

# The Implementation of Electronic Medical Record (EMR) in Hospitals: A Conceptual Study

Wan Nor Syazana Binti Wan Hashim, Fatanah Binti Jislan\* Aida Nur Binti Mohd Kodri, Siti Nurul Akma Ahmad, Erratul Shela Binti Eshak, Khalijah Binti Mohd Nor, Noor Haty Binti Nor Azam

Universiti Teknologi MARA, Cawangan Melaka, Malaysia

\*Corresponding Author

fatanah@uitm.edu.my

## Abstract

**Purpose:** The trend of electronic medical records (EMR) was on a steady rise worldwide. Governments and healthcare authorities worldwide have been promoting the use of EMRs to improve patient care, data management, and healthcare efficiency. Thus, the aim of this study is to conceptualize the practices that are being utilized by Electronic Medical Records (EMR) systems in hospitals.

**Design/methodology/approach:** The current study involves reviewing research articles which were gathered from Scopus, ScienceDirect and a few other online databases. This study discussed the implementation, benefits, and challenges of EMRs by conducting a complete literature review.

**Findings:** Based on the findings, previous studies prove that EMRs implementation significantly improve the quality of healthcare, the results for patients, and the security of patient data.

**Research limitations/implications:** This study does not involve any systematic literature search; however, the selection of articles is strictly limited to the established online databases. Practical implications: Healthcare organizations should consider ongoing support and continuous improvement efforts to maximize the benefits of EMR systems while mitigating potential issues.

**Originality/value:** The research sheds light on the obstacles that are faced during EMR integration and identifies potential opportunities for development. It is essential to understand EHR practices in hospitals to maximize the efficiency of healthcare information management and improve the standard of healthcare provided throughout the country of Malaysia.

**Keywords:** Electronic Medical Records (EMR), Electronic Health Records (EHR), Healthcare, Healthcare Management

## Introduction

A medical record is an essential component of a health-care organization that collects all related data, information and findings necessary to care for patients, families, communities and populations. Since the quality and effectiveness of care are directly related to the accuracy and quality of the record contents (Albano et al., 2019), complete and accurate documentation of all services provided to patients is vital. However, deficiencies in records (incomplete or missing data elements in medical record sheets) have negative consequences for patients and hospitals; studies have shown that they can lead to test duplication,

inappropriate decisions, therapeutic side effects, increased hospital expenses and revenue reduction (Klein et al., 2018; Yavari et al., 2015).

In this digital era, technology is touching virtually every aspect of our lives to the extent of creating dependency. Entry of technology in the health-care industry is a recent development and hence is still in the developing stage. Thus, the Electronic Medical Record (EMR) system is considered as one of the most significant changes to health-care practice in the twenty-first century and it has been met with both enthusiasm and healthy skepticism (Tierney et al., 2013). The EMR systems are used by health-care professionals to maintain patients' medical records, billing information, prescription history and diagnostic results in a digital, rather than paper, format (Alagoz et al., 2010).

In gaining effective use of EMR (whatever terminology is used), key issues are not really about the technology, or even about willingness of doctors to use systems. The aim of this study is to conceptualize the practices that are being utilized by Electronic Medical Records (EMR) systems in hospitals including its benefits and challenges of the EMR implementation. Healthcare organizations should prioritize continual support and ongoing enhancement initiatives to optimize the advantages of EMR systems, all while addressing potential challenges. A thorough grasp of EMR practices hospital facilities is crucial for enhancing the effectiveness of healthcare information management and raising the healthcare standards across Malaysia.

### **Literature Review Medical Record**

A medical record is an essential component of a health-care organization that collects all related data, information and findings necessary to care for patients, families, communities and populations. Since the quality and effectiveness of care are directly related to the accuracy and quality of the record contents (Albano et al., 2019), complete and accurate documentation of all services provided to patients is vital (Murphy, 2001).

Documenters, including physicians, nurses, ward secretaries, hospital registrars and discharge staff are all responsible for recording clinical and administrative data elements in medical records. These documents often fail to completely and accurately record data elements due to factors such as busy schedules, the complexity of the treatment process and lack of sufficient knowledge of the technical aspects of documentation and its impact on patients (Murphy, 2001; Rosenbaum et al., 2014). Also, some physicians and surgeons prioritize providing patient medical or surgical care over documenting healthcare information as a part of the treatment process (Albano et al., 2019). Hence, they may enter data elements after patient discharge, which increases the possibility of overlooking relevant information and incompleteness of the records (Alkhatlan, 2019).

Over the past decade, systems such as electronic medical records (EMR) and electronic health records (EHR) have been used in many countries to facilitate the documentation of medical care (Burke et al., 2015; D'huyvetter et al., 2014). However, these systems do not continually improve the quality of the documentation (Hahn et al., 2011; Salazar et al., 2011; Lemma et al., 2020). Methods used to eliminate possible data deficiency and enhance EMR include data quality assessment (DQA) guidelines (Weiskopf et al., 2017; Callahan et al., 2017; WHO, 2017), audit and feedback, reminders, dictation, training, templates, and multiple interventions (Lorenzetti et al., 2018; Triplet et al., 2017).

