Implementation and Issues Concerning Electronic Healthcare Records

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Introduction

Health Informatics or healthcare informatics, medical/clinical/ bioinformatics is a process of acquiring, storing and retrieving healthcare information to provide better healthcare service for patients by the healthcare providers. It is a multidisciplinary field which links information technology and healthcare to provide better quality care to the patients, ensuring patient safety and to safeguard the information generated is accurate and of good quality.

Many countries are facing difficulties in delivering healthcare services to their people due to the rise in healthcare cost, patient expectations on the services provided and others. Thus, it is important to ensure that healthcare is cost effective and the same time provides quality service to the people. In order to provide better healthcare, it is important to have information in place to develop cost-effective healthcare and this can be done via the implementation of health informatics.

The huge amount of data on medical information needs to be stored and translated for the benefit of patients/consumers. This can be done by having a proper infrastructure in place to manage all these data so that the data can be converted or translated into knowledge, which can then be used to make a decision [1]. The knowledge can also be used in the treatment and management of the disease and also to revise the current policy or to develop and implement a new policy which can benefit the patients/ consumers. A substantial amount of data is able to produce large-scale analysis such as on the outcomes, trends etc. and can be used for prediction, forecasting and others [2].

Medical errors can occur with regards to incorrect diagnosis, wrong prescription of medication, inaccurate interpretation of laboratory results, and incorrect information generated from medical or laboratory equipment. By having health informatics, these errors can be minimized. Health informatics can also reduce doctors' workload of having to key in the patient's information such as diagnoses and management manually via electronic record.

Although the application of ICT can reduce medication and communication related errors via the use of Electronic Health Records (EHR), it was less convincing in terms of diagnostic and technological related errors. In a study by Rajasekar on the implementation of IT in the healthcare system in the United States, the findings have not shown much significant achievements although the rate of medical errors has been reduced [3].

Each patient may have various medical/healthcare providers and most of these medical/healthcare providers documented patient health information by means of case notes or through an electronic system that can only be accessible by the specific clinic/hospital/medical centre. This is inconvenient for other medical providers who need to access patient medical records in order to get an overview of the patient's condition as well as for treatment and management. This can be overcome with the implementation of health informatics where all the information on the patients can be stored in an e-system that can be made accessible to any medical/healthcare provider at any time and location.

There is also a need to link the information on medical care provided by the healthcare providers and medical care received by the patients with insurance providers so that the medical treatment and fee reimbursement can be done promptly. All the documents required by the insurance provider can be made available online by both the healthcare providers and patients so that the insurance providers are able to access the documents without any delay.

In most hospitals or clinics, patient medical/health records are still recorded manually and kept locked in shelves or cabinets and not saved electronically. This can pose a risk as the medical records can get lost, be stolen or destroyed by fire. To avoid this, electronic health records (EHR) systems is the best solution since the data can be safely stored and encrypted.

Information System and Electronic Records Development

Over the years, information system and electronic records development have progressed from unit/departmental to institutional, national, regional and global level [4].

The most common issue that arises in any information system is the system compatibility. Due to incompatibility of various systems, there is a need to develop a new system which can integrate the existing system. It is difficult to develop a new system and neither it is possible to integrate various systems because this involves various locations and also different operating systems.

To develop a good information system and EHR; factors such as types of data (number, text, digital images, videos etc.), source of data, records of data, data format and others need to be considered. To incorporate the information of the patients, diagnosis and images into electronic format is not easy as it involves many units/departments and also requires proper devices to capture the information [5]. A case study by Piliouras et al. showed that the poor integration of images into EHR can complicate clinician work flow [6]. The information technology requirement does not affect the integration of EHR into healthcare rather it is human, organizational and managerial issues that can have an effect [5].

Patient information from previous records needs to be incorporated into the current information so that there is a complete overview of the patient's health information [7]. This will allow healthcare professionals to access the patient's information irrespective of the time and location.

There is a limited understanding of human information behavior as noted by Spink and Cole [8]. The health information system must consider individual needs based on the human behavioral models in health informatics [5]. For example, some patients may require certain information at a particular time that is, the patients may want to know only the diagnosis and not the rest of the information on the disease [9] such as risk factors of the disease, treatment etc. and vice versa. The human behavioral information is important in the course of management of the patient's illness as it will help doctors to obtain information on the availability of treatments as well as information on the symptoms of the disease that may be unknown to the doctors.

The information from various sources needs to be filtered so that quality and accurate information can be provided. Berner and Moss have noted that although the health information may be available in the health informatics, healthcare providers may not be able to use this information effectively [10].

