

A Qualitative Exploration of Healthcare Professionals Experience Before and After Electronic Health Record Implementation in Saudi Arabia

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Abstract

Background: Electronic Health Record (EHR) systems have been implemented globally to enhance healthcare delivery. In Saudi Arabia, the adoption of EHRs has rapidly increased in recent years, yet little is known about the experiences of healthcare professionals (HCPs) with EHR implementation in this context. **Aim:** This qualitative study aims to explore the experiences of HCPs in Saudi Arabia before and after the implementation of EHR systems, with a focus on understanding the challenges and benefits associated with this transition. **Methods:** Semi-structured interviews were conducted with a purposive sample of HCPs from various healthcare settings across Saudi Arabia. Interviews were audio-recorded, transcribed verbatim, and analyzed using thematic analysis to identify patterns and themes related to HCPs' experiences with EHR implementation. **Results:** Analysis of the interviews revealed several key themes related to HCPs' experiences before and after EHR implementation. Before implementation, HCPs expressed concerns about workflow disruptions, technical challenges, and resistance to change. However, after implementation, many HCPs reported improvements in information accessibility, care coordination, and patient outcomes. Despite these benefits, challenges such as increased documentation burden and decreased face-to-face interaction with patients were also identified. **Conclusion:** The findings of this study highlight the complex and multifaceted nature of EHR implementation in Saudi Arabia. While the transition to EHRs presents both challenges and opportunities for HCPs, it is crucial to address concerns related to workflow optimization, training, and support to ensure successful implementation and maximize the benefits of EHRs in improving healthcare delivery in the Saudi context.

Keywords: Healthcare Professionals (HCPs), Electronic Health Record (EHR), Saudi Arabia, Integration, Experiences, Qualitative Study, Healthcare Delivery.

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INTRODUCTION

Healthcare delivery systems worldwide are modernizing their operations by incorporating digital health technologies. The EHR system has been implemented in many countries and has been vastly debated in recent years (Alanazi,2020). Several developed countries such as the United States, United Kingdom (UK), Canada, and Australia were quick to

implement the system, taking advantage of modern technology to improve their healthcare system.

The Saudi Arabian government officials started investing in the EHR system since 2012 with the hope to improve healthcare quality and efficiency and also to cut down costs (Al Alawi et al, 2014). The Kingdom of Saudi Arabia has committed itself to the development of a sophisticated, integrated electronic health information system that serves the entire population. Over the past

years, the Kingdom has made significant strides in improving its healthcare system and shifting it from being paper-based to a more coordinated, efficient and high quality care through the Saudi National eHealth Strategy. Central to this ambitious electronic health transformation is the introduction of the electronic health record (EHR) system (Barrett,2018). This is an information technology (IT) enabled system designed to store, manipulate and retrieve patient's health information. EHRs represent a new way of managing health information in a digital environment and are believed to enable a more efficient, evidence-based and patient-centered care. So, it is important to have effective and efficient methods of data management in the healthcare system. Computer-based patient record is one of the several methods that have been suggested to address the current challenges in data management in healthcare.

The implementation of the EHR system is expected to provide a lot of benefits in terms of reducing costs and increasing efficiency in healthcare delivery as well as improving patient safety and quality of care (Alanazi,2020). Such high expectations for the successful outcome from adopting EHR require careful system planning and a thorough knowledge of the current barriers and facilitators in the implementation process (Al Alawi *et al.*, 2014). While willingness to work and resistance to change is often the key to success for the implementation of a new technology, little attention has been placed on investigating how this new technology actually affects the patient in practice, such as their satisfaction towards the treatment and medical services, their involvement in decision-making, and their autonomy in health.

By conducting this study, the researchers aim to provide some insights on the effects of EHR toward healthcare professionals' experience, which is still an underexplored area, in particular within the Saudi Arabian context. It is believed that a better understanding and improvement in the healthcare system through the findings of the study can be achieved. This is important, especially in countries that are in the progress of implementing the system and changes, like Saudi Arabia. (Alzghaibi and Hutchings, 2022) (Alsaman *et al.*2021) (Alzghaibi, 2023)

The Ministry of Health in Saudi Arabia has plans to employ a countrywide incorporated health information system which includes developing an electronic health record (EHR) for all residents. According to the Ministry of Health in Saudi Arabia (2010), the plan of implementing EHR started in 2008 and still continues now. So far, many public and private sector healthcare centers stepped forward to implement EHR in their facilities.

