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The Impact of Electronic Health Records on Healthcare Workers' Performance: A Cross-Sectional Study of Perceptions and Experiences

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Abstract

This study aims to examine the impact of Electronic Health Records (EHRs) on the performance of healthcare workers and to explore their perceptions and experiences regarding the use of these systems in healthcare settings. As healthcare institutions increasingly rely on digital transformation, EHRs have become essential tools for improving the quality, efficiency, and coordination of healthcare services. However, the actual influence of these systems on healthcare workers' daily performance remains an important area of investigation.

The study adopts a cross-sectional descriptive analytical design to assess how EHRs affect healthcare workers in terms of efficiency, accuracy, communication, and overall work performance. Data are collected through a structured questionnaire targeting healthcare workers in different clinical settings, and the findings are analyzed to identify the relationship between EHR use and perceived work performance.

The study is expected to show that Electronic Health Records contribute positively to improving documentation accuracy, facilitating access to patient information, enhancing communication among healthcare professionals, and reducing time spent on administrative tasks. At the same time, some challenges may emerge, such as technical issues, increased documentation burden, and the need for adequate training.

The study is expected to conclude that EHRs play a significant role in supporting healthcare workers' performance when implemented effectively and supported by proper infrastructure and training. It recommends strengthening digital systems, providing continuous professional training, and improving system usability to maximize the benefits of EHRs in healthcare institutions.

Keywords: Electronic Health Records, Healthcare Workers, Work Performance, Digital Health, Healthcare Quality, Cross-Sectional Study

المخلص

تهدف هذه الدراسة إلى بحث أثر السجلات الصحية الإلكترونية على أداء العاملين في الرعاية الصحية، واستكشاف تصوراتهم وخبراتهم المتعلقة باستخدام هذه الأنظمة في بيئات العمل الصحية. ومع التوسع في التحول الرقمي داخل المؤسسات الصحية، أصبحت السجلات الصحية الإلكترونية من الأدوات الأساسية التي تسهم في تحسين جودة الخدمات الصحية وكفاءتها وتنسيقها. ومع ذلك، لا يزال التأثير الفعلي لهذه الأنظمة على الأداء اليومي للعاملين في الرعاية الصحية مجالاً مهماً للدراسة والبحث.

تعتمد الدراسة على تصميم وصفي تحليلي مقطعي من أجل تقييم أثر السجلات الصحية الإلكترونية على العاملين في الرعاية الصحية من حيث الكفاءة، والدقة، والتواصل، والأداء الوظيفي بشكل عام. ويتم جمع البيانات من خلال استبانة منظمة تستهدف العاملين في الرعاية الصحية في بيئات سريرية مختلفة، ثم تحليل النتائج للكشف عن العلاقة بين استخدام السجلات الصحية الإلكترونية ومستوى الأداء الوظيفي المدرك.

ومن المتوقع أن تُظهر الدراسة أن السجلات الصحية الإلكترونية تسهم بصورة إيجابية في تحسين دقة التوثيق، وتسهيل الوصول إلى معلومات المرضى، وتعزيز التواصل بين المهنيين الصحيين، وتقليل الوقت المستغرق في المهام الإدارية. وفي المقابل، قد تظهر بعض التحديات مثل المشكلات التقنية، وزيادة العبء المرتبط بالتوثيق، والحاجة إلى التدريب الكافي.

ومن المتوقع أن تشير نتائج الدراسة إلى أن السجلات الصحية الإلكترونية تؤدي دوراً مهماً في دعم أداء العاملين في الرعاية الصحية عند تطبيقها بصورة فعالة وتوفير البنية التحتية المناسبة والتدريب اللازم. وتوصي الدراسة بتعزيز الأنظمة الرقمية، وتقديم التدريب المهني المستمر، وتحسين سهولة استخدام الأنظمة بما يحقق أقصى استفادة ممكنة من السجلات الصحية الإلكترونية داخل المؤسسات الصحية.

الكلمات المفتاحية: السجلات الصحية الإلكترونية، العاملون في الرعاية الصحية، الأداء الوظيفي، الصحة الرقمية، جودة الرعاية الصحية، الدراسة المقطعية.

Chapter One

Introduction

The digital transformation of healthcare systems globally underscores the increasing reliance on Electronic Health Records (EHRs). These integrated digital systems aim to centralize patient data, thereby enhancing various aspects of healthcare delivery ¹. While the potential for improved efficiency, patient safety, and coordination of care is widely acknowledged, the actual experience of healthcare workers (HCWs) with these systems often presents a complex picture ²¹. Understanding the perspectives of HCWs is fundamental for successful EHR implementation and optimization, especially as these systems become ubiquitous across diverse clinical settings ³.

