Electronic Health Record (EHR) System a Future View towards Applying in Libyan Medical Institution

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Abstract
In the 21st Century to deliver safe, effective, high quality and affordable healthcare system, healthcare leaders in governments and medical institutions should now begin to realize the next step of technology that focus increasingly on efficiency, patient safety and reducing medical errors. Leaders of most developed countries consider electronic health record (EHR) and health information systems (HIS) to be among the most important applications that health and medical organizations will need because they have a significant impact on reducing medical errors and removing delays due to paper record handoffs and missing information. The objective is to enable delivery of the right care, in the right setting, at the right cost. EHR means different things to patients, health professionals and health care providers in countries that applied this type of healthcare programs. In developing countries it’s long way to simulate this programs in their health care systems and medical institutions, this applying difficulties do not prevent us to improve our special and future view towards this type of advanced healthcare systems using others experimental, experiences and try to reflect it in our present health care infrastructure system. Government should establish a nationwide EHR system which will become a primary objective for many countries and medical care institutions around the world, in order to improve the quality of healthcare while at the same time decreasing its cost. Strategic adoption of an interoperable health information infrastructure is needed to transform health care from today’s largely paper-based system to an electronic interconnected health care system. Development and implementation of a health information infrastructure lead to understanding the importance that EHRs has, with its various structural types, grades, series of standards and quality control methods. EHR system has evolved along medical data’s change of structure and allows the health records to be easily integrated, shared and exchanged between health institutions. In this paper we try to give a future view towards implementing this type of programs in Libyan medical institutions through answering few simple questions:

1. What is the current state of information infrastructure in Libyan medical institutions and hospitals?
2. How can EHR improve present data collection and management and what data will the EHR capture?
3. What are some of the barriers and challenges that face changing in Libyan medical institutions and hospitals?

This type of system would require a computer program that captures data at the time and place where healthcare is provided, whether at a hospital or primary care level over an extended period of time. This paper explores the conditions for successful implementation of EHRs in a Libyan General Hospitals and medical institutions. The core focus of the paper was studying the workflows in specific and specific departments. Data collection and management presents a serious challenge in those departments. Interviews and questionnaire methods used in this
research to examine (doctors, nurses) attitudes toward EHR system implementation in an academic based healthcare system. Using questionnaire instrument to identify theoretical and technological acceptance model that was tested to determine which factors contribute to (doctors, nurses) acceptance of an EHR implementation.

Keywords
Electronic health record, Health information system, medical institution, future view, Libya

Introduction
Tight cooperation and communication between medical institutions involved in a patient’s treatment process improved quality and efficiency of care that based on legal and organizational framework. Appropriate technical infrastructure is required to facilitate communication in-between in order to provide patient-centered care. Multiple institutions are involved in the treatment process, therefore EHR should provide medical data in an appropriate representation after successful authorization. Although EHR have become subject of intensive researches over the past few years in many countries around the world, it is still unclear which Health Information System architecture is the most appropriate.

In general, analysis system requirements for implementing EHR is one of the important issues because it enable the health care institutions to find out the points of concern in order to develop their HIS that based on the identified requirements including the comparison of existing architectures at this point they can Implement this program according to the developed infrastructure.

Costs, lack of technical expertise, computer skills of medical staff, data processing facilities and the weak state of information infrastructure at the medical institutions are in fact major challenge issues which would need to be addressed before implementation is possible. Many developed countries advances their information technology over the past 20 years, particularly in healthcare field, a number of different forms of electronic health records EHR have been discussed, developed, and implemented, many professionals & providers involved in healthcare today expect to move from a paper to a paperless environment, this is a major step has been only successfully achieved in a many healthcare institutions around the world to date, were medical Institutions should not focus on just going paperless, they should focus on encouraging departments and healthcare practitioners to move to an electronic system.

So the proposed EHR will cover all individual personal health data electronic by healthcare providers at the point of care over a person’s lifetime.

A complete EHR system must include demographic data, notes on the health state of the patient, illness, medication, vital signs, history of the disease as well as family history, laboratory data, immunization, and image data a high quality EHR system must be perfectly adapted to the context and it consists of several information organizing levels. The implementation details are very lot according to the level of medical assistance (primary assistance, ambulatory assistance, emergency, hospital etc), to the standards that are respected, to the infrastructure that is based on, according to the explanation of the information for health strategy.

