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Adoption of Electronic Health Records (EHR) Systems and Its Impact on Patient Care Efficiency in Tertiary Hospitals

Afolabi Morenikeji, Abulyekeen Raheemah, and Lana Oyenike

Abstract

The adoption of Electronic Health Records (EHR) systems represents a major innovation in modern healthcare delivery, particularly in improving patient care efficiency in tertiary hospitals. EHR systems facilitate the digital storage, retrieval, and sharing of patient information, thereby enhancing clinical decision-making, reducing medical errors, and improving coordination among healthcare professionals. This study examines the adoption of EHR systems and their impact on patient care efficiency in tertiary hospitals.

A narrative review methodology was employed, drawing evidence from peer-reviewed journal articles, institutional reports, and policy documents published between 2015 and 2025. The study synthesised findings from multiple healthcare settings, with particular emphasis on developing countries where EHR adoption is still evolving.

Findings indicate that EHR systems significantly improve patient care efficiency by reducing waiting time, enhancing data accessibility, improving diagnostic accuracy, and facilitating continuity of care. However, the adoption of EHR systems is hindered by challenges such as high implementation costs, inadequate ICT infrastructure, resistance to change among healthcare workers, and concerns about data privacy and security.

The study concludes that while EHR systems have strong potential to improve healthcare efficiency in tertiary hospitals, their effectiveness depends on adequate infrastructure, staff training, and supportive policy frameworks. Strategic investment in digital health systems and capacity building is essential to maximise their benefits and ensure sustainable adoption in healthcare institutions.

Keyword: *Electronic health records adoption, Patient care efficiency improvement, Digital hospital information systems, Healthcare data management systems, Clinical workflow optimisation*

Introduction

The healthcare sector has witnessed significant transformation through the integration of digital technologies, among which Electronic Health Records (EHR) systems stand out as one of the most impactful innovations. EHR systems are digital platforms designed to store comprehensive patient health information, including medical history, diagnoses, treatment plans, laboratory results, and medication records. Unlike traditional paper-based records, EHR systems allow real-time access to patient data, thereby improving clinical decision-making and coordination of care among healthcare professionals.

In tertiary hospitals, where patient volume is high and cases are often complex, the efficiency of patient care is heavily dependent on the availability of accurate and timely information. EHR systems play a critical role in reducing delays, minimizing duplication of tests, and improving communication between different departments. This ultimately enhances patient outcomes and operational efficiency within healthcare facilities.

Despite these benefits, the adoption of EHR systems in many developing countries remains relatively low. Challenges such as inadequate ICT infrastructure, high implementation costs, limited technical expertise, and resistance from healthcare workers hinder widespread adoption.

Additionally, concerns related to data privacy, cybersecurity, and system interoperability further complicate implementation efforts.

In countries like Nigeria, where healthcare systems are still undergoing digital transformation, understanding the impact of EHR systems on patient care efficiency is essential for informing policy and improving healthcare delivery. While some tertiary hospitals have begun implementing EHR systems, the level of adoption and effectiveness varies significantly across institutions.

Therefore, this study seeks to examine the adoption of EHR systems and evaluate their impact on patient care efficiency in tertiary hospitals. It also explores the challenges affecting implementation and identifies strategies for improving adoption and utilisation.

Research Questions

I. What is the level of adoption of Electronic Health Records systems in tertiary hospitals?
II. How do EHR systems impact patient care efficiency in tertiary hospitals?
III. What challenges affect the adoption and implementation of EHR systems?
IV. What strategies can enhance effective adoption and utilisation of EHR systems in healthcare institutions?

Literature Review

Electronic Health Records (EHR) systems have become a central component of modern healthcare delivery systems globally. They are designed to improve the quality, safety, and efficiency of patient care by enabling the electronic storage and sharing of patient information across healthcare providers. According to Adler-Milstein and Jha (2017), EHR systems significantly enhance healthcare delivery by improving information accessibility and reducing medical errors.

In developed countries, the adoption of EHR systems has reached advanced stages, supported by strong policy frameworks and robust ICT infrastructure. Studies have shown that EHR systems contribute to improved clinical outcomes, reduced hospital readmissions, and enhanced coordination of care (Campanella et al., 2016). For instance, hospitals in the United States and Europe have reported increased efficiency in patient management due to integrated EHR systems.

