Conceptual Model for Electronic Clinical Record Information System

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Abstract

This research paper is drawn from an ongoing, large-scale project of implementing Electronic Clinical Record (ECR). The overall aim in this study is to develop a deeper understanding of the socio-technical aspects of the complexities and challenges emerging from the implementation of the ECR, and in particular to study how to manage a gradual transition to digital record. We have proposed ECR conceptual mode. The end result of our research was a collection of ideas / surveys, and field work that clinical institutions and medical informatics must consider to ensure that patients and clinics do not lose long-term access to ECR and technology continually progress. Results of our study identified the need for more research in this particular area as no definitive solution to long-term access to electronic clinical records was revealed. Additionally, the research findings highlighted the fact that a few medical institutions may actually be concerned about long-term access to electronic records.

Keywords: ECR - Digital Record - Technology

I. Introduction

Information and Communication Technology (ICT) has improved remarkable change in the provision and management of intelligent healthcare services. An Electronic Clinical Record (ECR) is an electronic way for storing Clinical Information System (CIS). Most of the ECR duplicates the formation that is used in the Paper-based Record (PR), and it accumulates all the information that is related for the treatment and nursing of a patient. Among others, the record includes doctors' notes and nurses' notes concerning the ongoing treatment. Various studies have shown that PR can not sufficiently maintain the work of patient care in well-organized manner [1].The ECR includes both CIS: such as diagnoses, allergies, and medicines; and demographic information, such as: Personal Information (PI), for non-clinical use. It includes information that is used in various areas for different purposes. Doctors can instance, use the ECR for diagnostic and therapeutic decisions [2].

1.1 Visions and Challenges of Electronic Clinical Record

The idea of computerized record that contains information as recorded was introduced in the 1960's and 1970's [3], [4]. An ECR is supposed to authorize essential development to the healthcare work practice [5]. It is not our view to reveal all of them, but slightly to point out the significant ones. Substitute PR with ECRs will significantly boost the process information is collect, organize, extend, and utilize. Until now, the

several of healthcare records were printed on paper and kept in a PR folder [6]. The ECR personnel do not want to waste a long time in struggle to write down the PR in the entire clinic while it is continuously offered in the electronic format. The ECR open up innovative possibility while it permit various people to sight the same record concurrently from different computers, also to recover the most updated information.

1.2 Benefits of Electronic Clinic Record

ECR documentation has a great quality than PR, and it is a secure procedure for saving information while a backup copy is being taken day by day information regarding patient. In the end using an electronic medium keep and strengthen control system for the clinical record since one can see all the logs of the personnel, including in which records they have been looking and the reason for recover information. For the last thirty years, the enlargement and operation of computerized has been observing as a really hard task. Now, we are introducing ECR. In other words, the ECR is supposed to permit enlarged consistency and reduced redundancy of information. Healthcare provides are moving away from traditional PR to electronic versions [7]. The better use of this technology has allowed doctors, nurses, and clinical administrators to perform tasks faster and easier [8].

1.3 Problem Statement

Administration among clinicians is poor in the manual healthcare system. Patients are being admitted unnecessarily stays in the clinic, multiple tests are being ordered, and adverse drug reactions are happening because clinicians are not aware of drugs prescribed. Clinic staff and patients are receiving conflicting treatment information and advice from doctor. Since medical errors are a leading cause of death and since paper records can be easily lost, misplaced, or are often illegible, the use of electronic health record technology would eliminate many of these issues and lead to major improvements in the health and safety of patient care.

Clinical administrators are realigning business strategies to make sure they have the proper healthcare systems in place to store the amounts of patient-related data and information. Until now, there is no appropriate answer detailing the way in which clinics will assurance the availability of a patient's medical record once it is digital.