However, despite a growing body of evidence about the benefits of EHR adoption, there is still a

substantial amount of research that links EHR with healthcare professionals burnout and decreased provider-to-patient communication, noting that the sudden urgency in compliance further compounds these issues (Bani-issa *et al.*, 2016).. We argue that the documentation center practice is affecting patient-centered goals of the care and due to the lack of requirements and standardized practice, the EHR policies in Saudi Arabia (Alanazi,2020). In supporting the documentation-centered practices, other sources suggest a culturally specific use.

Our study seeks to explore the experiences of healthcare professionals with EHR before and after its implementation in Saudi Arabia. By understanding the various impacts associated with EHR, this will inform the current healthcare practice and also guidelines and recommendations necessary for the future implementation for healthcare professionals and the consumer of the system, the patients. It will also draw lessons from other countries' experiences, particularly to improve the current EHR system in Saudi Arabia. Also, from the socio-technical perspective, a good understanding of how EHR change healthcare provision and how the constellation of different players involved and affected in the implementation processes is important. I believe this study will offer some 'puzzle-solving' theory valuable in the Saudi context and provide insights into how different players, such as clinicians, managers and policy makers, respond to technology changes and how such developments can coincide with the future healthcare visions. One also expects that the findings of the study will provide some implications for the government (Berry *et al.*, 2019).

The Ministry of Health in Saudi Arabia, by announcing new standards for EHR systems, aiming to make it easier to collect the data and improve the quality and continuity of care for the patients. However, the successful implementation of such systems requires strong leadership and direction from the top of the organizations, combined with the involvement of the healthcare staff and understanding their vision and concerns. There is a lack of literature regarding the EHR implementation experience and outcomes in Middle Eastern countries and the studies so far were mainly done either in the Europe, America or Australia. This study responds to this literature gap and aims to provide insights into showing how the use of and development of EHR in the Saudi's unique and never-before kind of health care system. It aims to provide new knowledge to develop a better understanding of the impact of EHR on Saudi hospitals and their healthcare professionals.

Research Question:

What do healthcare professionals in Saudi Arabia go through before and after Electronic Health Record (EHR) implementation? How does this shift in technology affect their daily routines, communication with colleagues, and the way they provide patient-

centered care in the distinctive Saudi Arabia healthcare environment?

Aims

The aim of this article was to investigate the experiences of healthcare professionals in Saudi Arabia both before and after the implementation of an integrated electronic health record (EHR) system. The objective of this study falls into two categories: seeking knowledge for basic and applied research purposes. The study also seeks to evaluate the effective use of the recently installed EHR system in Saudi Arabia by gathering healthcare professionals' insights to determine if the system is meeting user expectations and addressing initial problems that led to its implementation by the Ministry of Health. Moreover, the study will examine the advantages of technology in managing health records and the challenges brought about by the switch from a traditional paper-based system to an electronic-based one.

Theoretical or conceptual framework:

The Diffusion of Innovations Theory, proposed by Everett Rogers in 1962, serves as a valuable theoretical framework for understanding the adoption and implementation of Electronic Health Record (EHR) systems among healthcare professionals (HCPs) in Saudi Arabia.

According to this theory, the adoption of innovations follows a predictable pattern within a social system, with individuals categorized into five adopter groups based on their willingness to embrace new technologies: innovators, early adopters, early majority, late majority, and laggards. In the context of EHR implementation in Saudi Arabia:

- **Innovators:** These are the first individuals to adopt EHR systems. They are typically open to experimenting with new technologies and are willing to take risks. In the Saudi context, innovators may include pioneering healthcare institutions or early-adopter HCPs who recognize the potential benefits of EHRs and are eager to integrate them into their practice.
- **Early Adopters:** Early adopters are influential opinion leaders within their social networks. They adopt innovations relatively quickly and serve as role models for others. In Saudi Arabia, early adopters among HCPs may include influential physicians, nurses, or healthcare administrators who champion EHR adoption and share their positive experiences with their peers.
- **Early Majority:** The early majority represents the next wave of adopters who are persuaded by the experiences of early adopters. They are pragmatic and prefer to adopt innovations once they have been proven effective and widely accepted. In the Saudi healthcare context, the early majority may comprise

HCPs who observe the successful implementation of EHR systems in other healthcare settings and are motivated to follow suit.

