Leveraging Medical Libraries for health information Resources and Services in Nigeria

Sugabsen Martins
Abdurrahman Ghaji Library
Adamawa State University, Mubi, Nigeria
martinsbakari@gmail.com; martins1085@adsu.edu.ng

Abubakar Sharif
Abdurrahman Ghaji Library
Adamawa State University, Mubi, Nigeria
Ashsharif100@gmail.com
07067266000

Abstract

The study investigates how Nigerian medical libraries can be more effectively leveraged to support health information provision within academic and teaching hospital contexts. Grounded in socio-technical systems theory, it adopts a mixed-method, cross-sectional design combining resource audits, and surveys of 115 users across eight institutions, and qualitative interviews and focus groups with librarians, clinicians, students, and health administrators. Quantitative findings show collections dominated by print textbooks with moderate quality ratings, limited current journals, and uneven provision of electronic databases, computers, and internet access, resulting in relatively higher satisfaction with print than with digital resources. Service portfolios remain largely conventional, centered on basic reference and circulation, with low uptake of selective dissemination, training in literature searching, clinical outreach, and public-facing health information services. Qualitative data highlight chronic underfunding, weak ICT infrastructure, bureaucratic constraints, and insufficient specialist training for medical librarians as key structural, technological, and professional barriers. Taken together, the findings reveal a persistent misalignment between global expectations for evidence-based, digitally mediated health information and the realities of Nigerian medical libraries, which remain under-resourced and under-integrated into clinical and educational workflows. The study proposes a context-sensitive framework that emphasizes resource diversification, sustained ICT investment, professional capacity-building, user-centered and clinically embedded services, and stronger policy support to reposition medical libraries as active knowledge infrastructures within Nigeria's health system.

Keywords: *Medical libraries, Health information services, Electronic resources, Socio-technical systems, Nigeria*

Introduction

Health information is more than just data, it is the backbone of clinical judgment, the fuel for biomedical research, and the compass guiding public health decisions. In healthcare systems that aim to be evidence-driven, timely access to accurate, relevant, and credible health information is not a luxury; it is a necessity. Medical libraries, long recognized as repositories of such knowledge, are now expected to function as dynamic service centres, bridging the gap between raw data and informed action. They are supposed to support clinicians seeking clinical guidelines, researchers verifying evidence trails, students building foundational knowledge, and patients searching for reliable health information. In principle, the medical library should be an active agent within the healthcare information ecosystem, not a passive collection room tucked away in an institutional basement.

But how well do the medical libraries live up to this role in practice, especially in lower-middle-income countries like Nigeria, where information systems often remain fragmented, funding

unreliable, and access unequal? The question invites scrutiny. In Nigerian academic and teaching hospital settings, medical libraries are widespread, but many of them remain under-equipped, underutilized, and misaligned with the rapid transformations occurring in health education and practice. Despite increasing global attention to open access, evidence-based practice, and digital learning environments, many Nigerian medical libraries still struggle to provide updated, comprehensive, and actionable resources to their user base (Okeke & Eze, 2019; Popoola, 2020). Services that could connect knowledge to clinical and research outcomes like literature searching, reference consultations, or digital evidence summaries, are often rudimentary or absent.

This paper examines this tension directly. It asks: What resources and services do Nigerian medical libraries currently offer, and how can they be better leveraged to enhance health information access and use? It responds to growing calls, both national and global, for more robust, context-sensitive models of knowledge infrastructure in health settings (Hjørland, 2020; Koon et al., 2022). The goal is not just to evaluate existing provisions but to identify the structural, technological, and professional conditions that enable (or inhibit) the library's contribution to health outcomes. It is a study concerned with both performance and potential.

Problem Statement

In an ideal setting, medical libraries function as integrated knowledge centres within health systems. Their collections would be current and broad in scope, spanning clinical evidence, public health data, basic sciences, and emerging research. Services would be proactive and inclusive: literature search assistance, reference support, current awareness alerts, and systematic review consultation, all delivered by professionally trained staff in digitally equipped environments. Access would be equitable and efficient, enabling students, practitioners, and researchers to retrieve reliable information when and where they need it.

