An Exploratory Study of Health Information Technology and Electronic Health Records on Improving Quality of Patient Care

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Abstract

This paper explores the relationship and use of health information technology in the modern healthcare industry. Specifically, we identify the connection between health information and the quality of care patients receive. Electronic health records are one technology currently being employed as a means of controlling health care costs, better managing patient information, and enhancing patient care. Given the limited number of practitioners and facilities that have currently implemented such systems, it is important to explore the extent to which EHR systems are being utilized and the impact such systems are truly having on the quality of care and patient outcomes.

Keywords: Health Information Technology, Electronic Health Records, Quality of Care

1. Introduction

In spite of being the most expensive and extensive healthcare system in the world, the United States healthcare system is noted to be deficient in quality of care (Institute of Medicine, 2001; Jha et al., 2006; Lutfiyya et al., 2007; Werner & Bradlow, 2007). The healthcare industry is continuously being scrutinized and investigated (Lutfiyya et al., 2007). This deficiency stimulated the interest of policy makers, healthcare providers, and consumers to assess and improve the quality of care. The implementation of health information technology (HIT) has been proposed as a strategy to both reduce costs and improve the quality of care. Researchers have found that the implementation of health information technology benefits the healthcare management of patients by improving the quality of care provided (Follen et al., 2007; Taylor et al., 2005). Blumenthal (2010) identified information as the "lifeblood" and health information technology and the *circulatory system* of medicine.

This paper explores the relationship between information management and health information technologies. It further presents the role of electronic health records (EHR) and the evolution of these systems in modern healthcare. Currently, few healthcare practitioners and facilities have fully implemented such systems, so we discuss the steps necessary for implementation to occur.

2. Connection between Information and Quality of Healthcare

As one would expect, there are a number of factors that impact the quality of care patients receive in any healthcare environment. Tourangeau et al. (2006) identified accurate diagnoses by clinicians and effective interventions in the process of care as factors influencing the quality of care. Another factor to be taken into consideration is nursing care. Tourangeau et al. (2006) found that nursing care plays a vital role in the quality of care as well. In this study, a direct correlation between nursing care and healthcare quality was observed through the finding of fewer deaths in hospitals that employed more registered nurses. Another major factor in healthcare quality is the management of clinical data (Asch et al., 2004).

Decision making is an important part of the medical profession. In order to make the right decisions, it is important to have all pertinent information, and it is also imperative that this information is accurate. Using information technology is the most proficient means of storing, retrieving, updating, and maintaining accurate health information. Use and re-use of clinical data is evident at all levels: personal, family, regional, national, and global (Hammond, Bailey, Boucher, Spohr, & Whitaker, 2010).

Interoperability is essential to the successful achievement of healthcare goals through the use of data, and this is a primary goal of the healthcare data exchange. Its focus is to improve healthcare in the United States through the enhanced use of data and information (Jha et al., 2006; Lutfiyya et al., 2007; Werner & Bradlow, 2007). The healthcare system in the United States is currently in the process of moving from paper forms to electronic systems (Hammond et al., 2010), and some researchers have suggested improvement in information systems to help improve quality of care. The Veterans Health Administration was one of the first to implement an electronic health record (EHR) system across veteran hospitals and has observed an improvement in quality of care when compared to other hospitals (Asch et al., 2004).

Cleary et al. (1994) conducted a study to establish an accurate and reliable database of discharge abstracts in order to appraise its value for the assessment of quality of care. They found that hospitals extracted insufficient data from case notes. In essence, the method of extraction of clinical data was unsatisfactory (Cleary et al., 1994).

2.1 Integration of Healthcare and Information Technology

According to Seeley (2009), the implementation of health information technology has improved healthcare quality and has become increasingly vital to the management of patient care. Integration of technology in healthcare enforces secure mechanisms for the sharing and handling of confidential health information. Walker et al. (2005) indicated the implementation of health information technology in the United States could potentially save approximately 5% of the funds spent on healthcare annually.

2.2 Health Information Technology

Health information technology is a combination of technologies used to electronically manage and share patient information. This combination may include the implementation of a health information system specifically designed to manage patient information and delivery of patient care through a decision support system. These technologies have been postulated to help improve the quality of care (Jamal et al., 2009).

The cost of medical errors in the healthcare field is estimated to be in the billions of dollars annually. Due to the magnitude of this problem and the impact that it has on citizens, Taylor et al. (2005) indicated the improvement of quality of care is a priority for policy makers. The need for improvement has been the impetus for solutions to fix the healthcare discrepancy. In the next section, we discuss electronic health records and their utility in modern healthcare environments.

3. Electronic Health Record (EHR)

The EHR system is a type of health information technology designed to improve patient care, reduce medical errors, reduce patient recovery time, reduce costs, and provide better care. This system facilitates the exchange of patient information across all entities within a healthcare organization (Hamelburg, 2009). The EHR has been identified as an important tool in the improvement of quality of care (Keyhani et al., 2008; Werner & Bradlow, 2007; Zhou et al., 2009). Several studies indicated there is resistance in the usage of technology by clinicians (Bhattacherjee & Hikmet, 2007).

The National Alliance for Health Information Technology (Institute of Medicine, 2000) released the definitions for some of the commonly used health information technology terminology:

Electronic Medical Record: An electronic record of health-related information on an individual that can be created, gathered, managed, and consulted by authorized clinicians and staff within one healthcare organization.

