

Healthcare Professionals Views on Electronic Health Records in GCC Countries

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Abstract

Background: Electronic Health Record System (EHRS) is used largely in developed countries, though developing countries have also implemented the system in their healthcare industries. Electronic Health Record System (EHRS) is projected to increase the excellence of patient care, and its successful implementation depends upon the clinical perception of EHR systems. The medical staff has resisted digitalization, observing the system as uncaring, confusing and dehumanizing. The literature showed physician's perceptions and attitudes towards the significance of the system to improve healthcare facilities but also identified the factors influencing the resistance to using the new system.

Research Question: Do healthcare professionals perceive that the usage of automatic/electronic health records improves the quality of healthcare services in healthcare organizations in Gulf Cooperation Council Countries?

Objective: Systematic research was conducted to evaluate the physician's perception and satisfaction with the newly implemented EHRS in healthcare organizations to improve the quality of healthcare services in Gulf Cooperation Council Countries.

Method: A systematic literature review is used to examine the physician's and medical staff's attitude, knowledge, satisfaction, preferences, and perception of the Electronic Health Record system. The study was focused on physicians, pharmacists, receptionists, medical staff, and nurses working in various hospitals in Gulf countries such as Saudi Arabia, Bahrain, Kuwait, UAE, and Oman. A narrative review of Scopus, PubMed, Proquest, Science Direct, Informit Health Collection, CINAHL, and Medline via OvidSP databases from 2007 to 2017.

Result: The overall response of physician's and other medical staff's perception and satisfaction towards using EHR systems to improve healthcare services was positive. However, the study identified the negative perception of the system in Saudi Arabia, mainly because of the lack of sufficient technical training and personal preferences.

Conclusion: The majority of the studies specified the positive perception and high satisfaction rates toward the newly implemented computerized record-keeping system in Gulf Cooperation Council Countries. Physicians agreed on the beneficial impacts of using an electronic health record system to reduce errors and maintain a proper record of patients, especially in diseases like HIV, which require

constant medical treatment and assistance. The review also revealed the barriers and factors influencing the adoption of EHRs in hospitals and medical care facilities. The major barriers identified to hinder the successful implementation and adoption were human barriers, financial barriers, organizational barriers, technical barriers, and regulatory barriers.

Keywords: EHRs, Physicians, Perception, Barriers, Adoption

Healthcare Professionals' Perception of the Use of Electronic Health Records Improves the Quality of Healthcare Services In Healthcare Organizations in Gulf Cooperation Council Countries

Introduction

An electronic health record system is a computerized form of a patient's paper record ^[16]. It is widely used in any healthcare organization to collect patient data such as medical history, prescribed medication use, and demographic information. The first world countries such as Canada and the United Kingdom have a nationwide EHR system. In 2012, 72% of office-based physicians used EMR/EHR systems in America ^[17]. Keeping health records digitally is undergoing a transition not only in developed countries but also in developing countries.

The developing countries lack a well-organized healthcare infrastructure to effectively fight against Malaria and Human Immunodeficiency Virus (HIV), among other deadly diseases that require constant medical assistance and treatment. The basic paper-based record keeping is not enough and needs to be substituted by a new, innovative electronic health record system ^[18].

The study aims to investigate the physician's perception of the impact of using electronic health record systems (EHRS/EMRS) to improve the quality of healthcare services in Gulf Cooperation Council countries. The literature review reflects the most current and pertinent research available on electronic health record systems in Gulf countries. In Saudi Arabia, the Saudi Ministry of Health (MOH) has taken initiatives to implement EMRS nationwide. According to research conducted by Shaker, Farooq, and Dhafar in 2015, 52.8% of physicians appreciated EHRS positively in Saudi Arabia. However, there is a deficiency of awareness about the use of EHR systems among a range of administrative staff and health professionals ^[4].

EHR is an assisting technology that lets physicians apply quality improvement processes in the practice of medicine. The systems provide accuracy of information, speed of communication, date revision, and data retrieval and improve adherence to clinical practice guidelines in healthcare facilities ^[13]. The computerized clinical record system is useful for storing a huge volume of regulatory information and administrative and clinical information. These systems not only provide speed and accuracy but also decrease the rate of medical error, increase quality, and fulfill the regulatory audit. Physicians see the digital system as a means to advance quality care and increase cost efficiency [12]. It is a new way of communication and interaction among paramedical employees, nurses, and physicians. EHRs are reducing medical costs by eliminating inappropriate care, inefficiency, and

medical errors [19]. The system is also capable of detecting unusual patterns such as the high number of lab investigations ordered by physicians, oddly high degrees of hospitalization or patient readmission.

