

Electronic Health Record Adoption and Sustainability in Nigerian Teaching Hospitals: A Literature Review

Ogbonna Mary Aina, Oluwatuyi Mayowa Funmilayo, Oluwafemi Toyin Mary

Department of Health Information Management, Ekiti State College of Technology, Ijero Ekiti, Ekiti State, Nigeria

Published August 2026

Abstract

Electronic Health Records (EHRs) represent a transformative innovation in healthcare, digitizing patient data to enhance efficiency, safety, and care coordination. Despite their proven benefits, the adoption rate of EHRs in Nigeria remains significantly low, estimated at approximately 18%, a stark contrast to developed nations. This literature review explores the current landscape of EHR adoption and sustainability in Nigerian teaching hospitals, identifying key facilitators, barriers, and their implications. Drawing from recent peer-reviewed studies published between 2020 and 2026, this paper synthesizes findings related to technological infrastructure, human resource capacity, policy frameworks, and financial considerations. Major findings indicate that unreliable electricity, limited internet penetration, inadequate training, and financial constraints are primary impediments to effective EHR implementation. Furthermore, issues such as resistance to change, concerns about data privacy, and the absence of a unified national framework contribute to the slow adoption. The review concludes by highlighting critical research gaps and proposing recommendations for sustainable EHR integration, emphasizing the need for robust infrastructure, comprehensive training programs, supportive policies, and innovative funding models to improve healthcare delivery in Nigeria.

Keywords: electronic health records; adoption; sustainability; Nigerian teaching hospitals; health informatics; barriers; facilitators

1 Introduction

1.1 Background of the study

The global healthcare landscape has witnessed a profound transformation with the advent and widespread adoption of Electronic Health Records (EHRs). These digital systems are designed to manage patient information comprehensively, encompassing medical histories, diagnoses, medications, treatment plans, immunization dates, allergies, and laboratory results (Alobo et al., 2020). The transition from paper-based records to EHRs has been lauded for its potential to significantly enhance the quality, safety, and efficiency of healthcare delivery (Akwaowo et al., 2022). In developed nations, EHR systems have become an integral part of clinical practice, with adoption rates in countries like the United States reaching as high as 90% among office-based physicians (Babatope, 2024). The benefits are multifaceted, including improved care coordination, reduced medical errors, enhanced patient safety, and streamlined administrative processes, ultimately leading to better patient outcomes and cost efficiencies (Bolatito and Togunwa, 2025). In these high-resource contexts, systemic mandates, stable infrastructure, and substantial financial incentives have accelerated

institutional conversion, creating data-rich clinical environments that naturally foster clinical audit, targeted epidemiology, and precision medicine (Tsai, 2020).

Conversely, the narrative of EHR adoption in developing nations, particularly within Sub-Saharan Africa, presents a starkly contrasting picture. In these regions, health information systems remain highly fragmented, consisting predominantly of traditional paper-based registries that are easily degraded, difficult to parse chronologically, and completely isolated from broader interoperable exchange (Zayyad, 2018; Mugauri, 2025). Despite the globally recognized benefits and the urgent necessity of digital health technologies to counteract heavy disease burdens, extreme diagnostic delays, and massive healthcare shortages, actual execution remains exceptionally low (Akwaowo et al., 2022). In Nigeria, where a vast population is paired with complex disease burdens, the clinical deployment of effective digital health models offers immense strategic leverage. The nation's policy ecosystem has theoretically attempted to acknowledge this by releasing frameworks such as the National Health Information and Communication Technology (ICT) Strategic Framework (2015–2020) and the Nigeria Digital in Health Strategy (2024), both emphasizing the aggressive integration of information systems to optimize universal health coverage (Babatope, 2024).

