

Electronic Health Records Challenges and Barriers in Iraq

Assoc. Prof. Dr. Mohd. Khanapi Abd. Ghani¹ Assist Lecturer Ali Fahem Neamah²

¹ Department of software engineering, faculty of information and communications technology, UTeM, Malaysia

² Department of computer science, computer science and mathematics college, Wasit University, Wasit, Iraq

Abstract

Developing countries are slow adopters of new technologies, particularly with regards to the health services of these countries. This study explores the challenges to applied EHRs system in Iraq hospital. The Technology Acceptance and Barriers of this technology in the Iraqi medical section this study is probably the one of the few studies of its kind in Iraq; there have been some limited studies of EHR early trials in some developing countries assessing the challenges of implementation. This study briefly mentions barriers EHR projects to applied in Iraq. Some challenges that would impede the implementation of EHR in an Iraqi hospital are the initial huge startup costs, poor computer skills of healthcare professionals, poor maintenance culture, and people embedding political meaning(s) into the system. The weak state of information infrastructure at the hospital would be another challenge in an EHR implementation. EHR could potentially reduce waiting times for patients, reduce the cost of the hospital's operations, improve interdepartmental communication and collaboration, provide opportunity for sharing best practices among physicians within Iraqi hospitals, and enhance better resource allocation. The data an EHR could primarily capture would be patients' demographics, care plans, laboratory results, billing and claims information.

Keyword: EHR, WHO, ICT, IT

Introduction

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. In response to the WHO shocking report, this study embarked on information and communication technology (ICT) to improve outcomes, reduce medication errors, increase healthcare efficiency, and eliminate unnecessary costs. Information technology (IT) in healthcare has expanded in the health sector in Iraq. However, despite their knowledge, the important of health the health sector in Iraq is ignored. One probable reason for this problem is that the key users, including physicians and nurses, are not using the technology to its greatest potential or, in too many cases, have not begun to use the technology at all. There are several definitions for electronic-health (e-health), however in this paper use the Eysenbach's definition:

"E-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies (Carter, 2008). In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology" As healthcare is getting more and more complex with more healthcare givers involved in patients' health, paper-based patients' charts cannot keep clinicians completely informed. Paper records can only be in one place at a time, and thus cannot be shared between 2 or more health specialists at different locations simultaneously, which has a negative impact on optimization of information management in healthcare and as a consequence reduce productivity and quality of care provided. Therefore, records must be available in an electronic format so that health specialists can easily access and review patient's history, including allergies, medication, investigation, and laboratory tests performed. Consequently, healthcare organizations have started seeking e-health solutions that can automate and integrate business processes, enable information sharing across the organization and between different organizations, enhance services to patients, and ensure security and privacy of patient information. Nevertheless, e-health is of an importance for the following reasons: most hospitals and medical centers still record patient information on paper; the amount of health information is increasing; most of the existing information systems are of administrative nature rather than patient-care focus; most healthcare systems have historically organized the delivery of healthcare around institutions and not around patients, it is believed that e-health will enhance quality and patient safety.

1- Iraq country profile

The Iraq means different things to different people. It is land of prophets; it is the ultimate Holy Land, land of first civilization. For a large number of investment and biggest companies from Asia, Europe,

and the United States (US), it is a land of opportunities. On 6 Jan 1920 is foundation of Iraq. Large reserves of oil were discovered soon after, and within a span of 6 years, commercial production of oil began. The first step in the oil was by British Oil Company Today, Iraq is the biggest market and trade in the Middle East.

In all these years, the Iraq has displayed remarkable economic stability. The population of Iraq is 32,000,000 and the area is 438,000 km square ("Marine Corps Institute Iraq : an Introduction To the," n.d.).

2- Health care in Iraq

During the 1970s and 1980s, Iraqi health care and medical education were said to be the best in the region. The country boasted free health care in 172 hospitals and 1200 primary health-care clinics.

