

تحليل تأثير السجلات الطبية الإلكترونية على جودة الخدمات الصحية في المستشفيات الخاصة

Analyzing the Impact of Electronic Medical Records on the Quality of Healthcare Services in Private Hospitals

Prepared by

Student Name: Zeinab Ismail Al-Haddad

Academic ID: 253000872

Supervision

Dr. Fayez Ali Jarad

Dr. Al-Faisal Abdulhamid Mohammad

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Abstract

The digital transformation in healthcare has highlighted Electronic Medical Records (EMR) as a vital tool for improving healthcare management. This study investigates the impact of EMR systems on the quality of healthcare services in private hospitals. It focuses on how EMR adoption affects operational efficiency, the accuracy of clinical documentation, and patient safety. A quantitative research design will be used, with data collected through structured surveys from 200–250 healthcare professionals, administrators, and IT staff. The study expects to find a positive relationship between EMR use and healthcare service quality, showing that EMRs help reduce medical errors, decrease administrative workload, and enhance care coordination. The results aim to provide practical insights for healthcare administrators and policymakers in Saudi Arabia to optimize digital health technologies and improve patient outcomes.

Keywords: Electronic Medical Records (EMR), Healthcare Service Quality, Private Hospitals, Patient Safety, Saudi Arabia, Operational Efficiency.

1. Introduction

The healthcare sector has experienced significant transformation in recent years due to the rapid advancement of digital technologies and health information systems. Among the most influential innovations in modern healthcare is the adoption of Electronic Medical Records (EMR) systems, which have replaced traditional paper-based records with digital platforms designed to store, manage, and access patient health information efficiently. EMR systems enable healthcare professionals to record patient histories, diagnoses, medications, laboratory results, and treatment plans electronically, allowing for faster access to accurate and up-to-date medical information. The digitalization of medical records is widely recognized as a critical step toward improving healthcare efficiency, clinical decision-making, and patient safety in healthcare organizations (Saleh et al., 2025) .

In recent years, healthcare institutions worldwide have increasingly invested in EMR systems as part of broader digital health transformation initiatives aimed at improving healthcare quality and operational efficiency. These systems facilitate real-time access to patient information, enhance communication among healthcare providers, and support coordinated care delivery. By integrating clinical information across different departments, EMR systems help reduce duplication of medical tests, minimize documentation errors, and improve the overall management of patient data (Otayf et al., 2024) .

Furthermore, several recent studies indicate that the implementation of electronic health record systems can significantly improve the quality of clinical documentation and patient safety. For example, research conducted in a hospital setting demonstrated that the adoption of electronic health records significantly increased the quality of clinical documentation, with documentation accuracy improving from approximately 63% in paper records to more than 90% after the implementation of electronic systems (Alharbi et al., 2024) . These improvements highlight the potential of EMR systems to enhance healthcare service quality by ensuring accurate and complete patient information, which supports more reliable clinical decision-making.

Despite these benefits, the adoption of EMR systems may also present several challenges for healthcare organizations. Some studies have reported that healthcare professionals may experience difficulties adapting to digital documentation systems, particularly when adequate training and technical support are lacking. Additionally, issues related to system usability, interoperability, and data security may limit the full utilization of EMR systems and affect the efficiency of healthcare

In private hospitals, where service quality, patient satisfaction, and operational efficiency are essential indicators of organizational performance, the successful implementation of EMR systems is particularly important. Private healthcare providers often rely on advanced digital technologies to enhance healthcare delivery, improve administrative processes, and maintain competitiveness in the healthcare market. However, the extent to which EMR systems contribute to improving the quality of healthcare services in private hospitals remains an area that requires further empirical investigation.

Therefore, this study aims to analyze the impact of Electronic Medical Records on the quality of healthcare services in private hospitals. By examining the relationship between EMR utilization and healthcare service quality, the study seeks to provide evidence-based insights that may assist healthcare administrators, policymakers, and healthcare professionals in optimizing the use of digital health technologies to improve healthcare outcomes and service delivery. delivery (Alomair & Pasha, 2024) .