Data Mining on Electronic Health Records

Data mining is important in clinical medicine as it helps to make decisions which can affect patient's lives. It is vital to understand the process of data mining, data analysis and interpretation of findings when it comes to healthcare [5]. Sometimes the findings may be statistically significant but may not necessarily be clinically important [11].

According to Bath [5], although a large clinical data storage warehouse may contain a lot of information, it could merely be a total sum of minor sets of data collected and may not be feasible for generalization. Apart from this, missing data is also another issue and can have an impact on predictive analysis. The success of data mining depends largely on the availability of expertise, results derived from data mining and the interpretation of the results [5].

Ethical Issues

The process of data collection, storage and retrieval of personal medical information from individual patients has always raised ethical concerns when it comes to health informatics. The uploading of information from hardcopies to electronic records and the usage of computers and database can pose a threat to data security as well as infringe on patient's privacy and confidentiality. The entire patient's personal and medical information is considered sensitive, private and confidential. Thus, health informatics can cause concern when it comes to the management of health data and information. Patient's safety and confidentiality needs to be addressed prior to the implementation of the health informatics.

Besides the confidentiality of the patient's e-information there are some other ethical issues which need to be addressed such as informatics tools, system accessibility, evaluation on system role, system developer's role, maintenance and the vendors [12].

Security breaches can also occur when the health information is shared with others without prior consent of the individual. One way to overcome this is to have EHR secured with an encrypted password [13].

According to Layman [14], although health informatics is able to improve the quality of care and decrease the cost, it can create conflict for the ethical principles of autonomy (e.g. merging multiple databases can poses threat to autonomy), fidelity (security is breached) and justice (e.g. data not uniformly distributed within or across countries or only certain data of health information is made available) [14].

Challenges of Health Informatics and Electronic Health Records

In order to ensure the success of the implementation of health informatics, one of the challenges is funding [15]. In government budgeting, it is common practice that a big portion of allocation

is assigned to critical healthcare which is considered a priority. As such, funds allocated for health informatics is very little.

Although health informatics professionals and managers see the importance of the health informatics, the support from healthcare professionals and managers on the development of the ICT is lacking. This lack of support and understanding from the healthcare professionals may hinder the full potentials of ICT. Healthcare professionals may also end up making life-threatening decisions [10]. Thus, it is very important to involve the healthcare professionals in the development of decision support system and also to provide the salient information to the healthcare professionals on the importance and the application of ICT [10].

The data transferred into the system needs to be of high quality and accurate so that the safety and well-being of the patients are assured [5, 10]. According to Bowman [16], although health informatics has substantial benefits such as better care and reduced healthcare costs, it can have some serious consequences. If the EHR system is poorly designed or inappropriately used, EHR-related errors can occur, which can endanger patient safety and at the same time reduce the quality of care.

With different systems used in various departments, it is difficult to integrate, exchange or transfer information. As such a larger intraoperability (architecture) platform would be useful to integrate the similar system into various departments so that the exchange of information can occur [5].

The implementation of EHR can also pose many challenges. One of the challenges is it is expensive to develop EHR. Apart from this, the functionality of each system may differ from one another and this can contribute to time consumption, slow processing, and not being user friendly. Also a lack or poor interoperability between the electronic medical records (EMR) systems can hinder other providers to communicate effectively. The information in the EMR needs to be accurate and reliable. Otherwise, the quality of care will be compromised.

Technological glitches are bound to happen when it comes to the use of EMR. As such data breaches may occur. The implementation of EMR may also affect the communication between physicians and patients and other physicians [17].

Future Direction

The electronic health records (EHR) or electronic medical records (EMR) are seen to improve the quality of care and practice among healthcare professionals. A majority of physicians strongly believe that the EMR will bring many benefits, which will outweigh the costs and should be implemented [18,19]. However, the unwillingness of physicians to take part in training to enhance the usage of EMR is one of the obstacles hindering the implementation of the EMR [19]. There is a need to have some form of motivation to persuade them to allocate some of their time in EMR training [19]. Implementation of EHR/EMR is not easy as it requires certain users, system attributes, support, various organizational facilitators etc. [18, 20].

Health informatics should provide value for money in terms of quality as well as cost effectiveness. Most of the time, the investment returns are poor. It is hence, important to address the problem with regards to engineering process, project management and skills and practice [21].

Conclusion

Health informatics is important in providing quality care and is cost-effective. The implementation of EHR/EMR is beneficial to healthcare providers and the patients as it can provide high quality service. However, the implementation will need to take into consideration the ethics and legal aspect in order to safeguard patient information. The main challenge is the integration, intraoperability and interoperability of various systems between various departments and users who may lack the understanding and knowledge of current information.

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