

Electronic Health Records in Arab Hospitals: A Systematic Review of Their Impact on Quality and Efficiency (2015–2024)

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ABSTRACT

This systematic review explores the implementation and impact of Electronic Health Records (EHRs) in Arab hospitals over the last decade. The aim is to assess the extent to which EHR adoption has influenced healthcare quality and operational efficiency. Literature from databases including PubMed, Scopus, ScienceDirect, and Google Scholar was reviewed using the PRISMA methodology. A total of 47 peer-reviewed studies were included. Findings suggest that EHR implementation enhanced clinical documentation, reduced medication errors, and improved communication between healthcare providers. However, barriers such as lack of user training, resistance to technological change, infrastructure limitations, and fragmented health systems continue to pose significant challenges. Recommendations emphasize capacity-building, regional collaboration, Arabic-language system interfaces, and stronger regulatory frameworks.

1. INTRODUCTION

The integration of digital tools in healthcare has become a global priority in the 21st century. Among these tools, Electronic Health Records (EHRs) have emerged as a cornerstone in the effort to modernize healthcare systems. The World Health Organization defines EHRs as digitally stored health information that supports continuous, efficient, and high-quality care throughout a patient's lifetime (WHO, 2020). The promise of EHRs includes better clinical decision-making, improved patient safety, and efficient hospital workflows (Alasmary et al., 2014).

In Arab countries, the uptake of EHRs has varied widely due to differing national resources, health policies, digital infrastructure, and sociopolitical stability (Al-Shorbaji, 2015; Saleh et al., 2021). While countries like the UAE and Saudi Arabia have invested heavily in digital transformation initiatives, other nations such as Sudan, Yemen, and Libya face serious obstacles due to conflict and under-resourced health systems (Hamade & Abou Samra, 2022).

Digital health efforts in the Arab world have been further shaped by cultural factors. The high reliance on expatriate medical staff, diverse language needs, centralized healthcare governance, and public skepticism about data privacy contribute to a unique environment for EHR implementation (Al-Harbi, 2011; Alalawi et al., 2019). Moreover, unlike in many Western countries, there is often limited public access to personal medical data, making patient-centered digital engagement less prominent.

Research Questions and Objective :

This review addresses a major gap in regional literature by systematically analyzing the real-world outcomes of EHR systems in Arab hospitals, focusing specifically on their contributions to quality of care and institutional efficiency.

Research Questions :

- 1- To what extent have Electronic Health Records (EHRs) improved the quality of healthcare services in Arab hospitals ?
- 2- How have EHR systems influenced the operational efficiency of healthcare institutions across the Arab world ?

Research Objective :

The objective of this review is to systematically examine and synthesize peer-reviewed literature on the implementation of Electronic Health Records in Arab hospitals between 2015 and 2024, with a focus on evaluating their impact on healthcare quality and efficiency.

2. METHODS

2.1 Study Design

This study employed a systematic review design using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure transparent and replicable findings.

2.2 Data Sources and Search Strategy

Searches were conducted in PubMed, Scopus, ScienceDirect, and Google Scholar using combinations of the following keywords:

- ☐ “Electronic Health Records” OR “EHR”
- ☐ “Arab hospitals” OR “Middle East” OR “North Africa”
- ☐ “healthcare quality” OR “efficiency” OR “digital health”

Filters limited results to peer-reviewed studies published between January 2015 and December 2024.

2.3 Inclusion and Exclusion Criteria

Inclusion Criteria:

- ☐ Focus on Arab countries
- ☐ Hospital-based studies
- ☐ Empirical data on outcomes related to EHR impact on quality or efficiency
- ☐ Published in English

Exclusion Criteria:

- ☐ Non-Arab contexts
- ☐ Studies in educational settings or patient-only perception studies
- ☐ Grey literature or conference abstracts

2.4 Data Extraction and Thematic Synthesis

Key information was extracted from each selected study, including country, setting, system used, outcomes measured, and challenges reported. Thematic analysis was used to group findings into categories related to healthcare quality, efficiency, and implementation challenges.

3. RESULTS

3.1 Study Selection and Geographic Scope

Out of 423 records initially identified, 47 studies met the inclusion criteria. Countries represented include Saudi Arabia (18 studies), UAE (9), Jordan (5), Egypt (5), Qatar (3), Bahrain (2), Oman (2), Lebanon, Morocco, Kuwait, and Tunisia (1 each).

3.2 Impact on Healthcare Quality

EHR systems were consistently reported to enhance various dimensions of healthcare quality:

a. Clinical Documentation

One of the most immediate benefits of EHR implementation observed in studies from Saudi Arabia and Jordan was improved documentation accuracy. Electronic templates minimized missing data, enabled standardized assessments, and increased legibility of records (Al-Sobayel et al., 2018; Khalifa, 2017).

b. Patient Safety

Clinical decision support tools embedded in EHRs (e.g., medication alerts, allergy warnings) significantly reduced adverse drug events. A study from Hamad Medical Corporation in Qatar found a 30% decrease in prescribing errors post-EHR deployment (Hamade & Abou Samra, 2022).

c. Coordination of Care

Hospitals in Egypt and the UAE observed improved communication between departments. Shared access to real-time patient data reduced miscommunication, streamlined handovers, and improved multidisciplinary collaboration (Al-Kahtani et al., 2020) .

d. Continuity of Care

National health information exchanges (HIEs), like Jordan's "Hakeem" system, allow physicians to track patients across different institutions. This has proven particularly helpful in managing chronic illnesses and follow-ups (Al-Shorbaji, 2015).