2. Background of the Study

Over the past decade, the healthcare sector has undergone a profound digital transformation driven by advancements in health information technologies. Among these developments, Electronic Medical Records (EMR) systems have emerged as a cornerstone in modern healthcare management, replacing traditional paper-based documentation with comprehensive digital platforms. EMRs enable healthcare professionals to record, store, and access patient medical histories, diagnoses, medications, laboratory results, and treatment plans in real time, facilitating more informed clinical decisions and improving care coordination (Saleh, Lundborg, & Sharma, 2025).

Traditionally, healthcare institutions relied on paper-based records, which presented several limitations, including restricted accessibility, risk of loss or damage, inefficiencies in clinical workflows, and difficulties in sharing patient information across departments. Such constraints often led to delayed decision-making, medical errors, and compromised patient safety. The introduction of EMR systems addressed many of these issues by providing reliable, real-time access to accurate patient information, thereby supporting the delivery of higher-quality healthcare services (Alharbi, Alaofi, Almeahmadi, & Alharbi, 2024).

EMR systems offer multiple advantages that extend beyond improved access to information. They enhance communication among healthcare providers, support coordinated care delivery, and incorporate functionalities such as clinical decision support, automated medication alerts, and preventive care reminders. These features collectively reduce medical errors, improve patient safety, and contribute to more effective healthcare management (Otayf, Al-Garni, & Hamdi, 2024).

Empirical studies have confirmed that EMR implementation significantly improves clinical documentation and operational efficiency. For instance, documentation accuracy has been shown to increase from 63% with paper records to over 90% after adopting electronic systems. Additionally, EMRs reduce administrative burdens, minimize redundant tasks, and allow healthcare professionals to dedicate more time to direct patient care, thereby enhancing overall service quality (Alruwaili, Alshehri, & Alghamdi, 2024).

Despite these benefits, the implementation of EMR systems faces several challenges that may limit their effectiveness. Healthcare professionals may struggle with system usability, insufficient integration with other healthcare information systems, and inadequate training. Concerns about data security and patient privacy further complicate the adoption process, potentially affecting the overall quality of care (Alomair & Pasha, 2024).

In private hospitals, where patient satisfaction, service quality, and operational efficiency are critical, EMR adoption has become a strategic priority. However, empirical evidence examining the direct impact of EMR systems on healthcare service quality in private settings remains limited. Understanding this relationship is essential for optimizing EMR implementation and realizing the full benefits of digital health technologies.

Therefore, this study aims to analyze the impact of Electronic Medical Records on the quality of healthcare services in private hospitals, providing evidence-based insights that can guide healthcare administrators, policymakers, and practitioners in improving healthcare delivery and patient outcomes.

3. Problem Statement

Electronic Medical Records (EMR) systems have become a fundamental tool in modern healthcare, offering the potential to improve clinical documentation, streamline workflows, and enhance patient care.

Despite their widespread adoption, the actual impact of EMR systems on the quality of healthcare services in private hospitals remains insufficiently understood. Previous studies indicate that EMR systems can improve documentation accuracy, coordination of care, and operational efficiency (Alharbi et al., 2024; Saleh et al., 2025). However, other research highlights challenges such as usability issues, inadequate staff training, and difficulties integrating EMR systems into daily clinical practices (Alomair & Pasha, 2024).

Private hospitals face unique demands for high-quality services and patient satisfaction, making it critical to assess whether EMR systems deliver measurable improvements in these areas. Currently, most empirical studies focus on public hospitals or general healthcare settings, leaving a significant gap regarding private healthcare facilities. This gap limits administrators' and policymakers' ability to make evidence-based decisions about EMR implementation and its effect on service quality.

Therefore, there is a need for a comprehensive study to evaluate how EMR usage influences clinical workflows, healthcare delivery efficiency, and patient outcomes in private hospitals. Understanding these relationships will provide essential insights for optimizing EMR adoption and enhancing overall healthcare service quality.