Nowadays, the efforts are focused on gradual passing from functional interoperability (ISO level6) towards semantically interoperability health level 7 (HL7). The easy access and sort out of medical data must be completed
by incorporating efficient security mechanisms in the EHR systems, meant to ensure integrity and confidentiality of
the stored data.
This paper explores the conditions for successful implementation of EHR system among sample of doctors and
nurses how worked already in Libyan medical institution and they know clearly the difficulties that face them in
their daily work. The core focus was the study of workflows in specific departments from Jun 9th to July 2nd 2012.
Data collection and management presents a serious challenge in these departments. The bulk of records are still
paper based, with just a fraction inputted in computers for statistical outputs for onward transmission to regional and
national health directorates.

**Paper objectives**
The complexity of the problems makes it impossible to provide an overall solution for all of the analyzed problems.
So, trying to solve all the mentioned problems reaches far beyond the scope of this paper, the majority of the
currently existing problems is likely to be solved step–by–step within the next coming years. Especially the finding
of formal unified medical data infrastructure to start implementing EHR in medical institutions is expected to remain
partly unsolved for an even longer period.
So our research objectives is to:-
1. Is program will provide (doctors, nurses) quick access to patient medical data.
2. Is program will ensure us Provide us that patient medical data is collect and managed comprehensively,
   accurately and timely by (doctors, nurses).
3. This program will prevent duplication of patient record, keep patient data privacy and security and make it easy
   to authorize people to manage this data (edit, save, delete…ect ).
4. This program will represent a small and future data base store for a national data base storage system.
5. This research will examine (doctors, nurses) attitude towards EHRs.

**Electronic Health Record (EHR)**
the National Alliance for Health Information Technology (NAHIT)
” an electronic record of health-related information on an individual that conforms to nationally recognized
interoperability standards and that can be created, managed, and consulted by authorized clinicians and staff across
more than one health care organization. Although EHR sometimes is used interchangeably with electronic medical
record (EMR), EHR is now the preferred term because its definition includes the ability to exchange information
interoperable while EMR does not necessarily imply that ability”.

**Why EHR ?**
EHR improve care by enabling functions that paper records cannot deliver:
1. EHR can make a patient’s health information available when and where it is needed – it is not locked away in
   one office or another.
2. EHR can bring a patient’s total health information together in one place, and always be current clinicians need
   not worry about not knowing the drugs or treatments prescribed by another provider, so care is better
   coordinated.
3. EHR can support better follow-up information for patients for example, after a clinical visit or hospital stay, instructions and information for the patient can be effortlessly provided; and reminders for other follow-up care can be sent easily or even automatically to the patient.

4. EHR can improve patient and provider convenience patients can have their prescriptions ordered and ready even before they leave the provider’s office, and insurance claims can be filed immediately from the provider’s office.

5. EHR can link information with patient computers to point to additional resources patients can be more informed and involved as EHRs are used to help identify additional web resources.

6. EHR don’t just “contain” or transmit information, they also compute with it for example, a qualified EHR will not merely contain a record of a patient’s medications or allergies, it will also automatically check for problems whenever a new medication is prescribed and alert the clinician to potential conflicts.

7. EHR can improve safety through their capacity to bring all of a patient’s information together and automatically identify potential safety issues providing “decision support” capability to assist clinicians.

8. EHR can deliver more information in more directions, while reducing “paperwork” time for providers – for example, EHRs can be programmed for easy or automatic delivery of information that needs to be shared with public health agencies or quality measurement, saving clinician time.

9. EHR can improve privacy and security with proper training and effective policies, electronic records can be more secure than paper.

10. EHR can reduce costs through reduced paperwork, improved safety, reduced duplication of testing, and most of all improved health through the delivery of more effective health care.

**Current Libyan Medical System Infrastructure**

Libya has a small population in a large land area. The total estimated population at midyear of 2006 was 5,323,991. With a geographic area of 1,775,500 square kilometers, it makes one of the lowest population density rates in the world, at 2.9 persons per km2. About 85% of the population is urban, mostly concentrated in the two largest cities, Tripoli and Benghazi. 32% of the population is estimated to be under age 15. The public health sector is the main health services provider. Health care including preventive, curative and rehabilitation services are provided to all citizens free of charge by the public sector. Almost all levels of health services are decentralized. In Libya, there is a mixed system of public and private health care, rather than a purely state-run model. Health care is delivered through a series of primary health care units, centers, polyclinics, rehabilitation centers, general hospitals in urban and rural areas and tertiary care specialized hospitals. A national health strategy based on Primary Health Care (PHC) was adopted to attain the goal of “Health for All by the Year 2000”

**The health care delivery system operates on three levels:**

1. The first level consists of the Primary health care units (which provide curative and preventive services for 5,000 to 10,000 citizens); Primary health care centers (serve from 10,000 to 26,000 citizens); and polyclinics, staffed by specialized physicians and containing laboratories as well as radiological services and a pharmacy. These polyclinics serve approximately 50,000 to 60,000 citizens.