Yet this ideal is not materializing in many Nigerian academic and hospital-based medical libraries. Instead, print-based collections dominate, with significant lags in updating clinical and research content (Nwagwu, 2021). Digital subscriptions are patchy and often donor-dependent. Services are limited in scope, narrowly focused on circulation or basic reference, and rarely embedded into academic or clinical workflows (Oluwaseun & James, 2023). Librarians themselves frequently lack advanced training in clinical information delivery, evidence synthesis, or data services, capacities that are becoming essential in today's healthcare knowledge environment (Eke & Aminu, 2020).

Several initiatives have aimed to address these deficits. The Health Internetwork Access to Research Initiative (HINARI) has widened access to biomedical literature, but uptake in Nigerian institutions remains uneven due to poor ICT infrastructure and training gaps. National library consortia have attempted to negotiate access to digital collections, yet institutional commitment and follow-through vary. Even when resources are available, low awareness and weak user engagement often prevent full utilization (Okeke et al., 2017).

The consequences are predictable. Clinicians may make decisions based on outdated evidence; students rely on incomplete or misaligned resources; researchers lack access to the full breadth of literature; and public health professionals struggle to respond effectively during health emergencies. These shortcomings reflect not simply a resource gap but a systems problem where libraries are under-leveraged within the broader architecture of health information delivery.

While previous studies have documented individual aspects of this problem, resource adequacy, service awareness, librarian competencies, very few have integrated these elements into a coherent framework for reform. The lack of a synthesized, context-sensitive model limits both academic understanding and practical intervention. What is missing is not just more data, but a structured way of thinking about how Nigerian medical libraries can evolve into responsive, evidence-based information hubs.

This study addresses that void. It draws on socio-technical systems theory (Hjørland, 2020) to treat medical libraries not as static entities but as dynamic infrastructures shaped by the interaction of people, technology, resources, and organizational context. It builds on, but goes beyond, existing studies by developing an empirically grounded framework tailored to the operational realities of Nigerian academic health institutions.

Objectives of the Study

The study has four interrelated objectives:

1. To assess the range and quality of health information resources currently provided by medical libraries in Nigeria.
2. To examine the specific services medical libraries offer to clinicians, students, researchers, and the general public.
3. To identify the structural, technological, and professional factors that influence how effectively these libraries support health information provision.
4. To develop a context-sensitive framework for leveraging medical libraries to strengthen health information services in Nigerian academic and healthcare environments.

The research aims to test whether the current configuration of resources, services, and support structures is fit for purpose, and to offer a structured pathway toward improvement. The findings will matter not only to academic researchers and library professionals but also to health policymakers and institutional leaders responsible for knowledge infrastructure in teaching hospitals and medical schools.

Literature Review

Theoretical and Conceptual Framework

This study is grounded in a socio-technical systems perspective that views medical libraries as complex organizations where technology, human agents, and organizational structures interact to affect health information provision. Key constructs include the availability and quality of health information resources, the scope and effectiveness of library services, and the influencing institutional and technological factors. These constructs are interrelated: effective service delivery depends not only on the richness of available resources but also on the professional expertise of librarians and the enabling infrastructural and organizational context. Conceptually, the framework posits that optimizing health information access and utilization through medical libraries requires synchronized improvements across these domains (Bawden & Robinson, 2019). This systemic view underpins the study objectives, guiding an integrated assessment and intervention design rather than isolated evaluations of resources or services alone.

Assessment of Health Information Resources in Nigerian Medical Libraries

The body of literature on health information resources within Nigerian medical libraries reveals a landscape marked by underdevelopment and uneven access. Empirical studies indicate that Nigerian medical libraries predominantly house monographs and print journals while

struggling to maintain current serials and electronic resources (Popoola, 2020). Despite the availability of significant global health databases such as HINARI, JSTOR, and Cochrane Library, which provide free or low-cost access to developing countries, many libraries inadequately subscribe or promote these services, limiting their utility (Okeke, 2018; Popoola, 2020). This gap highlights not merely resource scarcity but infrastructural and awareness deficiencies that obstruct optimal resource availability. Scholars generally agree on the critical importance of electronic resource access for contemporary health research and practice, yet there is disparity regarding the extent of actual resource integration and usage in Nigeria. Some argue that traditional print-dominant collections reflect institutional inertia, while others see these as a consequence of inadequate funding and digital infrastructure (Okeke, 2018; Odufuwa et al., 2019). Nonetheless, a notable research gap persists in systematically evaluating the quality of these resources from user perspectives and correlating resource availability with utilization patterns and health outcomes in the Nigerian context. Therefore, this study aims to assess both the range and quality of health information resources, providing an empirical basis to inform resource development strategies tailored to the local environment.

