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Research paper



Factors Associated in the Implementation and Adoption of Electronic Health Records (EHR) in Private Healthcare

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Abstract

The health industry is undergoing a fast transition from its conventional method of care-giving. E-health or Health Informatics is an ICT-integrated method adopted by the hospitals for providing healthcare services to the patients anytime, anywhere without any restriction of location or facility. Many countries now follow suit to improve efficiency and accuracy in their healthcare systems. Nowadays, many countries including Malaysia still face challenges in the implementation of the healthcare electronic system. Substantial evidence suggests that paper medical records do not provide reliable and updated information on patients. Health physicians provide medical services based on patient history. In cases where this information is inaccurate and/or inaccessible, chances of medical errors due to improper prescriptions remain high.

Keywords: *Electronic Health Records, Electronic Medical Records, Patient Records Systems*

1. Introduction

Electronic health records (EHR) began as route for specialists to organize their records, make ordering easier, decrease repetitive tasks and decrease errors caused by bad writing and others. The electronic health records (EHR) is a computer based record of patient health data. It is produced by one or more encounters in any healthcare delivery setting. The EHR incorporates data on patient demographics, progress notes, medications, vital signs, clinical history, immunizations, laboratory results, and reports of diagnostic procedures. The EHR reports prove based decision-making, quality administration, and patient results. An EHR is more advantageous than paper records since it enables suppliers to track information after some time, distinguish patients who are expected for preventive visits and screenings, screen how patients measure up to specific parameters, for example, vaccinations and blood pressure readings and furthermore enhance overall quality of healthcare.
One of the current tragedies that can be relating to electronic health records is the ransomware attack called 'WannaCry". This gigantic ransomware assault has closed down work at 16 hospitals over the United Kingdom. As indicated by The Guardian, the assault started at around 12:30PM local time, freezing systems and encrypting files. At the point when employees endeavored to access the computers, they were presented with a demand for $300 in bitcoin, a classic ransomware strategy [1].

2. Problem Statement

A problem statement is a reasonable succinct portrayal of the issue(s) that need(s) to be tended to by a critical thinking group. It is utilized to focus and center the group toward the starting, keeps the group on track amid the exertion, and is utilized to validate that the effort delivered an outcome that solves the problem statement. There are a few issues raised regarding the implementation and adoption of electronic health records (EHR) in private healthcare:

Inaccurate patient data

The slow implementation of electronic healthcare records has caused a reduction in the quality in patient care and productivity within hospitals and medical care facilities. In cases where this information is inaccurate and/or inaccessible, chances of medical errors due to improper prescriptions remain high. This situation can result in adverse patient effects and/or fatalities [2].
In relations to ransomware attack, hospitals are esteemed focuses since they are viewed as "treasure trove of data" that keep up gigantic patient information, for example, to Personal ID data, similar to social security numbers or places of bank account data, protected health data, which is HIPAA (Health Insurance Portability and Accountability Act) information and cardholder information. The hackers utilized ransomware to encrypt information, lock computers and hold the data for ransom installments [3].

Security

The security among software systems is a major problem in developing countries because their systems are not advanced enough to monitor hackers. Our country Malaysia needs many funds available to employ large number of IT professionals to monitor EHR security systems. The increase in hackers and unauthorized access to patient information globally has raised issues all over the world whether or not all EHR systems are safe

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to use [4-5]. The ability for hackers and thieves to gain access to patient files is a very real issue that affects both developed and developing countries alike. The benefits and risks of implementing EHR system must be carefully weighed, however it is becoming more common place to incorporate such technology that all those who don't are viewed as being outdated [6-7].

Madsen [5] propose that healthcare institution should hire IT professionals to monitor EHR security systems.**Error! Bookmark not defined.** The increase in hackers and unauthorized access to patient information globally has raised issues all over the world whether or not all EHR systems are safe to use. Mohney [3] in his reports about ransomware attacks stated that hospitals can be especially vulnerable, since their networks are rarely offline. The attack resulted a wave of canceled appointments and general disarray, as many hospitals are left unable to access basic medical records and several patients were sent to other hospitals and surgeries were canceled. Multiple medical facilities in the U.S. were targeted in different attacks, with some paying thousands of dollars to recover their files. Hospitals are particularly vulnerable because many haven't yet completed to increase the system security. They also typically have open networks where "everything is accessible to everything else on the network."

Centralized Healthcare Systems

The lack of centralized healthcare systems with a predetermined list of standard requirements to protect patient privacy and security issues in addition to the gap in computer literacy within the medical community has caused a delay in its implementation [8]. Each year millions of people all over the world die due to medical errors that could have been prevented. Medical errors account for billions of dollars a year to hospitals all over the world as well. These medical errors aren't only the result of poor medical training, but as a result of poor communication caused by faulty systems and processes which cause people to make mistakes and fail to the correct the situation in time [4, 9].