The newly released World Health Organization’s (WHO) draft four-year global strategy on digital health aims to improve health for everyone, everywhere by accelerating the adoption of appropriate digital health (WHO, 2019a) and clearly underscores the value of electronic health records (EHR). Development of national and sub-national EHR in the health care system of the low- and middle-income countries (LMICs) is also vital for achieving the United Nations Sustainable Development Goal of ensuring healthy lives and promoting well-being for everyone at all ages.

***The Implementation of EMR***

The concept of EMR started in the 1970s, and usage of such systems has spread rapidly, although even in most developed countries, still only a minority of hospitals have fully implemented systems. Such systems go by many names, including EMR, health information technology (HIT) and many other terms. Technically, different terms sometimes are considered to cover slightly different content. Occasionally authors argue that the terms must be carefully distinguished, e.g. Garets and Davis (2006) say EMR and EHR are different in that EHR is somewhat broader.

EMR implementation does not always work well, and there may be resistance to adoption among key stakeholders. In gaining effective use of EMR, key issues are not really about the technology, or even about willingness of doctors to use systems. They are about management of EMR implementation. Management of the implementation process needs to be better understood so that implementation can be better managed.

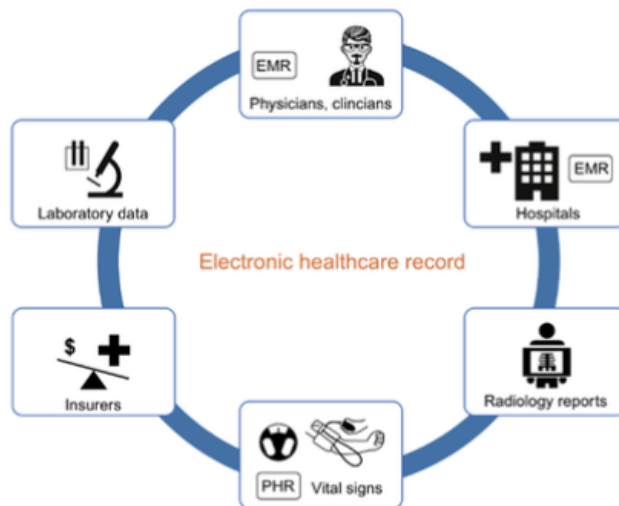


Figure 1: Electronic Healthcare Record Process Diagram (Source: S. Rakesh, et al., 2019)

Figure 1 shows the EHR process diagram which indicates the maintenance that involves multiple entities, including physicians, clinical data from patients, medical insurers, various health reports and test results. These entities collectively contribute to the ongoing management and utilization of EMR in hospitals, ensuring that they remain accurate, up-to-date, and accessible for the benefit of patients and healthcare providers.

***The Benefits of EMR Improve Patient Care***

EMRs enhance the quality of patient care by enabling precise and timely access to patient information, resulting in improved clinical decision-making and better patient outcomes (Adler-Milstein et al., 2017). The utilization of EMR as a communication tool fosters effective and efficient interactions between healthcare providers and patients, promotes horizontal integration within clinical settings, and facilitates vertical integration among primary care, specialists, hospitals, laboratories, and imaging centers (Janett et al., 2020).

***Increased Efficiency***

EMR optimizes operational efficiency by simplifying administrative tasks, minimizing paperwork, and enhancing the smooth flow of work processes, enabling healthcare providers to dedicate more time to patient care (Lau et al., 2018). Furthermore, according to Ruffin (2015), extensive research has systematically examined the impact of EMR on various health improvement interventions. For instance, EMR equipped with automated reminders and prompts for administering the human papillomavirus vaccine to eligible patients have demonstrated significantly superior performance when compared to EMR lacking these features. Additionally, EMR provides instantaneous access to patient data, fostering improved coordination among healthcare teams and reducing the occurrence of errors (Kruse et al., 2016).

There is no perfect electronic medical record system, but there are features of systems that have been shown to improve reliability, quality, and efficiency over time. There is no better tool than an EMR to integrate patient care among members of the care team at a specific facility (horizontal integration), and among providers and various facilities at the primary, secondary, and tertiary levels of care (vertical integration). A high functioning EMR helps reduce fragmentation in the care delivery system and this improves quality and efficiency by reducing gaps in care. An EMR can also enhance data accessibility and reduce cost. It also offers reminders of important interventions that are needed at the time of an office visit and can track and flag patients who do not present themselves for follow up care in an appropriate time frame.

