forms an integral component of healthcare systems, particularly in low- and middle-income countries where access to conventional services is constrained.^{1,2} The World Health Organization (WHO) Traditional Medicine Strategy 2014-2023 (extended to 2025) and the emerging draft Global Traditional Medicine Strategy 2025-2034 emphasize integrating safe, effective T&CM into national health frameworks to advance Universal Health Coverage (UHC) and Sustainable Development Goal (SDG) 3.¹ Countries such as China (with institutionalized Traditional Chinese Medicine) and India (AYUSH systems) demonstrate successful models, achieving improved access, cost-effectiveness, and cultural resonance in care delivery.³ In Africa, the African Union's Plan of Action on Traditional Medicine (2001-2010, extended) and WHO regional ini-

tiatives have spurred policy development, yet implementation varies widely.^{4,5}

In sub-Saharan Africa, traditional medicine (TM) usage rates reflect reliance on indigenous knowledge systems amid epidemiological transitions and healthcare inequities.^{6,7} Nigeria, Africa's most populous nation, exemplifies this dynamic. With over 200 million inhabitants and persistent challenges including physician shortages, high out-of-pocket expenditures, and rural-urban disparities, orthodox medicine reaches only a fraction of the population. Estimates suggest 70-80% of Nigerians consult traditional healers or use herbal preparations as first-line care, particularly for common ailments such as malaria, gastrointestinal disorders, and chronic conditions.⁸⁻¹⁰ Locally, Nigeria's rich biodiversity, spanning tropical rainforests, savannas, and mangroves, underpins an extensive pharmacopoeia. Practices range from crude decoctions ("agbo") to packaged products regulated by the National Agency for Food and Drug Administration and Control

(NAFDAC).¹¹ The Federal Ministry of Health established a Traditional, Complementary, and Alternative Medicine department and promulgated the National Policy on Traditional Medicine (2007, revised 2024), aiming to standardize practices, promote research, and facilitate integration into primary health-care.^{12,13} Despite these efforts, progress remains fragmented due to weak enforcement, limited clinical validation, and practitioner-orthodox divides.¹²

Herbal medicine aligns with holistic healthcare by addressing not only symptoms but also psychosocial and spiritual dimensions, fostering wellness through preventive self-care and community-based models. This resonates with SDG targets: affordability supports reduced financial hardship (SDG 3.8), biodiversity conservation links to SDG 15, and local production stimulates economic growth (SDG 8).¹⁴ Recent literature underscores potential translational impacts, expanded primary care access, resilience against pandemics (e.g., COVID-19 ethnobotanical responses), and cost savings, yet highlights persistent barriers: adulteration risks, herb-drug interactions, and insufficient evidence generation.¹⁵⁻¹⁷

Objectives of the study

This scoping review synthesizes evidence on herbal medicine in Nigeria as a pathway toward holistic, equitable healthcare. By bridging global frameworks with local realities, it identifies actionable strategies to harness indigenous resources for national development. Specific objectives include the following: i) to map the prevalence, patterns, and determinants of herbal medicine use in Nigeria; ii) to examine safety, efficacy perceptions, and regulatory frameworks governing herbal medicine; iii) to evaluate integration efforts within the national healthcare system and their alignment with holistic care principles; iv) to assess contributions of herbal medicine to health and wellness and SDG attainment, particularly SDG 3 and UHC; v) to identify gaps and propose evidence-based recommendations for policy, practice, and research.

Methods

Study design

This scoping review followed the Joanna Briggs Institute (JBI) methodological framework and was reported in accordance with the PRISMA-ScR guidelines. The aim was to map the extent, range, and nature of evidence on herbal medicine use, regulation, and integration in Nigeria within the broader context of healthcare delivery, holistic wellbeing, and SDGs.