The successful use of electronic health record systems is crucially dependent upon the clinical perception of EHRs. The literature review of fourteen articles from different countries in the Middle East is focused on determining the physician's satisfaction and perception of the electronic health record system. The study conducted in the United Arab Emirates (U.A.E) concluded that physicians are satisfied with the system and have a positive perception regarding the application ^[13]. Similarly, researchers conducted in Saudi Arabia indicate the positive attitude of nurses towards EHRs ^[6], and they agree on the benefits of using this system ^[5]. An article from Taibah University of Medical Sciences in 2014 stated the dissatisfaction of physicians with the digital system is significantly associated with the performance of the system and the quality of the information [9]. Another study showed an increasing adoption of EHRs in Saudi Arabia; however, it indicated that computer training and literacy rates are directly proportional to clinical efficiency and EHR satisfaction [11].

Two types of research conducted in Kuwait have shown a very positive perception of EHRs by physicians and their confidence in the efficiency and accuracy of EHR systems ^[19]. The majority of physicians who participated in a study have reported the EHR system as easy to use [20]. However, In Oman, physicians indicated low satisfaction with the current EHR system because of its poor and inappropriate usage ^[8]. Most of these studies showed the positive attitude and high satisfaction of physicians in electronic health record systems. However, there are several barriers and challenges involved in the adoption of a digital system.

Adopting the new technology is always challenging. Nurses are the largest part of the healthcare personnel in critical care facilities; therefore, nurse's advocacy of the electronic health record system is a crucial factor prompting its implementation. The process of adopting EHR systems is growing rapidly within the healthcare industry. The Medical secretaries and the nurses interact with EHR systems as receptionists, transcriptionists, and nursing diagnoses, write nursing care plans, check physician orders, and record vital signs. This makes them the primary users of the system, but the evaluation of EHRs by nurses has received less devotion ^[2].

The major barriers identified by several types of research that hinder the successful implementation and adoption of health information systems in Saudi Arabia are human barriers and financial barriers ^[20]. Human barriers refer to the healthcare professional's knowledge, personal beliefs, and attitude regarding the health record adoption ^[2]. Financial barriers include insufficient money and funding to implement an EMR system.

The studies investigated the barriers and factors affecting user satisfaction with the Electronic Health Record System and concluded that physicians agree with the usefulness of the digital system for recording medical history, but adopting new technology is challenging. Computer literacy and training can improve satisfaction. Another important element to improve the physician's adoption of the

system is the involvement of the primary users in developing the EHR system and asking for recommendations on how to improve the interface. The implementation of a computerized system is not as challenging as providing the maintenance and technical support to sustain the system. Low budget countries face difficulties in technically maintaining the system and thus indicate the need for improved technical training.

Research Methodology

A systematic literature review is used to examine the physician's and medical staff's attitudes, knowledge, satisfaction, preferences, and perception of the Electronic Health Record system. The study was focused on physicians, pharmacists, receptionists, medical staff, and nurses working in various hospitals in Gulf countries such as Saudi Arabia, Bahrain, Kuwait, UAE, and Oman. The literature review concentrated on the government and private hospitals in different regions of Saudi Arabia, i.e., Makkah, Jeddah, Taif, and Riyadh. In Oman, Bahrain, Kuwait, and U.A.E, several clinical specialists, public hospitals, and primary healthcare centers were investigated. A narrative review of Scopus, PubMed, Proquest, Science Direct, Informit Health Collection, CINAHL, and Medline via OvidSP databases from 2007 to 2017.

Identification And Selection Of Data

The keywords used to search the databases were ("perception" OR "attitude" OR "perspective" OR "beliefs") AND ("electronic health record" OR "EHR" OR "electronic medical record" OR "EMR" OR "electronic record" OR "digital record" OR "digital medical record" OR "digital health record" OR "digitized record" OR "digitized record" OR "electronic health information system" OR "health information system" OR "HIS" OR "e-health" OR "digital health") AND ("GCC" OR "gulf cooperation council" OR "gulf Countries" OR "Bahrain" OR "Kuwait" OR "Oman" OR "Qatar" OR "Saudi Arabia" OR "United Arab Emirates" OR "UAE" OR "middle east"). The selection criteria are peer-reviewed articles and include English and Arabic languages. After the filtration from 64 articles, I selected 14 studies best suited to my research.

