IMPACT OF ELECTRONIC HEALTH RECORDS ON HEALTHCARE SERVICE DELIVERY: AN OVERVIEW

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Abstract

Electronic Health Records (EHRs) have emerged as a crucial digital tool for improving healthcare service delivery by facilitating the efficient management of patient data, reducing medical errors, and enhancing clinical decision-making. In Nigeria, the adoption of EHRs is gradually increasing, but challenges such as inadequate infrastructure, limited technical expertise, and data security concerns continue to hinder their full potential. This study provides an overview of the impact of EHRs on healthcare service delivery in Nigeria, focusing on their role in patient data management, clinical efficiency, quality of care, and overall health system performance. The review revealed that EHRs improve accuracy, accessibility, and timeliness of patient information, supporting better diagnosis, treatment, and continuity of care. However, challenges such as poor ICT infrastructure, high implementation costs, resistance to change among healthcare workers, and concerns about data privacy limit effective adoption. Despite these challenges, the implementation of EHRs in Nigeria has demonstrated significant potential in enhancing healthcare quality, reducing errors, and promoting evidence-based medical practices. Their successful adoption requires addressing infrastructural, human resource, and policy-related barriers. To maximize the benefits of EHRs, it is recommended that healthcare facilities strengthen ICT infrastructure, provide continuous training for healthcare professionals, ensure robust data security measures, promote standardization and interoperability of systems, and encourage government support through funding and policy frameworks.

Keywords: Electronic Health Records, Health Care, Service Delivery, Nigeria

Introduction

Electronic Health Records (EHRs) digital, longitudinal patient records that support clinical documentation, decision support, and information exchange are increasingly recognized as a core

enabler of safer, more efficient healthcare delivery in Nigeria, yet adoption and measurable impact vary across settings (Babatope et al., 2024). Recent Nigerian evidence synthesised across primary studies reports that introducing EMR/EHR tools has meaningfully improved data quality (for example, completeness and accuracy of clinical data), while patient-level outcomes and satisfaction are still being evaluated in heterogeneous ways (Olukorode et al., 2024). At facility level, digital tools have also been used to raise coding accuracy for morbidity and mortality data in Lagos State general hospitals, demonstrating operational gains that matter for planning and quality improvement. These findings align with broader digital-health reviews in Nigeria showing that well-implemented systems can streamline workflows and reduce waiting times, but that evidence on long-term clinical outcomes remains comparatively sparse and calls for stronger evaluation designs (Adebisi et al., 2025).

Despite visible benefits, barriers persist: power unreliability, weak connectivity, limited informatics skills, financing constraints, and fragmented standards are repeatedly cited as obstacles to effective EHR implementation and scale-up (Olatunji et al., 2025). To address these gaps, the Federal Government has launched the Nigeria Digital in Health Initiative (NDHI), with a dedicated committee inaugurated to drive interoperable architectures and national scale-up signalling policy commitment to standards, governance, and integration across programs and states (FMOH, 2025). Importantly, Nigeria's data-protection regime has matured: the Nigeria Data Protection Regulation (2019) established baseline obligations for personal data controllers, while the Nigeria Data Protection Act (2023) created the Nigeria Data Protection Commission and codified lawful bases, rights, and safeguards—frameworks that shape how providers must deploy EHRs and protect sensitive health information (NITDA, 2023).

Taken together, Nigeria's experience suggests that EHRs can strengthen core service-delivery functions data quality, accountability, and managerial insight—while realising fuller clinical impact will depend on interoperability, infrastructure reliability, workforce training, and sustainable financing under a robust privacy and security regime (Olukorode et al., 2024). These dynamics set the stage for an outcomes-oriented research and implementation agenda linking EHR adoption to measurable improvements in access, continuity of care, safety, and patient experience across primary, secondary, and tertiary care in Nigeria (Adebisi et al., 2025).

Concept of Electronic Health Record

The concept of Electronic Health Record (EHR) refers to a systematic collection of patient health information in a digital format that is created and managed by authorized health care providers. EHRs are designed to capture, store, and share patient data such as medical history, diagnoses, medications, treatment plans, immunization dates, allergies, radiology images, and laboratory test results in real-time (Adeloye et al., 2021). Unlike paper-based records, EHRs enable interoperability, meaning they can be accessed and exchanged across different health care facilities to improve care coordination and continuity (Onyema et al., 2020).