Examination of Services Offered by Medical Libraries

Services in Nigerian medical libraries remain primarily conventional, with limited specialization or proactive outreach targeting clinicians, students, researchers, or public health needs (Popoola, 2020; Ikolo, 2022). The literature reflects a consensus that services such as selective dissemination of information, literature searching, and reference assistance exists but are inconsistently delivered and rarely integrated into clinical workflows (Popoola, 2020). User engagement with available services is generally low due to poor visibility, lack of tailored offerings, and insufficient professional capacity in evidence-based information mediation (Ikolo, 2022). While international models demonstrate successful embedding of medical librarians within healthcare teams and clinical decision-making (e.g., Johns Hopkins' Clinical and Evidence-Based Practice program), replication in Nigeria is minimal, largely because of systemic constraints and limited recognition of librarians' roles (Popoola, 2020). Some attempts to train librarians in advanced competencies have been noted but are sporadic and institutionally fragmented (Ikolo, 2022). This fragmented service landscape underscores the need for a comprehensive service assessment aligned with varied user needs, which the current study addresses by examining service portfolios contextually and recommending enhancements.

Identification of Influencing Structural, Technological, and Professional Factors

A recurring theme in Nigerian medical library literature is the multifaceted barriers constraining library effectiveness, spanning infrastructure, technology, human resources, and organizational governance (Popoola, 2020; Okeke, 2018; Ikolo, 2022). Central library control over medical libraries, erratic internet and power supply, insufficient ICT infrastructure, and the absence of formal medical librarianship training emerge as critical structural and technological limitations (Popoola, 2020; Okeke, 2018). Professionally, librarians generally possess beginner to intermediate knowledge of health sciences literature and systematic review methods, but they lack opportunities for continuous development and formal recognition, further limiting service innovation (Ikolo, 2022). Contrasting views exist regarding prioritization of these factors: some scholars emphasize infrastructural improvements as foundational, while others highlight human capital development to leverage existing resources. Importantly, these factors intersect, as technological solutions without professional capacity or organizational autonomy cannot realize their potential (Popoola, 2020; Ikolo, 2022). Yet, comprehensive studies integrating these dimensions to understand their combined impact on service delivery remain sparse in Nigeria. Addressing this lacuna, this study critically

investigates how these structural, technological, and professional factors interlock to influence health information provision outcomes in Nigerian medical libraries.

Development of a Context-Sensitive Framework for Leveraging Medical Libraries

Literature from both global and Nigerian contexts underscores the necessity of tailored frameworks that reflect local realities and user needs for optimizing medical library contributions to health information ecosystems (Bawden & Robinson, 2019; Adekunle & Olorunsola, 2021). International frameworks emphasize integrated technology deployment, user-centered service design, professional development, and inter-institutional collaboration, yet these often assume resource-rich settings and robust health infrastructure (Bawden & Robinson, 2019). Nigerian studies call for adaptation of such models to accommodate infrastructural deficits, diverse user competencies, and systemic governance arrangements (Adekunle & Olorunsola, 2021). However, extant frameworks focusing on academic libraries or general health information lack specificity for medical libraries in Nigeria, especially concerning their function within healthcare delivery systems and research institutions. This research aims to develop a framework sensitive to these contextual factors by synthesizing empirical insights from resource, service, and institutional analyses, thereby providing a practical roadmap for strengthening health information services through medical libraries in Nigeria.

Summary and Research Gap

In summary, the literature reveals a fragmented but insightful picture of Nigerian medical libraries' current state: resource limitations, conventional service models, and infrastructural and professional challenges collectively undermine their potential as health information hubs. While previous studies have illuminated individual dimensions, such as resource access or librarian training, few have systematically integrated these to provide a holistic understanding. Furthermore, little research has articulated actionable, context-specific frameworks to guide transformation efforts aligned with Nigeria's unique health and information environment. This study addresses this gap by critically examining the interplay of resources, services, and enabling factors, and by formulating an empirically grounded, context-appropriate framework for leveraging medical libraries to enhance health information provision. By doing so, it contributes both theoretically and practically to the nexus of library and information science and health system strengthening in Nigeria.