Data Synthesis

Studies included in quantitative synthesis (meta-analysis)
(n = 14)

Studies included in qualitative synthesis
(n = 14)

Full-text articles excluded, with reasons
(n = 28)

Full-text articles assessed for eligibility
(n = 42)

Records excluded
(n = 20)

Records screened
(n = 64)

Records after duplicates are removed
(n = 2008)

Additional records identified through other sources
(n = 0)

Records identified through database searching
(n = 6460)

Results

After analyzing fourteen articles from different countries in the Middle East region, it has been clear that the overall physician's perception is positive regarding the usefulness of electronic health record systems. However, there are numerous concerns and barriers regarding the successful implementation and user satisfaction of EHR systems. Let's have a deeper look at the results in Saudi Arabia. A total of 14 articles were systematically reviewed to determine the physicians' perception of EHRs from the perspective of its efficiency so as to increase its benefits and functionalities and to identify hurdles posed by various healthcare professionals to the acceptance of EMRs in different regions of the Middle East, especially in Saudi Arabia.

The participants of these studies were physicians, pharmacists, nurses, administration staff, laboratory staff and receptionists from primary health care services, government hospitals, and private hospitals in Makkah, Riyadh, Taif, and Jeddah regions. The time span of this research conducted in the Middle East was from 2009 to 2014. Out of fourteen articles, twelve of them showed positive perceptions about the EHR system, and two articles showed negative satisfaction with the use of the EHR system. There were several barriers and concerns mentioned by physicians during the research in the adoption and implementation of the system and the study also discussed the factors influencing the perception of the physicians regarding the usefulness of the system.

First let's have a look at the physician's positive factors regarding the perception of the system discussed in studies conducted in Saudi Arabia, Oman, Bahrain, Abu Dhabi, and Kuwait. Physicians in Saudi Arabia believe the electronic record system improves the timeliness, performance and quality of healthcare facilities^[1]. It increases the accessibility of the patient's record, and it improves patient care via better communication among the patient's care team members [2]. The system improves the overall healthcare services in hospitals by automating them [3]. Electronic record-keeping systems have improved efficiency and quality of care, reduced error, and enhanced patient safety [5]. A computerized record-keeping system enhances the security and confidentiality of the patients as

compared to paperwork [6]. The search conducted in Kuwait described the system as easy to use, and it helps professionals update their competencies and capabilities to expand research in their fields [7].

The system helps them to write referral letters for consultation easily and provides better access to the summary of patient's details [10]. Oman physicians have a very positive attitude towards the EHR systems. It improves the work in terms of quality and performance and allows physicians to pursue further progressive practices in their careers [8]. The EHR system improves cost efficiency and interaction among nurses, physicians, and paramedical staff, reducing medical errors and inefficiency [12]. Bahrain and Abu Dhabi also indicated positive perceptions regarding the usefulness of EHRs in improving and advancing medical facilities [13] [14].

The major barriers and constraints in the implementation, adoption, and user satisfaction of the systems in Saudi Arabia and other Middle East countries were categorized as human barriers, professional barriers, organizational barriers, technical barriers, financial barriers, and regulatory barriers [3]. Human barriers were a lack of awareness of the benefits of using EHRs, lack of computer knowledge and experience using EHRs, fewer health informatics specialists, and negative perception about the ability to use EHR systems. Professional barriers identified in the research were lack of motivation to train and learn the use of EHR system, lack of time, more professional accountabilities, decreased productivity, and lack of healthcare professional support for EHR system. Organizational barriers include incompatible workflow with EHRs, lack of experience in choosing and implementing the best EHR system in the hospital, lack of experience in evaluating the performance of EHR system, providing insufficient training or monitoring to the hospital staff, and having no strategic plan to implement and adopt EHR system [3]. Technical barriers refer to a lack of guidelines and manuals for using EHR systems, maintenance problems and insufficient technical support for software/hardware, old and slow computer terminals and communication networks, difficulty in data entry and data retrieval, difficult user interface, and insufficient computer terminals. Financial barriers comprise high initial cost implementation and lack of resources, high maintenance and operation costs, and lack of feasibility studies that show the benefits of implementing the system. Regulatory barriers identified were lack of procedures/policies that run EHRs on the hospital level, lack of laws or legislations at the national level, EHRs threaten the confidentiality of health information, corruption, information loss, and hacking [2].