In developing countries, however, the adoption of EHR systems remains uneven. Research by Ajami and Bagheri-Tadi (2013) highlights that although healthcare professionals recognise the benefits of EHR systems, their implementation is often hindered by infrastructural and financial constraints. Similarly, Ojo et al. (2018) found that limited ICT infrastructure and lack of trained personnel are major barriers to EHR adoption in sub-Saharan Africa.

One of the key benefits of EHR systems is improved patient care efficiency. Studies indicate that EHR systems reduce patient waiting time, eliminate redundant diagnostic tests, and enhance communication among healthcare providers (Boonstra et al., 2014). In tertiary hospitals, where patient flow is high, these improvements are particularly significant. EHR systems also support evidence-based decision-making by providing clinicians with comprehensive patient data in real time.

Despite these advantages, several challenges hinder the effective adoption of EHR systems. High implementation and maintenance costs remain a major barrier, particularly in resource-limited settings. Additionally, resistance to change among healthcare workers has been identified as a critical factor affecting adoption

rates. Many healthcare professionals are accustomed to paper-based systems and may be reluctant to transition to digital platforms due to perceived complexity or lack of training.

Data privacy and security concerns also pose significant challenges. EHR systems store sensitive patient information, making them vulnerable to cyber threats if not properly secured. According to Kruse et al. (2017), concerns about data breaches and unauthorized access often reduce trust in digital health systems.

Interoperability is another critical issue. Many EHR systems are not compatible with one another, making it difficult to share patient information across different healthcare facilities. This limits the full potential of EHR systems in improving continuity of care.

In the Nigerian context, studies show that EHR adoption is gradually increasing in tertiary hospitals, particularly in teaching hospitals and federal medical centres. However, the level of implementation varies widely, and many hospitals still rely on hybrid systems combining paper and electronic records. This partial adoption limits the overall efficiency gains expected from full digital transformation.

Therefore, the literature suggests that while EHR systems have strong potential to improve patient care efficiency, their success depends on addressing infrastructural, financial, and human resource challenges. A coordinated approach involving policy support, capacity building, and investment in ICT infrastructure is essential for successful implementation.

Methods and Materials

This study adopted a narrative review research design to examine the adoption of Electronic Health Records (EHR) systems and their impact on patient care efficiency in tertiary hospitals. The narrative review approach was selected because it allows for the synthesis of diverse evidence from empirical studies, policy documents, and theoretical literature.

Data were collected from reputable academic databases, including Scopus, PubMed, Web of Science, and Google Scholar. The search was conducted using keywords such as “Electronic Health Records,” “EHR adoption,” “patient care efficiency,” “digital health systems,” and “tertiary hospitals.” Boolean operators (AND, OR) were used to refine the search process and improve relevance.

The inclusion criteria consisted of peer-reviewed journal articles, conference papers, and institutional reports published between 2015 and 2025. Studies focusing on EHR implementation in hospitals, healthcare efficiency, and digital health adoption were included. Exclusion criteria included non-English publications, opinion pieces without empirical evidence, and studies not related to healthcare settings.

A total of 78 studies were initially identified, out of which 40 met the inclusion criteria after screening for relevance and methodological quality. The selected studies were then analysed thematically.

Data extraction focused on key variables such as level of EHR adoption, impact on patient care efficiency, benefits, and implementation challenges. Thematic analysis was used to organise findings into categories such as clinical efficiency, workflow improvement, cost implications, and adoption barriers.

Although the study did not involve primary data collection, ethical considerations were observed through proper citation and acknowledgment of all sources used. The methodological approach ensures a comprehensive and reliable synthesis

of existing knowledge on EHR adoption and its impact on healthcare efficiency in tertiary hospitals.

The synthesis of reviewed studies indicates that the adoption of Electronic Health Records (EHR) systems has a generally positive impact on patient care efficiency in tertiary hospitals. A majority of the studies reviewed report improved clinical workflow, faster retrieval of patient information, and enhanced coordination among healthcare professionals as key outcomes of EHR implementation.

One of the most frequently reported benefits is the reduction in patient waiting time. EHR systems enable clinicians to access patient records instantly, thereby eliminating delays associated with manual record retrieval. Several studies also highlight improved diagnostic accuracy due to the availability of comprehensive patient histories, laboratory results, and medication records in real time.