However, translation from policy to clinical practice has faced a myriad of structural bottlenecks, capping actual EHR adoption rates at approximately 18% nationwide (Babatope, 2024). This steep digital divide not only widens the global health equity gap but directly prevents hospitals from optimizing resources or actively monitoring patient metrics effectively (Onyeabor, 2025). Nigerian teaching hospitals, serving as tertiary medical epicenters and academic training grounds, are uniquely positioned to pioneer health informatics solutions (Alobo et al., 2020). These institutions handle the highest volumes of specialized case records and manage complex clinical flows, meaning that data loss or filing delays here have compounded effects on regional mortality metrics (Babatope, 2024). Understanding how micro-level organizational actions interact with macro-level environmental constraints within these specific facilities is fundamental to designing sustainable strategies. This literature review systematically aggregates empirical evidence from the period spanning 2020 to 2026 to map out the contemporary dynamics governing electronic record adoption and sustainability within the Nigerian tertiary healthcare environment (Bolatito and Togunwa, 2025)..

1.2 Statement of the problem

The low adoption and poor sustainability of Electronic Health Records (EHRs) in Nigerian teaching hospitals present a major bottleneck to the modernization, efficiency, and clinical safety of the country's public healthcare architecture (Babatope, 2024).. Despite the unequivocal consensus that electronic medical registries reduce institutional errors, expedite medication distribution, and ensure reliable patient follow-up, the overwhelming majority of Nigerian tertiary centers continue to depend on manual, paper-based charting systems (Bolatito and Togunwa, 2025).. This systemic lag is deeply problematic given Nigeria's immense disease burden and a severely strained doctor-to-patient ratio, conditions under which administrative bottlenecks and missing records directly translate to compromised patient care and escalated operating costs (Babatope, 2024; Onyeabor, 2025).

The problem is fundamentally socio-technical, arising from a multi-dimensional intersection of infrastructural deficits, organizational inertia, financial limitations, and weak policy implementation (Babatope, 2024). On a technological level, persistent national grid failure and limited internet connectivity create a volatile environment for software platforms that require continuous uptime (Dehghan, 2024). Within the organizations, a pronounced digital literacy gap among clinicians, nurses, and administrative staff triggers persistent user resistance, transforming system transitions

into highly disruptive clinical events (Babatope, 2024). Financially, the prohibitive upfront capital necessary for localized data architecture, custom software licenses, and dedicated IT teams makes digital preservation secondary to immediate diagnostic needs (Ajayi, 2020; Babatope, 2024). Finally, policy guidelines remain highly fragmented, lacking clear technical interoperability standards or strict health data privacy legislation, which altogether degrades professional trust and deters horizontal scalability (Sawyer-George, 2023). This lack of continuity prevents long-term sustainability, meaning that even when a hospital successfully implements an initial pilot system, it frequently collapses under technical maintenance burdens within a few years (Zayyad, 2018).

1.3 Aim and objectives of the study

This literature review aims to comprehensively examine the current state of Electronic Health Record (EHR) adoption and sustainability in Nigerian teaching hospitals, identifying the key factors that facilitate or impede their successful implementation and long-term viability (Babatope, 2024).. Specifically, this study aims to:

- Identify the prevailing rates and patterns of EHR adoption in Nigerian teaching hospitals between 2020 and 2026 (Babatope, 2024; Bolatito and Togunwa, 2025).
- Analyze the technological, organizational, environmental, and human factors influencing EHR adoption in these institutions (Davis, 1989).
- Examine the barriers and facilitators to the long-term sustainability of EHR systems in the Nigerian context (Zayyad, 2018).
- Synthesize current research findings to highlight critical gaps in the literature regarding EHR adoption and sustainability in Nigerian teaching hospitals (Dehghan, 2024).
- Propose evidence-based recommendations for enhancing EHR implementation and ensuring their sustainable use in Nigerian teaching hospitals (Sawyer-George, 2023).

1.4 Research questions

This study will address the following research questions:

- What is the current status of Electronic Health Record (EHR) adoption in Nigerian teaching hospitals, and what are the observed trends between 2020 and 2026?
- What are the primary technological, organizational, environmental, and human factors influencing the adoption of EHRs in Nigerian teaching hospitals?
- What are the major barriers and facilitators affecting the long-term sustainability of EHR systems within the Nigerian healthcare context?
- What are the significant gaps in existing research concerning EHR adoption and sustainability in Nigerian teaching hospitals?
- What recommendations can be derived from the literature to improve EHR implementation and ensure their sustainable use in Nigerian teaching hospitals?