Search strategy

A comprehensive search was conducted in PubMed, Scopus, ScienceDirect, Frontiers, BMC, and African Journals Online covering studies published between January 2010 and December 2025. Search terms included combinations of keywords and MeSH terms such as “herbal medicine”, “traditional medicine”, “phytomedicine”, “Nigeria”, “healthcare integration”, “holistic health”, “SDGs”, “UHC”, “prevalence”, “regulation”, and “ethnobotany”. Boolean operators and truncation were applied to refine the search. In addition, reference lists of eligible studies were manually screened to identify further relevant articles. Grey literature, including policy documents and WHO reports, was retrieved from official institutional websites to complement peer-reviewed evidence.

Eligibility criteria

Inclusion criteria

Included studies were peer-reviewed, English-language empirical research conducted in Nigeria. Eligible study designs included cross-sectional surveys, ethnobotanical studies, descriptive studies, and qualitative research focusing on herbal medicine use, patterns, safety, regulation, or integration into healthcare systems (Table 1).

Exclusion criteria

Studies were excluded if they were conducted outside Nigeria, were animal or laboratory-based experimental studies without human data, editorials, conference abstracts without full texts, or published before 2010 (Table 1).

Risk of bias assessment

Risk of bias was assessed using the JBI critical appraisal tools appropriate for each study. Table 2 presents the risk of bias assessment of the included studies.

Study selection

Two independent reviewers screened titles and abstracts, followed by full-text screening of eligible articles. Discrepancies were resolved through discussion and consensus. This iterative process ensured consistency and reduced selection bias.

Data extraction and data synthesis

Data were extracted using a standardized JBI data extraction form. Extracted variables included author(s), year of publication,

Table 1. Inclusion and exclusion criteria for the review.

Items	Inclusion criteria	Exclusion criteria
Population	Population in Nigeria	Population outside Nigeria
Exposure	Herbal medicine	Other exposure different from herbal medicine
Outcome	Health and wellness	Other outcomes different from health and wellness
Study design	Cohort, cross-sectional, and case-control studies	All other study designs
Language	English	All other languages
Time/year	Article published from January 2010 – December 2025	Articles published before January 2010
Articles	Full-text peer reviewed articles	Not full-text peer-reviewed (e.g., abstracts only, unpublished reports)
Geographical location/settings	Nigeria	Location different from Nigeria

study design, study setting, sample characteristics, objectives, key findings, and conclusions. A narrative synthesis approach was used to analyze and integrate findings.

Quality appraisal

Quality appraisal was conducted using JBI checklists for observational and ethnobotanical study designs. The assessment considered sampling strategy, data collection methods, measurement validity, and analytical rigor. Overall, the studies demonstrated moderate methodological quality, with strengths in clear reporting of objectives and findings, but limitations in sampling representativeness, lack of confounder control, and limited use of validated instruments for measuring outcomes. These limitations were considered when interpreting the strength of the evidence. Table 2 presents the quality appraisal of the included studies.

Screening procedure

A total of 452 records were identified. After removal of duplicates, 312 records remained for title and abstract screening. Following screening, 140 full-text articles were assessed for eligibility. Of these, 135 were excluded due to irrelevance, non-Nigerian focus, or failure to meet inclusion criteria. Ultimately, 5 studies met the eligibility criteria and were included in the review (Figure 1).

Results

Characteristics of included studies

A total of 5 studies published between 2011 and 2022 met the inclusion criteria (Table 3).^{8,9,18–20} The characteristics of these studies are summarized in Table 2. Of these, 4 studies used cross-sectional survey designs, primarily descriptive in nature, with data collected through structured or interviewer-administered questionnaires, and 1 study adopted an ethnobotanical

design incorporating semi-structured interviews and quantitative ethnobotanical indices such as frequency of citation and informant consensus factor. Sample sizes ranged from 100 to 1265 participants. Three studies recruited general community populations, one focused on TM practitioners, and one targeted patients attending a National Health Insurance Scheme (NHIS) clinic.

