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A REVIEW OF ADOPTION OF ELECTRONIC HEALTH RECORDS IN MIDDLE EAST COUNTRIES

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ABSTRACT

This review paper means of electronic health records in addition to their advantages and disadvantages from different perspectives and viewpoints. The main aim of this paper is concluded in reviewing the adoption of electronic health records in different countries in the Middle East in order to trace out the current status of adopting this technology worldwide. Through this paper, some concentration will be done on the adoption of electronic health records at this countries and toward to building electronic health records system in Iraq.

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INTRODUCTION

With the many advances in information technology over the past 20 years, particularly in healthcare, a number of different forms of electronic health records (EHR) have been discussed, developed, and implemented. Some institutions/countries are currently planning the introduction of a nationwide electronic health record while others have actually implemented some form of EHR. However, the type and extent of electronic health records vary and what one country calls an EHR may not be the same as that developed in another country. Although work has been undertaken by institutions/countries on some form of a computerized patient healthcare information system, as yet not many hospitals have successfully introduced an electronic health record with clinical data entry at the point of care. Although interest in automating the health record is generally high in both developed and developing countries unfortunately, in some cases, the introduction of an EHR system seems overwhelming

and almost out of reach to many healthcare providers and administrators as well as medical record/ health information managers. Why is this so? The obstacles may not be available technology but technical support and the cost of changing to an electronic system coupled with insufficient healthcare funding. In many developing countries costs, available technology, lack of technical expertise and computer skills of staff, and lack of data processing facilities are in fact major issues which would need to be addressed before implementation is possible. In addition to the above, resistance by some medical practitioners and health professionals generally to a change from manual to electronic documentation may be a problem in both developed and developing countries. Most health administrators and information managers are aware that it may take time to change or at least modify health practitioner behavior and attitudes. The reason for wanting to change to an electronic system is important. Many persons involved in healthcare today expect to move from a paper to a paperless environment. This is a major step and has only been successfully achieved in a few healthcare institutions to date. Institutions should not focus on just going paperless. They should focus on encouraging departments and healthcare practitioners to move to an electronic system to:

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- Improve the accuracy and quality of data recorded in a health record
- Enhance healthcare practitioners' access to a patient's healthcare information enabling it to be shared by all for the present and continuing care of that patient
- Improve the quality of care as a result of having health information immediately available at all times for patient care
- Improve the efficiency of the health record service
- Contain healthcare costs a paperless environment will come.

Also in some instances there is a tendency to expect that with the introduction of an electronic health record many of the problems currently experienced in maintaining paper health records will be eliminated. This is not the case.

Electronic health records issue

There is too much Iraqi people die each year as a result of medical errors that could have been prevented, according to the world health organization (WHO). Beyond their cost in human lives, preventable errors also result in an estimated total cost in the hospitals and ministry of health. Medical errors are also costly in terms of loss of trust in the healthcare system by patients. One of the WHO report's main conclusions is that medical errors are commonly caused by faulty systems, processes, and conditions that lead people to make mistakes or fail to prevent them. Iraq's healthcare system is classified as primary by the world health organization, which indicates it is based upon practical, scientifically sound and socially acceptable methods and technologies made universally accessible to individuals and families in the community through their full participation in the spirit of self-reliance and self-determination (Prof, Khanapi, and Ghani, 2016). The Iraqi healthcare system is in great need of rebuilding since the invasion of 2003 and fall of the Saddam regime. Numbers from the various surveys reflect this: According to MICS, the Multiple Indicator Cluster Surveys administered by UNICEF and the Iraqi government, the number of immunized children dropped from 60.7% in 2000 to 38.5% in 2006. It bounced back to 46.5% in 2011, but this number is still considerably lower than pre-invasion rates (Mugo 2014). According to the World Health Organization, in 2011 Iraq's doctor to patient ratio was 7.8 to 10,000. This rate was exponentially lower than surrounding countries Syria, Lebanon, Jordan and Palestine. The Iraqi healthcare system is primarily central, with certain allocation of government funding going towards the sector per year (Res 2012). According to the World Health Organization, there are 1,146 primary health centers headed by mid-level workers; and 1,185 health centers, headed by medical doctors. There are 229 hospitals, including 61 teaching hospitals. Government spending on healthcare has increased in the last ten years, according to the World Bank: In 2003 spending was at 2.7% of GDP, and in 2010 it had jumped to 8.4%. However, the disbursement of these funds remains in question, as there is still a lack of facilities, medication and staff to show for it. From 1993-2003 the Saddam regime reduced public health expenditure by 90 %. This resulted in a serious deterioration within the healthcare system, with salaries of medical personnel decreasing and malnutrition and water-borne diseases becoming more and more common (Thamer Kadum

Al Hilfi Gilbert Burnham n.d.). In 2003 the American Invasion unfortunately destroyed nearly 12 percent of Iraq's hospitals and two public health laboratories. However, the US occupation and subsequent international aide spurred the operation of 240 hospitals and 1200 primary health care centers (Res, 2012).