Iraqi medical graduates would often receive specialty training and certification in the UK and Germany. From the late 1980s until 2004, most medical graduates were barred from leaving Iraq.

In the duration of war, funds were diverted from the health sector.

The 1980–88 Iran–Iraq War killed perhaps half a million people on both sides, and further diverted resources and medical staff from civilian facilities, in 1991, Iraq invaded Kuwait, triggering the first Gulf War. The sanctions that followed had a major off etc. on Iraq's health system and the health status of Iraqis.

The subsequent oil-for-food program mitigated some of the off etc. of sanctions, but serious damage had been done to the health system. At the time of the 2003 US-led invasion of Iraq, the health system was weak, with non-functioning equipment, inadequate drug supplies, and fragile infrastructure.

The destruction and looting of health, after that the government has spent billions of dinars about health care but the corruption and bad management lead to spent all these billions without any benefit(Al Hilfi, T.K et al. 2013, n.d.).

Adoption of Electronic Health Records (EHR) In Different Countries

In the following sections, the adoption of electronic health records is described in certain leading countries of the world such as United Kingdom, European Union countries, United States and Australia.

1- United Kingdom (UK)

The NHS set a target in 1998 to have EHR implemented in all its trusts by the year 2005, in 2002 only 3% of the trusts were found to achieve the target. Budget constraints and lack of required IT standards were the main reasons for this low rate. In response to this the government allocated £2.3bn for a new national program for information technology (NPfIT). It is considered the biggest IT program in the history of the NHS due to its complexity and size. Its purpose was to develop centrally mandated electronic care records for patients so that nearly 30,000 staff can be connected to 300 hospitals and have secure and audited access to patients' records(Al-Aswad, et al.2013).

However, the NPfIT, like other large-scale programs around the world; has faced some problems in its implementation. The targets of the original performance are consistently missing in the NPfIT. The strategy to move towards an electronic medical record has not yet reached the expected levels of uptake as a dramatic variation can be seen in the progress of the program in the different regions, for instance more progress was seen in London whereas there is little progress in other areas e.g. in the North, Midlands and East, just four out of ninety-seven systems have been installed. Based on the poor return of investing £2.7 billion so far on the program, the NAO does not expect that the remaining planned funding of the £4.3 billion will make any difference in the NPfIT. The NAO concluded that the Program is failing to represent value for money(Al-Aswad, et al. 2013).

The Office of Government Commerce (OGC) Gateway process examines a wide range of projects and programs to provide assurances that they can make successful progress. It uses independent experts from outside the program to examine the progress and likelihood of successful delivery of the program or project. The review provides a valuable perspective on the issues being faced. The Health Gateway Process provides the NHS, DH and its Arm's-Length Bodies (ALBs) with free and confidential support using well established peer review and principles. The Gateway Reviews produced for the NPfIT gave a red code which is the worst status. Nine of the 31 reviews published by the OGC gave the project a red status and called for immediate action to achieve success. Nineteen out of the 31 reviews gave the NPfIT an amber status, which means that the project should proceed whilst taking the OGC recommendations seriously. Only two of the 31 reviews gave the NPfIT the green status, based on their concern about the infrastructure developed for the program.

The NAO attributed the problems to many factors such as: unrealistic ambition, the complex nature of the NHS and problems with technology.

Although the NAO has not suggested scrapping the entire scheme, the BBC has mentioned that there are some critics that call for such action. For example, on May 18, 2011, Tory MP Richard Bacon, a member of the House of Commons' Public Accounts Committee said: "This turkey will never fly and it is time the

Department of Health faced reality and channeled the remaining funds into something useful that will actually benefit patients". Despite critics, the Department of Health advocates the project's potential capability to deliver value for money(Al-Aswad, et al. 2013).