The rising costs that these medical errors have caused are the result of many variables. The driving forces are that medical profession, doctors and nurses don't use electronic healthcare records to their advantage or don't use them to their full potential. Some doctors and nurses don't have access to these various systems at all. There has been a lack of universal EHR implementation around the world. Cost is an aspect that could be preventing many hospitals and medical facilities from adopting EHR systems [10-12].

The EHR system makes the clinician's workflow highly streamlined through automation and increased efficiency since one avoids the difficulty of fumbling through paper medical records that do not provide consistent information on the patients' medical history. The healthcare system monitors, records and generates precise information about the progress of patients whilst suggesting feasible solutions to recurring or sustained symptoms [13]. Despite the aforementioned benefits that come with EHR system, numerous studies reveal that its implementation is still in its infancy stages. Empirical research shows that even in the wake of rapid technological changes and globalization, the country faces major barriers in the implementation of EHR that either hamper or slow down the process [13].

For years, patient medical information has been kept up in paper-based records. These records are typically written by hand and kept in documents. Depending upon the readability of handwriting of the doctors doing the examinations on patients, the data may not be useful later on [14]. Furthermore, it is significant to remember that at whatever point the patient comes in for a checkup, the record is recovered taking a considerable measure of time and the doctor writes on a similar sheet of paper or includes another sheet of paper. This further builds the weaknesses in light of the fact that the history is not reliable. It is extremely hard for one to comprehend divided data other than being questionable [15].

3. Research Objectives

Research objectives are generally communicated in lay terms and are guided as much to the client as to the researcher. Research objectives might be connected with a hypothesis or utilized as a mission statement in a study that does not have a hypothesis. This paper endeavors:

- To identify the technological issues pertaining to patient privacy, focusing access authorizations to patient data.
- To identify the security concerns regarding the access to EHR systems.
- To identify the needs of a centralized healthcare system.

Research Questions

A research question is the major center of an exploration venture, study, or survey of literature. It focuses the study, determines the methodology, and guides all stages of inquiry, analysis, and reporting. This research questions will help to address the problems or issues raised:

- What are the technological issues pertaining to patient privacy focusing access authorizations to patient data?
- What is the security concerns regarding the access to EHR system?
- What are the needs of a centralized health care system?

4. Literature Review

A literature review is the activity that studies books, insightful articles, and some other sources important to a specific issue, region of research, or hypothesis, and by so doing, gives a depiction, synopsis, and basic assessment of these works in connection to the exploration issue being investigated.

Patient data

Electronic healthcare records allow physician to gain real time access to their patients' files. This allows doctors and medical professionals to collaborate and track laboratory and diagnostic tests easily and efficiently. Transitioning to electronic healthcare records is becoming more important than ever as health information in patient files is increasing and the fact that many systems that hospitals use are more administrative than clinical and most healthcare organizations have been providing healthcare services that favor the organizational needs rather than that of the patient [16-17].

Patient data that is collected and stored electronically within general practitioner offices during routine visits can be used in conjunction with data collected from patient visits to specialists to improve communication between doctors who are treating the same patients [18]. This information serves as valuable resources to support diagnosis and tracking patient care. Also, patient laboratory and medical test results that from test prescribed from these doctors should not only be stored in the local databases, but also the hospital and medical care facility databases where this test were performed. The benefit of this the recording process is that patient care data is automatically updated and kept track of to maintain updated records [19]. Any diagnosis and patient symptoms should be recorded electronically including a doctor's notes that would complement any possible condition that the patient is experiencing as this could possibly assist in the diagnosis of rare condition and could also be used to track possible symptoms that could have otherwise been overlooked [20].

EHR systems security

Hospitals are progressively endeavoring to "solidify" their systems by disposing of unneeded software that would make systems more defenseless. Solidifying systems and making more detachment between systems can make extra levels of security, so that if the network is traded off, it doesn't influence each computer or device on that network. Solidifying a system can be portrayed as killing pointless administrations and ability so they are not accessible to

be focused on. On the off chance that a system should fill in as a record server, the IT department can remove other software like email and web browsers that would make it more vulnerable to be hacked, but there's nobody strategy or instrument that will totally shield you or your organization from a ransomware attack. Possibility and remediation arranging is urgent to business recovery and continuity and these plans should to be tried frequently. The FBI has advised a multi-pronged approach to battling hackers including implementing software restriction policies, backing up data regularly, patching operating systems and restricting access to certain key files or directories.**Error! Bookmark not defined.**

The challenges in implementing electronic health records include the risk associated with similar central database systems in which security and privacy is always an issue. Recent breaches in the central databases among large financial institutions has led to further discussion over the level of security required to adequately ensure that personal data remains secure [4, 10]. Also, the security of such databases that contain accurate personal data is the target of hackers and fraudsters who attempt to access and steal personal data for impersonation for personal ad financial gain [9, 21-22].