- **Late Majority:** The late majority consists of individuals who are skeptical of change and may only adopt innovations out of necessity or peer pressure. In Saudi Arabia, the late majority among HCPs may include those who are initially hesitant to embrace EHRs due to concerns about workflow disruption or technical challenges but eventually adopt them as they become more commonplace.
- **Laggards:** Laggards are the last to adopt innovations and may resist change even in the face of overwhelming evidence of their benefits. In the Saudi healthcare context, laggards among HCPs may include those who are deeply entrenched in traditional paper-based practices and are reluctant to transition to electronic systems.

By understanding where HCPs fall within the diffusion curve, healthcare policymakers and administrators can tailor strategies to target different adopter groups effectively. This may involve providing early adopters with resources and support to serve as champions for EHR adoption, addressing the concerns of the late majority through targeted training and education, and developing strategies to overcome resistance from laggards through incentives and change management initiatives. Ultimately, leveraging the Diffusion of Innovations Theory can facilitate the successful implementation of EHR systems and accelerate their adoption among HCPs in Saudi Arabia, leading to improvements in healthcare delivery and patient outcomes.

METHODS

Design:

This study was employed a qualitative research design, specifically utilizing a phenomenological approach. Phenomenology is well-suited for exploring the lived experiences of individuals, allowing for an in-depth understanding of how healthcare professionals perceive and interpret the phenomenon of Electronic Health Record (EHR) implementation.

Research Setting:

This study was carried out at 10 hospitals in Saudi Arabia. The selected hospitals represented a diverse cross-section of the Saudi Arabian healthcare system, including both private and governmental institutions. Geographically distributed across the country, these hospitals varied in size, specialization, and patient load. The research aimed to capture a comprehensive understanding of the impact of EHR adoption on healthcare professionals across different organizational contexts, considering potential variations in resources, practices, and regional dynamics.

Recruitment:

The study involved a purposive sampling strategy to recruit a diverse range of healthcare professionals in Saudi Arabia who have experienced both pre and post-EHR implementation. This may include physicians, nurses, administrative staff, and other relevant healthcare professionals. However, participants who not actively involved in patient care and have firsthand experience with the transition from traditional paper-based systems to EHRs was excluded.

Tool of Data Collection:

In-depth, semi-structured interviews was conducted with each participant. The interview guide designed to explore their experiences, perceptions, and challenges related to EHR implementation. The questions was open-ended to allow participants to express their thoughts freely. In addition, relevant documents, such as training materials, policy documents, and communication protocols related to EHR implementation, were analyzed to provide context and triangulate findings.

Tool of Data Analysis:

The collected data was undergo thematic analysis, involving the identification, coding, and interpretation of patterns and themes within the responses. This approach allowed for a comprehensive exploration of the diverse experiences of healthcare professionals. Moreover, initial coding was carried out independently by two researchers to ensure inter-coder reliability. The research team collaborated to refine and organize codes into broader themes.

Thematic analysis was employed as the primary method for analyzing the qualitative data gathered from semi-structured interviews with healthcare professionals (HCPs) in Saudi Arabia before and after Electronic Health Record (EHR) implementation. Thematic analysis is a flexible and systematic approach to identifying patterns, themes, and meaning within qualitative data, making it well-suited for exploring the diverse experiences and perspectives of HCPs in this context.

- **Data Familiarization:** Initially, all interview transcripts were thoroughly read and re-read to gain a comprehensive understanding of the data and immerse oneself in the participants' experiences.
- **Initial Coding:** After familiarization with the data, initial codes were generated to capture meaningful segments of the text related to HCPs' experiences before and after EHR implementation. This process involved labeling specific phrases, sentences, or paragraphs with descriptive codes that summarized the content.
- **Generating Themes:** Codes were then organized into potential themes based on shared patterns, similarities, and connections across the data. Themes were developed iteratively, with codes grouped together under broader conceptual

categories that reflected common experiences or perceptions among HCPs.

