Utilizing Electronic Medical Records in Iran

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Abstract

In recently years, extensive development has occurred in both the technology and health care industries. Earlier, there were no efficient systems in hospitals; therefore, it was necessary to set up and apply advanced electronic information systems in these institutions. Iran was competitive with developed countries in regards to different technologies; however, the development of electronic medical records (EMRs) required additional improvements. Correct and timely delivery of medical information is the most important parameter to improve the quality of health care, education, and medical research globally. A cross-sectional survey from 2006 attempted to survey a population of 37 teaching hospitals in Tehran to determine the level of utilization of EMRs. The data was collected using a checklist; its reliability and validity were measured and compared with the results of a pilot study (r = 0.9). Results showed that the utilization of EMR systems in hospitals were low (21–40%) and that the most important item was the data transaction between different systems and different hospitals. No hospitals were found to have an electronic connection with other hospitals. In conclusion, EMR systems in teaching hospitals in Tehran are not in wise-spread use. These hospitals do not generally utilize new technologies, perhaps due to a lack of experts in medical informatics or medical records and health information management, insufficient knowledge, or a lack of confidence in EMR systems.

INTRODUCTION

Our society has been changed because of progress in information processing and communication technology. Medical and health knowledge is increasing based on a very amazing rate. When we want to retrieve and use this knowledge, must keep them structured. It is so difficult about new and existing knowledge in this era, without using new information technologies (Mantas & Hasman, 2002).

A rapid development of technology and health care industry has occurred during past decades. During these changes, the traditional manual systems could not be efficient and it is necessary to setup and apply electronic information systems in hospitals.

It seems very clear that "modern data analysis" is a very different with the methods, which existed in about 1950. Indeed, it is no surprised that "modern data" seems very different from the data types and capacity, which existed before. Computers process the data and produce information as similar as human brain procedures (Mendes-Davidson, 2000).

Although Iran could competitive in different technologies with developed countries, in Electronic Medical Records (EMR) had to do many things. Correct and on time medical information are the most important and effective items to improve quality of health care, education and medical research in global and international levels (Jalalifard, 2000).

Recently, researchers have shown the importance of EMR and defined it as follow:

"The EMR and Electronic Patient Record (EPR), which are, in fact reasonably synonymous, are electronic, machine-readable versions of much of the data found in paper-based records, comprising both structured and unstructured patient data from disparate, computerized ancillary systems and document imaging systems. Clinical documentation may originate in either paper records or computerized data; however, the data are not comprehensively coded." (Carter, 2001)

International Standard Organization (ISO) was prepared principles on EMR concepts that include: on-time, completeness, correctness, security and availability. (International Standard Organization, 2003)

Increasing variety and complexity of works that will be a part of our life in future hospitals are in attention now and it is cause of transferring to electronic information. Without electronic records several problems will occur. The managers need fast answers to reaction to events. Thus,

preparing electronic patient record system is necessary, because patient information will be accessible any time and any where (Richards, 1997).

Based on the past researches, different hospitals had different systems, thus different information entered to these systems sometimes were not valued (Jalalifard, 2000). Because of this reason, the high-level manager cannot make good decision and cannot create a good plan. In this research, try to explore the EMR characteristics and their utilization in educational hospitals in Tehran.

METHOD OF RESEARCH

This was a cross-sectional survey study, which had done in 2006. The population was including 37 teaching hospitals in Tehran. The data had collected based on a checklist that prepared for different proposes by researcher. The participants were including network manager in each hospital. These participants answered to partial specific questions which send to them via email. The checklist reliability and validity measured before data collection and during a pilot study (r =0.91). The data analyzed by SPSS.

BACKGROUND

Reports of the use of computers to support clinical data management activities date back to the late 1950s. Over the years computer systems have been designed for supporting most major activities related to health care business practices and clinical processes. (Carter, 2001)

Skurka stated that "today many medical record tasks are computerized, including:

1. Patient index

2. Diseases and procedures coding

3. Patients' records tracing

4. Tumors registration (cancers)

5. DRG system

6. Admission, Discharge and information transaction

7. Statistical reports

8. Discharge summery

9. Type

10. Quality measurement" (Skurka, 1988)

Until recently, hospitals have led the way in the development of clinical formation systems. This owed, in part, to several factors specially the followings:

1. The cost of these systems made information technologies too expensive for smaller entities

2. Hospitals had greater needs of meeting regulatory and financial requirements.

Hospital Information System (HIS) usually have, as their central component, an Admission, Discharge and Transfer (ADT) system that manages census and patient demographic information. Billing and accounting packages are also frequently included as core components. In many community hospitals, financial and ADT systems along with Laboratory Information Systems (LIS) comprised the complete HIS package until recently (Carter, 2001).

Waegemen described about 5 levels toward EMR that the EMR is prepared in 3rd level. He purposed following essential specifications for an EMR system:

- Recognition system of all patient data in organization

- Using share workstations including software and current medical record structure

- Present whole patient data for all authorized health care providers (Torabi & Safdari, 2004)

Departmental systems, especially those for Pharmacy, Radiology, and Laboratory, have evolved from a focus on administrative tasks to more clinically oriented function. Departmental systems were designed primarily for using by workers within those departments, not for using by health care providers. Clinical Information Systems (CIS) were labeled such because they were utilized in areas that supported clinical activities (Carter, 2001).