In order to reduce clinical errors, we provide more effective methods of communicating and sharing information among clinicians, and better manage patient medical records. We need to embrace Information and Communication Technology (ICT) in healthcare. We will introduce a solution, which is presently involves transformation of the information from the Paper-based Record (PR) to an Electronic Clinical Record (ECR). Particularly, electronic healthcare records would be placed in the patient's charge to manage over their lifetime information in record. The implementation of ECR is broadly considered an essential component of future healthcare delivery. ECR is seen as key to the vital inter-operability required for healthcare efficiency, effectiveness and safety; and quality needs [9], [10]. A new healthcare system model is necessary to offer proper facilities for a patient. Due to this, research focuses on addressing the healthcare issues. The new method should be user friendly, provide a higher facilities and an efficient clinical record. This research plans to study some well-know related work.

1.4 Research Objectives

The aim of this research is to propose a new model that supports the Electronic

Clinic Record (ECR) application. It will study essential related work to examine the available healthcare records outcome and drawbacks. It will propose new model to improve the clinical systems. The objective of this research is to ensure sufficient in-depth knowledge of the challenges confronting service delivery in health, especially in the healthcare sector; and a grasp of how the underlying ICT infrastructure and an ECR might be expected to assist in meeting these challenges. In this research the specific objectives are as follows:

• To know detail understanding of electronic healthcare record and do detail literature review.

• To propose a new electronic clinic record model that is able to fulfil the clinical requirements.

• To do detail survey of related clinic and apply our propose model to improve electronic healthcare record

2. Literature Review

Information and Communication Technology (ICT) has become the information resource of both selection and requirement and has thus motivated from the margin of healthcare. Quick advances in ICT with reduced costs, improved reliability and better robustness are enabling a new wave of transform in how and where healthcare can be delivered.

Many researchers consider that the electronic record will considerably modify healthcare, rather than merely replacing the Paper-based Record (PR). This alteration allows data to be used for a wide variety of purposes ranging from direct patient care, decision maintain, quality promise, scientific research, and management of healthcare facilities [11]. In their review of the medical related work, the use of electronic medical records is linked with enhanced surrogate outpatient care outcomes. [12], [13]

This research will discuss the fundamental background of the related healthcare records. This research also identifies the importance of the healthcare records through electronic way. This proposal will also study a general discussion of related research work for healthcare real-time applications. There are a number of healthcare ways introduced to meet the above requirements. In literature review describe the manual and electronic healthcare records, advantages, disadvantages, and challenges.

2.1 Electronic Health Records

The Electronic Health Record (EHR) is a longitudinal electronic record of patient health information created by one or more encounter in any care delivery conditions [14], Included in this information are patient vital signs, problems, past medical history, demographics, progress notes, medications, laboratory data, immunizations, and radiology reports. The EHR has the aptitude to form a full record of a patient encounter, as well as supporting other care-related activities directly or indirectly via interface including evidence-based decision support, quality management, and outcomes reporting [15], [16].

The drawbacks of the HER are with the complicated, focus on big hospitals and consider as a big commercial business. An EHR is actually multiple organizations within one. Many EHRs have multiple healthcare facilities, such as affiliated hospitals and, numerous specialties diagnostic and treatment centres, laboratories associated with training and research, and complex business operations to manage all of these complicated components.

2.2 Electronic Patient Records

There has been a growing attention in the area of Electronic Patient Records (EPR)

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and more and more hospitals all over the world attempt to keep their patients' records electronically. The implementation of EPR has become a main concern in the healthcare business, as it is a key issue to the healthcare quality development [17].

Today, despite the immense investment in EPR systems in hospitals, these systems are not used by the clinical staff in most hospitals. The main drawbacks of EPR are limited for hospitals.

2.3 Electronic Medical Record

The meaning of electronic medical record (EMR) is that the electronic record of health associated information on an individual that is created, collect, managed, and consulted by certified medical and staff from a single organization who are involved in the individual's health and care. By these definitions, it can be understand that EHR is more comprehensive view of patient's overall health state. An EHR document is shared across different health providers. EMR is a record regarding the only diagnosis or treatment and mainly linked with a single health office [18]. In addition, it cannot be said as full in all phase because EMR deals with information of a single patient of a clinic. In case of EHR, it controls the latest data of patient's health condition. Thus, it is more helpful in the treatment of patient.