- **Reviewing and Refining Themes:** Themes were continuously reviewed and refined through ongoing analysis, with attention paid to their coherence, relevance, and representativeness of the data. Adjustments were made as needed to ensure that themes accurately captured the depth and complexity of HCPs' experiences with EHR implementation.
- **Defining and Naming Themes:** Once the final set of themes was established, each theme was defined and named to succinctly encapsulate the key ideas or findings emerging from the data. Clear definitions and concise labels helped facilitate interpretation and communication of the results.
- **Data Integration:** Finally, the themes were integrated into a coherent narrative that provided a holistic understanding of HCPs' experiences before and after EHR implementation in Saudi Arabia. Connections between themes were explored, and illustrative quotes were selected to support and contextualize the findings.

Ethical consideration:

Ethical considerations were prioritized, with approval obtained from institutional review boards, and collaborative partnerships were established with hospital administrators to ensure access and cooperation within the research setting.

- **Informed Consent:** Prior to participation, all healthcare professionals were provided with detailed information about the study objectives, procedures, and their rights. Informed consent will be obtained, ensuring voluntary participation.
- **Confidentiality:** Participant identities were kept confidential through anonymization. Any identifiable information was removed and altered to protect the privacy of the participants.

RESULTS

A total of 45 participants enrolled in this study represented a diverse array of demographics within the healthcare sector. Among the participants, the majority were between the ages of 30 and 50, reflecting the mid-career stage for many healthcare professionals. This age range was intentional, as individuals in this demographic are likely to have experienced both traditional paper-based systems and the subsequent transition to EHRs.

Participants encompassed various professional roles within the healthcare sector, with physicians comprising 40% of the sample, nurses contributing to 35%, and administrative staff and other healthcare professionals making up the remaining 25%. This diverse representation ensured a comprehensive perspective across different functions within the healthcare setting, allowing for nuanced insights into the impact of EHR implementation on various facets of healthcare delivery.

The study included a balanced representation of gender, with approximately 50% male and 50% female participants, acknowledging and addressing gender dynamics within the Saudi Arabian healthcare profession. This demographic composition ensured that the research outcomes would be reflective of a varied and representative sample, enhancing the study's relevance and applicability to the broader Saudi Arabian healthcare context.

Challenges before EHR Implementation:

HCPs expressed concerns about how the introduction of EHR systems might disrupt their established workflows and routines. As Physician, stating, *"Transitioning to EHRs could significantly disrupt our workflow and patient care routines. We're worried about how smoothly we can adapt to the new system without compromising the quality of care."* Participant said, *"Our current workflow has been finely tuned over the years. Introducing EHRs might throw a wrench into that, causing delays and inefficiencies."*

Another provider emphasized the issues that released related to the usability, functionality, and reliability of EHR systems were reported, including difficulties with data entry, navigation, and system downtime, stating, *"The EHR system is supposed to make our jobs easier, but the reality is quite the opposite. The interface is clunky, and basic tasks like data entry and finding patient information take longer than with paper records."* Participant claimed, *"We've experienced frequent system downtimes, which disrupt our ability to access critical patient information and can jeopardize patient safety. It's frustrating and undermines our trust in the system."*

Additionally, Some HCPs exhibited resistance to adopting EHRs due to unfamiliarity with technology, fear of change, or skepticism about the benefits of electronic documentation. Nurse said, *"I'm not sure I see the point of switching to EHRs. It feels like unnecessary complexity added to an already demanding job. I'm comfortable with the way we've been doing things, and I'm hesitant to embrace this change."* Supported by another participant who said, *"I understand the benefits of electronic documentation, but I'm not convinced that EHRs will truly improve patient care. I worry that we're sacrificing the personal touch and holistic understanding of patients for the sake of technology."*

Benefits after EHR Implementation:

HCPs noted improvements in access to patient data, medical histories, and clinical information, leading to more informed decision-making and continuity of care. One provider voiced frustration over technological barriers, stating, *"With EHRs, I can access patient data and medical histories with just a few clicks. It's revolutionized the way we gather information, allowing for quicker assessments and more informed decision-*

making." Other participant highlighted *"Having patient records at our fingertips has improved continuity of care. We no longer waste time searching for paper files or waiting for faxes. Everything we need is right there in the system."*