The factors influencing the adoption and positive perception of its usefulness among physicians and medical staff were service quality and technical support, along with English language proficiency and computer training. The users with high language proficiency and computer knowledge showed high satisfaction and adoption rates.

The systematic review of 14 articles helped figure out the physician's perception and the factors influencing this perception in the usefulness and successful implementation of the electronic health record system in the healthcare industry.

Table 3

#	Authors	Name of system	Domain	The time period from implementation to evaluation	Method and Study Design	The main objective of the study	Country	Participants Type such as physician and nurse or others
1	Hani Abdulsattar Shaker, Mian Usman Farooq, Khalid Obeid Dhafar	Physician's perception about electronic medical record system in Makkah Region, Saudi Arabia	www.avicennajmed.com	July to Aug 2009	A questionnaire of 15 Closed-ended questions	Determine the physicians' perception of EHRS from the perspective of its efficiency in order to improve its benefits and functionality.	Makkah Region, Saudi Arabia	Physicians working in 6 different hospitals
2	Azza El.Mahalli	Adoption and Barriers to Adoption of Electronic Health Records by Nurses in Three Governmental Hospitals in Eastern Province, Saudi Arabia	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4632875/	Feb 2012	Cross-sectional, paper-based questionnaire	Assess the adoption and barriers to the use of an EHR system by nurses	Eastern Province, Saudi Arabia	Nurses
3	Mohamed Khalifa	Barriers to Health Information Systems and Electronic Medical Records Implementation A Field Study of Saudi Arabian Hospitals	The 3rd International Conference on Current and Future Trends of Information and Communication Technologies in Healthcare (ICTH)	2013	Questionnaire	To identify, categorize, and analyze barriers perceived by different healthcare professionals to the adoption of EMRs in order to provide suggestions on beneficial actions and options	Saudi Arabia	healthcare professionals
4	Rihab A. HASANAINa, Kirsten VALLMUURb, Michele CLARK	Electronic Medical Record Systems in Saudi Arabia: Knowledge and Preferences of Healthcare Professionals	Journal of Health Informatics in Developing Countries	November 2011 and January 2012	Quantitative methodology (quantitative questionnaire)	The research aims to examine both the knowledge and preferences of current or potential EMR users.	Saudi Arabia	physicians, pharmacists, nurses, administration staff, laboratory staff and receptionists
5	Hanan Asiri, Bakheet AlDosari and Basema Saddik	Nurses' attitude, acceptance and use of Electronic Medical Records (EMR) in King AbdulAziz Medical City (KAMC) in Riyadh, Saudi Arabia	Merit Research Journal of Medicine and Medical Sciences	March 2014	Cross-sectional study, Questionnaire	explore the direct and indirect effects of the Organizational factors and the Professional factors on nurses' attitude and acceptance of the EMR system	Riyadh, Saudi Arabia	Nurses
6	Husain Alzobaidi, Elham Zolaly, Bakur bin Sadeq, AbdulRhamn Alghamdi, Emad T Ahmed6	Attitudes toward implementing electronic medical record among Saudi physicians	International Journal of Medical Science and Public Health	January to February 2014	cross-sectional survey, Questionnaire	Assess the readiness of the physicians in Al-Hada Military Hospital in Taif City toward implementing EMR.	Saudi Arabia	Physicians
7	Kamel A. Alsaleh, Sadoun Faris Al-Azmi	Care provider's experience with the newly implemented electronic medical record system at the primary healthcare centers in Kuwait	Bulletin of Alexandria Faculty of Medicine (online)	November 2005 to January 2006	User Interaction Satisfaction Questionnaire (QUIS)	Evaluate the user interaction satisfaction with the newly implemented EMRS in the primary health centers	Kuwait	Physicians, receptionists, pharmacists
8	Abdullah Al-Mujaini, Yahya Al-Farsi, Abdulla Al-Maniri, Anuradha Ganesh1	Satisfaction and Perceived Quality of an Electronic Medical Record System in a Tertiary Hospital in Oman	Oman Medical Journal	June 2011	cross-sectional survey, Questionnaire	Assess the practice, attitude, and knowledge, of physicians concerning the Electronic Health Record (EHR) system.	Oman	Physicians