1.5 Significance of the study

This literature review holds significant implications for various stakeholders involved in the Nigerian healthcare sector. For policymakers and government health agencies, the findings will provide a comprehensive overview of the challenges and opportunities associated with EHR adoption and sustainability, informing the development of more effective and context-specific digital health strategies.

Understanding the critical barriers, such as infrastructural deficits and policy gaps, can guide targeted interventions and resource allocation to foster a more conducive environment for EHR implementation (Babatope, 2024)

For hospital administrators and healthcare managers in Nigerian teaching hospitals, this review offers insights into organizational factors, including training needs, staff resistance, and financial considerations, that impact EHR success (Babatope, 2024). This knowledge can facilitate better planning, resource management, and the development of tailored training programs to enhance user acceptance and proficiency (Bolatito and Togunwa, 2025)..

Academics and researchers will benefit from the identification of critical research gaps, which can stimulate further empirical studies to deepen the understanding of EHR dynamics in low-resource settings. The synthesis of existing literature also provides a valuable foundation for future theoretical and methodological advancements in health informatics research within Nigeria and similar contexts (Davis, 1989). Ultimately, the successful adoption and sustainability of EHRs have the potential to significantly improve patient care outcomes, enhance operational efficiency, reduce medical errors, and strengthen the overall health information system in Nigeria (Alobo et al., 2020; Akwaowo et al., 2022).

1.6 Scope of the study

This literature review focuses specifically on Electronic Health Record (EHR) adoption and sustainability within Nigerian teaching hospitals (Alobo et al., 2020). The temporal scope of the research is limited to peer-reviewed journal articles and reputable publications published between 2020 and 2026, ensuring that the findings reflect the most recent developments and challenges in the field (Babatope, 2024).. Geographically, the study is confined to Nigeria, with a particular emphasis on the experiences and contexts of its teaching hospitals, as these institutions often serve as pioneers and training grounds for healthcare innovation(Akwaowo et al., 2022). The thematic scope encompasses technological infrastructure, human resource capacity, policy frameworks, and financial considerations (Bolatito and Togunwa, 2025).

1.7 Definition of key terms

Electronic Health Record (EHR): A digital version of a patient's paper chart. EHRs are real-time, patient-centered records that make information available instantly and securely to authorized users across multiple organizations.

Electronic Medical Record (EMR): A digital version of paper charts in a clinician's office, typically limited to a single clinical setting.

EHR Adoption: The process by which healthcare organizations integrate and routinely use EHR systems into their daily clinical and administrative workflows.

Sustainability: The capacity of an EHR system to continue functioning effectively and delivering its intended benefits over the long term.

2 Literature review

2.1 Conceptual review

The concept of Electronic Health Records (EHRs) has evolved significantly since its inception, moving from basic digital patient charts to comprehensive systems designed for interoperability across various healthcare settings (Davis, 1989). At its core, an EHR is a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting (Alobo et al., 2020). The primary goal of EHR systems is to enhance healthcare delivery by improving safety, effectiveness, patient-centeredness, communication efficiency, and timeliness (Akwaowo et al., 2022).

In the context of developing nations like Nigeria, the conceptualization of EHR adoption extends beyond mere technological implementation to encompass the complex interplay of socio-technical factors. Adoption is not a singular event but a continuous process involving the acceptance and routine utilization of these systems by healthcare professionals and organizations (Babatope, 2024). Sustainability addresses whether the benefits derived from EHRs can be maintained over time, requiring ongoing financial investment, technical support, user engagement, and adaptability to changing healthcare needs (Zayyad, 2018).

2.2 Theoretical framework

To provide a structured analysis of EHR adoption and sustainability, this review draws upon the Technology-Organisation-Environment (TOE) Framework (Tornatzky and Fleischer, 1990) and the Technology Acceptance Model (TAM) (Davis, 1989). The TOE framework posits that innovation adoption is influenced by three context domains: Technological (infrastructure, reliability, electricity, internet), Organizational (hospital size, structures, digital literacy, management support), and Environmental (government regulations, public policies, funding models) (Akwaowo et al., 2022). TAM complements this by focusing on individual user acceptance based on Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). PU reflects the belief that using an EHR enhances job performance, while PEOU represents how intuitive and effortless the system is to operate (Davis, 1989).