Now, there are a number of problems occurred in the patient monitoring system in both local and foreign hospitals such as: lost of information when data are recorded automatically from the hardware patient monitoring system into the database without involvement of the physician, blur images taken by the system which gave wrong or inaccurate information to doctors in emergency cases (usually occurred in mobile

system), patients' medical records are written on papers and no backup for the records in case of information lost, and large number of patients and less number of staff in the hospital lead to difficulties in recording all the medical information properly [19].

3. Research Methodology

The views of the position of an Electronic Clinic Record (ECR) vary broadly with lots of the stakeholder groups focusing on the provider requirements for knowledge management and information sharing. Usually lost in this focal point is the viewpoint and requirements of the patient in managing their medical condition and care.

3.1 The Healthcare Value System

The healthcare policy makers will have to manage few ways in which to deliver more and more complex services to meet increasing demand and expectations for maintenance of health, treatment and care.

3.2 Proposed Model of Electronic Clinic Record

While the increase of electronic adaptation of healthcare records, a enormous level of contractions have been used to indicate and classify the diverse variations of electronic healthcare records (EHCR). As below in Figure 1 we have shown proposed Electronic Clinic Record (ECR). First patient will arrive at clinic for online registration; from track number clinic will recognize the patient. After that patient will move to assessment and proved visit information such as clinical history, program notes, discharge summaries.

Figure 1 Flow diagram of Electronic Clinic Record

After assessment patient will move ahead to consultant and then patient will get cheek up by doctor. Then doctor will provide treatment to the patient then move to online payment system. If patient wants to go for further consultation then follow up all process and visit a specialist.

3.3 Steps of Proposed Model of Electronic Clinic Record Form.

Proposed model of Electronic Clinic Record (ECR) form based on three steps such as patient information, patient reason for visit and treatment provided by clinic. First name as patient information and it takes personal information regarding patient such as patient track no as a primary key for anytime visit at clinic. This tracks no works as an identification of patient. This track no will provide all case history of patient.

Furthermore, it's based on name of patient, age, gender, status, contract information and address. Figure 2 shows patient information form as following.

Figure 2 Patient Information

Second step of proposed ECR is patient reason for visit at clinic. This information to be filled by attending physician depends on patient disease in clinic. In this list, already mention all basic diseases information, so doctor can diagnose and takes decision in a well manner. Figure 3 shows as following.

Figure 3 Patient Reasons for Visit

Third step of proposed ECR is treatment provided by clinic. It's an important part of ECR because consultation and medication prescription inside treatment provided by clinic. Also, detailed information about clinic expanses.

Figure 4 Treatment Provided to Patient by Clinic

Survey and analysis based on 9 steps such as patient id, patient demographics, physician notes, nursing assessment, medication list, discharge summaries, laboratory tests and finally on tracking pharmaceuticals.

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4. Survey and Analysis

Please respond to all questions checking only one item per question or noting your response in the text box provided.

Table 1 Survey on ECR

S.N0	Clinic Documentation	Implemented in all units	Implemented in at least one unit	Starting to Implement in at least one unit	Considering to Implementing	Do not have Resources to Implement
1	Patient ID					
2	Patient Demographics					
3	Physician Notes					
4	Nursing Assessments					
5	Medication list					
6	Discharge Summaries					
7	Laboratory Tests					
8	Tracking Pharmaceuticals					
9	Pharmaceutical Administration					

5. Conclusion and Finding

The finding of this research is to propose a new model that supports the Electronic Clinic Record (ECR) application. It will study essential related work to examine the available healthcare records outcome and drawbacks. It will propose new model to improve the clinical systems. The objective of this research is to ensure sufficient in-depth knowledge of the challenges confronting service delivery in health, especially in the healthcare sector; and a grasp of how the underlying ICT infrastructure and an ECR might be expected to assist in meeting these challenges.

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