2- The European union

Two major electronic health initiatives to develop cross-border EHR have been launched by the European Commission. The aim is to support seamless care to Europeans during their time spent living or travelling abroad. This large-scale project is called Smart Open Services (SOS) and involves 12 member states. The SOS is a step in the direction of pan- European emergency health records that will connect pharmacy systems at the national level. The project will support free health care to citizens in any EU member state. Citizens will be allowed to access their health information stored in the EHR anywhere and at any time. The project will also enable health care providers to access clinical information of patients from other EU member states(Ingenico Corporate Communication, 2012).

According to the European Commission the SOS will ensure compatibility of electronic medical information without the need to develop a common system throughout the EU. The electronic records will be voluntary and will respect the privacy of the citizen. It will be created only upon request from the interested citizen. Although there is no agreement about the contents of the electronic health record, it is expected to include important information such as allergies, medications and blood group(Ingenico Corporate Communication, 2012).

In 2004, the Community e-Health Action Plan identified interoperability of electronic health records as one of the top priorities for Member States in the roadmap to the Action Plan. As a follow-up to the Community e-Health Action Plan, the European Commission drafted in 2008, the recommendation on cross-border interoperability of electronic health record systems. The recommendation aims to enable the free flow of patients as well as e-Health products and services. One of the major obstacles hindering the achievement of the economic and social benefits of e-Health is the lack of interoperability of electronic health record systems across the states. The lack of interoperability has aggravated the existing fragmentation in e-Health. Using incompatible information and communication systems by member states impedes the access to health information that is necessary for providing high quality and safe health care across Europe.

The European Commission (2008) recommended to member states a set of guidelines for the deployment of interoperable electronic health record systems that facilitate cross- border exchange of patient health information. Developing such electronic health record systems should provide healthcare providers with a secure and timely access to the vital health information while protecting the patients' rights to confidentiality and privacy. The Recommendation facilitates e-Prescription solutions through a set of guidelines for interoperability of emergency data, patient summaries, and medication records.

The purpose of the guidelines is to make sure that electronic health records systems in the EU member states can interoperate (communicate to each other) to allow rapid access to vital patient information by health care providers across the EU. The objectives addressed by these guidelines include: establishing features of EHRs that allow exchange of vital patient information between systems; enabling share of health data; building network systems that cover all areas of health care, while meeting operational, legal and training requirements. The Commission aims to achieve and maintain cross-border interoperability of electronic health record systems by the end of the year 2015. According to the Commission, to achieve this, member states are urged to undertake action at five levels: 1) the overall political leaders should make the necessary regulatory and financial environment to make e-Health infrastructure and services interoperable; 2) to create a common domain and interface that enable the national domains to interact; 3) to promote the use of technical standards and develop common interoperability platforms; 4) to agree on common priorities and specific applications; and 5) to improve education and awareness for monitoring and considering all intended and related developments(Ingenico Corporate Communication, 2012) .

3- United States (US)

In an attempt to create an electronic medical record for most Americans by 2014, the US government established the Office of the National Coordinator for Health Information Technology in 2004 to promote and coordinate health information technology. Four goals were identified to guide the adoption of IT in the public and private health care sectors; 1) the adoption of electronic health records; 2) the establishment of a secure national health information network; 3) the use of personal medical records by individual patients; and 4) the use of research, dissemination of evidence, and quality measurement to improve the public health.

Only 1.5% of the American hospitals had implemented comprehensive electronic health records and that 7.6% had basic EHR. An expert panel set criteria for each of the "comprehensive" and "basic" EHR for the purpose of the study. The criteria for the "comprehensive" EHR included 24 functionalities while it included only ten for the "basic". Examples of the functionalities were; physician notes, laboratory reports and medications. Although, progress seems to be slow, the results are considered significant in the light of the 19 billion dollars allocated by Congress for the adoption of EHR and other health information technology. The

major barriers to the implementation of electronic health records among US hospitals that did not have EHR included: financial limitations (73%), maintenance costs (44%), cultural barriers (36%), uncertainty about return on investment (32%) and lack of IT training (30%). The study shows that physician resistance and inadequate capital are the major barriers for hospitals seeking to implement HER(Heisey-grove, et al. 2014).