4. Significance of the Study

- ❖ **Academic Contribution:** This study contributes to the scholarly understanding of Electronic Medical Records (EMR) by providing empirical evidence on their impact on healthcare service quality in private hospitals. It addresses a gap in existing literature by focusing specifically on private healthcare settings (Otayf et al., 2024).

- ❖ **Practical Implications:** The findings will help hospital administrators and healthcare managers recognize the advantages and limitations of EMR systems, supporting informed decisions to enhance service delivery, streamline clinical workflows, and improve staff efficiency.
- ❖ **Policy Development:** The study offers valuable insights for policymakers and healthcare planners by highlighting best practices for EMR implementation, which can inform policies aimed at improving the overall quality of healthcare services.
- ❖ **Patient Care:** By examining the effectiveness of EMR systems, the study identifies opportunities to improve clinical documentation, reduce errors, and enhance patient safety, ultimately contributing to better patient outcomes and higher satisfaction (Alruwaili et al., 2024).

5. Research Objectives

5.1 General Objective:

To evaluate the impact of Electronic Medical Records on the quality of healthcare services in private hospitals.

5.2 Specific Objectives:

- i. To assess the extent of EMR adoption and usage in private hospitals.
- ii. To examine the relationship between EMR usage and the quality of healthcare services.
- iii. To identify challenges faced by healthcare professionals when using EMR systems.
- iv. To explore the perceived benefits of EMR systems in improving patient care and operational efficiency.

6. Research Questions

- a) What is the current level of EMR adoption and utilization in private hospitals?

- b) How does EMR usage influence the quality of healthcare services?
- c) What challenges do healthcare professionals encounter when using EMR systems?
- d) What benefits do healthcare professionals perceive from EMR systems in improving patient care and hospital operations?

7. Hypotheses of the Study

7.1 Main Hypothesis

H0 (Null Hypothesis):

There is no statistically significant relationship between the use of Electronic Medical Records and the quality of healthcare services in private hospitals.

H1 (Alternative Hypothesis):

There is a statistically significant relationship between the use of Electronic Medical Records and the quality of healthcare services in private hospitals.

Sub-Hypotheses

H0₁: Electronic Medical Records have no statistically significant effect on the efficiency of healthcare services in private hospitals.

H1₁: Electronic Medical Records have a statistically significant effect on the efficiency of healthcare services in private hospitals.

H0₂: Electronic Medical Records have no statistically significant effect on the accuracy of medical information in private hospitals.

H1₂: Electronic Medical Records have a statistically significant effect on the accuracy of medical information in private hospitals.

H0₃: Electronic Medical Records have no statistically significant effect on patient safety in private hospitals.

H1₃: Electronic Medical Records have a statistically significant effect on patient safety in private hospitals.

8. Previous Studies

1. Wang, X., Li, H., & Zhang, Y. (2023). The impact of electronic health record systems on hospital efficiency and patient outcomes. *Journal of Health Informatics*, 29(2), 45–60.

- Objective: To examine how the implementation of electronic health record (EHR) systems affects hospital efficiency and patient outcomes.
- Methodology: Quantitative study; sample included 15 private hospitals and 250 healthcare professionals; data collected via structured surveys.
- Key Findings: EMRs improved access to patient information, reduced administrative workload, and enhanced staff coordination. Hospitals reported a 25% reduction in medical errors.
- Relevance to Current Study: Supports the hypothesis that EMRs positively influence healthcare service quality in private hospitals by improving operational efficiency and reducing errors.
- Critical Analysis: While the study provides strong quantitative evidence, it is limited to efficiency and error reduction; it does not explore patient safety or documentation quality in depth. This gap will be addressed in the current research.

2. Shahmoradi, L., Hosseini, F., & Azimi, H. (2023). Electronic medical records and clinical documentation quality: Reducing errors in hospital care. *International Journal of Medical Informatics*, 174, 105–115.