Background and Rationale

Electronic Health Records represent a foundational shift from traditional paper-based systems to digital platforms for managing patient information ⁴. Their adoption has been driven by the promise of improved information accessibility, streamlined workflows, and reduced medical errors ¹⁵. Many countries have invested significantly in EHR infrastructure, recognizing their utility in promoting continuity of care and supporting evidence-based practices ⁶. Despite this global momentum, the successful integration of EHRs into daily clinical practice hinges on their acceptance and effective use by the frontline HCWs who interact with them regularly ³⁷. Evaluations often reveal a disparity between the theoretical benefits and the practical challenges encountered by users ².

Problem Statement

While EHR systems are designed to simplify tasks and improve healthcare delivery, HCWs frequently report issues that complicate their daily routines rather than easing them ². Concerns range from increased cognitive workload and burnout to usability deficits and disruptions in established workflows ⁸⁹. These challenges can impede the full realization of EHR benefits, potentially compromising patient care and HCW job satisfaction ¹⁰². A comprehensive understanding of HCWs' perceptions regarding EHR utility and ease of use is necessary to address these discrepancies effectively. Previous studies in Saudi Arabia and globally have identified both positive perceptions and significant barriers, indicating the need for further focused investigation ¹¹¹²¹³.

Objectives and Research Questions

This research aims to ascertain whether the use of Electronic Health Records (EHRs) facilitates the work of healthcare professionals. Specifically, it intends to explore HCWs' perceptions of EHR usability, workflow integration, and the impact on their professional roles.

The primary research questions guiding this investigation are:

- How do healthcare workers perceive the usability and effectiveness of Electronic Health Records in their daily clinical practice?
- What are the reported impacts of EHR systems on healthcare workers' cognitive workload and job satisfaction?
- What demographic and professional factors influence healthcare workers' perceptions of EHRs?
- What are the key similarities and differences between local (Saudi Arabia) and global findings regarding HCWs' experiences with EHRs?

Research Hypotheses

H1: Electronic Health Records have a significant positive effect on healthcare workers' performance.

H2: The usability of Electronic Health Records has a significant positive effect on healthcare workers' job satisfaction.

H3: The use of Electronic Health Records has a significant effect on healthcare workers' cognitive workload.

H4: Healthcare workers' demographic and professional variables significantly affect their perceptions and experiences regarding Electronic Health Records.

H5: Adequate training in the use of Electronic Health Records significantly improves healthcare workers' perceptions and performance.

Significance of the Study

This study offers insights for healthcare organizations, policymakers, and EHR developers. By focusing on HCW perceptions, the research can inform the design and implementation of EHR systems that are truly user-centric, enhancing clinical efficiency and reducing professional burden ⁷. A nuanced understanding of the factors influencing HCW acceptance can lead to improved training programs and support mechanisms, which are critical for maximizing the return on investment in health information technology ¹⁴¹⁵. Furthermore, by comparing local and global perspectives, this study contributes to a broader understanding of EHR implementation challenges and successes across diverse cultural and healthcare contexts, particularly within Saudi Arabia, where e-health adoption is a strategic national objective ¹⁶¹⁷.

Delimitations of the Study

Spatial Delimitation

This study is limited to healthcare institutions in Saudi Arabia

Human Delimitation

The study focuses on healthcare workers, specifically physicians, nurses, pharmacists, and allied health professionals who use Electronic Health Records in their daily work

Temporal Delimitation

The study is confined to the year 2026

Subject Delimitation

The study examines the impact of Electronic Health Records on healthcare workers' performance, particularly in relation to usability, workflow integration, cognitive workload, and job satisfaction

Methodological Delimitation

The study adopts a quantitative cross-sectional design and relies on a structured questionnaire for data collection

Operational Definitions

Electronic Health Records (EHRs)

Electronic Health Records refer to digital systems used by healthcare institutions to collect, store, manage, and retrieve patients' medical information electronically. In this study, EHRs refer to the electronic systems used by healthcare workers in their daily clinical practice for documentation, accessing patient data, and supporting healthcare delivery

Healthcare Workers (HCWs)

Healthcare workers refer to professionals involved in the delivery of healthcare services, including physicians, nurses, pharmacists, and allied health professionals. In this study, the term specifically refers to those who regularly use Electronic Health Records in their workplace

Work Performance

Work performance refers to the level of effectiveness and efficiency with which healthcare workers perform their professional duties. In this study, it includes perceived improvements in task completion, documentation accuracy, communication, and overall productivity associated with the use of EHRs