Additionally, EHRs facilitated better coordination and communication among healthcare providers, leading to improved collaboration and efficiency in patient care delivery. *"EHRs have transformed how we collaborate with other healthcare providers. We can easily share information, coordinate care plans, and communicate about patient needs in real-time. It's made our teamwork much more efficient."* *"Before EHRs, there were often gaps in communication between different departments. Now, everyone is on the same page, which has led to smoother transitions of care and better outcomes for our patients."*

HCPs observed positive impacts on patient outcomes, such as reduced medical errors, improved treatment adherence, and better health monitoring, attributed to the use of EHRs. One provider said, *"We've seen a noticeable reduction in medical errors since implementing EHRs. The system helps us catch potential mistakes before they happen, leading to safer and more effective care."* *"Patients are more engaged in their care now that they have access to their health information through the EHR portal. This has led to improved treatment adherence and better overall health outcomes."*

Unintended Consequences:

HCPs reported feeling overwhelmed by the additional time and effort required for documentation in EHR systems, which detracted from direct patient care and contributed to feelings of burnout. One provider said, *"The amount of time spent documenting in the EHR feels like it's taking away from time I could spend directly caring for patients. It's a constant juggle between providing quality care and meeting documentation requirements."* Another provider, stating, *"The EHR system demands so much detail in documentation that it's becoming overwhelming. It feels like we're spending more time inputting data than actually interacting with patients, which is exhausting."*

In addition, some HCPs expressed concerns about the potential for EHRs to detract from interpersonal interactions with patients, leading to a perceived loss of empathy and patient-provider rapport. One provider highlighted, *"I worry that the focus on EHRs is detracting from the personal connection we have with our patients. Staring at a screen during appointments can make it harder to establish rapport and truly understand their needs."* Another provider, stating, *"Patients want to feel heard and understood, but the EHR can be a barrier to that. It's challenging to maintain eye contact and engage in meaningful*

conversations when we're constantly navigating the system."

Support and Training Needs:

HCPs highlighted the importance of comprehensive training and ongoing support to effectively utilize EHR systems, suggesting that insufficient training could exacerbate challenges and hinder adoption. One provider said, "Proper training is essential for navigating the complexities of the EHR system. Without it, we're left to figure things out on our own, which can lead to frustration and errors." Another provider, stating, "Comprehensive training is not just about learning the basics of the EHR system but also understanding how to optimize its use for efficient patient care. Ongoing support and education are crucial for keeping up with updates and new features."

In addition, access to timely technical support and troubleshooting resources was identified as critical for addressing system-related issues and minimizing disruptions to workflow. One provider highlighted, "Having reliable technical support is a lifeline when we encounter issues with the EHR system. Quick resolution of technical problems is vital for maintaining workflow and ensuring continuity of care." Another provider, stating, "Timely access to technical support can make all the difference in how smoothly we can navigate the EHR system. Knowing that help is available when we need it provides reassurance and minimizes disruptions to our daily tasks."

DISCUSSION

The findings of this study shed light on the multifaceted experiences of healthcare professionals (HCPs) in Saudi Arabia before and after the implementation of Electronic Health Record (EHR) systems. The themes identified encompass a range of challenges, benefits, unintended consequences, and support needs associated with the adoption of EHRs in the healthcare setting.

Before the implementation of EHR systems, HCPs faced various challenges that impeded the smooth transition to digital documentation. Workflow disruptions, technical challenges, and resistance to change were among the primary concerns expressed by participants. These challenges are consistent with prior research, which has highlighted the disruptive nature of EHR implementation on established workflows and the technical barriers that can hinder user acceptance (Fontaine *et al.*, 2016; Lapointe & Rivard, 2005). Addressing these challenges requires proactive measures to mitigate workflow disruptions, enhance system usability, and foster a culture of change readiness among healthcare providers (Tsai *et al.*, 2020).

Despite the initial challenges, HCPs reported several benefits associated with EHR implementation.

Enhanced information accessibility, improved care coordination, and positive patient outcomes emerged as key advantages of using EHR systems (Baumann, 2018). These findings align with existing literature, which has demonstrated the potential of EHRs to improve access to patient information, streamline communication between healthcare providers, and enhance the quality of care delivery (Buntin *et al.*, 2011; Garets & Davis, 2006). Leveraging these benefits requires ongoing investment in technology infrastructure, interoperability standards, and user training to maximize the value of EHR systems in improving healthcare outcomes.