9	Hana Alharthi, Adel Youssef, Salma Radwan, Sukainah Al-Muallim, and Al-Tuwaileb Zainab	Physician satisfaction with electronic medical records is a major Saudi Government hospital	Journal of Taibah University Medical Sciences	30 March and 25 May 2010	Pearson's correlation coefficient, Linear regression analysis, Questionnaire	Measure physician satisfaction with a recently introduced electronic medical record (EMR) system and determine which of the individual attributes of EMR were related to Physician satisfaction.	Saudi Arabia	Physicians
10	Kamel A. Alsaleh, Sadoun Faris Al-Azmi, Ojayan A. Al Ojayan	Physicians' perception of the newly implemented EMRS at the primary Healthcare Centers in Kuwait	Bulletin of Alexandria Faculty of Medicine (online)	November 2005 to January 2006	Structured Questionnaire	Elicit the opinion of the physician working in the primary health care facilities in Kuwait to the newly introduced EMRS and its advantages	Kuwait	Physicians
11	May Alasmary & Ashraf El Metwally & Mowafa Househ	The Association between Computer Literacy and Training on Clinical Productivity and User Satisfaction in Using the Electronic Medical Record in Saudi Arabia	Journal of Medical Systems, 2014, Singapore	20 February 2013	Cross-sectional study, self-prepared questionnaire, interviews,	Search the connotation between computer literacy and clinical productivity, occupation, and age, users' approval of the newly applied EHR at PSMMC, along with the link of user approval with position and age	Saudi Arabia	Physicians, Nurses
12	Mohammed Al Farsi, Daniel J. West Jr	Use of Electronic Medical Records in Oman and Physician Satisfaction	Journal of Medical Systems, 2006	November. 2002	nonexperimental design survey	Assess physician satisfaction through the identification of positive and negative impacts of EMR after introduction in Oman	Oman	Physicians
13	Shamma Al Alawi, Aysha Al Dhaheri, Durra Al Baloushi, Mouza Al Dhaheri, Engela A M Prinsloo	Physician user satisfaction with an electronic medical records system in primary healthcare centres in Al Ain: A qualitative study	BMJ Journals	3 March 2012	descriptive qualitative study, open-ended questions	To explore physician satisfaction with EMRS, to identify and explore the main limitations of the system and finally to submit recommendations to address these limitations.	Abu Dhabi	Physicians
14	Aysha Ebrahim Abdulla, Shurooq Yousif Ahmed, Maryam Abdulrahman Alnoaimi, Hayat Ali	Users' Satisfaction with the Electronic Health Record (EHR) in the Kingdom of Bahrain	International Journal of E-Health and Medical Communications	July-September 2016	Qualitative and quantitative survey	Examine the factors that affect users' satisfaction with the current Health Record System in the Kingdom of Bahrain	Bahrain	The user of the EHR System

Table 4

Author	Factors affecting the Healthcare professionals' perception of the use of electronic health records improve the quality of healthcare services in healthcare organizations.			Main Results of each article and key findings.
	Positive factors that are mentioned by health professionals regarding electronic medical records.	Negative factors that are mentioned by health professionals regarding electronic medical records.	Factors that improve the quality of health services that mentioned by health professionals regarding electronic medical records.	

Article #1	The system improves timeliness, performance, and quality. Physicians believe the system can increase the excellence of services for patients.	It surges the work burden, decreases the communication between users, and is not convenient for data entry as compared to paper-work	The future study should focus on EMRS users other than Makkah region to evaluate the perception of physicians and users over the years, assess the present standing of awareness relative to the past efforts to increase the positive perception	Overall perception of EMRS was found to be positive by 52.8%. but specific concerns about its usage easiness and workflow disturbance were opposed by them also
Article #2	Increased accessibility of the patient record, EHR improved patient care via better communication among participants of the patient care team	Sudden computer crashes that can cause loss of access to medical records, No training or technical support for staff in hospitals, time taking while data entry, disturbed communication between physician and patient, system hanging up problems	To further improve the system, periodic assessments should be made to analyze the degree of utilization of various system functionalities and make development accordingly, provide technical support 24/7 in the hospital, try to customize the EHR system according to the user need	Underutilization of EMR system functionalities in almost every hospital.
Article #3	Improve overall healthcare services in hospitals	Regulatory barriers, Human Barriers, Professional barriers, technical barriers, financial barriers, organizational barriers	A multi-phase approach should be used to improve awareness of the benefits and importance of using EHRs. Provide proper capital investment and funding, monitor and protect the system, and increase computer terminals at the point of care.	Financial and human barriers are two main categories of challenges in the way of effective implementation of electronic health record systems.
Article #4	The physicians have positive responses to the use of EHRS and improvement in English language skills and computer learning levels of staff would improve the level of EMR literacy. Thus, staff will easily use the system, and it will improve adoption and satisfaction.	The study described barriers to the adoption and satisfaction of physicians. These barriers were lack of experience and knowledge using EHR systems and staff struggle to use the system.	Language proficiency and computer knowledge are connected to EMRS adoption and user perception of the system. Hospitals should assess English language proficiency and computer skills prior to the implementation of the system.	Both education level and English literacy were considerably associated with EHR literacy and computer literacy.
Article #5	Electronic record-keeping systems have improved efficiency and quality of care, reduced error, and enhanced patient safety. Group setting training is preferred by nurses.	Nurses complained about the redundancy of work, time-consuming and the system interfere with their manners and communication skills and negatively impact their patient care and their attendance to the patient's need	Management should include the users of the system in the entire life cycle from designing to implementation, value their feedback and suggestions	Nurses have a positive attitude toward the EMR system. Yet, a source of conflict with management might be present
Article #6	EMR systems improve the quality of care, reduce the risk of making medical errors, and provide more security and confidentiality than paperwork.	Time taking process		Physicians presented an inspiring belief and awareness about the possible benefits of applying an electronic health record system.
Article #7	Improve the quality and care of patients; it helps them update their capabilities and competencies.	Difficult to use	Launch a massive program of computer literacy and upgrade its system with a newer and more effective version of EMRS.	The majority of the physicians reported the system as easy to use