- Objective: To investigate the impact of EMRs on the quality and accuracy of clinical documentation and error reduction.
- Methodology: Cross-sectional quantitative study; analyzed 200 medical records from three hospitals; used statistical correlation tests.
- Key Findings: EMRs significantly improved documentation accuracy, completeness, and timeliness, contributing to better patient safety. Challenges included staff adaptation and system usability.

- Relevance to Current Study: Confirms that EMRs improve documentation quality, a key dimension of healthcare service quality measured in this research.
- Critical Analysis: The study focuses on documentation but does not evaluate overall service quality or workflow efficiency, leaving a gap for comprehensive assessment.

3. Alzahrani, S., Alotaibi, F., & Alqahtani, M. (2024). Healthcare professionals' perceptions of electronic medical records in Saudi private hospitals. *BMC Health Services Research*, 24(1), 118.

- Objective: To explore healthcare professionals' perceptions regarding EMR implementation and its effects on workflow and service delivery.
- Methodology: Mixed-methods design; surveys of 180 professionals in three private hospitals, complemented by semi-structured interviews.
- Key Findings: EMRs enhanced workflow efficiency, reduced administrative burden, and allowed faster access to patient data. Staff training and organizational support were critical for success.
- Relevance to Current Study: Highlights the importance of human factors in EMR effectiveness, directly informing how implementation affects service quality in Saudi private hospitals.
- Critical Analysis: The study relies partly on perceptions rather than objective performance measures; integrating quantitative outcomes in the current research addresses this limitation.

4. Rahman, M., & Hasan, M. (2024). Health information technology adoption and healthcare quality in hospitals: A longitudinal analysis. *Health Policy and Technology*, 13(2), 101–114.

- Objective: To assess the relationship between health information technology adoption, including EMRs, and healthcare service quality over time.
- Methodology: Longitudinal study across five private hospitals; combined administrative records and staff survey data.
- Key Findings: EMR adoption improved operational efficiency, provider communication, and overall patient care management.
- Relevance to Current Study: Provides empirical evidence linking EMR implementation to multiple dimensions of healthcare service quality.

- Critical Analysis: Although comprehensive, the study does not focus on private hospital-specific contextual factors, which the current study will address.

5. Torab-Miandoab, R., Ghanbari, H., & Ahmadi, M. (2025). Effects of electronic medical records on clinical documentation quality in private hospitals. *Journal of Clinical Health Informatics*, 17(1), 55–69.

- Objective: To analyze the effect of EMRs on clinical documentation quality and patient care efficiency in private hospitals.
- Methodology: Quantitative study; 220 patient records from four private hospitals; paired t-tests and regression analyses applied.
- Key Findings: EMRs significantly improved documentation completeness and accuracy, reduced duplication of tests, and enhanced care efficiency.
- Relevance to Current Study: Reinforces the focus on documentation and efficiency as core dimensions of service quality in private hospitals.
- Critical Analysis: Study is limited to documentation and efficiency; broader measures of service quality, such as patient satisfaction and safety, are not fully addressed.

Analytical Summary & Research Gap

- Consistency: All studies consistently show EMRs improve efficiency, documentation accuracy, and reduce errors.
- Differences: Some studies emphasize staff perceptions (Alzahrani et al., 2024), others focus on objective measures (Shahmoradi et al., 2023; Torab-Miandoab et al., 2025).
- Gaps Identified:
 - ✓ Limited research combines all dimensions of healthcare service quality (efficiency, documentation, safety, patient satisfaction) in private hospitals.
 - ✓ Few studies focus on Saudi private hospital contexts.
 - ✓ Most studies are either quantitative only or rely on perceptions; a comprehensive approach integrating multiple dimensions is lacking.

Conclusion: These gaps justify the current study, which aims to evaluate the impact of EMRs on healthcare service quality in private hospitals in Saudi Arabia, using a quantitative design that covers multiple quality dimensions.

8. Alharbi, N., Alharthi, S., & Alqahtani, R. (2023). Electronic health records and quality of clinical documentation in private hospitals in Saudi Arabia. *Journal of Health Informatics Research*, 12(3), 211–225.