Geographically, there was a marked concentration of evidence in Southern Nigeria: 3 studies were conducted in Lagos State and 1 in Ekiti State, while only 1 study originated from Northern Nigeria (Bauchi State). No studies were identified from the South-East region. This geographic imbalance limits the representativeness and generalizability of the evidence base and suggests a regional research gap in herbal medicine utilization and regulation. Across the included studies, key outcomes included prevalence and patterns of herbal medicine use, socio-demographic determinants, perceived efficacy and affordability, safety perceptions, disclosure practices to healthcare providers, adverse effects, willingness for integration into orthodox healthcare systems, and ethnobotanical documentation of medicinal plants. Overall, the evidence base was predominantly descriptive, with no longitudinal, experimental, or robust analytical studies identified.

Quality appraisal of included studies

Individual study quality scores ranged from 5/10 to 7/10, indicating moderate quality across all included studies. None of the studies achieved high-quality ratings, primarily due to reliance on cross-sectional designs and self-reported data. One ethnobotanical study demonstrated relatively stronger methodological rigor through the use of quantitative indices such as frequency of citation and informant consensus factor. However, most studies lacked probability sampling and were geographically concentrated in Southern Nigeria, limiting generalizability. Overall, the evidence base is considered moderate and exploratory in nature. The quality appraisal of the included studies is presented in Table 2.

Table 2. Risk of bias and quality assessment.

Authors (year)	Risk of bias score	Quality assessment category	Key methodological comments
Aina <i>et al.</i> (2020) ⁸	Moderate	Moderate	Large sample size and good coverage of determinants; however, cross-sectional design limits causality. Reliance on self-reported data introduces recall and social desirability bias. Limited control for confounding factors
Oreagba <i>et al.</i> (2011) ⁹	Moderate	Moderate	Clear survey design with good urban representation. However, descriptive cross-sectional nature limits inference. Possible recall bias and lack of analytical modelling reduce strength of associations
Awodele <i>et al.</i> (2011) ¹⁸	Moderate	Moderate	Focused on practitioners' perspectives, but sampling from a market setting limits generalizability. Self-reported attitudes may be subject to response bias. Limited methodological detail on sampling strategy
Maiyegun <i>et al.</i> (2022) ¹⁹	Moderate	Moderate	Analytical cross-sectional design strengthens internal validity. However, still limited by self-reported data and inability to establish causality. Good inclusion of insured population improves relevance
Lawal <i>et al.</i> (2022) ²⁰	Moderate	Moderate	Strong ethnobotanical methodology and use of quantitative indices (ICF, FC). However, focus on plant documentation limits direct relevance to clinical outcomes. Non-random sampling affects representativeness

ICF, Informant Consensus Factor; FC, frequency of citation.

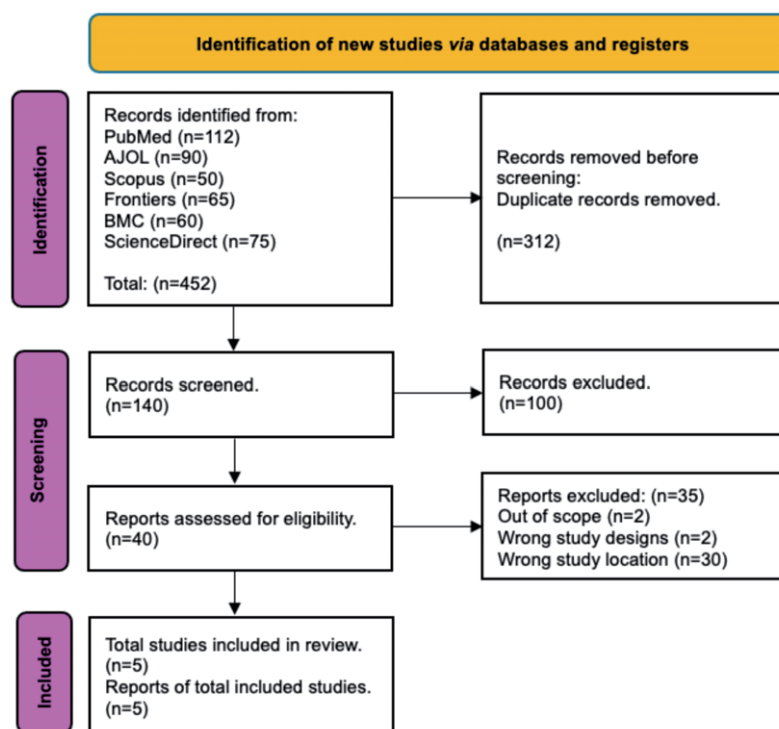


Figure 1. Diagram of the PRISMA 2020 Process for Systematic Reviews and Meta-Analyses.