Methodology

This study employed a mixed-methods approach to provide a comprehensive understanding of health information resources and services in Nigerian medical libraries. Quantitative methods, including surveys and structured resource audits, were used to objectively assess the range and quality of health information resources (Objective 1) and to document the frequencies and types of services provided (Objective 2). These instruments enabled the collection of standardized, measurable data that could be analyzed for patterns and trends across different institutions.

Qualitative methods, comprising semi-structured interviews and focus groups, were incorporated to capture the perceptions, contextual factors, and lived experiences of diverse stakeholders; including librarians, clinicians, students, and health administrators (Objectives 2 and 3). This approach facilitated a deeper analysis of the professional, technological, and structural influences shaping library effectiveness. By integrating both quantitative and qualitative data, the study allowed for a more nuanced, comprehensive analysis and supported the iterative development of a context-sensitive framework for strengthening health information services (Objective 4).

Data collection was conducted at a single point in time (cross-sectional design), which was appropriate for assessing the current state of resource provision and user experiences. Descriptive statistical analyses, including frequencies and cross-tabulations, were performed to summarize the quantitative findings. Semi-structured interviews were conducted with key stakeholders to explore their perspectives in greater depth.

Sampling was purposive, targeting libraries with varied infrastructures, user populations, and geographic contexts to ensure a broad representation of Nigerian medical libraries. For the survey component, stratified sampling was used to further ensure that respondents reflected the diversity of user groups and institutional settings. This methodological design was selected to balance breadth and depth, enabling robust findings that are both generalizable and contextually grounded.

Critical Justification of Choices

These methodological choices respond directly to the research objectives. Quantitative audit and survey methods provide measurable, generalizable data for resource and service evaluation. Qualitative, context-rich methods are necessary to unpack structural, technological, and professional dynamics and to develop a framework sufficiently tailored to the Nigerian context. Pragmatism and mixed methods remain essential for producing actionable knowledge beyond mere academic theorizing, addressing both practice and policy gaps.

Results

Table 1: Institution where data were collected

Zone	Institution Name (Teaching Hospital)	Medical College Library Name	Location
Northwest	Ahmadu Bello University Teaching Hospital	ABU College of Health Sciences Library	Zaria, Kaduna
Northwest	Barau Dikko Teaching Hospital	Barau Dikko Medical Library	Kaduna
Northeast	Federal Medical Centre, Gombe	Federal Medical Centre Library, Gombe	Gombe
Northeast	Modibbo Adama University Teaching Hospital	Modibbo Adama College of Medical Sciences Library	Yola
Southwest	University College Hospital, Ibadan	University of Ibadan Medical Library	Ibadan
Southwest	Lagos University Teaching Hospital (LUTH)	College of Medicine Library, University of Lagos	Lagos
Southeast	University of Nigeria Teaching Hospital (UNTH) Enugu	College of Health Sciences Library, UNN	Enugu

Zone	Institution Name (Teaching Hospital)	Medical College Library Name	Location
Southeast	Nnamdi Azikiwe University Teaching Hospital	NAUTH Medical College Library	Nnewi/Enugu

Table 1 shows the institutions data were collected from.

Table 2: Distribution of Respondents

Stakeholder Group	Teaching Hospitals Libraries	Medical College Libraries	Total
Librarians	10	12	22
Clinicians	24	11	35
Students	20	26	46
Health Administrators	7	5	12
Total	61	54	115

Table 2 is the distribution of respondents based on teaching hospital Library and medical college libraries.

Table 3: Resource Audit (Availability and Quality)

Resource Type	% Libraries (N=20) Reporting Available	Average Reported Quality (1=Poor, 5=Excellent)
Print textbooks	95%	3.8
Print journals	60%	2.7
Electronic databases	50%	2.5
Internet access	70%	3.1
Computers for users	55%	2.9
Multimedia resources	40%	2.2

Table 3 Shows both the prevalence and the perceived quality; useful for benchmarking and identifying critical gaps.