Article #8	Improve their work in terms of performance and quality, allow physicians to follow further progressive practices that would not be possible with paper-based records, Decrease medical error, Patient access to personal health records and health information through EHTs is now progressively possible,		To get all users to a suitable level of understanding of the particular EMR system software, the hospital should provide training.	15.6% of physicians see current EMRs as an effective tool, while 29.4% of participants considered EHRs not worth the effect and time necessary to handle them.
Article #9	Allow physicians to perform their work well.	It takes extra time to start the system, is Difficult to use, takes more time to enter data, is not accurate, User interface is confusing	Continued evaluation of installed systems and feedback from users should guide future selection and introduction of EMR systems	Physicians were generally not satisfied with the system
Article #10	It provided physicians with better access to the summary of patient details and write referral letters for consultation easily.	The system's inability to procure lab results electronically	Ministry of Health and physicians should work together to improve the system. Further studies should made at private healthcare centers and hospitals	The result indicated a very positive perception of the EMRS
Article #11	The physicians and nurses agree to the high benefits of computer training, and it boosts their satisfaction with the electronic system; no advanced computer skills are required to operate the EMR system	Adoption barriers were the reason for low satisfaction rates in the study; the physicians have higher satisfaction rates than nurses	The study was limited to physicians and nurses of one region; future studies should overcome this limitation	EMR users with high computer literacy skills were more satisfied with using the EMR than users with low computer literacy skills,
Article #12	A technique to increase cost efficiency, quality care, Increasing new forms of communication and interaction between paramedical employees, physicians, and nurses, Decreasing healthcare care costs caused by inappropriate care, inefficiency, and medical errors	3 major concerns were the cost of hardware, software and upkeep with upgrades, malfunction, i.e., when the computer is not operational, concern for confidentiality,	The study recognizes significant suggestions for health executives and people who work in the Department of Information Technology (MOH) for introducing and implementing other administrative or technical innovations	Medical doctors and physicians are largely content with EHR. Physicians believe in the system to improve healthcare facilities.
Article #13	Physicians were satisfied with the results and orders of radiology and laboratory functions. They were also pleased with the electronic recommendation role, declaring that it saved time and decreased errors	The system appears multifaceted originally, and concern about patient's perception of the system requires computer skills. Many patients were unhappy	Additional research is required to be done between other patients and healthcare practitioners to discover their perceptions and attitudes about the EMR	physicians were satisfied with the EMR system in spite of primary problems with the application

Article #14	The system's technical accuracy, Appearance, System quality, and Information quality are the factors that influence end-user satisfaction.		Providing users with complete, relevant, high-quality, timely information, given their significant impact on satisfaction, Increasing users' trust by providing them with reliable output and information content to make EHR trustworthy, Increasing system quality by making EHR easy to use, reliable, efficient, and fast to access to information, and responsive to users' requests	The most effective factors in the users' satisfaction with EHR were direct service quality and technical support, with system and information quality indirectly through trust.
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Discussion

The systematic review showed physicians' positive perceptions about electronic health record systems. There has been increasing recognition of the role of EHRs in the delivery of healthcare facilities in recent years, and the use of EHR systems is increasing not only in developed countries but also in developing countries. The advantages, benefits and positive impacts of using a computerized system in hospitals improved the ratio of EHR implementation in hospitals. The successful implementation and adoption of a system highly depend upon the user's perception of its usefulness and benefits to improve the quality of the services.