Usability

Usability refers to the degree to which Electronic Health Records are easy to learn, easy to use, and efficient in supporting healthcare workers' tasks. In this study, usability is measured through participants' perceptions of system simplicity, clarity, accessibility, and ease of navigation

Workflow Integration

Workflow integration refers to the extent to which Electronic Health Records fit into and support the routine clinical processes of healthcare workers. In this study, it reflects how well EHR systems align with daily tasks and whether they facilitate or disrupt clinical work

Cognitive Workload

Cognitive workload refers to the mental effort required by healthcare workers when using Electronic Health Records. In this study, it includes perceived mental demand, concentration, time pressure, and effort associated with interacting with EHR systems

Job Satisfaction

Job satisfaction refers to the degree of contentment healthcare workers feel regarding their professional roles and work environment. In this study, it specifically relates to how the use of Electronic Health Records influences their sense of comfort, stress, and satisfaction at work

Limitations of the Study

This study may encounter several limitations that could affect the generalizability and interpretation of its findings. First, the study relies on a cross-sectional design, which captures data at a single point in time and therefore does not allow for establishing causal relationships between Electronic Health Records use and healthcare workers' performance

Second, the use of a self-administered questionnaire may result in response bias, as participants may provide socially desirable answers or may interpret some items differently. In addition, the study is limited to healthcare workers in Saudi Arabia, which may reduce the generalizability of the findings to other healthcare systems and cultural contexts

Furthermore, the use of convenience sampling may limit the representativeness of the sample. Differences in institutional policies, technical infrastructure, and levels of EHR implementation across healthcare settings may also influence participants' responses. Finally, the study does not include qualitative methods, which may restrict deeper exploration of participants' personal experiences and perceptions

Chapter Two

Theoretical Framework

This study is based on the concept that the use of Electronic Health Records (EHRs) influences healthcare workers' performance through several interrelated dimensions. Electronic Health Records are considered the independent variable, while healthcare workers' performance is the dependent variable. The relationship between these variables is examined through specific dimensions, including usability, workflow integration, cognitive workload, and job satisfaction

The framework assumes that effective use of EHR systems enhances healthcare workers' performance by improving access to patient information, increasing documentation accuracy, facilitating communication, and supporting clinical decision-making. At the same time, poor usability or inadequate system integration may increase cognitive workload and negatively affect job satisfaction and overall work performance

In addition, demographic and professional characteristics such as age, profession, years of experience, and prior training are considered influencing factors that may shape healthcare workers' perceptions and experiences regarding EHR use

Accordingly, the conceptual framework of this study proposes that the impact of Electronic Health Records on healthcare workers' performance is influenced by system-related factors and user-related characteristics

Literature Review and Thematic Analysis

The adoption of Electronic Health Records (EHRs) has profoundly reshaped global healthcare delivery. This section synthesizes existing research on HCW perceptions, benefits, and challenges associated with EHR systems, offering a thematic analysis of the literature, including specific insights from Saudi Arabia.

Global Perspectives on Electronic Health Records Adoption

Global trends indicate a significant increase in EHR adoption across various healthcare settings, particularly in high-income countries, with notable growth also observed in developing nations ⁶. For instance, EHR adoption rates in sampled Chinese hospitals increased from 18.6% to 85.3% between 2007 and 2018, while US hospitals saw an increase from 9.4% to 96% from 2008 to 2017 ⁶. This widespread implementation is often driven by national policies and the recognized potential of EHRs to improve health outcomes and system efficiency ²⁴. However, the pace and success of adoption vary, influenced by factors such as infrastructure, funding, and user acceptance ²⁵³. Despite general progress, challenges in implementation and realization of benefits persist, as evidenced by ongoing issues with usability and integration into clinical workflows ²⁶.

Perceived Benefits of Electronic Health Records by Healthcare Workers

Healthcare workers frequently identify several advantages associated with EHR use. Improved accessibility and accuracy of patient information are consistently reported benefits, allowing for more informed decision-making and better care coordination ¹. EHRs can enhance nursing work through increased information access, organization, and efficiency, with useful alert screens contributing to safer care ¹⁰. The ability to reduce medication errors and adverse drug events (ADEs) is another significant benefit, with EHR use associated with a 46% reduction in medication errors and a 34% reduction in ADEs⁵. Additionally, EHRs support guideline adherence, facilitate communication among care teams, and contribute to patient safety ⁵²³. For pharmacists, potential advantages include improved medication safety and enhanced communication with healthcare teams ²¹.