The decision over the safety and security of electronic health records is to be evaluated on a system wide basis which is dependent upon the level of security protocols that are put in place [23-24]. Security software and the use of checks and balances within health organizations prevent the unauthorized access of confidential information. Organizational security methods that are employed through each hospital and/ or medical facility including private doctors' offices protect patient data. Federal compliance through the Health Insurance Portability and Accountability Act (HIPAA) requires hospitals and medical professionals to safeguard patient data and limit access. The continuous issues surrounding internal fraud and identity theft among those with access to confidential information has led to numerous studies across various disciplines over the requirements for internal security measures [26-26].

Centralized Healthcare System

The latest advances in information technology have made it possible for patient data to be centralized into large databases that have improved the efficiency of healthcare. The benefits of implementing electronic health records are extensive, but the associated risks raise concerns over privacy rights and security. In hospitals, centralized databases are increasingly becoming more efficient in identifying patients and limiting errors in patient treatment [9, 27]. Patients are able to receive fast and efficient care through the application of electronic health records from the ease of accessing patient medical records to electronically sending prescriptions to pharmacies. Though there are many benefits to using electronic health records, there must be a balance.

Centralized databases allow hospitals and healthcare facilities to quickly access patient data in order to provide fast and high-quality care to patients. The reduction in paper work allows doctors and medical professionals to improve the quality and efficiency of patient care. Concerns over the security of centralized electronic health records and the risk of security breaches of confidential information have been raised as a result of recent breaches of information among financial institutions.[Error! Bookmark not defined.] Databases that contain confidential personal data are the ideal target for hackers and fraudsters that target vulnerable databases for loopholes in security systems. Identity theft and the safety of inputting personal data into electronic systems have raised questions over how such practices should be regulated [17].

5. Methodology

The procedure used to gather data and information with the end goal of settling on business choices. The approach may include publication research, interviews, surveys and other research methods, and could incorporate both present and historical data.

The population consists of six groups of health care professionals participate such as physicians, nurses, lab technician, pharmacists, medical records, and administrative staffs in one of the private hospital in Malaysia. The population comprises of 100 staffs of the organization; therefore, the questionnaire will be distributed with potential respondents which expertise on that field and job scope. Non-probability sampling method will be used in the study which is purposive sampling method. In non-probability sampling design, the elements in the population do not have any probabilities attached to their being chosen as sample subjects. This study uses self-administered questionnaire. Several studies on the related topics were consulted and their instruments were critically examined. Material from this instrument and the personal knowledge of author were used to develop a questionnaire for the study.

After considering the objectives of the study, research questions, and limitations, adopting quantitative method is the best ways in obtained data through questionnaire. The data will be collected from primary sources can be customized to answer target research question. The data is usually new and dissimilar from other sources. It will be process and analyzed before the researcher can make any sense of it. It also has to be strategically applied to the questions at hand.

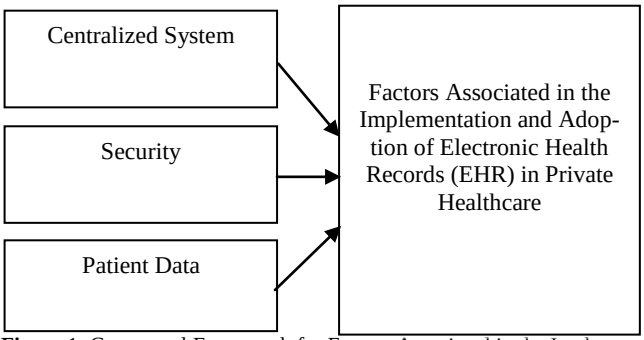


Figure 1: Conceptual Framework for Factors Associated in the Implementation and Adoption of Electronic Health Records (EHR) in Private Healthcare

Data Collection and Analysis

Data collection is the process of gathering and measuring data on focused variables in an established systematic fashion, which then enables one to answer significant inquiries and assess results. From the research instrument, questionnaire is use to collect the data. It is the most traditional and most frequent form of data collection in empirical user research consists of questionnaires delivered by mail or personally. The advantages of questionnaire derive mainly from the fact that a relatively large group of persons can be surveyed in a relatively short period of time.

Data analysis is a process of investigating, refining, changing, and modeling information with the objective of finding helpful data, recommending conclusions, and supporting decisions in business. In this study, the collected data will be coded into the Predictive Analytics Software also known as Statistical Package for Service Solution (SPSS) version 24. Both descriptive inferential statistics will be utilized to reach valid findings. Initially, descriptive statistics such as mean, median and the standard deviation from each variable will be used to get overall view of responses from the respondent.

6. Conclusion

The health care system stands to improve substantially upon successful implementation of electronic health records system. EHR systems help in data management, interoperability, information sharing and decision making by health physicians. The system also cuts data storage costs, minimizes information loss, and prevents medical errors that result in fatal injuries and deaths. The rapidly burgeoning population requires a modern health care system to ensure efficient and effective disease control and monitoring. Also, there are different findings among the health care pro-

fessionals who participate in the study have a different opinion, view, and perception of the level about EHR system implemented in their health care facility.

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