Of all the systems that fall under the rubric of clinical information systems, only a few systems are designed primarily for using by health care providers: Intensive Care Unit (ICU) systems, Picture Archiving (PAC) systems, and EMR systems.

The EMR is intended to integrate information from all departmental systems and deliver that information to health care providers at or close the point-of-care.(Carter, 2001)

The EMR building blocks are including:

1. Databases

2. Data input technologies

3. Networking

4. Biometrics

5. Messaging

6. Codes and classifications

Earlier researches about EMR components in Iran showed that (table 1) the new data input mechanism (voice recognition) was not used in EMR systems and the most common mechanism that used in these systems is manual data input (by a keyboard) (Azizi, Hajavi, & Haghani, 2006).

Figure 1

Table 1: Mechanisms for data Input

Feature	pharmacy		laboratory		radiology		Medical Records		Wards	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Manual	35	100	35	100	35	100	35	100	35	100
Automatic	30	85.71	26	74.28	33	94.28	28	80	29	82.85
Barcodes	0	0	0	0	0	0	0	0	0	0
Scanning	0	0	2	5.71	2	5.71	2	5.71	1	2.85
Word Processing	0	0	0	0	34	97.14	3	8.57	6	17.14
Voice recognition	0	0	0	0	0	0	0	0	0	0

RESULTS

As table 2 shows, total of hospitals, which have computerized equipments, were 35 (out of 37) (94.59). The major number of EMR systems was written by C language (40%) and 70% of cases worked under networks. The most important item in this table is that there are no data encoding, PAC, educational or training systems, and patient's status control systems.

Figure 2

Table 2: General characteristics distribution of EMR in hospitals

Items		Number	Percent
Computer equipments	Computerized	35	94.59
	Non-computerized	2	5.41
Programming Language	C	14	40
	Pascal	2	5.71
	Delphi	10	28.57
	unspecified	9	25.71
General characteristics	Relation between units	9	25.71
	Data security	21	60
	Data confidentiality	33	94.29
	Data encoding	0	0
	Error alerts	18	51.43
	PAC	0	0
	Training system	0	0
	Patient's status control	0	0

The results showed that utilization of EMR in major of studied hospitals was in LOW rate (21 to 40%) and the most important reasons of low utilization are obtained as follow:

- Cost of EMR systems

- There is no organization to consultation and certifying the systems

- Lack of enough knowledge about EMR between managers

- There are no special companies in this specific area

- There is no standard to select and use a system

About departmental systems features, results showed that do not used new technologies and most used the common and previous generation techniques in EMR systems. These results are the same as the other researches results. As Azizi reported, there are the following important points (Azizi, Hajavi, & Haghani, 2006):

- In pharmacy system, there was no automatic allergy warning, adverse reactions, and overdose features

- In radiology / laboratory/pathology, the system did not prepare features for Permits creation of panels based on patient, disease, and population.

- In medical record department, many important

features did not used. These features were including remote access, fax support, decision support, statistical analysis, knowledge resources (Medline), ASCII data import, sound, graphics or video support, commercial file format standards (Oracle, Sybase, etc) and ASCII, data transferring standards (as well as X12, HL7, CORBA, SNOMED, LOINC and Except ICD), and biometric security (as well as voice of face pattern).

- In wards, no features prepared to Encoding and search for vital signs and clinical findings.

DISCUSSION

Based on the results, which reported earlier it seems that when hospitals do not use networks they cannot use many features of EMR. In addition, it may cause to reduce utilization rate.

Lack of standards to select and use a useful system is a universal problem that all hospitals have challenge with vendors and they could not sure about all things which seems in advertisements or marketing meetings (Carter, 2001). The results showed that the Iranian hospitals have similar challenge too. So, there is no evaluating model in Iran for HIS evaluation yet and some body attempted to determine most important factors in this situation (Shahmoradi, Ahmadi, & Haghani, 2007).

A very important item in EMR systems is information transaction between different departmental systems or between different hospitals. As results showed there is no system that does data transaction based on messaging standards such as HL7, LOINC or X12. It can occur because of conflict between Farsi language that commonly used in EMR systems and these standards.

The other most important item is that in many cases there are not some basic forms such as operation report, pathology result, and so on. This can have a negative effect on the system utilization and decrease it hardly.

In conclusion, EMR systems' features in teaching hospitals in Iran have not been explored maximum and major systems do not utilized of new technologies. It can because of following reasons:

- Lack of experts in Medical Informatics field. The consultant and programmers in designing team do not have enough knowledge about latest technologies and how they can apply them in EMR.

- Medical Records and Health Information Management experts did not present in designing team or they do not attention to new technologies which can apply in EMR.

- Lack of confidence in the EMR systems.

- Preparing business systems and do not attention to scientific and technological features.

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