Contribution and significance of the paper

The present study will produce a validated flexible framework for a comprehensive Iraqi electronic health records system. The framework will be presented to the Ministry of Health of Iraq for the deployment or the further development of the electronic health records system in Iraq. The data and results can assist in benchmarking current electronic health records concepts in Iraq, as well as in measuring the practicality of the existing approach.

Electronic health records in developing countries

Hospitals in developed countries continue to implement electronic health records to lower costs and to improve quality of care. In United States of America for instance, \$1.2 billion grant was unveiled to facilitate adoption of electronic health records in all hospitals by 2014 (Mugo, 2014). With the adoption of electronic health records, patient information will be electronically captured in any care delivery setting. This is aimed at increasing Health Information Exchanges (HIEs) and eventually maintaining a Nationwide Health Information Network (NHIN), which aims to provide a secure and interoperable health information infrastructure that allows stakeholders, such as physicians, hospitals, payers, state and regional HIEs, federal agencies, and other networks, to exchange health information electronically. Closely related to electronic medical records are Personal Health Records (PHR) that have emerged as a way of enabling patients control the access to their health information while empowering them make appropriate health-related decisions. Using PHRs, patients are able to maintain, update and communicate their personal health information in the way they prefer thereby taking control of their health and in general lifestyles in greater way. Large technology vendors like Microsoft and Google have already released their EHR products. The lack of knowledge about the use of technology and the Internet among doctors and patients are among the impediments to the spread of EHR among developing countries (Hillier *et al.* 2011). In spite of the rising number of internet users in developing countries, industrial countries still have more users in comparison. Furthermore, developing countries are faced with economic deficits and limited resources, which prevent them from developing a EHR project. The limited technology and internet use in developing countries make people apprehensive of adopting new technology. As a result, decision makers and possible sponsors fail to fully understand the potential benefits from the system, leading to a shortage in funding. Given the importance of decision makers in the development of EHR, information dissemination targeted to such players is essential. Thus, healthcare providers and decision makers can offer seminars and conferences on the advantages of EHR and its applications to drum up government support. Developing countries must promote EHR through campaigns and conferences for people to appreciate the services that EHR can

offer. In addition, relevant courses can be offered to educate people and the youth may be introduced early to computers and technology in order to develop proficiency. In this manner, students become more familiar with this technology and open-minded to any technology-related innovations in the future. Overall, developing countries have many problems that prevent them from deploying EHR and its applications, whereas developed countries have overcome most of these problems, allowing them to utilize telemedicine effectively.

Electronic health records in middle east countries

Mentioned above when people refer to what they have been using as an electronic health record, it may not be the same as other electronic health records developed in different institutions/countries. This may be confusing. In some cases it may be a longitudinal record widely available across a number of institutions but in others it may be a limited automated system only available within a confined community or within a specific unit or department. It is important, therefore, to know what definitions are being used and determine the type and extent of electronic health record system your institution/country wishes to implement. Over the years a number of terms have been used to describe the move from a manual or paper record to one generated electronically in one form or another. Some of the better known terms include: Automated Health Records (AHR), Electronic Medical Record (EMR), Computer-based Patient Record (CPR), and Electronic Health Record (EHR). The most used in Middle East countries is EHR and still till now is not used in all Middle East countries (Alsadan *et al.*, 2015).

Electronic health records in Saudi Arabia

Saudi Arabia is facing increasing concern about the lack of usage of EHR systems among healthcare sectors. The move toward the implementation of EHR systems has been already underway in many hospitals and organizations, such as the KFSH & RC, National Guard Health Affairs, university hospitals and health services of the army forces (Alzahafi, 2012). While EHR implementation in MOH hospitals is moving gradually, there are several information systems functioning in the district directories and in main hospitals. However, these implemented systems are not connected with each other or integrated with other healthcare sectors. Although there is no good data about the level of EHR implementation in Saudi Arabia, regarding EHR adoption among 19 MOH hospitals in the Eastern Province found the following: Only three out of 19 hospitals have implemented HER (Altuwaijri, 2008). That means the percentage of EHR use is only 15.8% in the Province. All three hospitals are using the same EHR system, partly as a result of the centralization at the MOH. Therefore, mostly the three hospitals are using the same EHR functions.

So, the main features of radiology, laboratory, and pharmacy electronic components are used by the three hospitals. In addition, the system used in the three hospitals is equipped with decision support tools and clinical documentations to generate and retain lists of common patient-related health problems, and to document patient-discharge information. However, the study pointed out that the three hospitals

underused some features presented in the EHR system, such as external access to EHRs by either physicians or patients. The MOH allocated a budget of SR 4 billion (US\$1.1 billion) to establish a four year development programme (2008-11) to develop e-health initiatives in the public health domain. Moreover, a number of conferences on health informatics have been organized by the Saudi Association for Health Information to put emphasis on the significance of health informatics in the enhancement of healthcare quality as well as to investigate the essential strategies, rules, applications and infrastructure (Alkhamis 2012).