Table 3. Summary of the included studies.

Authors (year)	Objectives of the study	Study design	Sample size and study setting	Key findings	Conclusions
Aina <i>et al.</i> (2020) ⁸	To examine prevalence, determinants, safety perceptions of herbal medicine	Cross-sectional study	1,265 adults; Ekiti State, Southwest Nigeria	85% used in last 2 years; effectiveness (39.6%) and affordability primary reasons; uncertified products dominant; higher use in men, farmers, elderly	Effectiveness drives use; scientific validation and regulation essential for safe integration
Oreagba <i>et al.</i> (2011) ⁹	To assess extent and knowledge of herbal medicine use among urban residents	Descriptive cross-sectional survey	388 adults; Surulere LGA, Lagos (urban)	66.8% prevalence; common preparations: agbo jedi-jedi (35%); family influence 78.4%; 20.8% adverse effects; 58% perceived safe	High use despite limited toxicity awareness; need for clinical evaluation and public education
Awodele <i>et al.</i> (2011) ¹⁸	To assess TMPs' knowledge and disposition toward integration into NHCS	Descriptive survey (WHO questionnaire)	170 TMPs; Awolowo market, Lagos	64% willing for scientific investigation; 54% open to orthodox collaboration; 18% acknowledge adverse effects	TMPs largely supportive of integration; government body needed to facilitate process
Maiyegun <i>et al.</i> (2022) ¹⁹	To determine prevalence and determinants among NHIS clinic attendees	Analytical cross-sectional	364 adults; NHIS Clinic, Abubakar Tafawa Balewa University Teaching Hospital, Bauchi	Lifetime 76.65%; common: moringa (47%), garlic; effectiveness (61.3%) main reason; 82% non-disclosure	High use even among insured; counsel patients on risks and interactions
Lawal <i>et al.</i> (2022) ²⁰	To document medicinal plants and uses among indigenous people	Ethnobotanical survey (semi-structured questionnaires)	100 participants; five areas (Alimosho, Badagry, Eti-Osa, Epe), Lagos State	183 plants (Fabaceae dominant); top: <i>Mangifera indica</i> (FC 95%); high ICF for malaria (0.95); leaves most used part	Provides baseline for pharmacological validation and conservation

ICF, Informant Consensus Factor; NHCS, National Health Care Scheme; NHIS, National Health Insurance Scheme; TMPs, traditional medicine practitioners; WHO, World Health Organization.

Thematic review/key themes

Prevalence and patterns of herbal medicine use

Herbal medicine use is widely reported across different population groups, with lifetime prevalence reaching up to 85% in some Southwest Nigerian populations.^{8,9} Commonly used preparations include “agbo” decoctions (*e.g.*, agbo jedi-jedi, agbo iba, agbo ale, agbo afato, agbo opa-eyin) and individual medicinal plants such as *Moringa oleifera*, garlic, ginger, and black seed. Use patterns vary by socio-demographic characteristics, with higher utilization observed among men, older adults, farmers, individuals with lower educational attainment, and those practicing traditional religions.⁸ The primary drivers of use include perceived effectiveness, affordability, accessibility, and cultural familiarity.^{8,19}

Concurrent use of herbal and orthodox medicine is common, with approximately one-third of users reporting simultaneous use. However, disclosure to healthcare providers remains low, raising concerns about potential herb-drug interactions.¹⁹ Utilization patterns also differ by setting, with urban residents more likely to use packaged herbal products, while rural populations rely on fresh plant preparations.²⁰ Overall, herbal medicine functions as an important complementary and often primary source of care, particularly in contexts where access to formal healthcare is limited.⁹ However, the predominance of self-medication raises important safety and regulatory concerns.