Electronic Health Record: An electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards and that can be created, managed, and consulted by authorized clinicians and staff across more than one healthcare organization (National Alliance for Health Information Technology, 2008, p. 6).

Also known as an Electronic Medical Record (EMR), the EHR is the digital lifetime information about a patient (Gupta & Murtaza, 2009; Raghupathi & Kesh, 2007). According to Nagel (2007), the EHR is comprised of comprehensive information compiled from various providers.

As stated by Dente (2011), the eventual goal of EHR implementation is to capitalize on cutting edge technology in sharing data in a safe and secure manner that conforms to the Health Information Portability and Accountability Act (HIPAA). The benefits of employing such technology can be witnessed in cases including individual emergencies, national disasters, shrinking geographical boundaries, fostering information exchange, and facilitating research and reporting.

3.1 EHR Evolution

Gupta and Murtaza (2009) noted the important role the digital revolution has played in transforming the healthcare industry and in the evolution of the EHR. Billing systems are no longer the only technology implementation in healthcare information management. Costs saving realizations triggered by electronic business systems have sparked interest in digitizing patient admission, discharge, and transfer information. Through the integration of technology and admission, discharge, and transfer information, current EHR systems are able to effectively track, locate, and meticulously count patients and their data.

3.2 Use of EHR Systems in the United States

Although an EHR system is a promising tool in the improvement of quality, implementation in the United States is limited. In 2006, only 25% of physician practices were using an EHR system, and only 5% of the hospitals had implemented the computerized version. Various causes have been introduced to explain the technology integration process (Felt-Lisk et al., 2009). Some of these reasons for low implementation levels were identified as: (a) unawareness of EHR security issues, (b) large gaps in knowledge of an EHR system, and (c) cost issues (Jha et al., 2006).

Another reason for the slow EHR proliferation was that one third of physicians practiced in solo- or two-physician facilities. These smaller facilities did not have the financial capability to purchase and implement an EHR system, which delayed implementation of the EHR (Felt-Lisk, Johnson, Fleming, Shapiro, & Natzke, 2009). Also, the number of physicians seems to be an important factor in determining the degree of EHR implementation. Practices with larger physician groups had a higher rate of EHR implementation than practices with a smaller number of physicians (DesRoches et al., 2010). In addition, facilities with independent practices were slower in EHR implementation than facilities associated with a larger hospital system.

3.3 HIT Integration and Stages in EHR Implementation

Before EHR systems can be implemented, it is necessary to understand the conditions that must exist prior to such initiatives. Various phases have been introduced to explain the technology-integration process (Felt-Lisk et al., 2009). According to Seeley (2009), there are a number of conditions that illustrate the integration of technology in healthcare. *Life cycle of health* was identified as the first step, which is the understanding of the financial incentives from the federal government, by the leadership in the healthcare industry. The second stage was identified as *change* that helps find new technologies for use in the healthcare industry. Change leads to *innovation,* the third condition. Change and innovation are possible only if there is *readiness*. The final step was identified as the *expectation,* of the technology in question, by the end users. These steps lead to the development of innovative technologies, such as the EHR, that are designed to improve healthcare (Seeley, 2009).

Once these conditions have been met, healthcare organizations and practitioners are ready to integrate HIT and EHR systems. Six stages of EHR implementation have been suggested for achievement of meaningful use of an EHR system. The six stages are (a) preparation, (b) planning, (c) installation, (d) action, (e) maintenance, and (f) termination of paper processes. Involvement of end users is critical to each of these stages. Preparation involves recognition of organizational decision making processes. Planning includes an active role of engaging end users in the selection of the appropriate EHR system. Installation is the shortest stage and involves technical expertise. The action stage includes actively encouraging and implementing the use of the EHR throughout the organization. The maintenance stage encompasses keeping up with the requirements and functionalities of the EHR system of choice. The final stage is termination of the paper processes, which further ensures maximum EHR implementation (Amatayakul, 2010).

Once the EHR system is in place, the benefits of such technologies can be realized, which can include improved quality of care for patients; however, as mentioned previously, many healthcare practitioners and facilities are slow to fully adopt such systems.

4. Conclusions

Research continues to explore the impact of health information technology on patient quality of cares issues. The implementation of health information technology has been proposed as a strategy to cost reduction in healthcare and quality improvement. Previous studies have found health information technology, specifically EHR, implementation resulted in enhanced quality of patient care by improving both administrative and clinical information management (Follen et al., 2007; Taylor et al., 2005). Jamal et al. (2009) conducted a review of literature dedicated to examining the impact of healthcare technologies on the quality of care with a focus on clinical outcomes. Out of the 23 studies they explored, only 14 indicated a positive impact on the quality of care. Another interesting observation from this literature review was that the use of health information technologies increased clinician adherence to standard guidelines for medical practice and administration.

Health information technologies improved quality of care through (a) reduced administrative functions, (b) decreased paperwork, (c) reduced workload of clinicians and healthcare professionals, (d) increased efficiency of administrators, and (e) increased access to quality care (Hillestad et al., 2005; Jamal et al., 2009; Schoen et al., 2006). Unfortunately, many healthcare facilities and practitioners have yet to implement EHR systems at the level of meaningful use. As such, further study is necessary to determine what factors are continuing to limit such implementations and to better understand the impacts such systems are truly having on healthcare costs and patient care.

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