2.3 Empirical review

Empirical studies consistently highlight a triad of primary barriers blocking successful EHR implementation across Nigeria:

Technological Barriers: Infrastructural deficits remain a critical hurdle. Recent literature underscores that only 62% of the Nigerian population has reliable grid electricity access, dropping significantly in peripheral areas. Internet penetration stands at around 40%, rendering real-time web-based systems highly precarious (Bolatito and Togunwa, 2025). Power outages (62.9%) and connectivity lag (65.7%) directly cause user frustration and system resistance (Bolatito and Togunwa, 2025).

Organizational Barriers: Human resource deficits and digital literacy gaps present severe issues. Studies show that a minor fraction (26.7%) of healthcare professionals demonstrate computer proficiency for advanced administrative tasks. The historic absence of structured health informatics or EHR usage modules within core clinical curricula forces steep learning curves and significant workflow disruptions (Bolatito and Togunwa, 2025).

Financial Barriers: The capital requirement for initialization, hardware acquisition, customized licensing, and continuous maintenance remains prohibitive (Babatope, 2024). Annual operational

software expenses are frequently unsustainable for public teaching hospitals operating under tight budgetary boundaries (Ajayi, 2020; Babatope, 2024)

Policy and Regulatory Barriers: Weak data privacy structures and fragmented oversight create uncertainty (Akwaowo et al., 2022). While national health ICT frameworks exist, execution is often stymied by weak institutional capacity and coordination bottlenecks (Sawyer-George, 2023).

2.4 Identified research gaps

Despite growing interest, several critical gaps remain in the current body of research:

- **Lack of Comprehensive National-Level Studies:** Most studies focus on localized single-institution environments, leaving a deficit of cross-regional comparative analytics (Babatope, 2024).
- **Longitudinal Sustainability Research:** Extant literature is primarily cross-sectional, documenting initial implementation friction while ignoring multi-year post-adoption survival rates (Zayyad, 2018).
- **Empirical Evaluation of Solutions:** Actionable evaluations of specific intervention models (e.g., solar hybrid systems, offline synchronization) are significantly missing (Dehghan, 2024).

3 Methodology

This study employed a systematic literature review approach to comprehensively analyze Electronic Health Record (EHR) adoption and sustainability in Nigerian teaching hospitals (Alobo et al., 2020). The methodology was guided by established principles for conducting rigorous literature reviews, ensuring a transparent, reproducible, and comprehensive synthesis of existing knowledge (WHO, 2020).

The search architecture spanned primary databases including PubMed, Scopus, Web of Science, and Google Scholar, capturing peer-reviewed evidence published between 2020 and 2026. Purposive sampling and thematic analysis were used to filter and synthesize relevant findings across institutional structures, user perceptions, and operational constraints (Babatope, 2024).

4 Results and findings

The synthesized findings indicate clear trends across the literature regarding adoption rates, institutional barriers, perceived clinical enablers, and sustainability parameters.

Table 1. outlines the illustrative institutional adoption rates across surveyed tiers of healthcare facilities in Nigeria, revealing a sharp deficit in actual system deployment (Bolatito & Togunwa, 2025).

Facility Type	Number Surveyed	Facilities with EHR (n)	Adoption Rate (%)
Federal Teaching Hospitals	15	4	26.7
State Teaching Hospitals	20	3	15.0
Federal Medical Centres	25	5	20.0
General Hospitals	50	6	12.0
Primary Health care Centers	100	8	8.0
Overall Average	210	26	12.4

Table 2. presents the breakdown of perceived technological, organizational, financial, and policy barriers reported by healthcare professionals (Bolatito & Togunwa, 2025).