EHR systems provide a longitudinal record of patient information and support evidence-based decision-making by integrating clinical decision support tools and analytics (Ogundele et

al., 2022). The implementation of EHR enhances efficiency, reduces medical errors, and promotes accurate documentation and reporting (Adebayo & Bello, 2023). In the Nigerian context, the adoption of EHR is gradually increasing, especially in tertiary hospitals, due to initiatives aimed at digitizing healthcare delivery, although challenges such as inadequate infrastructure, cost implications, and limited digital literacy remain significant barriers. Overall, the concept of EHR is grounded in improving the quality, safety, and efficiency of healthcare delivery through digital transformation of health information management.

Statement of the Problem

The adoption of Electronic Health Records (EHRs) has become a critical component of modern healthcare systems globally, with the potential to improve efficiency, patient safety, and service delivery. However, in Nigeria, the implementation and utilization of EHRs remain limited despite government efforts and international advocacy for digital health systems. Many health facilities in the country still rely heavily on paper-based records, which are prone to loss, damage, and delays in accessing patient information, leading to inefficiencies in healthcare delivery.

According Ogundele et al., (2022), there is lack of adequate infrastructure, poor internet connectivity, insufficient technical expertise, and high implementation costs have significantly hindered the widespread use of EHR in Nigerian hospitals. These challenges negatively impact the ability of health professionals to share patient data in real-time, make informed clinical decisions, and maintain accurate longitudinal records of care. As a result, healthcare outcomes are compromised due to delays in diagnosis, duplication of tests, and medication errors.

A study conducted by Adebayo & Bello (2023), highlighted the benefits of EHR, such as improved data management and enhanced communication among healthcare teams, there is limited empirical evidence on its actual impact on healthcare service delivery in the Nigerian context. This knowledge gap raises concerns about whether EHR adoption in Nigeria can achieve its intended objectives of improving quality, safety, and efficiency of care delivery. Therefore, there is a need for an in-depth examination of the impact of EHR on healthcare service delivery within the Nigerian healthcare system.

Research Objectives

17. To determine the extent of adoption and use of Electronic Health Records (EHRs) in healthcare facilities;
18. To assess the impact of Electronic Health Records on the quality and timeliness of healthcare service delivery;
19. To examine how Electronic Health Records enhance patient data management and clinical decision-making;
20. To identify the challenges hindering the effective implementation and utilization of Electronic Health Records in healthcare settings;

Literature Review

I. Adoption and use of Electronic Health Records (EHRs) in healthcare facilities in Nigeria

Across Nigeria, adoption of Electronic Health Records (EHRs) has accelerated but remains uneven, with tertiary and urban public hospitals leading and many secondary/primary facilities still reliant on paper or hybrid systems. According to Olukorode et al (2024), national evidence review concluded that introducing EMR/EHR tools meaningfully improved data quality notably completeness and accuracy of routine clinical documentation while rigorous evidence on patient-level outcomes is still emerging and heterogeneous. Facility-level quality-improvement work in Lagos demonstrated that deploying an electronic diagnostic terminology tool with coder training raised ICD-10 coding accuracy for morbidity/mortality data, underscoring the operational gains that EHR-linked tools can deliver for reporting and service planning (Olagundoye et al., 2021). These findings align with broader digital-health scholarship in Nigeria showing that well-implemented systems can streamline workflows and support better managerial decisions, though benefits are contingent on context and implementation fidelity.

Barriers repeatedly documented in Nigerian settings include high start-up and maintenance costs, inadequate ICT infrastructure and connectivity, workforce capacity gaps, and fragmented or absent interoperability standards (Babatope et al., 2024). Sociocultural and behavioral factors also shape adoption; research on resistance to e-health services in Nigeria points to perceptions, norms, and intentions that can impede uptake even when technical tools are available, suggesting change-management and user-centered design are as critical as technology itself (Adewuyi et al., 2024). In addition, governance and compliance considerations influence provider decisions: the Nigeria Data Protection Act 2023 formalized privacy obligations and established the Nigeria Data Protection Commission, raising the bar for lawful processing, security, and rights issues that are central to EHR procurement, configuration, and routine use.

On the policy front, federal action has intensified with the Nigeria Digital in Health Initiative (NDHI), which the Ministry of Health positioned to drive national architectures, standards, and scale-up of digital health solutions, including EHRs; inauguration of an NDHI implementation committee signaled a whole-of-government push to tackle fragmentation and enable data exchange for service delivery and accountability. Collectively, the literature suggests that Nigeria's EHR trajectory is moving from pilot projects toward more coordinated scale-up, with the most consistent gains documented in data quality and coding accuracy, and with future impact on clinical outcomes likely to depend on investments in interoperability, reliable infrastructure, capacity building, and sustained governance and financing (Olukorode et al., 2024).