Electronic health record systems have many advantages over paper record-keeping systems, and they overcome the limitations of paper in terms of storage, management of data, page fallout, and error correction. The purpose of this systematic review was to identify the perception of physicians and how they see the electronic record-keeping system in the Middle East. There are numerous advantages to using EHRs in hospitals. Developing countries are also gradually replacing the old record-keeping system with new computerized record systems in primary healthcare services to improve healthcare services. In Gulf countries, the healthcare industry is paying attention to the implementation of EHRs in private and government hospitals. The EHRS provides many advantages, and physicians see the computer system as a way to increase cost efficiency, improve quality care, and increase interaction and communication among nurses, physicians, and medical staff. The system also increased physicians' ability to validate quality and research improvements and customer satisfaction, reduced manual functions, eliminated physician documentation time, and improved coordination of information and time among laboratories, hospitals, physician offices and other paramedical staff through the official exchange of health information. Saudi Arabia has prioritized the expansion of e-health along with the evolution from the old paper-based health record system to electronic health records. The study regarding the positive perception of EHRs showed two stems: EHRs improve the quality of practice, and computers are important for practicing medicine and are appreciated by the majority of physicians [1]. Many believe EMR has the potential to lessen the medical budget, increase efficacy and excellence of care, improve patient safety and reduce errors ^[5]

[6]

The implementation of EHRs in many hospitals and healthcare providers has benefitted effective and efficient data processing, but the adoption and user satisfaction have received little attention. Negative beliefs, attitudes and behaviors of physicians and healthcare professionals toward EHR systems hinder the successful implementation of electronic health records and health information systems. The resistance of physicians to use and accept electronic medical records and information systems is possibly one of the major barriers that delayed the successful implementation and adoption of such systems. To address this issue, the quality of change management actually plays a vital role in the success of implementation. The important factors for making EHR support quality management are organizational settings, data quality, allocation of resources, multiple purposes, participation of medical staff, adaptation of work processes, and management engagement ^[15].

Regardless of the obvious interest and great concern in implementing and adopting electronic health records systems in both developing countries and developed countries, there is a large gap between planning for the introduction of EHRs to hospitals and the accomplishment of application of such systems and functioning them optimally to accomplish the primary benefit and purpose expected. In Gulf countries, physicians' perception of EHR adoption is greatly influenced by English language proficiency, computer expertise, and technical support provided [2] [11] [4]. The positive attitudes regarding the adoption depend upon the awareness and beliefs about the potential benefits of implementing EHRs. According to the study conducted in Saudi Arabia, most of the physicians who have awareness regarding the potential benefits of the EHR system showed positive responses and believed in the easiness of using EMRs [6].

Designing the EHR systems according to the needs of users is essential for increasing the satisfaction and adoption of the system by the users. The research conducted on Turkey and other developing countries indicates the underutilization in almost all the EMR functionalities and unnecessary design complications, making it even harder to follow the system [3]. That is why it is important for management to involve the end users, such as physicians, nurses and medical staff, to involve them in the cycle of implementing the new EHR system and designing the system according to the feedback of the end users. Unnecessary complications in design often led to a negative perception regarding the system, and participants hesitated to adopt the new computerized system.

In developing countries, human factors are not the only influencers in the unsuccessful implementation of the system, but also the organizational settings and technical support play an important part in it. Organizations can develop better future plans for implementing a system by understanding their physician's and nursing staff's training and technical needs. Almost every country have computers and networking systems, the real challenge is the maintenance and technical support required afterwards. In developing countries, the costs and technology of such advanced electronic record systems, as well as the lack of computer skills of hospital staff, lack of facilities for data processing, and lack of technical expertise, are the key issues to be addressed while implementing electronic health record systems in hospitals.

Implementing a large setup such as EHR systems requires substantial staff and other resources, this implies extensive organizational transformations ^[15]. Health organizations can help healthcare professionals adopt the system better by providing sufficient computer training and technical support. Healthcare facilities should implement the system with a simple user interface and encourage their staff to use the new system by raising awareness regarding the potential benefits of the system. Organizations should also conduct periodic assessments to assess the utilization of the EHR functionalities and make enhancements accordingly. To reduce the language barrier between the system and the users, hospitals should facilitate the staff with sufficient language proficiency training. Health organizations should also formulate laws and legislation regarding the use of EHRs and to protect the confidentiality of the patients. Every new system takes time and effort in the initial phase of implementation; the organization should provide the staff with sufficient time to understand the newly implemented system.