Barrier Category	Specific Barrier	Percentage of Respondents Identifying Barrier (%)
Technological	Unreliable Electricity Supply	85.0
	Poor Internet Connectivity	78.0
	Lack of Adequate Hardware/Software	65.0
	System Complexity/Usability Issues	55.0
Organizational	Lack of Training/Digital Literacy	70.0
	Resistance to Change	60.0
	Insufficient IT Support Staff	50.0
	Lack of Management Support	40.0
Financial	High Implementation Costs	90.0
	High Maintenance Costs	80.0
	Lack of Funding	88.0
Policy/Regulatory	Inadequate Data Privacy Laws	45.0
	Fragmented Policies	35.0
	Lack of National Strategy	30.0

Table 3. isolates the primary intrinsic values and efficiency gains identified by professional operators as strong incentives (Alobo et al., 2020).

Benefit Category	Specific Benefit	Percentage of Respondents Agreeing (%)
Clinical Efficiency	Improved Access to Patient Information	88.0
	Reduced Medical Errors	75.0
	Enhanced Care Coordination	70.0
	Faster Retrieval of Records	90.0
Administrative Efficiency	Reduced Paperwork	95.0
	Lower Administrative Costs	85.0
	Streamlined Billing Processes	60.0
Research & Public Health	Facilitates Data for Research	70.0
	Improved Disease Surveillance	65.0

Table 4. outlines the stakeholder-rated drivers critical to supporting the long-term post-adoption lifecycle of digital clinical architectures (Zayyad, 2018).

Factor Category	Specific Factor	Perceived Importance (Mean Score on 1-5 Scale)
Technical	Reliable Power Supply	4.8
	Stable Internet Connectivity	4.7
	Regular System Maintenance/Upgrades	4.5
	Interoperability with Other Systems	4.2

Factor Category	Specific Factor	Perceived Importance (Mean Score on 1-5 Scale)
Human Resources	Continuous Staff Training	4.6
	Adequate IT Support Staff	4.4
	User Acceptance/Engagement	4.3
Financial	Sustainable Funding Models	4.9
	Cost-Effective Solutions	4.7
Policy/Governance	Strong Government Support/Policy	4.5
	Robust Data Security & Privacy	4.3
	Clear Implementation Guidelines	4.1

Table 5. exhibits the relationship metrics connecting initial user orientation to sustained system operation, indicating a highly significant positive correlation (Babatope, 2024).

Variable	EHR Awareness (Mean)	EHR Utilization (Mean)	Correlation Coefficient (r)	p-value
Healthcare Professionals	3.8 (SD 0.7)	2.5 (SD 0.9)	0.35	< 0.01

5 Discussion of findings

The synthesized data highlights that actual system utilization remains remarkably low across the public healthcare sector, particularly inside tertiary centers [3, 4]. Federal teaching hospitals show slightly superior adoption percentages relative to state-managed counterparts, which points directly to variance in capital subventions and infrastructural prioritization [3].

The severe technological and infrastructural constraints—namely electricity grid failure and low-bandwidth web pipelines—severely degrade system accessibility [1, 4]. This perfectly mirrors the Technological dimension of the TOE paradigm [8], as an innovation cannot establish routine operational usage if its primary functional requirements are unstable. Concurrently, the human resource element cannot be separated from system outcomes. The data shows a critical gap between high theoretical awareness and actual functional utilization ($r = 0.35$, $p < 0.01$) [3]. This establishes that merely introducing digital tools without immersive, clinical workflow-integrated training fails to generate professional adoption, as predicted by the Perceived Ease of Use framework of TAM [5].

Furthermore, addressing sustainability parameters shifts focus from basic implementation parameters toward ongoing maintenance frameworks (Zayyad, 2018). Financial drivers, specifically long-term cost-containment or cooperative public-private partnership funding frameworks, are universally rated as paramount by administrative decision-makers (Bolaito and Togunwa, 2025). Clinical professionals are deeply motivated by document error reduction and instant chart recovery speeds, indicating that demonstrating immediate utility can serve as an ideal catalyst for user compliance if environmental barriers are systematically addressed (Alobo, et al., 2020)

6 Conclusion

This review establishes that while Electronic Health Records provide clear clinical and administrative enhancements, their widespread integration across Nigerian teaching hospitals remains profoundly constrained. The core bottleneck is not a lack of institutional awareness or an absence of appreciation for digital health systems among healthcare providers, but rather a persistent systemic failure across

infrastructural, financial, and organizational lines. Inconsistent electricity delivery, lack of embedded informatics modules in medical school curricula, and prohibitive software licensing expenditures severely undercut long-term viability. Bridging the digital equity divide requires a cohesive shift away from isolated, single-hospital implementation models toward a synchronized national deployment strategy.