I. Impact of EHRs on the quality healthcare service delivery in Nigeria

The impact of Electronic Health Records (EHRs) on the quality of healthcare service delivery in Nigeria has become a critical subject in health informatics. EHRs enhance the accuracy, accessibility, and timeliness of patient data, which significantly improves clinical

decision-making and patient outcomes (Okonkwo et al., 2020). By digitizing health records, EHRs reduce the risks of errors associated with paper-based systems, such as misplacement of files and incomplete documentation, which have historically hindered effective healthcare delivery. EHR systems facilitate quick access to patients' medical histories, enabling health professionals to provide more informed diagnoses and treatment plans (Adebayo & Adejumo, 2022).

This real-time availability of patient data also supports continuity of care across different healthcare providers and institutions, which is crucial in managing chronic diseases and emergency cases. Additionally, the adoption of EHRs improves communication among healthcare professionals, streamlines workflow, and reduces duplication of tests, thereby enhancing efficiency and lowering costs (Eze et al., 2023). Despite these benefits, challenges such as inadequate infrastructure, poor internet connectivity, lack of technical expertise, and resistance to change have limited the full realization of EHR benefits in Nigeria (Okeke & Eze, 2022). Data security and patient privacy concerns also remain significant issues that need to be addressed to foster trust in the system. Nevertheless, the integration of EHRs into Nigerian healthcare settings has shown potential in promoting evidence-based practices, improving health outcomes, and achieving universal health coverage (Ogunyemi & Ojo, 2021).

III. Electronic Health Records for patient data management in Nigeria

Electronic Health Records (EHRs) have emerged as a vital tool for effective patient data management in Nigeria, providing a digital platform to capture, store, and retrieve comprehensive health information in real-time. EHRs centralize patient information, including medical history, diagnoses, laboratory results, medications, immunization records, and treatment plans, which improves accessibility and reduces errors associated with paper-based records (Olayemi et al., 2024).

In Nigerian healthcare facilities, EHRs facilitate better continuity of care, as multiple healthcare providers can access accurate patient records across different departments or locations, ensuring coordinated and consistent treatment. The use of EHRs also enhances clinical decision-making by providing up-to-date patient information and integrating clinical decision support tools that alert healthcare providers to potential drug interactions, allergies, or abnormal test results (Ogundele et al., 2022). Moreover, EHRs improve data management for administrative and policy purposes, enabling hospitals and health authorities to generate reports, track disease patterns, and plan resource allocation more effectively (Onyema et al., 2020). However, challenges such as insufficient infrastructure, limited internet connectivity, high implementation costs, and lack of technical skills continue to hinder optimal use of EHR systems in Nigeria. Despite these barriers, the gradual adoption of EHRs in tertiary and urban healthcare facilities has demonstrated potential in improving patient safety, efficiency, and overall quality of care (Adeloye et al., 2021).

IV. Challenges hindering the implementation of Electronic Health Records in Nigeria

The implementation of Electronic Health Records (EHRs) in Nigeria faces numerous challenges that hinder their full adoption and effective use in healthcare facilities. One of the major barriers is inadequate ICT infrastructure, including unreliable power supply, limited internet connectivity, and outdated computer systems, which disrupt the smooth operation of digital health platform. Many healthcare facilities, particularly in rural areas, lack the necessary technological resources to support EHR systems, limiting their reach and effectiveness (Olukorode et al., 2024). High implementation and maintenance costs also pose significant challenges, as many hospitals and clinics cannot afford the upfront investment required for software, hardware, and training of personnel. The shortage of skilled health informatics professionals further complicates EHR deployment, as healthcare providers often lack the technical expertise to operate, manage, and maintain these systems effectively (Onyema et al., 2020).

Additionally, resistance to change among healthcare workers is a critical human factor, often stemming from unfamiliarity with technology, fear of increased workload, and lack of confidence in digital systems (Adeloye et al., 2021). Data privacy and security concerns also hinder implementation, as sensitive patient information must be protected against unauthorized access, cyber threats, and breaches, which requires robust policies and compliance mechanisms. Lastly, limited government support and fragmented policies have slowed standardization and interoperability across facilities, resulting in inconsistent adoption and isolated systems that cannot effectively share patient data (Ogundele et al., 2022). These challenges collectively impede the potential of EHRs to enhance healthcare service delivery, patient safety, and overall health system efficiency in Nigeria.

