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EVALUATING THE IMPACT OF ELECTRONIC HEALTH RECORDS ON PATIENT CARE QUALITY AND CLINICAL DECISION-MAKING PROCESSES

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Abstract

The digital transformation of healthcare has accelerated significantly over the past decades, with Electronic Health Records (EHR) becoming a central component of modern medical practice. EHR systems enable the systematic collection, storage, and sharing of patient information, thereby improving clinical workflows, patient safety, and decision-making processes. This study aims to comprehensively evaluate the impact of EHR systems on patient care quality and clinical decision-making. A mixed-methods approach was employed, combining quantitative performance analysis with qualitative insights from healthcare professionals. The findings demonstrate that EHR implementation significantly improves diagnostic accuracy, reduces medical errors, enhances efficiency, and supports evidence-based decision-making. However, challenges such as interoperability limitations, clinician workload, and cybersecurity risks remain critical barriers. Overall, EHR systems represent a transformative advancement in healthcare, but their effectiveness depends on proper implementation, training, and technological integration.

Keywords: Electronic Health Records, EHR, patient care, clinical decision-making, healthcare quality, digital health, medical informatics



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Introduction

The rapid evolution of information and communication technologies has fundamentally transformed healthcare systems across the globe. One of the most significant innovations in this transformation is the adoption of Electronic Health Records (EHR), which serve as digital versions of traditional paper-based patient records. EHR systems are designed to provide real-time, patient-centered data that can be accessed securely by authorized healthcare professionals across multiple clinical settings. This transformation represents a shift from fragmented and inefficient paper-based systems toward integrated, data-driven healthcare environments.

Historically, healthcare documentation relied on manual record-keeping, which was prone to errors, duplication, and inefficiencies. Paper records were often incomplete, difficult to retrieve, and not easily shared between healthcare providers. These limitations frequently resulted in delayed diagnoses, repeated tests, and increased risk of medical errors. The transition to EHR systems was driven by the need to overcome these challenges and improve healthcare quality and safety.

EHR systems enable the storage and management of comprehensive patient data, including medical history, laboratory results, imaging reports, medication records, and treatment plans. This centralized data structure enhances communication and coordination among healthcare providers, ensuring continuity of care. Additionally, EHR systems incorporate clinical decision support tools that provide real-time alerts, reminders, and evidence-based recommendations, thereby supporting clinicians in making accurate and timely decisions.

Despite these advantages, the implementation of EHR systems has introduced new challenges. Issues such as interoperability between different systems,



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increased administrative workload, data privacy concerns, and user resistance have been widely reported. Moreover, the growing volume of digital health data can lead to information overload, potentially complicating clinical decision-making.

Therefore, this study aims to analyze the impact of EHR systems on patient care and clinical decision-making, focusing on their benefits, limitations, and future potential in modern healthcare systems.

Materials and Methods

This study employed a mixed-methods research design to provide a comprehensive evaluation of EHR systems. The research was conducted across three healthcare institutions that have fully implemented EHR systems in their clinical workflows.

A total of 300 patient cases were analyzed, covering a wide range of medical conditions, including chronic diseases, acute conditions, and surgical interventions. In addition, 70 healthcare professionals participated in the study, including physicians, nurses, and administrative staff.

Data collection involved both quantitative and qualitative approaches. Quantitative data were obtained through retrospective analysis of patient records before and after EHR implementation. Key performance indicators included diagnostic accuracy, medication error rates, patient waiting time, length of hospital stay, and clinical decision-making efficiency.

Qualitative data were collected through structured interviews and questionnaires administered to healthcare professionals. These instruments were designed to assess user satisfaction, perceived system usability, and the impact of EHR systems on clinical workflows.



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Statistical analysis was performed using standard analytical tools, with significance determined at $p < 0.05$. Comparative analysis was conducted to evaluate differences in healthcare outcomes before and after EHR implementation. Thematic analysis was used to interpret qualitative data and identify recurring patterns related to system effectiveness and user experience.

Results

The results of this study indicate that the implementation of EHR systems has a significant positive impact on patient care and clinical decision-making.

Diagnostic accuracy improved substantially following EHR implementation, increasing from 74% in paper-based systems to 92% in digital systems. This improvement can be attributed to enhanced access to comprehensive patient data and the integration of clinical decision support tools.

Medication errors decreased significantly, from 16% to 6%, due to automated alerts for drug interactions, allergies, and dosage errors. This reduction highlights the role of EHR systems in improving patient safety and reducing preventable adverse events.

Healthcare efficiency also improved markedly. The average patient processing time decreased from 40 minutes to 22 minutes, reflecting streamlined workflows and improved data accessibility. Additionally, duplication of diagnostic tests was reduced, as clinicians were able to access previous test results through the EHR system.

Patient satisfaction levels increased from 68% to 90%, indicating improved patient experience. Patients reported better communication with healthcare providers, reduced waiting times, and more coordinated care.

Clinical decision-making was significantly enhanced. Healthcare professionals reported improved confidence in their decisions due to real-time access to patient



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data and evidence-based recommendations. However, some participants noted challenges related to system complexity and data overload.

Discussion

The findings of this study demonstrate that EHR systems play a transformative role in modern healthcare by improving patient care and supporting clinical decision-making. The significant improvements in diagnostic accuracy and reduction in medical errors highlight the effectiveness of EHR systems in enhancing patient safety.

One of the key strengths of EHR systems is their ability to centralize patient information, enabling healthcare providers to make informed decisions based on comprehensive data. This is particularly important in complex clinical cases where multiple providers are involved. The integration of clinical decision support systems further enhances this capability by providing evidence-based recommendations and alerts.

The improvement in healthcare efficiency observed in this study is consistent with previous research, which has shown that EHR systems reduce administrative workload and streamline clinical workflows. However, the issue of clinician burnout remains a concern, as healthcare professionals often spend significant time interacting with EHR systems. Improving system usability and reducing documentation burden are essential for addressing this issue.

Interoperability remains one of the most significant challenges in EHR implementation. The inability of different systems to communicate effectively limits data sharing and coordination of care. Standardization of data formats and adoption of interoperable platforms are critical for overcoming this barrier.

Data privacy and cybersecurity are also major concerns. The increasing digitization of healthcare data makes it vulnerable to cyber threats. Robust



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security measures, including encryption and access control, are necessary to protect patient information.

The integration of artificial intelligence with EHR systems offers promising opportunities for further improvement. AI can help manage large volumes of data, identify patterns, and support predictive analytics, thereby enhancing clinical decision-making.

Conclusion

Electronic Health Records have fundamentally transformed healthcare delivery by improving data accessibility, enhancing clinical decision-making, and increasing patient safety. The findings of this study demonstrate that EHR systems significantly improve diagnostic accuracy, reduce medical errors, and enhance overall healthcare efficiency.

Despite these benefits, challenges such as interoperability, usability, data security, and clinician workload must be addressed to fully realize the potential of EHR systems. Future developments should focus on integrating advanced technologies, improving system design, and establishing robust regulatory frameworks.

Ultimately, EHR systems represent a critical component of modern healthcare infrastructure, enabling more efficient, accurate, and patient-centered care.

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