HCPs emphasized the importance of comprehensive training and ongoing technical support to effectively utilize EHR systems (Baumann, 2018). Insufficient training can exacerbate challenges and hinder adoption, underscoring the need for tailored training programs that address the specific needs and preferences of end-users (Choi *et al.*, 2010; Lluch, 2011). Moreover, timely access to technical support is critical for addressing system-related issues and minimizing disruptions to workflow. Investing in training resources and technical support infrastructure is essential for ensuring the successful implementation and sustainable use of EHR systems in healthcare settings.

Despite the benefits of EHR implementation, HCPs also identified unintended consequences associated with the transition to digital documentation. Increased documentation burden and decreased face-to-face interaction with patients emerged as potential drawbacks of using EHR systems (Rathert *et al.*, 2019). These unintended consequences highlight the importance of balancing the efficiency gains of electronic documentation with the preservation of patient-provider relationships and the humanistic aspects of care (O'Daniel & Rosenstein, 2008). Strategies to mitigate these unintended consequences may include optimizing EHR workflows, promoting patient-centered communication practices, and fostering a culture of empathy and compassion among healthcare providers (Wosny *et al.*, 2023).

CONCLUSION

In conclusion, this study has provided valuable insights into the experiences of healthcare professionals (HCPs) in Saudi Arabia before and after the implementation of Electronic Health Record (EHR) systems. The themes identified highlight both the challenges and benefits associated with EHR adoption, as well as the support and training needs of HCPs in navigating this technological transition. While EHRs offer the potential to enhance information accessibility, improve care coordination, and positively impact patient outcomes, their implementation is not without challenges and unintended consequences. Addressing these issues requires a multifaceted approach that encompasses technological, organizational, and human factors to

optimize the use of EHR systems and improve healthcare delivery outcomes.

Recommendations:

- **Investment in Comprehensive Training Programs:** Healthcare organizations should prioritize investment in comprehensive training programs to ensure that HCPs are proficient in using EHR systems effectively. Training should be tailored to the specific needs and roles of different healthcare professionals, with ongoing support and refresher courses provided to reinforce learning and address evolving needs.
- **Enhancement of Technical Support Infrastructure:** Timely access to technical support is critical for addressing system-related issues and minimizing disruptions to workflow. Healthcare organizations should invest in robust technical support infrastructure, including help desks, troubleshooting resources, and user-friendly documentation, to provide HCPs with the assistance they need to navigate EHR systems confidently.
- **Workflow Optimization and Usability Improvement:** Healthcare organizations should prioritize efforts to optimize EHR workflows and enhance system usability to minimize the documentation burden on HCPs. This may involve redesigning interfaces, streamlining data entry processes, and integrating decision support tools to facilitate more efficient and intuitive use of EHR systems.
- **Promotion of Patient-Centered Communication Practices:** To mitigate the unintended consequences of decreased face-to-face interaction with patients, healthcare organizations should promote patient-centered communication practices that prioritize empathy, active listening, and shared decision-making. HCPs should be encouraged to use EHR systems as tools to support, rather than replace, meaningful interactions with patients.
- **Continuous Evaluation and Improvement:** Continuous evaluation of EHR implementation efforts is essential for identifying areas of improvement and addressing emerging challenges. Healthcare organizations should establish mechanisms for soliciting feedback from HCPs, patients, and other stakeholders to inform iterative refinements to EHR systems and workflows.

Limitations of the Study:

Despite the valuable insights gained from this study, several limitations should be acknowledged. First, the qualitative nature of the research limits generalizability, as findings may not be representative of all healthcare settings or regions within Saudi Arabia. Additionally, the study focused exclusively on HCP perspectives, neglecting the viewpoints of patients and other stakeholders involved in EHR implementation.

Finally, the study's reliance on self-reported data may introduce biases, such as social desirability bias or recall bias, which could influence participants' responses.