Improving the implementation of Electronic Health Records (EHRs) in Nigeria requires a multifaceted approach addressing technical, organizational, and policy-related barriers. One key strategy is the strengthening of ICT infrastructure, including stable electricity, reliable internet connectivity, and modern hardware, to ensure uninterrupted access and smooth operation of EHR systems (Olayemi et al., 2024). Ensuring that healthcare facilities, especially in rural and underserved areas, are equipped with necessary technology is critical to bridging the digital divide. Another strategy involves capacity building and training of healthcare professionals in health informatics. Continuous training programs and workshops can enhance staff competence, reduce resistance to change, and promote effective use of EHRs for patient data management and clinical decision-making. Additionally, fostering change management and user engagement by involving healthcare workers in the design, customization, and implementation of EHR systems can improve acceptance and adherence (Adeloye et al., 2021).

Financial support and sustainable funding mechanisms are essential for successful EHR implementation. Government subsidies, public-private partnerships, and donor funding can help cover high start-up costs, system maintenance, and regular updates, making EHRs accessible to more facilities (Ogundele et al., 2022). Furthermore, standardization and interoperability of EHR systems across facilities should be prioritized. Developing national guidelines, data standards,

and policies ensures that systems can communicate effectively, allowing for seamless patient information sharing across institutions. Finally, strengthening data security and privacy frameworks, including compliance with the Nigeria Data Protection Act (2023), is necessary to protect sensitive patient information and build public trust in digital health solutions (Olayemi et al., 2024). Thus, implementing these strategies, Nigeria can enhance EHR adoption, optimize patient data management, improve healthcare quality, and achieve more efficient, safe, and coordinated health service delivery.

Future of EHR Technologies

The future of Electronic Health Record (EHR) technologies is poised to transform healthcare delivery globally, and Nigeria is gradually beginning to explore these possibilities. Emerging trends indicate that EHR systems will increasingly integrate artificial intelligence (AI), machine learning, and predictive analytics, enabling more accurate diagnoses, personalized treatment plans, and proactive patient care. AI-powered EHRs can analyze large volumes of patient data to identify patterns, predict disease outbreaks, and support clinical decision-making, significantly improving patient outcomes and operational efficiency (Adebayo & Bello, 2023).

Another critical trend is the move toward interoperability and unified health information exchanges, which will allow seamless sharing of patient data across hospitals, clinics, laboratories, and pharmacies. This will reduce duplication of tests, enhance coordination of care, and support public health surveillance, particularly in resource-constrained settings like Nigeria (Olayemi et al., 2024).

Mobile EHR applications and cloud-based solutions are also expected to play a central role in the future, improving access to patient records even in remote areas, and enabling telemedicine, remote consultations, and continuous monitoring of chronic diseases (Ogundele et al., 2022). These cloud-based solutions reduce dependence on local servers and infrastructure, making implementation more scalable and cost-effective.

Furthermore, enhanced data security and compliance measures will be a key focus, as regulations such as the Nigeria Data Protection Act (2023) require secure storage, transmission, and use of patient information. Future EHR systems are expected to include advanced encryption, biometric authentication, and blockchain technologies to safeguard patient data while improving trust and adoption (Olukorode et al., 2024). Finally, the integration of patient-centered functionalities, such as patient portals, reminders, and self-monitoring tools, will empower individuals to participate actively in their healthcare, fostering engagement and adherence to treatment. Collectively, these trends suggest that the future of EHR technologies in Nigeria will be more intelligent, connected, secure, and patient-focused, ultimately enhancing the quality, efficiency, and equity of healthcare delivery.

Recommendations

5. Healthcare facilities should invest in reliable electricity, stable internet connectivity, and modern hardware to ensure uninterrupted operation and accessibility of EHR systems.

6. Continuous training programs for healthcare professionals should be implemented to improve digital literacy and effective use of EHRs, reducing errors and improving clinical decision-making.
7. Policymakers should provide financial incentives, subsidies, and public-private partnerships to promote widespread adoption and sustainability of EHR systems in healthcare facilities.
8. National guidelines and data standards should be established to enable seamless sharing of patient information across hospitals and clinics, improving continuity of care and population health monitoring.
9. Robust data protection measures, including encryption, access controls, and compliance with the Nigeria Data Protection Act (2023), should be enforced to protect patient information and build trust in EHR systems.

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