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PROMISES AND CHALLENGES OF ELECTRONIC HEALTH RECORDS (EHRs) IMPLEMENTATION: A SYSTEMATIC REVIEW

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Abstract

Even though Electronic Health Record Systems (EHRs) plays prominent roles to enhance the efficiency and effectiveness of health related services, its implementation has not been without challenges as it pervades technology into what has been a historically manual process of health information recording. The study reviews literatures and gives an intellectual background to the study by reviewing various studies made by different researchers and institutions on the ideas of EHRs and its advantages and challenges for implementation. Identifying the obstructions will be a precursor to assessing readiness for a system. The review suggests that user resistance, lack of skills, Provider engagement and commitment, administrative and policy support are the primary barriers to implement EHRs. Privacy, security and legal issues are also other challenges of EHRs implementation. In order to successful implementation of EHRs, health care organizations and professionals should committed for tackling interoperability, security, business continuity, and digital divide issues. Further studies are recommended to examine the challenges in detail and recognize how to overcome said barriers.

Keywords: Electronic Health Records (EHRs), Information Communication Technology (ICT), Challenges, Advantages, implementation

Introduction

In today's increasingly digital and networked society, the volume of personal information captured in electronic databases continues to grow at exponential rates. As a result, interest of most of the countries around the world towards implementing Electronic health record system (EHRS) is increasing from time to time [4]. The Electronic Health Record (EHR) is a "longitudinal electronic record of patient health information generated by one or more encounters in any healthcare delivery settings". The record is in computerized format which is able to be exchanged at all levels and settings of the health care systems [8]. It is "a repository of electronically maintained information about an individual's lifetime health status and health care, stored such that it can serve the multiple legitimate users of the record" [7].The EHRs may comprise data about individual patients such demographic, interventions, laboratory test results, images laboratories and vital events. [8]. A well-Managed health care data assists providers to provide attention health care events from wellness to illness and recovery. Therefore, the record may need to combine various data about subjects' health and illness accessed by different providers across diverse professions. This system also includes tools as clinical reminders and alerts, linkages with knowledge sources for health care decision support, and analysis of aggregate data both for care management and Research. In addition, the systems helps users to organize, interpret, and react to data easily. [7].

Definitions and Concepts of EHRs

Electronic health record definitions suggest that the EHR is a tool that allows health information to be produced in an electronic format. It can be created, gathered managed and consulted by authorized clinicians and staff within one health care organization. The record may be made available at any time to providers, once authorized by the individual, and can be used as a tool in the provision of health services. The use of the term EHR remains widespread; however, it is useful to note that several other terms for EHR still exist, such as: Electronic Patient Record (EPR); Electronic Medical Record (EMR) and Computer-Based Patient Record (CPR). Even though there are many different ways to describe the EHR, its general function and clinical relevance remain the same, for instance, it is commonly used for billing, reporting outcomes, quality management, strategic planning and public health disease reporting [1].

The term computerized clinical systems is usually used interchangeably as Electronic Medical Records. EHRs represent the historical evolution of care delivery records by health professionals from paper-based handwritten formats to electronic formats. As such, it carries an unfortunate connotation of systems that are primarily designed to be passive after-the fact archives of the observations and actions initiated by clinicians on behalf of individual patients in the course of providing medical care. The term expands its scope to include data relevant to both health and disease and the sources of data beyond the records created by health professionals, to include the patient's own observations, and family history data generated by relatives. The data can consist of standardized codes, text, or other electronic forms such as video and audio, and may include electronic communications among these multiple stakeholders [3]. In addition, the EHR can integrate multimedia information such as radiology images and echocardiographic video loops that were never part of the traditional medical record [7].

Advantages of EHR System over Its Paper-Based Counter Part

Unlike to that of a traditional health care data record, whose functionality is characterized by the static nature of paper, data stored in EHR systems in a single format for data entry and retrieval is flexible and adaptable. The biggest advantages of EHRs is changing the traditional concept of patient medical records, access type to patient medical records, patient and physician relation, and patients' medical information confidentiality, reducing healthcare cost, reducing the medical errors and ensuring patient safety [2]. Moreover, it can provide access to tools like clinical decision support reminders and reports that aid clinicians and teams in delivering care based on the best-available evidence. EHR has also the potential to integrate information from multiple sources and provide a more comprehensive view of patient care [9].

EHR systems can also have electronic interfaces which simplifies data entry processes in to computers where health data are stored and displayed in various formats suitable for interpretation. Moreover, different formats of Information such as radiology images and echocardiographic video loops can be integrated which is not possible in the traditional health record system. Data may be used both by a single patient to guide care and administrators to develop health related policies for a population. Therefore, the advantages of EHR systems is not confined only with single, serial recording of provider-patient encounter, but also, the systems extends the usefulness of health record data by applying information-management tools to the data.

In paper record systems, it is difficult to access the required data easily; whereas with computer-based records, data can be obtained immediately as needed by authorized users. Storage problems; lost/misfiled charts; ineffective data management and written errors are some of the limitations of paper based records. Manual or paper based records can also be badly written, inaccurate, incomplete, poorly structured and even lost altogether which can make it difficult to validate, collect and analyses data, to make decisions and to ensure quality of care [1].

EHR increases the accessibility and sharing of health records among authorized individuals. The need for transportability of patient information has also become an important factor. Remote access to EHRs also is possible. Regardless of the place, legitimate users anywhere can access it from a secure network to make timely decisions. For instance, legitimate users can access it from their office, home, or emergency room. The system can also provide the tools needed to control and track access to patient records to enforce the privacy policies required by the

Health Insurance Portability and Accountability Act (HIPAA).