Safety, perceived efficacy, and quality concerns

Across studies, herbal medicines are widely perceived as “natural” and therefore safe. However, this perception is not consistently supported by empirical safety data. Reported adverse effects include mild to moderate reactions such as rashes, vomiting, and dizziness.⁹ Although users frequently report perceived symptomatic relief, there is limited clinical validation of efficacy claims. This reliance on subjective outcomes introduces potential reporting bias and limits confidence in effectiveness assessments. Furthermore, ethnobotanical studies document between 111 and 183 plant species used for medicinal purposes, particularly for malaria and respiratory conditions, with high informant consensus scores.²⁰ However, dosage standardization and pharmacological validation remain largely absent.

Regulatory oversight by agencies such as NAFDAC is primarily limited to registered products, while a large proportion of herbal preparations remain unregulated, contributing to variability in quality, safety, and composition.

Regulatory and policy framework

Nigeria has developed several policy instruments, including the National Traditional Medicine Policy (2007) and subsequent revisions aimed at strengthening regulation, research, and integration into UHC.¹² Regulatory responsibilities are shared between NAFDAC and State Traditional Medicine Boards. Despite these frameworks, implementation remains fragmented. Challenges include weak enforcement mechanisms, limited practitioner formalization, inadequate research funding, poor documentation of traditional knowledge, and insufficient institutional coordination. These gaps constrain effective standardization and limit the translation of policy into practice.

Integration challenges and emerging opportunities

Evidence suggests that TM practitioners demonstrate willingness to collaborate with orthodox healthcare systems, particularly in

areas of scientific validation and structured integration.¹⁸ However, persistent barriers include mutual mistrust between practitioners, limited biomedical training among traditional healers, and weak institutional linkages. Emerging opportunities include the use of digital health tools for documentation, structured pilot integration programs, and improved regulatory frameworks. If effectively implemented, integration could enhance primary healthcare delivery, particularly in underserved and rural communities.¹⁹ Nevertheless, current evidence remains insufficient to evaluate the effectiveness or sustainability of integration initiatives.

Contribution to holistic healthcare, wellness, and sustainable development goals

Herbal medicine contributes to holistic healthcare by addressing physical, psychological, and culturally embedded health needs.^{8,9} It also plays an important socioeconomic role by improving affordability and supporting local livelihoods through plant cultivation and trade.

From a sustainability perspective, herbal medicine use aligns with SDG 3 (health and wellbeing) by potentially improving access to care and supporting UHC. It also contributes to SDG 15 through biodiversity use and conservation concerns, although unsustainable harvesting practices remain a potential risk.²⁰ While these contributions are notable, the current evidence base is largely descriptive and does not robustly evaluate health system-level outcomes or sustainability impacts.

Discussion

The findings of this review are broadly consistent with global evidence on T&CM use, while also revealing context-specific dynamics within Nigeria’s health system. The high prevalence of herbal medicine use aligns with estimates from other sub-Saharan African settings and WHO reports, but remains comparatively higher than rates reported in many high-income countries, where stronger regulatory systems and more accessible primary healthcare services reduce reliance on informal care pathways.^{1,6} In the Nigerian context, this pattern is better understood not solely as a function of poverty, but as a response to structural health system constraints, including cost barriers, limited service coverage, and cultural embeddedness of traditional healing systems. Importantly, the dominant driver of herbal medicine use, perceived effectiveness, challenges the commonly held assumption that utilization is primarily cultural or economic. Instead, users appear to engage in pragmatic health-seeking behavior based on perceived therapeutic outcomes, particularly for conditions such as malaria, gastrointestinal disorders, and chronic illnesses.^{8,20} However, the evidence base remains largely perception-driven and does not adequately distinguish between subjective improvement and clinically validated efficacy, underscoring the need for methodologically robust pharmacological and clinical studies.