Barriers and Challenges in EHR Implementation and Use

Despite the perceived benefits, HCWs encounter substantial barriers to optimal EHR use. A primary concern relates to usability issues, which can lead to increased workload, workarounds, and potential threats to patient safety ⁷. EHRs can impose a high demand on work time, with some nurses reporting spending at least half their shift using the records, potentially impairing critical thinking and decreasing interdisciplinary communication ¹⁰. Cognitive overload is a frequently cited challenge, stemming from complex user interfaces and excessive data entry requirements, which can contribute to clinician burnout ²⁷²². Other challenges include technical limitations, such as system downtime, interoperability issues, and lack of adequate infrastructure, particularly in low-resource settings ⁴¹³. Security and privacy concerns, lack of skilled personnel, and resistance to technology also present significant hurdles ¹³²⁸.

Facilitators and Factors Influencing Positive Perception of EHRs

Several factors enhance HCWs' positive perceptions and successful adoption of EHR systems. Comprehensive training and ongoing technical support are consistently identified as crucial facilitators ¹⁴²⁹. For instance, attending EMR training sessions significantly correlates with higher satisfaction scores among HCWs ¹¹. High computer literacy and regular computer access also positively influence user satisfaction ¹⁴. Perceived information quality, system quality, and service quality of the EHR system are strong predictors of user satisfaction ¹⁴. Organizational support, including leadership commitment and adequate infrastructure, further contributes to successful implementation ³⁰¹³. Moreover, HCWs who perceive EHRs as enhancing patient care quality and efficiency tend to have more positive attitudes ¹¹¹. Physician support throughout the implementation process is also essential for success .

Summary of Existing Cross-Sectional Studies in Saudi Arabia

Cross-sectional studies within Saudi Arabia reveal a mixed yet generally acceptable attitude among healthcare workers towards Electronic Medical Records (EMRs) ¹¹¹². A study involving 2684 HCWs across four Saudi cities found that 54.3% had attended EMR training, and those who did reported significantly higher EMR performance and satisfaction scores ¹¹. Older participants and non-Saudis also exhibited higher satisfaction ¹¹. Improved quality of care was the most agreed-upon benefit, while temporary loss of access and privacy concerns were major barriers ¹¹. Another study targeting

320 health practitioners indicated moderate effectiveness of EHRs in improving health care outcomes, with age, workplace, and years of experience being critical indicators ³¹. A key challenge identified across these studies includes privacy concerns, with 25.5% of HCWs admitting to unauthorized access of colleagues' EMRs in one Riyadh hospital survey ²⁸. These findings underscore the importance of continuous training, robust privacy policies, and addressing technical vulnerabilities specific to the Saudi context ²⁸¹⁶.

Chapter three

Methodology

To address the research objectives, a structured methodological approach was developed. This section delineates the study design, participant selection, data collection tools, and analytical procedures, ensuring rigor and reproducibility.

Study Design

This investigation employed a quantitative cross-sectional survey design. This approach facilitates the collection of data from a diverse group of healthcare professionals at a single point in time, allowing for the assessment of their perceptions and experiences with Electronic Health Records (EHRs) ¹⁸. A cross-sectional design is appropriate for exploring associations between variables and identifying prevalent attitudes within the target population without inferring causality ¹⁹. This design also permits the utilization of established survey instruments, enabling comparisons with prior research conducted in Saudi Arabia and internationally ¹¹.

Population and Sampling

The target population comprised healthcare workers from various specialties within hospitals and primary care settings in Saudi Arabia. This inclusive approach ensures a broad representation of clinical perspectives. A non-probability convenience sampling method was utilized due to the practicalities of accessing a large and diverse professional group. The inclusion criteria specified actively practicing physicians, nurses, pharmacists, and allied health professionals who regularly interact with EHR systems. Exclusion criteria included administrative staff without direct patient care responsibilities or HCWs who had not used an EHR system for a minimum of six months. Previous studies in Saudi Arabia have successfully sampled thousands of healthcare providers, indicating the feasibility of recruiting a substantial sample size ¹¹.

Data Collection Methodology

Data will be collected in the future using a self-administered online questionnaire adapted from previously validated surveys employed in Saudi Arabia and international settings to assess healthcare workers' perceptions of electronic health records (EHRs). The questionnaire is structured into several

sections to comprehensively capture user experiences and attitudes toward EHR systems.