4- Australia

The National Electronic Health Records Taskforce proposed in 2000 the 'Health Connect'. It is an IT system funded by the Australian government to allow collection, storage and sharing of health information. The availability of complete and updated electronic health information that can be easily shared by care providers and patients would help decision making and seamless care. The Health Connect objectives are to improve the effectiveness and efficiency of health care through electronic information that will be collected at the point of care and can be accessed online and shared as needed.

The government has established trial sites around the country to test the effectiveness of Health Connect and learn from these trials. The Federal Enterprise Architecture Framework set policies and standards for the electronic health record that include security, privacy, access control, data control, application and technology . In July 2010, the Computer Sciences Corporation (CSC) conducted an independent study on Australians' views of electronic health records. The research found that consumers see an individual electronic health record as a basic Australian right and they are waiting for the government to deliver it. The research also showed that Australians want to have personal control over their health records and they like to know about its contents and who has access to it. Australia has a plan for a national Personally Controlled Electronic Health Record (PCEHR) system for all Australians. The Government will invest \$466.7 million over two years for the (PCEHR) system and the registration online, from 2012-13. A draft Concept of Operations document is released to stimulate informed discussion with stakeholders regarding characteristics, design, build and implementation of the PCEHR(World Health Organization, 2006).

5- Kingdom of Saudi Arabia

Saudi Arabia is one of the rapidly developing countries in the Middle Eastern region. Its total area is 2.15 million Km² with a population of approximately 25 million. In Saudi Arabia, 60% of the health care services are provided by the Ministry of Health (MoH) whereas the remaining is provided by other government bodies such as the Ministry of Defense and Aviation, Ministry of Interior, National Guard, University Hospitals and rapidly growing private sector. Most medical record systems in the country are still paper-based and those centers, which have started using electronic medical records, have variations in terms of software and capabilities. Most importantly, most of the electronic medical services are not inter- connected. This situation resulted in fragmented patient information, duplication of work, incomplete data entry and negative effects on the quality, safety and cost of health care(Altuwaijri, 2008).

In recent decades, Saudi Arabia has made significant progress in the health sector with several hospitals receiving national and international accreditation, but EHR has not experienced equal progress. Since 2002, Saudi Arabia has shown great interest in adopting EHR to improve the quality of health care, enhance patient safety and reduce the cost of health care services.

In 2004, the King Saud Bin Abdul Aziz University for Health Sciences (KSAU-HS) was created to support ICT in the health care sector. The year 2005 witnessed the establishment of the Saudi Association for Health Informatics (SAHI) to promote health informatics training and education and to support the implementation of the system throughout Saudi Arabia. Similarly, the Central Board for Accreditation of Healthcare Institutions (CBAHI) is a national accrediting body, established in 2007, to promote the quality of health services and increase the degree of safety through accreditation. CBAHI has developed standards for medical records and information management both manual and electronic. Despite these efforts, diffusion of IT applications in Saudi Arabia is still problematic because it is often associated with problems that are not only technical, but that are also cultural, political, economic, educational and social. Taking all situations under consideration, the Saudi MoH initiated a project to automate 30 hospitals in different regions of the country including a unified electronic medical record in 2008. It was found that this project would save 10-15 % of its annual health budget upon the adoption of the EHR system. The project is meant to pave the way for a unified EHR at the national level. Similarly, in 2010 the Saudi Ministry of Health launched its five-year e-Health Strategy for 2011-15 for the Kingdom of Saudi Arabia. The strategy consists of three phases: analysis and vision, strategy design and strategic roadmap. The aim of the first phase is to understand the gap between the current and expected state of the e-Health/ICT. The second phase will include the design of the strategic plan for e-Health/ICT. The final phase is to develop a five-year roadmap for the implementation based on findings from the first two phases(Almuayqil, et al.2015).