Safety concerns identified in this review are consistent with international literature, particularly regarding low disclosure rates to healthcare providers (up to 82%), which increases the risk of herb-drug interactions and delayed treatment.^{19,21} However, unlike settings with more integrated pharmacovigilance systems, Nigeria lacks a comprehensive national monitoring framework for adverse herbal medicine reactions, limiting detection and response capacity.

From a health systems perspective, Nigeria’s regulatory environment anchored by NAFDAC registration processes and state-

level TM boards remains fragmented and unevenly enforced. While policy frameworks such as the 2007 National Traditional Medicine Policy and its 2024 revisions provide institutional direction, implementation gaps persist due to weak financing mechanisms, limited research infrastructure, and poor coordination between regulatory agencies and practitioners. This contrasts with more structured integration models such as Ghana's Traditional Medicine Practice Act and South Africa's Traditional Health Practitioners Act, where clearer accreditation systems and enforcement structures have improved governance. The persistence of fragmented integration in Nigeria can also be attributed to structural barriers, including limited biomedical engagement with traditional practitioners, absence of standardized clinical guidelines, inadequate insurance coverage for validated herbal products, and weak data systems for documenting usage patterns and outcomes. These factors collectively hinder the transition from informal practice to regulated, evidence-informed integration.

Digital health innovations have been proposed as potential enablers of integration, particularly through practitioner registries, mobile reporting tools, and pharmacovigilance platforms.²² However, these remain largely at pilot or conceptual stages, and their scalability within Nigeria's infrastructure constraints is yet to be demonstrated. Evidence of willingness among TM practitioners to engage in formal collaboration (54–64%) suggests a viable foundation for integration.¹⁸ Nonetheless, willingness alone is insufficient without institutional trust-building, standardized training frameworks, and clearly defined referral pathways between orthodox and traditional systems. Geographically, the evidence base remains heavily skewed toward Southern Nigeria, with minimal representation from Northern and South-Eastern regions. This imbalance is not merely a sampling limitation but reflects broader disparities in research production and funding distribution. It also raises concerns about the cultural and ethnobotanical generalizability of findings, given Nigeria's significant regional diversity in health beliefs, plant usage, and healthcare access patterns. Overall, while herbal medicine demonstrates clear potential as a complementary component of Nigeria's health system, its contribution to SDG-aligned healthcare remains constrained by weak regulation, insufficient evidence of clinical effectiveness, and limited system-level integration.

The fragmented integration of herbal medicine into Nigeria's formal healthcare system persists despite several policy initiatives and increasing public utilization. Contributing factors include weak regulatory enforcement, limited funding for TM research, inadequate quality-control mechanisms, insufficient documentation of indigenous knowledge, and limited collaboration between conventional healthcare providers and traditional practitioners. Experiences from countries such as China, India, Ghana, and South Africa demonstrate that successful integration is often supported by strong regulatory frameworks, practitioner accreditation systems, dedicated research institutions, standardized production processes, and incorporation of TM into national health strategies. Adapting these approaches to the Nigerian context may facilitate safer, evidence-informed, and more sustainable integration of herbal medicine within the healthcare system.

Strengths and limitations of the study

Strengths of the study

This scoping review provides a systematic and policy-relevant synthesis of evidence on herbal medicine use in Nigeria, situated within the broader frameworks of UHC, holistic healthcare, and the SDGs. A key strength is the use of a rigorous scoping review

methodology guided by JBI and PRISMA-ScR frameworks, ensuring transparency, reproducibility, and methodological consistency in study identification and selection. The inclusion of diverse study designs, including cross-sectional surveys and ethnobotanical studies, allowed for a multidimensional understanding of herbal medicine practices, encompassing prevalence patterns, socio-demographic determinants, perceived effectiveness, and regulatory dimensions. This breadth is particularly important in the Nigerian context, where herbal medicine use is both culturally embedded and structurally linked to health system accessibility. Additionally, the review contributes to policy discourse by synthesizing evidence across clinical, socio-cultural, and governance domains, thereby linking TM use to health system strengthening and SDG-related outcomes.