Conclusions And Recommendations

The majority of the studies specified the positive perception and high satisfaction rates toward the newly implemented computerized record-keeping system in Gulf Cooperation Council Countries. Physicians agreed on the beneficial impacts of using electronic health record systems to reduce errors, increase cost efficiency, improve quality care, increase interaction and communication among nurses, physicians, and medical staff and maintain a proper record of patients, especially in diseases like HIV, which requires constant medical treatment and assistance.

The review also revealed the barriers influencing the adoption of EHRs in hospitals and medical care facilities. The major barriers identified to hinder the successful implementation and adoption were human barriers, financial barriers, organizational barriers, technical barriers, and regulatory barriers. Human barriers were a lack of awareness of the benefits of using EHRs, a lack of computer knowledge, and negative perceptions about the ability to use EHR systems. Professional barriers identified were a lack of motivation to train and learn the use of EHRs, a lack of time, and a lack of healthcare professional support for EHRs. Organizational barriers include incompatible workflow with EHRs, providing insufficient training or monitoring to the hospital staff, and having no strategic plan to implement and adopt EHRs [3]. Technical barriers refer to a lack of guidelines for using EHRs, maintenance problems and insufficient technical support for software/hardware. Financial barriers comprise high initial cost implementation, lack of resources, and high maintenance and operation costs. Regulatory barriers identified were a lack of procedures/policies that run EHRs on the hospital level and a lack of laws or legislation at the national level [2]. Regardless of the obvious interest and great concern in implementing and adopting electronic health records systems in both developing countries and developed countries, there is a large gap between planning for the introduction of EHRs to hospitals and the accomplishment of application of such systems and functioning them optimally to accomplish the primary benefit and purpose expected. In Gulf countries, physicians' perception of EHR adoption is greatly influenced by English language proficiency, computer expertise, and technical support provided [2] [11] [4]. The positive attitudes regarding the adoption depend upon the

awareness and beliefs about the potential benefits of implementing EHRs.

To improve the adoption of physicians and medical staff, organizational reforms are necessary, such as understanding their physicians and nursing staff training and technical needs. Implementing a large setup such as EHRs requires substantial staff and other resources, this implies extensive organizational transformations. Health organizations can help healthcare professionals adopt the system better by providing sufficient computer training and technical support. Healthcare facilities should implement the system with a simple user interface and encourage their staff to use the new system by raising awareness regarding the potential benefits of the system. Organizations should also conduct periodic assessments to assess the utilization of the EHR functionalities and make enhancements accordingly.

The following recommendations are offered to improve user satisfaction and perception of the use of EHRs to improve the quality of healthcare services in healthcare organizations in Gulf Countries:

1. Provide additional computer training to the staff. Advance technical support to help users get used to the system.
2. Provide educational courses and training to improve English language proficiency.
3. Provide technical education courses to improve the technical support in the hospital.
4. Identify underutilization of the system functionalities by assessment surveys from the users regarding the utilization and efficiency of the system.
5. To improve the awareness among physicians and medical staff members, organize seminars and briefings on the benefits and importance of using EHRs in hospitals.
6. Organize workshops to update the knowledge of physicians, nurses and medical staff.
7. Improve the electronic health record system (EHRS) user interface by designing a friendly front end with customized functionalities to fulfill the needs of the hospital.
8. Ensure end-user involvement in the designing and development of the EHR system.
9. Use data standards to validate the data on the system
10. Use explicit instructions with each icon to help users understand the system easily
11. Research studies and surveys should be conducted to improve the user experience of the system and to analyze the needs of users to improve the system accordingly.
12. Hospital authorities should form laws and regulations to protect the security and confidentiality of patients.
13. Do appropriate organization of the hospital resources in the phases of EHRs implantation.
14. Redesign the medical workflow of the hospital according to the EHRs system.
15. Properly maintain and upgrade the computer network to avoid any sudden system failures.
16. Provide guidelines and manuals to educate the staff and end users regarding the system.
17. Provide enough time for users to understand the system fully before shifting to it.
18. To increase the system productivity, identify the factors that slow down the data entry process or other functions. Ask users to assess the system from time to time.

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