Since MoH has taken initiatives to enhance EHR adoption in healthcare settings in 2008 and 2010, no study has explored the level of EHR adoption at the national level. However, Bah and others evaluated the situation of EHR adoption in the Eastern province of the country and collected the information from 19 out of 244 MoH hospitals. Only three of the hospitals have adopted EHR partially and the level and extent of EHR

usage is undetermined despite the commitment of funding from the government(Al-Aswad, et al. 2013).

EHR barriers and governing barriers in Iraq

a- barriers

there are some barriers to e-health diffusion The adoption and implementation of a complex IT solution is influenced by the organization's ability to lower or remove the various knowledge barriers. Knowledge barriers associated with the adoption of larger-scale IT solutions, such as e-health, Can be categorized into:

1- Financial challenges

From a personal interview with the Director of Public Health in Wasit province the cost of the implementation of an EHR estimated it to be \$77,000 per bed in Iraq, making the cost of implementing EHR in all hospitals and medical centers throughout Iraq very expensive. The fact that the EHR project required such a large budget was a major problem for the Iraqi Ministry of Health (MOH). Costs were associated with:

a- implementation (most public hospitals and medical centers in Iraq do not have the infrastructure required for implementation, including hardware, software, and information technology (IT) specialists)

b- Maintenance and support

c- Training of stakeholders to use EHR.

2- Technological challenges

Hospitals in Iraq generally lack technological infra- structure, and most public hospitals do not even have an IT department. The high rate of change in the technological field compounds this problem. It is also difficult to support and maintain databases because of the huge volumes of data, and there are also many other ongoing problems with the system (e.g. power failures, systems crashing, data being lost).

3- Policy and legislative challenges

In most countries, policies exist to protect patient privacy and it is important that these policies be well protected and strictly adhered to. However, in Iraq, policies or regulations for privacy of patient information are not clear or not exist. In addition, there are other types of threat and attack on privacy of information in the cyber world, such as from hackers and viruses.

4- Stakeholder challenges

A number of challenges for stakeholders have been observed, which might explain why some stakeholders resist or reject change. Some stakeholders may not perceive any direct benefits for themselves from the project and believe that the only beneficiaries of change will be the patients. Administrative staff may fear that EHR systems will replace them in future and become concerned about job security. Some view themselves as 'experts' and resist being labelled as novices or learners, even when a new system is being introduced. Fear of failure can also create resistance to change, which may have inhibited leadership in the healthcare sectors because they wanted to be successful all of the time. Age can also be a factor. A number of older staff, particularly specialist doctors, simply cannot use tech- neology. Some staff may not have had sufficient experience with technology, and many may have used traditional paper-based methods for so long that they view using computers as too complex. There are also workload issues: doctors, nurses, and pharmacists have heavy workloads and experience a high degree of pressure in their jobs. Which places a heavy burden of work on these health professionals. Introducing a new system such as EHR adds to their workload and reduces their productivity, because they have to enter the information and diagnosis of all patients into the system(Nassar, et al. 2013).

5- Organizational barriers

This category is concerned with the difficulties of deploying a new technology into existing practices and processes. This includes privacy concerns and the lack of consistent national information standards and code sets

6- Failure of adoption Health Information Services

There are critical issues associated with planning and adopting, and its implementation in Iraq; some of these are caused by the poor technical support and over running of time and budge and Administrative corruption rampant in government departments

7- Human barrier

This problem has been considered as the major reason for failing to adopt health information systems in Iraq. Human barriers include negative beliefs of healthcare professionals towards technologies and lack of trust by medical staff towards computer based medical solutions. Therefore, many medical staff resists the change from traditional to computer

8- Cultural barriers

Cultural factors contribute to the failure in adopting e-health because of limited human interaction.

9- Wars, terrorist attacks

Influenced the ongoing wars that income and Iraq since the war began in 1971 against Israel and then in 1975-1979 against the Kurds in the north, and from 1980 to 1988 against Iran and then the first Gulf War in 1990, followed by the destruction of the economic blockade, which lasted 12 years and during this period, fought the Iraq war in 1998 against the United States of America, in 2003, the second Gulf war which ended with the occupation of Iraq, then subjected Iraq terrorist operations continued, and on a daily basis and so far, thereby directly affecting the infrastructure in Iraq.