- Objective: To evaluate the effect of EMRs on the quality of clinical documentation in private hospitals.
- Methodology: Quantitative study; 180 patient records from three private hospitals; analyzed using paired t-tests and regression models.
- Key Findings: EMRs significantly improved documentation quality, reduced errors, and facilitated faster clinical decision-making.
- Relevance to Current Study: Confirms the positive impact of EMRs on documentation and efficiency, central dimensions of service quality.
- Critical Analysis: Study focuses on documentation only; patient safety and overall service quality are not fully addressed.

7. Alomar, F., Alotaibi, H., & Alshammari, K. (2024). Patient engagement and satisfaction through access to electronic health records in private hospitals. *BMC Medical Informatics and Decision Making*, 24(1), 99.

- Objective: To investigate the effect of patient access to EMRs on engagement and satisfaction.
- Methodology: Mixed-methods study; survey of 200 patients and interviews with 30 healthcare providers in two private hospitals.
- Key Findings: Providing patients access to EMRs improved communication with providers, enhanced engagement, and increased satisfaction with healthcare services.
- Relevance to Current Study: Highlights the importance of patient-centered outcomes as a measure of healthcare service quality.
- Critical Analysis: Study emphasizes patient perception; objective measures of efficiency and documentation were limited, leaving room for integration in the current research.

Almutairi, A., & Alanzi, T. (2025). The role of electronic medical records in improving patient safety in Saudi private hospitals. *Journal of Patient Safety and Quality Improvement*, 10(2), 88–101.

- Objective: To examine the impact of EMRs on patient safety outcomes.
- Methodology: Quantitative study; 150 patient safety incident reports from four private hospitals analyzed pre- and post-EMR implementation.
- Key Findings: EMRs significantly reduced adverse events and medication errors, contributing to safer patient care.
- Relevance to Current Study: Supports the inclusion of patient safety as a core dimension of healthcare service quality in the research framework.
- Critical Analysis: Focused on safety only; broader service quality metrics such as efficiency and satisfaction were not studied.

9. Alghamdi, R., Alqahtani, F., & Alshahrani, M. (2023). Adoption of health information technologies and hospital service quality: Evidence from private hospitals in Saudi Arabia. *Health Policy and Technology*, 12(4), 321–334.

- Objective: To assess the relationship between adoption of EMRs and overall hospital service quality.
- Methodology: Cross-sectional study; survey of 220 healthcare professionals across five private hospitals; data analyzed with regression analysis.
- Key Findings: EMR adoption was associated with improvements in documentation, workflow efficiency, and inter-professional communication, leading to better service quality.
- Relevance to Current Study: Provides evidence linking EMR implementation to multiple dimensions of healthcare service quality, reinforcing the current study's framework.

Updated Analytical Summary & Research Gap

- Consistency: All studies confirm that EMRs positively affect documentation quality, workflow efficiency, patient safety, and patient engagement.

- Differences: Some studies focus on objective outcomes (errors, efficiency), while others emphasize perceptions (staff or patients).
- Research Gap:
 - ✓ Few studies comprehensively combine all service quality dimensions (efficiency, documentation, safety, patient satisfaction) in Saudi private hospitals.
 - ✓ Limited use of objective quantitative measures alongside perception-based assessments.
 - ✓ Contextual factors such as staff readiness, organizational support, and training are often not fully integrated.

9. Theoretical Framework

This study is grounded in a theoretical framework that explains how Electronic Medical Records (EMRs) influence the quality of healthcare services in private hospitals. The framework integrates theories from organizational management, technology adoption, and stakeholder engagement, providing a structured approach to examine how EMRs can enhance efficiency, documentation quality, patient safety, and overall service delivery.

10.Resource-Based View (RBV) Theory

The Resource-Based View (RBV) theory asserts that organizations achieve sustainable competitive advantage by effectively managing and utilizing valuable, rare, and inimitable resources. In the healthcare context, technological infrastructure, skilled personnel, and information systems are critical strategic resources. Within this study, EMRs are viewed as such strategic resources. By streamlining information flow, minimizing errors, and optimizing clinical workflows, EMRs contribute to improved operational performance and service quality. The study investigates how private hospitals leverage EMRs to enhance efficiency, accuracy of documentation, and patient safety.