2. At the second level, there are General hospitals in rural and urban areas where care is provided to those referred from the first level.
3. The third level comprises of tertiary care specialized hospitals.

**Key Components of Electronic Health Records**

1. Administrative System Components
2. Laboratory System Components
3. Radiology System Components
4. Pharmacy System Components
5. Computerized Physician Order Entry
6. Clinical Documentation

**Plan methodology**

Patient care increasingly requires clinical practitioners to access detailed and complete health records in order to manage the safe and effective delivery of complex and knowledge-intensive health care, and to share this information within and between care teams. Patients nowadays also require access to their own health record to an extent that permits them to play an active role in their health management. These requirements are becoming more urgent as the focus of health care delivery shifts progressively from specialist centers to community settings and to the patient's personal environment. In this paper we will try to transform the old model of patient health record documentation into electric one as we made a huge effort to look after the countries around the world how implemented this type of electronic health system and try to reflect this experience in our real health system in Libyan medical institution First we need to learn more about the applied health care system as well as the Electronic Health Records (EHR) and are health care provider ready to use this? If so, how? Which information is included in the records? Which information is always included which only sometimes? after having inventory the EHR and its progress, we will constructed a structured interview tool with the aid of the inventory, The interviews’ purpose was to find out what information they need, when they need it, the relative importance of the information and which information might be clustered, their thoughts about what they need from a user interface and perhaps what complaints they have on. Information was collected from the clinicians and nurses after organizing, and implement some of their reactions, we design program using a suitable program language implement it in a medical institution as a small health care interactive living example ,we follow up the results achieved, have our notes, mark it in the paper, then apply a small questionnaire as a survey instrument to measure and to identify theoretical and Technological Acceptance Model that was tested to determine which factors contribute to doctors and nurses acceptance of an electronic health record (EHR) application use statistic way to know if clinic staff could deal with EHR successfully. We met our goal to integrate external and internal factors in the EHR so results could be used for future advanced medical model .So After months of work experience, interviews with a lot of medical staff
(doctors and nurses) and make them applied our international program the results continue to be entered, viewed, and used. While we identified some transcription errors and problems with specific analyses, this project demonstrated the feasibility and benefit of electronic data entry. Over time, according to the above work and explanation on (EHR), we found this result from applying the acceptances survey instrument upon our experimental sample that include:

1- doctors (10) divided to (5) doctors applied this program and (5) don’t applied
2- nurses (20) divided to (10) nurse applied this program and (10) don’t applied and the result was

The applied group

**doctors**

1. 70% of doctors found it’s not comfortable and very difficult to apply this program in their clinical work at the hospitals and clinics for many reasons.
2. 25% of doctors accept to apply this program but they need more training and more time to use it.
3. 5% of doctors refused totally this program.

**Nurses**

1. 75% refused to apply this program on their duties as they need to improve their English language and computer skills.
2. 25% accept to apply this program but they need more time and training.

The group that not applied

**doctors**

1. 52% of doctors like to apply this new type of programs as a modern technology.
2. 33% of doctors hesitate to apply this program but they need to learn and have more training and more time to use it.
3. 15% of doctors they don’t care.

**Nurses**

1. 90% don’t like to use this program.
2. 10% accept to apply this program but they need more time and training.

We met our goal to integrate external and internal factors in the EHR so results could be used for future advanced medical model. So after months of work experience, interviews with a lot of medical staff (doctors and nurses) and make them applied our international program the results continue to be entered, viewed, and used. While we identified some transcription errors and problems with specific analyses, this project demonstrated the feasibility and benefit of electronic data entry.

**Conclusions**

The objective of this paper was to determine the individual characteristics and socio technical factors that may contribute to medical staff acceptance of an electronic health record (EHR) system. To summarize the overall findings, the paper is also constrained by the use of an anonymous survey for data collection. While surveys are useful in collecting quantitative data, they do not provide opportunities for deeper exploration and inquiry. In addition, these survey responses reflect the subjects’ self-reported perceptions of EHR technology, rather than actual system use. This paper has tested a model that conceptualizes physician acceptance attitudes. Lack of user acceptance continues to impede diffusion of EHRs, and this analysis supports the impact that leadership and other organizational changes have on user adoption. These results suggest that the integrated EHR Acceptance Model is an appropriate model for examining user acceptance of EHRs. The proposed model has been validated and provides a structure for future research with different user populations. In order to achieve nationwide interoperability and realize the benefits that EHRs can provide, physician adoption rates must be increased substantially. Results from this study highlight the need for strong physician leadership and management support in the EHR selection and implementation process. Use of sound project management techniques will be necessary to ensure successful design and implementation of EHRs.