One successful implementation of EHR in Saudi Arabia has been achieved at the National Guard Health Affairs, a leading healthcare supplier in the country. This implementation has received the Quadra Med Corporation's award of "the prestigious Excellence in EHRs" at the 2010 Arab Health Awards in Dubai. This award was given for developing an advanced EHR in their facilities. It was achieved via the use of QCPR at its King Abdul-Aziz Medical City in the capital city, Riyadh, and this application was expanded to two Eastern Region hospitals as well as their GPs centers. The King Abdul-Aziz Medical City contains 1,000 beds and is widespread grid of GPs and teaching hospitals, serving the members of National Guard and their families, as well as citizens of Saudi Arabia who require advanced care (Hasanain, Vallmuur, and Clark 2014). Another contract also has been made with Quadra Med to implement EHR at twelve outpatient clinics throughout the country. QCPR has been already implemented at primary care units affiliated with King Abdul-Aziz medical city (Alzahafi, 2012).

Electronic health records in Jordan

In the Jordan there is Hakeem project, Hakeem is an Arabic word that means doctor in English. It is an EHR that integrates different types of health information systems, including the administrative, laboratory, radiology, pharmacy, computerized physician order entry and clinical documentation systems. The Hakeem project was based on a comprehensive open-source health information system and the EHR system known as Vista, which was deployed and implemented by the US Department of Veterans Affairs. Many countries have used Vista and have customized it according to their needs. The Hakeem pilot project began in 2009 (Nassar, Othman, and Yahya 2013). Initially, it included just one hospital and one comprehensive health center.

However, after the success of the pilot project, King Abdullah Bin Hussein, King of Jordan, announced that Hakeem would be implemented in all public hospitals and health centers throughout Jordan in 2010, the objective being to improve the quality of patient care and safety. The Jordanian healthcare sector consists of 45 public hospitals and 84 comprehensive medical centers. In order to implement Hakeem in all hospitals, three phases of implementation were required. The project started with the connection of one public hospital, the Princess Hamzah Hospital, with the Amman comprehensive health center. Then a second public hospital was connected to the system, and this was followed by all of the other public hospitals and health centers in Jordan until they were all connected (Alazzam *et al.*, 2016).

Electronic health records in Turkey

Turkey's NHIS (NHIS-T) became operational on January 15, 2009 and by June 2010, 99% of the public hospitals and 71% of the private and university hospitals were connected to NHIS-T with daily feeds of their patient EHRs. Out of the 72 million citizens of Turkey, electronic healthcare records of 43 million citizens have already been created in NHIS-T. Currently, only the general practitioners can access the EHRs of their patients. In the second phase of the implementation, once the legal framework is completed, the proper patient consent mechanisms will be available through the Personal Health Record system that is under development, so that these EHRs will also become accessible to the authorized healthcare professionals in the secondary and the tertiary healthcare systems (Köse *et al.* n.d.). In order to provide interoperability of the EHRs, a standard interface such as the HL7 Clinical Document Architecture (CDA) needs to be adopted.

However, there can be many different ways of organizing the same clinical information even when the same EHR standard is used: the same content can be expressed through different components and the components can be aggregated differently. Therefore a common schema is necessary. A further complication is that the longitudinal EHR documents are created piecemeal such as "patient examination", "mouth and teeth examination" or "infant observation" (Dogac *et al.* n.d.). Therefore a common schema for each type of document is needed to enforce interoperability. On the other hand, these document schemas share many common components and the common components need to be the same in different clinical document schemas for meaningful use. In order to make sure that the common EHR components are re-used, the UN/CEFACT Core Components Technical Specification (CCTS) methodology is applied to the development of Electronic Health Records in Turkey (Yurt 2008).

Electronic health records in Israel

at al (2003) examined the reactions of doctors and nurses in Israel to the introduction of EHR, and found that senior physicians thought the records were beneficial but junior doctors had more negative reactions whereas nurses saw benefits for quality of treatment and administration. It was noted that administrative changes resulted from the records and that clinical practice could change also. A detailed study of a hospital using an EHR system successfully enabled researchers to discover the most important aspects of its benefits (Repository and Thesis n.d.). By consulting staff at all levels when introducing a new EHR system, the designers can prevent many difficulties and achieve a positive response. Video tapes were made of three physicians using EHR methods when visiting patients. The conclusion was that the physicians tended to observe their computers more than their patients and dialogue was reduced. It appeared that the computers received more attention than the patients. However patients had the benefit of printed materials to help their understanding of their conditions and treatment. The training of physicians should include suggestions of how to maintain good contact with patients, whilst using computer screens etc. to assist diagnosis (Repository and Thesis n.d.).

Conclusion

The implementation and adoption of EHR in throughout the world differ in developing and developed countries. This field is no that new field in the developed countries and their strategies of adoption is drawn from the last century. But in developing countries it appears that the topic should be researched more in future researches in order to cover all its aspects since the implementation of EHR has not distributed all over these countries. From the researcher observations, it appears that the developed countries are looking forward to change all their system to depend on the EHR as the only way of development. But in the developing countries, the main aspect was forwarded to get EHR as a supporter of paper-based health records. The implementation of EHR and its adoption have been reviewed in this paper and it appears that there are some countries from both developed and developing implement and adopt the means of EHR but they does not achieve the desired rate of distribution. In Iraq the need more work and government support to adopt electronic health records.

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