Moreover, data in EHRs is well organized and structured because it is recorded as printed text rather than as handwriting. In computer based record, Completeness and quality can also be improved by applying validity and required field checks on data as they are entered. For example, numerical results can be checked against reference ranges. Typographical errors can be detected via spell checkers and restricted input menus. Moreover, an interactive system can prompt the user for additional information. In this case, the data repository not only stores data but also enhances their completeness. Reusability of data is also possible in EHRs that in turn increases providers' effectiveness and efficiency. For example, health care providers could copy parts of their visit note into a letter to a referring provider and into an admission note. Reusability of data is one way that an EHR increases the provider's efficiency. Data entered as part of the patient care process can also be reused in reports that support patient safety, quality improvement, and regulatory or accreditation requirements [5].

Challenges of EHRs Adoption

A number of challenges are facing with the adoption of EHRs in health care facilities. The engagement of heath care providers, administrative and policy support and commitment; and Lack of infrastructures are among the main issues for EHRs successful implementation [5]. Privacy, security and legal and digital divide issues are also other challenges to implement EHRs. The privacy and security of health information is getting a lot of attention because of its personal nature, its significance, and the potential impact if the data is used in a malicious way. An individual's information privacy is violated when there is unauthorized collection, disclosure, and/or secondary use of his/her personally identifiable information such as health information. In the interconnected digital world, securing patients' EHRs is a challenging task. Security of EHRs is of paramount importance to ensure patients' and service providers' confidence in the use of EHRs. In healthcare organizations, security gaps can cause significant damage to the organization and to the patient. In worst-case scenario, unauthorized access and willful changes made to patients' medical records by

an infiltrator can result in loss of life. Due to the serious consequences associated with the security breach of EHRs, organizations must thoroughly review the procedural and technological aspects related to the security of EHRs [6].

Regarding physical controls, organization's security plan must address the needs of physical security of the complete network, from central data storage to the various desktop and mobile devices used by employees throughout the organization. Restricting access to work areas by the authorized personnel only is required, logging visitor access, and securing the visibility of data on the communication devices must be ensured. Some other important considerations include safety of mobile devices from potential theft, secure virtual private networking from remote locations and handling of hardware/software by authorized personnel only. Healthcare facilities do use devices that are supplied by vendors and store in them personal health information. Therefore, organization must place controls for vendor compliance, testing and accurate record of installation and removal of such devices on the facility network [5, 6].

Conclusions

Electronic Health Record System (EHRS) is an important healthcare innovation that can contribute to enhance and better quality of healthcare services. It is certain that the use of EHRs would improve quality and efficiency of health care rendered to the patients. Well implemented EHRS allows seamless communications of disease diagnosis and treatment process, and hence brings forward better disease management. The ultimate goal of EHRs is not to gain information but to improve action/obviously the improvement of health service management through optimal information support. A high EHR participation rate of health care facilities will lead towards efficient collaboration among health care institutions. If medical institutions implement EHRs effectively, medical institutions can then offer faster patient service, reduce medical errors, improve quality of patient care, and allow for the efficient sharing of medical records, convenience for its citizens, seamless medical research collaboration and make healthcare more efficient.

However, despite the obvious benefits of EHRs, a number of barriers still impede the widespread adoption of such technology by health organizations and consumers. It is

understood that implementation of EHRS is difficult to achieve full benefits for the health institutes and the patients unless administrative and policy supports and willingness were executed and trust built correspondingly. Therefore, it would be necessary for all health players such as healthcare legislators, public health officials, healthcare providers, healthcare payers, physicians, clinicians, consumers, and EHRs vendors to be involved in the design and implementation of the system. With regards to the type of challenges and barriers which were mentioned, particularly in funding the implementation cost of EHRs, the role of government will become very crucial. Governments can facilitate the acceptance and implementation of EHRs by budgeting required finance for healthcare institutions and introducing incentive packages, guiding the public opinion towards accepting inevitable changes in the traditional healthcare services, legalization paperless healthcare services and ensuring healthcare professionals of benefits of using EHRs. All concerned bodies including healthcare providers must be convinced about the impacts of EHRs for their future healthcare services. It is also important that general public realize the effectiveness of new ideas such as the integration of their lifetime medical records.

Adopting best practices related to the privacy and security of healthcare data that are at rest are the pivot to the trust relationships needed when exchanging health data across the healthcare networks. Administrators in the healthcare practice need guidance for implementing the best privacy and security practices. Some of these best practices include understanding of the legal framework involved, managing information content and context, identifying and implementing appropriate technical solutions including the technical standards and architectures, and policy and procedural frameworks necessary to achieve secure and effective management of health information storage and exchange. It is required that IT staff at medical facilities use network and data management best practices, follow risk assessment and management guidelines, and be on the forefront of technological advances to ensure the privacy and security of patients' data.

In order to properly implement EHRs, medical organizations and professionals need to be aware of the four main issues of implementation: interoperability, security,

business continuity, and digital divide. These issues can be mitigated by promoting awareness of these hindrances and addressing them alongside the implementation process. There should be a means to properly implement EHRs which effectively negates possible drawbacks. Interoperability issues can be addressed by considering metadata as a standard to create compatible health information systems. For security issues, medical institutions can minimize accidental and unauthorized access with security awareness training. Accessing files from a cloud-based EHR resolves business continuity issues. Finally, issues with the digital divide can be avoided by creating training programs for patients who focus on operating the various devices and services of EHRs.

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