***Rapid and Timely Access***

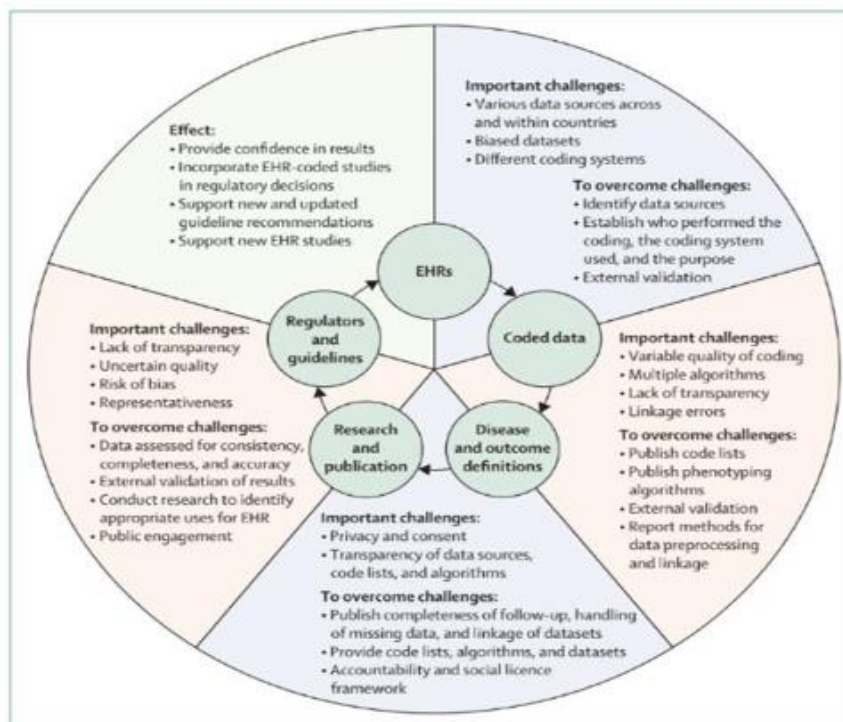
EMR systems are also multifunction systems, offering rapid and timely access to a patient's health information by all authorized personnel across different health-care providers involved in the patient's care; aggregation of health-care information from multiple sites; reduction of the incidence of missing, lost or illegible records; reduced time for diagnosis through quicker access to test results and diagnostic scans; enabling efficient sharing of health data with the patient or their caregiver, allowing for greater patient involvement and feedback in their health care; support for patients' requests for repeat prescriptions and direct to email access to their health-care practitioner; and supports of research and development through faster access to medical data (Behrens et al., 2019).

***The Challenges of EMR***

EMR were originally designed with the intention of enhancing the efficiency of patient care. Despite the benefits it serves, there are also challenges in implementing EMR systems. Challenges to implementing EMRS or EHRS include technology constraints (lack of connectivity between systems, not user friendly and at risk of hacking); contribution to staff

burnout due to heavy expectations of documentation for billing/legal and insurance purposes; discourages trainees from entering the profession (due to the frustrations of having to spend ample time with EHR systems, thus reducing the time given to patients which indeed reduces quality of care). They have encountered inefficiencies, such as inaccuracies in documentation and time-consuming nature of their use. These issues have led to negative impacts on both physicians and patient satisfaction. EHR have also diverted attention away from non-automated interactions between doctors and patients, generated irrelevant documentation, and over time perpetuated copy-and-paste errors, resulting in data inaccuracies (McAmis et al., 2021).

In addition to that, as noted by Janett et al., (2020), the implementation and maintenance of EMR systems come at a considerable cost. Furthermore, the initial financial investment and the ongoing expenses associated with the implementation and maintenance of EMR can be substantial. This financial burden can present challenges for healthcare organizations (Ludwick & Doucette, 2009). Apart from that, data security and privacy issues have remarked that the safeguarding of sensitive patient information within EMR continues to pose a significant challenge. This supported by Yaraghi et al., (2017), by stating that there is an ongoing risk of security breaches and concerns related to patient privacy. Resistance to change among healthcare professionals may exhibit reluctant in embracing EMR due to concerns about alterations in their workflow and apprehensions regarding usability (Holden et al., 2019).



**Figure 2:** Structured Health-care data in improving patient care (Source: Kotecha, et al., 2022)

Figure 2 shows the structured health-care data in improving patient care that includes the process workflow of EMR implementation as well as the important challenges and ways to overcome the challenges. Understanding and applying relevant frameworks can aid healthcare organizations in successful EMR adoption and utilization.



### Discussion and Conclusion

The wealth of evidence from previous studies underscores the positive impact of EMR when they are appropriately implemented. However, this impact is contingent on how well hospitals manage the integration of EMR into their clinical workflow. As healthcare continues to evolve, EMR will remain a central element in the quest for improved healthcare quality and patient satisfaction. While the potential benefits of ERM are substantial, their successful integration into healthcare settings hinges on understanding and addressing the challenges they present. In this context, further exploration on the elements that shape how EMR affects clinical workflow is needed for instance, workflow integration, usability and user training, data quality and accuracy as well as interoperability of the EMR.

In conclusion, the key lesson from prior research is clear; hospitals must approach EMR implementation with careful attention to its influence on clinical processes. By addressing workflow integration challenges, focusing on usability and user training, ensuring data quality and accuracy as well as prioritizing interoperability, healthcare organizations can harness the transformative power of the EMR to enhance patient care and drive positive outcomes. Therefore, ongoing research and adaptation of best practices in EMR implementation will be crucial to realizing their full potential in the ever-changing landscape of healthcare delivery.

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