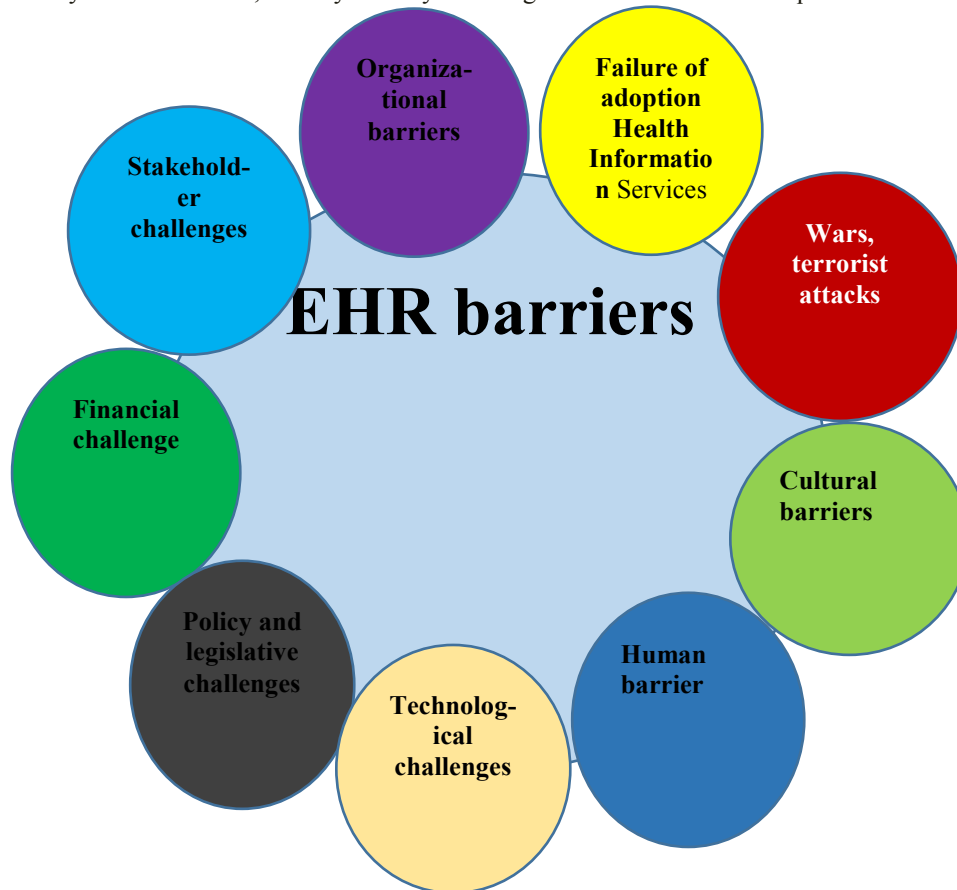


Figure1: EHR barriers

b- governing barriers

Through a full study of the problems and challenges facing the implementation of the project EHR in Iraq, we find a number of solutions that could help solve a number of problems.

- 1- Governments should consider the implementation of projects such as EHR as both lengthy and costly, but with great benefits to all stakeholders in the long term.
- 2- The Iraqi Government should give full support, especially financial support, to strategic initiatives that will encourage and assist stakeholders to embrace change
- 3- The vision, mission, goals, and benefits of the EHR project should be made known and be well understood by all stakeholders.
- 4- EHR should implement a clear and understandable work policy.
- 5- Stakeholders should be involved in all phases of EHR development, including the design of the system and IT decisions.
- 6- The workload for doctors, nurses, pharmacists, and others who work with patients should be reduced to allow time for these healthcare professionals to become familiar with the system and use it effectively. Time spent with patients should be increased to allow time to insert patient data into the system. Workload calculations should be averaged so doctors do not feel that they are overworking. This can be achieved by hiring an optimal number of staff to suit the number of patients.
- 7- Healthcare staff should understand that EHR has not been developed to replace jobs.
- 8- Financial and moral rewards, such as certificates, should be used to enhance productivity and encourage staff to use the new system.
- 9- Laws related to privacy and confidential information should be well publicized and enforced so that the general population is aware of them. In Iraq,