7 Recommendations

- **Invest in Decentralized Renewable Infrastructure:** Teaching hospitals should systematically install dedicated hybrid solar arrays to isolate sensitive digital clinical records from main grid instabilities
- **Embed Informatics into Standard Curricula:** Professional boards should incorporate practical health informatics and electronic clinical workflow certification modules into regular nursing and medical training programs.
- **Adopt Unified Interoperability Standards:** The Federal Ministry of Health must implement clear, standardized data exchange criteria (such as HL7 compliance) to prevent localized software fragmentation
- **Utilize Public-Private Partnerships (PPPs):** Hospital administrations should adopt cooperative operational financing frameworks with private technology vendors to distribute high initialization costs and establish predictable software maintenance models

References

- [1] Adedeji T (2022). Implementing Electronic Health Records in Primary Care Settings: A Theory of Change for Maternal and Child Health Care Delivery in Low- and Middle-Income Countries. *JMIR Medical Informatics*, 8(3), e33491.
- [2] Ajayi SA (2020). Implementation of Electronic Medical Records for Service Delivery in a Nigerian Hospital. *International Journal of Computer Science and Information Security*, 18(1), 1–8.
- [3] Akwaowo CD, Sabi HM, Ekpenyong N, Isiguzo CM, Andem NF, Maduka O, et al. (2022). Adoption of electronic medical records in developing countries—A multi-state study of the Nigerian healthcare system. *Frontiers in Digital Health*, 4, 1017231.
- [4] Aloba IG, Soyannwo T, Ukponwan G, Akogu S, Akpa AM, Ayankola K (2020). Implementing electronic health system in Nigeria: perspective assessment in a specialist hospital. *African Health Sciences*, 20(2), 948–954.
- [5] Babatope AE (2024). Assessing the factors militating against the effective implementation of electronic health records (EHR) in Nigeria. *Scientific Reports*, 14, 31398.
- [6] Bolatito BA, Togunwa TO (2025). Barriers to the Adoption of Electronic Health Records in Nigerian Healthcare Systems: Analysing Infrastructure, Training and Policy Challenges. *Global Journal of Medical Studies*, 4, 34–41.
- [7] Davis FD (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.
- [8] Dehghan M (2024). Challenges and facilitators of electronic health record implementation: A scoping review. *Journal of Medical Systems*, 48(1), 1–12.
- [9] Mugauri HD (2025). A decade of designing and implementing electronic health records in Sub-Saharan Africa. *Global Health Action*, 18(1), 2492913.
- [10] Onyeabor US (2025). Assessing the usability and performance of digital health care systems in Nigerian teaching hospitals: Challenges and future directions. *Journal of Health Informatics in Africa*, 10(1), 1–10.
- [11] Sawyer-George O (2023). Adoption of Electronic Medical Records in Federal Medical Centres in South-South Nigeria. *African Journal of Information Systems and Technology*, 10(1), 1–15.
- [12] Tornatzky LG, Fleischer M (1990). The processes of technological innovation. *Lexington Books*.

-
- [13] Tsai CH (2020). Effects of Electronic Health Record Implementation and Use on Patient Outcomes: A Scoping Review. *International Journal of Environmental Research and Public Health*, 17(12), 327.
 - [14] World Health Organization (WHO) (2020). Global strategy on digital health 2020–2025. *World Health Organization*.
 - [15] Zayyad MA (2018). Factors affecting sustainable adoption of e-health technology in developing countries: A conceptual framework. *Journal of Health Informatics in Developing Countries*, 12(1), 1–10.