Limitations of the study

This review is constrained by the small number of eligible studies ($n=5$), reflecting a limited and underdeveloped empirical evidence base on herbal medicine in Nigeria. This restricts the robustness and generalizability of conclusions. Most included studies employed descriptive cross-sectional designs, limiting the ability to establish causality or evaluate long-term safety, effectiveness, or health system impact. Reliance on self-reported data also introduces potential recall and social desirability biases. In addition, substantial heterogeneity in study populations, herbal formulations, outcome measures, and methodological approaches limited comparability across studies and precluded quantitative synthesis. A further limitation is the marked geographic concentration of studies in Southern Nigeria, with limited representation from Northern and South-Eastern regions. This introduces regional bias and limits the cultural and epidemiological generalizability of findings. Finally, potential publication bias cannot be excluded, as relevant grey literature and non-indexed studies may not have been captured.

Conclusions

Herbal medicine in Nigeria represents a widely utilized, culturally embedded component of healthcare delivery that continues to function alongside the formal health system. While evidence indicates high prevalence and perceived therapeutic value, the current knowledge base remains largely descriptive and methodologically limited. Policy efforts toward integration are evident but remain constrained by weak enforcement, fragmented governance structures, and limited clinical validation. As a result, herbal medicine currently operates in a parallel rather than integrated system. A transition toward evidence-informed integration will require strengthened regulatory systems, expanded research capacity, improved pharmacovigilance, and structured collaboration between orthodox and traditional healthcare providers. Without these reforms, the potential contribution of herbal medicine to UHC and SDG targets will remain under-realized.

Recommendations

Based on the findings of this study, the following recommendations are suggested.

Immediate priorities (0–3 years)

1. Establish a federally funded national research center for traditional and herbal medicine focused on clinical validation and safety trials.

2. Strengthen NAFDAC pharmacovigilance systems, including mandatory reporting of adverse herbal medicine events.
3. Introduce mandatory certification and licensing standards for commercial herbal products.

Medium-term priorities (3–7 years)

1. Develop structured interprofessional training programs for orthodox and traditional practitioners.
2. Integrate validated herbal products into primary healthcare and NHIS reimbursement frameworks.
3. Deploy national digital registries for herbal products, practitioners, and adverse event reporting.

Long-term priorities (7+ years)

1. Enact legislation on intellectual property protection for indigenous medicinal knowledge.
2. Promote sustainable harvesting policies aligned with biodiversity conservation goals.

Implications of the study

Public health implications

Herbal medicine plays a significant role in addressing healthcare access gaps, particularly in underserved populations. However, low disclosure rates and limited regulation highlight the need for public education on safe use and certified products to reduce preventable adverse outcomes.

Practice implications

Healthcare providers should routinely assess herbal medicine use during clinical encounters. Structured referral systems and training for TM practitioners are necessary to reduce risks and improve continuity of care.

Research implications

There is an urgent need for well-designed longitudinal studies, pragmatic clinical trials, and ethnopharmacological validation studies. Interdisciplinary collaboration across pharmacology, public health, and social sciences is essential.

Policy implications

Nigeria's TM Policy requires strengthening through measurable implementation targets, financing mechanisms, and integration benchmarks aligned with WHO TM strategies.

Economic and environmental implications

Formalizing the herbal medicine sector could generate employment and stimulate local economies, while sustainable harvesting practices are essential to prevent biodiversity loss.

Future directions

Future research should prioritize large-scale clinical trials on high-burden conditions such as malaria and diabetes, alongside implementation studies of integrated primary care models. Digital technologies, including AI-assisted plant identification and pharmacovigilance systems, may improve quality control and safety monitoring. Regional research collaborations across Africa are also recommended to harmonize regulatory standards and strengthen comparative evidence on TM integration.

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