- 10- EHR must be easy to use, easy to learn, and have the capacity to accommodate changes in technology and processes.
- 11- The most secure tools and algorithms to safeguard and protect data should be applied, such as encryption, watermarking and applying accountability
- 12- A mitigation plan should be established for emergency situations to ensure that EHR continues to work.
- 13- To facilitate EHR services, it is better to establish an in-house training department, to simplify staff training process. Most researchers have found that training is the best solution to decrease the healthcare staff resistance toward changes.
- 14- Using data warehouse and data mining techniques to deal with huge volume of data. Cloud computing could also be used to store data.
- 15- Provide appropriate work environment and through the provision of adequate security environment and provide full protection for workers in the project
- 16- The provision of adequate infrastructure in addition to providing support and information technology department by providing all the supplies and the project's needs
- 17- Set up intensive courses for all staff IT department for the ability to work on the project of maintenance and training for the rest of the workers in the health sector of the doctors and nurses and staff.

Conclusion

As a result the health section in Iraq needs continued attention to and support from the government, Iraqi health services have never developed over recent years in all levels of health services: primary, secondary and tertiary. As a consequence, the health of the Iraqi population has retreat markedly. , health services, and in particular public sector health services, are still facing many challenges. These include: human resource development; separation of the MOH's multiple roles (financing, provision, control and supervision of health care delivery); diversifying financial sources; implementing the cooperative health insurance, privatization of public hospitals, effective management of chronic diseases; development of practical policies for national crises; establishment of an efficient national health information system and the introduction of e-health , and the important section of health service is EHR in Iraq is ignored. In order to address these challenges and continue to improve the status of the Iraqi health care system, the MOH and other related sectors should coordinate their efforts to implement and ensure the success of the new health care strategy include HER.

Reference

- Al-Aswad, A., Brownsell, S., PALMER, R. & NICHOLSON, J.P. (2013). A Review Paper of the Current Status of Electronic Health Records Adoption Worldwide: The Gap between Developed and Developing Countries. *Journal of Health Informatics in Developing Countries* 7: 153–164.
- Almuayqil, S., Atkins, A. S., & Sharp, B. (2015). Knowledge Management Framework for E-Healthcare in Saudi Arabia. *eTELEMED 2015 : The Seventh International Conference on eHealth, Telemedicine, and Social Medicine*, (c), 112–117, ISBN 978–1–61208–384–1. (Best Paper Award).
- Altuwaijri, M. M. (2008). Electronic-health in Saudi Arabia. Just around the corner? *Saudi Medical Journal* 2: 171–178.
- Carter, J. H. (2008). What Is the Electronic Health Record? By Jerome H. Carter *Electronic Medical Records: A Guide for Clinicians and Administrators*, 3–20.
- Heisey-grove, D., Danehy, L., Consolazio, M., Lynch, K., & Mostashari, F. (2014). A National Study of Challenges to Electronic Health. *Medical Care* 2: 144–148.
- Ingenico Corporate Communication. (2012). e-Health in Europe. White paper.
- Marine Corps Institute Iraq : an Introduction To the. (n.d.).
- Nassar, D. A., Othman, M., & Yahya, H. (2013). Implementation of an EHR system (Hakeem) in Jordan : challenges and recommendations for governance, 3(3).
- Al Hilfi, T.K., Lafta, R ., Burnham, G. (2013). Health services in Iraq. *The Lancet* 381: 939–948.
- World Health Organization. (2006). Electronic Health Recors: Manual for Developing countries, 76.