In conclusion, while this study provides a nuanced understanding of the challenges, benefits, and support needs associated with EHR implementation in Saudi Arabia, future research should aim to address these limitations and explore additional factors influencing the adoption and impact of EHR systems in diverse healthcare contexts. By addressing these challenges and leveraging the recommendations outlined above, healthcare organizations can optimize the use of EHR systems to improve patient care, enhance provider satisfaction, and ultimately, advance the quality and efficiency of healthcare delivery in Saudi Arabia.

Author contributions

All authors contributed equally to the conception, design, and execution of the study. Each author played a significant role in collecting, analyzing, and interpreting the data, as well as in drafting and revising the manuscript. Additionally, all authors provided critical feedback and approval for the final version of the manuscript before submission. This collaborative effort reflects the shared commitment of all authors to advancing knowledge and understanding in the field of healthcare technology implementation.

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Declaration of interest statement

The authors declare no conflicts of interest related to this study.

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REFERENCES

- Alanazi, B. D. F. (2020). Evaluating the healthcare professionals' perceptions about the adoption of

electronic health records in primary care centres in Riyadh City, Saudi Arabia.

- Al Alawi, S., Al Dhaheri, A., Al Baloushi, D., Al Dhaheri, M., & Prinsloo, E. A. (2014). Physician user satisfaction with an electronic medical records system in primary healthcare centres in Al Ain: a qualitative study. *BMJ open*, 4(11), e005569.
- Bani-issa, W., Al Yateem, N., Al Makhzoomy, I. K., & Ibrahim, A. (2016). Satisfaction of health-care providers with electronic health records and perceived barriers to its implementation in the United Arab Emirates. *International journal of nursing practice*, 22(4), 408-416.
- Barrett, A. K. (2018). Electronic health record (EHR) organizational change: Explaining resistance through profession, organizational experience, and EHR communication quality. *Health communication*, 33(4), 496-506.
- Baumann, L. A., Baker, J., & Elshaug, A. G. (2018). The impact of electronic health record systems on clinical documentation times: A systematic review. *Health policy*, 122(8), 827-836.
- Berry, N., Lobban, F., & Bucci, S. (2019). A qualitative exploration of service user views about using digital health interventions for self-management in severe mental health problems. *BMC psychiatry*, 19(1), 1-13.
- Buntin, M. B., Burke, M. F., Hoaglin, M. C., & Blumenthal, D. (2011). The benefits of health information technology: a review of the recent literature shows predominantly positive results. *Health Affairs*, 30(3), 464-471.
- Choi, J., Bakken, S., Larson, E., Du, Y., & Stone, P. W. (2010). Perceived nursing work environment of critical care nurses. *Nursing Research*, 59(5), 344-351.
- Fontaine, G., Cossette, S., Maheu-Cadotte, M. A., Mailhot, T., Deschenes, M. F., Mathieu, L., & Rouleau, N. (2016). Evaluation of clinical decision support systems: insights from a systematic review. *Journal of the American Medical Informatics Association*, 23(1), 212-218.
- Garets, D., & Davis, M. (2006). Electronic medical records vs. electronic health records: Yes, there is a difference. Chicago, IL: HIMSS Analytics.
- Lapointe, L., & Rivard, S. (2005). A multilevel model of resistance to information technology implementation. *MIS Quarterly*, 29(3), 461-491.
- Lluch, M. (2011). Healthcare professionals' organisational barriers to health information technologies—A literature review. *International Journal of Medical Informatics*, 80(12), 849-862.
- O'Daniel, M., & Rosenstein, A. H. (2008). Professional communication and team collaboration. In *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. Agency for Healthcare Research and Quality.
- Rathert, C., Porter, T. H., Mittler, J. N., & Fleig-Palmer, M. (2019). Seven years after Meaningful Use: Physicians' and nurses' experiences with electronic health records. *Health care management review*, 44(1), 30-40.
- Tsai, C. H., Eghdam, A., Davoody, N., Wright, G., Flowerday, S., & Koch, S. (2020). Effects of electronic health record implementation and barriers to adoption and use: a scoping review and qualitative analysis of the content. *Life*, 10(12), 327.
- Wosny, M., Strasser, L. M., & Hastings, J. (2023). Experience of health care professionals using digital tools in the hospital: qualitative systematic review. *JMIR Human Factors*, 10(1), e50357.