11.Stakeholder Theory

Stakeholder Theory emphasizes that organizations must consider the needs and expectations of all relevant stakeholders—including patients, healthcare providers, administrators, and

regulatory authorities—to achieve sustainable performance. In this study, the theory is applied to assess the impact of EMRs across multiple groups:

- Patients: benefiting from safer, faster, and more reliable care.
- Healthcare Providers: gaining access to accurate patient information, reducing errors, and improving workflow efficiency.
- Administrators: improving decision-making, operational efficiency, and resource management.

12. Innovation Diffusion Theory (IDT)

Innovation Diffusion Theory explains how new technologies are adopted and integrated within organizations. Adoption is influenced by perceived usefulness, ease of use, and organizational readiness. In this study, EMRs are considered technological innovations whose effective adoption affects healthcare service quality. The research examines how hospitals' level of EMR adoption, combined with staff acceptance and organizational support, influences workflow efficiency, documentation quality, patient safety, and overall service quality.

13. Integration of Theories

By integrating RBV, Stakeholder Theory, and IDT, this study establishes a comprehensive framework to understand the impact of EMRs on healthcare service quality. RBV frames EMRs as strategic resources that enhance hospital performance. Stakeholder Theory ensures that the benefits and expectations of patients, providers, and administrators are considered. Innovation Diffusion Theory focuses on the adoption process and the factors that enable EMRs to improve operational and clinical outcomes. Together, these theories provide a holistic perspective for evaluating how EMRs contribute to efficient, safe, and high-quality healthcare services in private hospitals.

14. Methodology and Research Design

14.1 Type of Research

This study is applied and explanatory, aiming to examine the impact of Electronic Medical Records (EMRs) on the quality of healthcare services in private hospitals.

14.2 Research Approach

A quantitative approach is adopted to measure relationships between EMR adoption and service quality dimensions (efficiency, documentation, patient safety, satisfaction).

14.3 Research Plan

1. Preparation: Identify variables and review literature.
2. Instrument Development: Design a structured questionnaire based on validated scales and expert review.
3. Data Collection: Survey healthcare professionals, administrators, and IT staff in private hospitals.
4. Data Analysis: Conduct descriptive statistics, reliability tests, correlations, and regression analysis.
5. Reporting: Interpret results and provide recommendations.

15. Data Collection Instruments

- Demographics: Age, gender, position, experience, department.
- EMR Adoption: 10-item 5-point Likert scale (system usage, integration, ease of use).
- Healthcare Service Quality: 4 dimensions measured with 5-point Likert scales:
 - ✓ Operational Efficiency (6 items)
 - ✓ Documentation Quality (6 items)
 - ✓ Patient Safety (5 items)
 - ✓ Patient Satisfaction (5 items)

15.1 Validity and Reliability

- Content Validity: Reviewed by five healthcare management experts.
- Reliability: Cronbach's $\alpha \geq 0.70$ for all dimensions.

15.2 Population and Sample

- Population: Healthcare professionals, administrators, and IT staff in private hospitals.
- Sample: 200–250 participants selected via stratified random sampling.

16. Scope of the Study

A) Human Scope

- Study Population: The study population consists of Saudi industrial companies, representing the major contributors to the industrial sector in the Kingdom.
- Study Sample: A total of 50 large industrial companies located in Riyadh, Jeddah, and Dammam were selected.
- Sample Size and Selection Method: The sample was chosen using stratified random sampling to ensure representation across different sectors and company sizes, enhancing the validity and generalizability of the findings.

B) Geographical Scope

- Study Area: The research is conducted within the Kingdom of Saudi Arabia, covering major industrial regions to reflect the diversity of the sector.

C) Time Scope

- Data Collection Period: The data will be collected during the second quarter of 2026.
- Study Period: The study focuses on the period 2026 which reflects the timeframe of the current industrial practices and developments under investigation.

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