Table 4: Usage Metrics and Satisfaction Rate (n=115)

Item	Yes (%)	No (%)	Mean Satisfaction (1–5)
Used library in past 3 months	73	27	3.7
Used electronic resources in past 3 months	48	52	2.8
Satisfied with print resources	65	50	3.5
Satisfied with electronic resources	47	68	2.7
Satisfied with staff support	62	53	3.2
Would recommend library to colleagues	70	30	3.5

Table 4 Reports the percent of users engaging with the library and their satisfaction ratings; a gap between print and electronic resources is highlighted.

Table 5: Services Offered by Medical Libraries (As reported by Staff)

Service Type	Frequently Offered (%)	Rarely/Never Offered (%)
Reference/research consultation	82	18
Selective dissemination of info	30	70
Literature search training	41	59
Current awareness bulletins	36	64
Clinical/outreach librarian roles	14	86
Health information for public	21	79

Table 5 Highlights that basic reference is common but targeted, proactive, and clinical/outreach services are seldom available.

Table 6: Qualitative Insights from Semi-Structured Interview

Stakeholder	Themes	Quotes
Librarians	Inadequate funding, lack of training in e-resources, high print dependency	"We have little budget for new subscriptions, and digital platform usage among users is still low."
Clinicians	Need for quick access to evidence, frustration with outdated collections	"Accessing recent guidelines online is challenging due to poor internet in our library."

Stakeholder	Themes	Quotes
Students	Prefer digital, cite limited access and crowded facilities	"We often queue for computers, and many e-resources no longer work because subscriptions lapsed."
Health Administrators	Constraints of budget, policy inertia, weak IT support	"IT upgrades are slow due to procurement bureaucracy; resources lag behind global standards."

Table 6 shows how each group points to structural, technological, or policy factors shaping effectiveness.

Resource Audit

i) Print textbooks are nearly universally available and rated moderately high in quality.

ii) Electronic databases and multimedia resources are available in just half or fewer of institutions, with lower quality ratings. This suggests substantial gaps in digital infrastructure and budget for subscriptions.

iii) Internet access is better but still limited, likely due to shared facilities and inconsistent connectivity.

Usage Metrics & Satisfaction

iv) Library usage is reasonable (about 73% used recently), but less than half have accessed electronic resources. Satisfaction is higher for print than electronic resources, and recommendation rates are moderate.

v) Staff support receives only modest approval, indicating possible training or resourcing issues.

Services Offered

vi) Reference consultation is frequent, while advanced or outreach services (clinical librarian roles, tailored dissemination) are rarely implemented, showing a conventional service model.

vii) Training on retrieval and current awareness is limited, pointing to a gap in active capacity-building.

Discussion

Assessing the Range and Quality of Health Information Resources

The data presented from teaching hospitals and medical college libraries across Nigeria show a landscape dominated by print textbooks and monographs, which were almost universally available and rated moderately high in quality, yet with significant gaps in access to recent print journals and electronic databases. This distribution, mirrored across all surveyed regions,

suggests that the resource portfolios of Nigerian medical libraries remain largely oriented towards traditional formats, a finding consistent with Popoola (2020), who identified a strong print dependency inhibiting the transition to digital information environments.

The moderate ratings for quality of print materials equally reflect uneven collection management and update cycles, issues exacerbated by persistent underfunding and the absence of coordinated acquisition policies, a challenge articulated in the earlier works of Okeke (2018). Contrastingly, the more innovative libraries in resource-rich settings (e.g., North America and Europe) have undergone profound shifts towards digital collections, demonstrating a stronger commitment to global best practices in health information provision (Bawden & Robinson, 2019).

The limited availability of electronic databases and multimedia resources, with more than half of respondent institutions either lacking these entirely or reporting low quality, is especially noteworthy. This finding both accords with and amplifies earlier Nigerian studies, which have frequently reported that electronic health information is underutilized because of unstable internet, lapsed subscriptions, and weak institutional support (Odufuwa, Adeyemi & Odunsanya, 2019). Critically, it points to a structural dichotomy: while global access initiatives have expanded the theoretical reach of digital health knowledge, their local operationalization has been undermined by infrastructural and budgetary constraints. Student and clinician preference for digital resources remains largely as aspirations rather than actualized, reinforcing the urgency for targeted investments and advocacy at both institutional and policy levels.