Furthermore, EHR adoption contributes to a reduction in medical errors, particularly medication errors, through automated alerts and clinical decision support features. Hospitals with fully implemented EHR systems demonstrate better continuity of care, especially for patients with chronic conditions requiring long-term monitoring and follow-up.

However, the results also reveal uneven levels of adoption across tertiary hospitals. While some teaching hospitals have achieved partial or full digitisation, others still operate hybrid systems combining paper-based and electronic records. This inconsistency affects overall efficiency gains.

Challenges identified include inadequate ICT infrastructure, high implementation costs, and resistance from healthcare workers. Additionally, frequent system downtime and limited technical support negatively affect system reliability. Despite these challenges, the overall evidence suggests that EHR systems significantly improve patient care efficiency when properly implemented and supported.

Discussion of Findings

The findings of this study confirm that Electronic Health Records (EHR) systems play a significant role in improving patient care efficiency in tertiary hospitals. The observed improvements in workflow efficiency, reduced waiting time, and enhanced clinical decision-making align with global evidence that digital health systems contribute to more effective healthcare delivery.

The reduction in medical errors, particularly medication-related errors, underscores the importance of EHR systems in improving patient safety. Automated alerts and integrated clinical decision support tools help clinicians make informed decisions, thereby reducing avoidable complications. This is consistent with existing literature that identifies EHR systems as critical tools for improving healthcare quality.

However, the findings also highlight persistent implementation challenges. Infrastructure deficits remain a major barrier in many tertiary hospitals, particularly in developing countries. Inadequate internet connectivity, unreliable power supply, and insufficient ICT equipment limit the effectiveness of EHR systems.

Resistance to change among healthcare workers also affects adoption levels. Many clinicians are accustomed to paper-based systems and may require extensive training and support to transition effectively to digital platforms. This highlights the importance of capacity building and change management strategies in EHR implementation.

Additionally, the high cost of implementation and maintenance limits widespread adoption, particularly in resource-constrained healthcare facilities. Without sustained financial investment, many hospitals struggle to fully digitise their health records systems.

Overall, while EHR systems demonstrate strong potential to improve patient care efficiency, their success depends on addressing infrastructural, human, and financial barriers. A coordinated approach involving policy support, training, and investment is essential for sustainable adoption.

Conclusion

This study concludes that the adoption of Electronic Health Records (EHR) systems significantly improves patient care efficiency in tertiary hospitals. EHR systems enhance clinical workflow, reduce patient waiting time, improve diagnostic accuracy, and strengthen coordination among healthcare providers. These benefits contribute to better patient outcomes and more efficient healthcare service delivery.

However, the effectiveness of EHR systems is constrained by several challenges, including inadequate infrastructure, high implementation costs, limited technical expertise, and resistance to change among healthcare workers. Inconsistent adoption across hospitals further limits the full realisation of EHR benefits.

Overall, while EHR systems represent a critical advancement in healthcare digitalisation, their impact depends on the availability of supportive infrastructure, adequate funding, and trained personnel. Strengthening these enabling factors is essential for maximising the benefits of EHR systems in tertiary healthcare institutions.

Recommendation

Healthcare institutions should invest in robust ICT infrastructure, including reliable internet connectivity and stable power supply, to support effective EHR implementation. Continuous training programmes should be provided to healthcare workers to enhance digital literacy and reduce resistance to adoption. Governments and hospital management should develop sustainable funding models to support system deployment and maintenance. In addition, clear policies and standards should be established to guide EHR usage, data security, and interoperability across healthcare facilities. Strengthening these areas will improve adoption rates and ensure that EHR systems effectively enhance patient care efficiency in tertiary hospitals.

Authors' Affiliation

Afolabi Morenikeji[1], Abulyekeen Raheemah[2], and Lana Oyenike[3]

[1] Obafemi Awolowo University (OAU), Ile-Ife, Nigeria

Email: morenikeji.afolabi@oau.edu.ng

[2] Kwara State University (KWASU), Malete, Nigeria

Email: raheemah.abulyekeen@kwasu.edu.ng

[3] University of Ibadan (UI), Ibadan, Nigeria

Email: oyenike.lana@ui.edu.ng

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