1. **Demographic and Professional Information:** Age, gender, profession, years of experience, and frequency of EHR use.
2. **EHR Usability:** Items adapted from the System Usability Scale (SUS) or similar instruments, measuring ease of learning, efficiency of use, and overall satisfaction with the system interface ⁸²⁰.
3. **Workflow Integration:** Questions assessing how well EHRs align with existing clinical workflows, perceived disruptions, and efficiency gains ¹⁰²¹.
4. **Cognitive Workload:** Items adapted from tools like the NASA Task Load Index (TLX) to gauge mental demand, temporal demand, and effort associated with EHR use ²²⁸.
5. **Job Satisfaction:** Questions exploring the influence of EHRs on professional fulfillment, stress levels, and overall job satisfaction ².
6. **Perceived Benefits and Barriers:** Open-ended and Likert-scale questions on specific advantages (e.g., improved quality of care, data accessibility) and disadvantages (e.g., privacy concerns, system downtime) ¹¹²³.

The questionnaire underwent a pilot test with a small group of HCWs to ensure clarity, relevance, and face validity before full deployment.

Data Analysis Methods

This study investigates healthcare workers' perceptions of Electronic Health Records (EHRs) by analyzing quantitative survey data using descriptive statistics and inferential methods such as t-tests, ANOVA, and regression analysis. These approaches explore relationships between perceived EHR usability, cognitive workload, and job satisfaction across demographic and professional groups. Employing validated scales and robust statistical software at a significance level of $p < 0.05$ ensures the reliability of the findings. This rigorous methodology plays a crucial role in shaping understanding of EHR impact in clinical settings.

Ethical Considerations

This study will adhere to strict ethical standards to ensure the protection of participants' rights and confidentiality. Prior to data collection, ethical approval will be sought from the relevant institutional review boards in Saudi Arabia. Participation will be voluntary, with informed consent obtained

electronically from all respondents. Data will be anonymized and securely stored, with access limited to the research team, ensuring compliance with data protection regulations and ethical guidelines governing research involving human subjects .

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Chapter Four

Appendix A: Questionnaire

Questionnaire Title:

The Impact of Electronic Health Records on Healthcare Workers' Performance

Section One: Demographic and Professional Information

1. Age:

☐ Less than 25

☐ 25–34

☐ 35–44

☐ 45 and above

2. Gender:

☐ Male

☐ Female

3. Profession:

- ☐ Physician
- ☐ Nurse
- ☐ Pharmacist
- ☐ Allied Health Professional

4. Years of Experience:

- ☐ Less than 5 years
- ☐ 5–10 years
- ☐ 11–15 years
- ☐ More than 15 years

5. How often do you use Electronic Health Records (EHRs)?

- ☐ Daily
- ☐ Several times a week
- ☐ Occasionally

Section Two: EHR Usability

(Strongly Disagree – Disagree – Neutral – Agree – Strongly Agree)

- 6. The EHR system is easy to use.**
- 7. The system is clear and understandable.**
- 8. It is easy to navigate between different sections of the system.**
- 9. The system helps me complete my tasks efficiently.**
- 10. I am satisfied with the usability of the EHR system.**

Section Three: Workflow Integration

- 11. The EHR system fits well with my daily workflow.**
- 12. The system helps me complete tasks more quickly.**
- 13. The EHR system reduces duplication of work.**
- 14. The system improves coordination with other healthcare professionals.**
- 15. The EHR system disrupts my workflow. (reverse item)**

Section Four: Cognitive Workload

- 16. Using the EHR system requires a lot of mental effort.**
- 17. I feel time pressure when using the EHR system.**
- 18. The system increases my workload.**
- 19. I need a high level of concentration to use the system.**
- 20. The EHR system makes my work more stressful.**

Section Five: Job Satisfaction

- 21. The EHR system improves my job performance.**
- 22. I feel more satisfied with my work when using the EHR system.**
- 23. The system helps reduce work-related stress.**
- 24. I feel comfortable using the EHR system.**
- 25. Overall, I am satisfied with using EHR systems in my work.**

Section Six: Perceived Benefits and Barriers

- 26. EHR systems improve the quality of healthcare services.**

- 27. EHR systems improve access to patient information.**
- 28. EHR systems reduce medical errors.**
- 29. Technical problems affect my use of EHR systems.**
- 30. I need more training to use the EHR system effectively.**

Open-ended Questions:

- 31. What are the main advantages of using EHR systems in your work?**

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- 32. What challenges do you face when using EHR systems?**

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أثر السجلات الصحية الإلكترونية في تحسين أداء العاملين في الرعاية
الصحية: دراسة مقطعية حول التصورات والخبرات

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العام الدراسي:

2026