Under the lens of socio-technical systems theory, these findings illustrate how resource-related technical subsystems (collections, databases, IT infrastructure) interlock with broader social subsystems (policy, funding, and user priorities). According to Carayon et al. (2006), the quality of health service delivery in such systems is shaped by multi-level factors, from the adequacy of physical resources to the organizational context that constrains or enables their deployment. The Nigerian case reveals persistent misalignment between system goals and actual operational environments, underscoring the need for holistic, context-sensitive resource strategies that bridge technical and organizational gaps.

Services Offered to Diverse Stakeholders

Analysis of the results reveals that Nigerian medical libraries primarily offer conventional reference and research consultation services, with less frequent provision of advanced or specialized support such as literature search training, selective dissemination of information, or embedded clinical librarian roles. This echo of basic service portfolios aligns with Ikolo (2022), who documented a prevalent orientation towards core reference support and an absence of proactive or outreach models in most Nigerian medical libraries.

Where innovation in service delivery is noted, such as at selected medical college libraries in southwest and southeast institutions, it is typically sporadic or pilot-based rather than institutionally anchored. The provision of tailored clinical information services and public health outreach remains sorely lacking, trailing far behind international benchmarks where such programming has become routine (Bawden & Robinson, 2019). These patterns reflect service inertia rooted partly in resource limitations, but also in the insufficient recognition of librarians as partners and collaborators in healthcare delivery, a sociotechnical design challenge identified by Marjanovic (2020).

Furthermore, usage metrics show significant stakeholder disparities: while students and clinicians frequently utilize core services, their satisfaction with electronic and specialized

offerings is low, and administrative stakeholders report almost negligible engagement with advanced services. This confirms previous research on Nigerian medical libraries reporting weak integration into clinical workflows and academic programs (Popoola, 2020; Adekunle & Olorunsola, 2021).

Through a socio-technical lens, the service findings emphasize the mutual dependence of technological potential and professional/social action. As Carayon et al. (2006) and Marjanovic (2020) argue, innovation in healthcare service provision requires not just the presence of advanced tools, but systems for training, cultural alignment, and inter-professional collaboration. In Nigeria, the absence of integrated service pathways whereby medical libraries actively facilitate the dissemination and use of high-quality health information in care, education, and research remains a substantial limitation and signals an urgent need for strategic transformation.

Structural, Technological, and Professional Factors Shaping Effectiveness

Structured interview data highlight several recurring themes; chronic underfunding, lack of professional development, poor IT infrastructure, bureaucratic inertia, and crowded physical spaces. These obstacles are cross-cutting, emerging consistently across stakeholder groups and regions. Librarians express frustration at the slow pace of digital transformation and the lack of formal medical librarianship training, while clinicians and students cite limited access and poor renewal of digital resources as critical barriers. Administrators, on the other hand, point to budgetary and policy limitations that deprioritize library modernization in favor of direct clinical investment, confirming challenges reported in the broader literature (Ikolo, 2022; Popoola, 2020).

Comparing these findings to studies in better-resourced healthcare systems, structural barriers in Nigeria are recurrent and pronounced. In environments where innovation ecosystems are stronger, medical libraries operate within robust socio-technical frameworks that meaningfully align resource allocation, staff development, and organizational infrastructure (Marjanovic, 2020). The Nigerian data suggests a sociotechnical misalignment: technical improvements (e.g., new databases) do not produce practical benefits in the absence of parallel professional and structural change, confirming the interdependence posited by socio-technical systems theory.

Additionally, the lack of coordinated national policy on medical library standards and integration with electronic health record systems illustrates the country's lag in aligning health informatics strategy with clinical and educational objectives. These deficits place Nigerian medical libraries at an inflection point: either they remain peripheral repositories or transform, through strategic capacity-building and systemic policy intervention, into dynamic agents of health information dissemination.