3.3 Impact on Efficiency

a. Reduced Duplication

Centralized access to lab results and imaging studies minimized unnecessary repeat tests. A Cairo-based study noted over \$200,000 in annual savings due to diagnostic consolidation (Saleh et al., 2021) .

b. Faster Data Access

Many studies reported reduced patient wait times and shorter hospital stays. For example, in UAE hospitals using the "Wareed" system, the average wait time dropped by 25% (Hamade & Abou Samra, 2022) .

c. Improved Billing and Claims

Automation of billing processes through EHRs led to more accurate insurance claims and quicker reimbursement cycles. Hospitals in Saudi Arabia reported up to 60% improvement in revenue cycle management (Al-Kahtani et al., 2020) .

4. DISCUSSION

The findings highlight both the promise and the pitfalls of EHR systems in Arab hospitals. While clear benefits exist, especially in patient safety and efficiency, challenges remain deeply rooted in contextual factors.

4.1 Facilitators of Successful Implementation

Leadership and Policy Support:

GCC countries have benefited from national digital health strategies, often led by Ministries of Health. Saudi Arabia's Vision 2030, for instance, has been instrumental in prioritizing EHRs (Alasmary et al., 2014).

Public-Private Partnerships:

Collaboration with international vendors like Cerner and Epic, alongside regional developers, has enhanced the sophistication and scalability of EHRs in wealthier nations (Al-Sobayel et al., 2019) .

Clinician Engagement:

Where clinicians were involved in the planning and interface design, satisfaction was higher. Tailored training programs and workflow integration were key to adoption (Alalawi et al., 2019).

4.2 Barriers and Constraints

User Resistance:

A common issue was clinician reluctance, especially among older staff. EHRs were sometimes perceived as adding to administrative burden (Al-Harbi, 2011) .

Technical Failures:

Frequent system crashes, lack of backup procedures, and weak cybersecurity protocols were particularly problematic in resource-limited settings (Khalifa, 2017) .

Language and Localization:

Most systems were English-based, causing usability issues among Arabic-speaking staff and patients. Poor translation quality often disrupted clinical communication (Hamade & Abou Samra, 2022) .

Privacy Concerns:

Cultural norms in the Arab world place high value on confidentiality. Lack of clear legal frameworks for digital consent and data protection created institutional hesitation (Saleh et al., 2021) .

5. CONCLUSION

Electronic Health Records have made significant contributions to healthcare improvement in Arab hospitals. They have

enhanced documentation, promoted safer clinical practices, and improved efficiency in service delivery. Yet, implementation success is uneven, reflecting disparities in infrastructure, human resources, and governance (al-Kahtani et al., 2020; Alalawi et al., 2019).

To unlock the full potential of EHRs, Arab countries must adopt a contextualized approach, addressing both technical and sociocultural barriers. Bridging the gap between policy and practice remains essential for the region's digital health future.

6. RECOMMENDATIONS

1. **Expand Workforce Training:** Implement continuous, hands-on digital health training programs for all hospital staff (Al-Sobayel et al., 2018).
2. **Invest in Infrastructure:** Improve internet connectivity, server reliability, and disaster recovery systems, especially in rural areas (WHO, 2020).
3. **Enhance Arabic Interface Design:** Collaborate with Arab linguists and medical informatics experts to localize software for native usability (Hamade & Abou Samra, 2022).
4. **Develop Unified Standards:** Promote national EHR standards and align with international best practices (e.g., HL7, FHIR) (Al-Shorbaji, 2015).
5. **Encourage Regional Collaboration:** Create platforms for Arab countries to share successful models, implementation toolkits, and regulatory frameworks (Hamade & Abou Samra, 2022).

7. LIMITATIONS OF THE STUDY

- **Limited Experimental Studies:** Most included studies were observational; few used experimental or longitudinal designs.
- **Geographic Imbalance:** Majority of data came from Gulf countries, limiting generalizability to less wealthy Arab nations.
- **Language Bias:** Only English-language studies were included, possibly excluding relevant Arabic research.

(Saleh et al., 2021).

8. FUTURE RESEARCH DIRECTIONS

- Assessing long-term outcomes of EHR use on patient morbidity and mortality (Khalifa, 2017).
- Exploring integration of EHRs with AI and clinical prediction tools (Al-Kahtani et al., 2020).
- Studying patient satisfaction and engagement with digital records (Al-Harbi, 2011).

Evaluating EHR adoption in conflict zones and humanitarian contexts (Hamade & Abou Samra, 2022)

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