Towards a Context-Sensitive Framework for Library Transformation

Synthesizing the quantitative and qualitative results yields not just a list of deficits, but strategic opportunities for change. Drawing from socio-technical systems theory, the data underscores the necessity of a framework that synchronizes resource development, professional training, and organizational design. Such a framework should emphasize:

Resource diversification: Upgrading and integrating print, electronic, and multimedia collections guided by regular audit and needs analysis.

Professional capacity-building: Systematic librarian training in digital health information, evidence-based practice, and information literacy, adapted to local constraints.

Infrastructure and IT investment: Reliable internet, modern access points, and strong technical support across institutions.

Organizational change: Clear policies for regular collection renewal, collaborative research partnerships, and strategic advocacy for modernization.

User-centric service models: Expansion of specialized services including literature searching, clinical outreach, and tailored health information for all user groups.

This framework builds on local findings and mirrors global innovation trajectories in medical library science, adapting them for Nigeria's unique socio-technical landscape. Critically, such transformation is not merely technical or infrastructural, it is profoundly social, demanding shifts in institutional culture, bibliographic practice, and value assignment.

Theoretical, Policy, and Practice Implications

The findings have important implications for theory, policy, and practice. From a theoretical perspective, the research strongly supports socio-technical systems theory by demonstrating that resource and service enhancements are effective only when situated within a broader system of professional, cultural, and organizational change (Carayon et al., 2006; Marjanovic, 2020). The mutual shaping of technical capacity and social dynamics is powerfully evident in the Nigerian context, a novel empirical contribution that advances the field's understanding of medical library transformation in resource-constrained settings.

Policy-wise, there is urgent need for the Nigerian government, regulatory bodies, and higher education institutions to prioritize medical library modernization as integral to national health outcomes. This means budgetary allocation for digital infrastructure, policy frameworks specifying minimum standards for resource and service provision, and intersectoral partnerships that position libraries as central health system actors. Previous literature frequently calls for these advances, yet their actualization remains elusive (Popoola, 2020; Adekunle & Olorunsola, 2021). The study's findings add new urgency and specificity to these calls, particularly in emphasizing multi-level stakeholder engagement as necessary for sustainable change.

On the level of practice, the need for context-sensitive, user-engaged transformation in Nigerian medical libraries cannot be overstated. Institutional inertia must be addressed by fostering a culture of experimentation, continuous professional development, and proactive adaptation to emerging health information needs. International models provide templates but must be locally contextualized, balancing aspirations for technological advancement with real-world constraints and user preferences (Bawden & Robinson, 2019). Our results suggest that even modest gains in service innovation, resource upgrades, and staff capacity, can have outsized impact on health information access and quality.

Limitations and Reflections

Despite its strengths, the present study is subject to several limitations. Foremost, the reliance on self-reported data and the concentrated sample from eight representative institutions limits the generalizability across Nigeria's diverse healthcare and educational landscape. While the mixed-methods approach offers strong triangulation, resource audits and interviews could have benefitted from supplementary documentary analysis or observational data, which might uncover hidden constraints or informal practices not captured through structured instruments.

Additionally, the cross-sectional design provides only a snapshot, potentially missing shifts in library investment or policy priorities over time. Longitudinal research would better capture change trajectories and the durability of reforms. Another constraint concerns stakeholder representation; while clinicians, students, librarians, and administrators were sampled, patients

and public end-users, key groups for assessing health information equity, were not included. This omission limits the study's direct applicability to community-facing health information needs.

Lastly, the challenges of data access and respondent candor, particularly in resource-constrained environments, may have introduced bias. Respondents may underreport deficiencies due to institutional loyalty or overstate problems as a form of advocacy.

Conclusion

In sum, the study illuminates the persistent resource and service gaps of Nigerian medical libraries, the structural and professional constraints shaping these deficits, and the potential for rapid improvement through a socio-technical systems-driven approach. Comparing these findings with previous research spotlights both continuity and points of local novelty, especially in the critical need for context-sensitive framework development. By mapping practical, policy, and theoretical directions for transformation, the study contributes actionable knowledge to the fields of library science and healthcare informatics, while also highlighting the potential, and difficulty, of change in complex, resource-limited systems. The way ahead demands multi-stakeholder commitment, flexible innovation, and sustained policy attention if Nigerian medical libraries are to realize their role as pivotal agents of health information excellence.

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