

A Qualitative Study of an Electronic Health Record: Perspectives on Planning Objectives and Implementation at King Faisal Specialist Hospital & Research Centre (Kfsh & Rc), Saudi Arabia

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Abstract: *The patient health record is an essential information source for management and delivery of patient care services. Paper-based records are problematic with the issues, such as illegibility, missing data, double data entry, and difficulty with information retrieval. Thanks to the advent of the Health Insurance Portability and Accountability Act (HIPAA), which the Kingdom of Saudi Arabia introduces as part of healthcare reform, the local healthcare system employed Electronic Health Record (EHR) in order to enhance accountability and efficiency. The King Faisal Specialist Hospital & Research Centre (KFSH & RC) was the first organization to implement the EHR. The article explored the actual impact of EHR within KFSH & RC, as well as the issues surrounding the implementation of EHR. It evaluated the role of senior managers in the EHR planning. Qualitative research was chosen using interpretative phenomenology as the selected methodology. Information for the study was collected using semi-structured interviews with four senior managers and six patients. Three focus group interviews were also conducted with six healthcare provider middle managers in each group. The total sample was twenty eight participants. The study identified three categories of impact, including positive and negative issues affecting the staff, patients, and KFSH&RC organization.*

I. Introduction

The purpose of this study is to obtain insight into the issues surrounding the implementation and impact of EHR at King Faisal Specialist Hospital and Research Centre (KFSH&RC) in Saudi Arabia. The Electronic Health Record (EHR) has been widely adopted, with more than half of primary care physicians in Sweden, the United Kingdom, the United States of America, the Netherlands, and Australia using EHRs (Ash & Bates 2005; Podichetty & Penn, 2004). EHRs in United States of America enhance the efforts of the Health Insurance Portability and Accountability Act (HIPAA) by providing patients with accurate diagnoses and elaborating their effective treatment in a timely manner (Green, 2007). EHR in the Kingdom of Saudi Arabia was introduced as part of the national healthcare reform there in order specifically to enhance the accountability and efficiency requirements mandated by the adoption of HIPAA (Aldosari, 2012). The introduction of EHRs consistently affects the development of contemporary healthcare organizations and national healthcare systems. In this regard, the study of the effectiveness of introducing EHRs into healthcare organizations becomes particularly important after the introduction of the HIPAA, thereby stimulating the wider introduction of EHRs.

The HIPAA focuses on the improvement of the quality of healthcare services and the effectiveness of health organizations' performance (Green, 2007). An EHR system provides real-time access to a patient's complete medical history, potentially facilitating accurate and appropriate treatment. Studies have shown that medication errors, which are the most common cause of preventable injuries in hospitals, can be prevented by EHR systems (Poon et al., 2004). Helzner (2002) contended that not only patients, but also the entire healthcare organization could benefit from the implementation of an EHR system. Several studies have been done in the area of EHR in multiple settings and in various countries (Altuwaijri, 2008); however, to date, no study has assessed the effectiveness of planning and policy implementation with regard to EHR in a healthcare organization in the Kingdom of Saudi Arabia. This study will reveal how the King Faisal Specialist Hospital and Research Center (KFSH&RC) has planned and implement new EHR by taking into consideration the interests of all stakeholders and the role of senior managers. The study will further analyze the effectiveness of EHR implementation and planning measures in accordance with the broader policies of KFSH & RC. To this end, the main aim of the article is to explore and analyze the key benefits and challenges for healthcare providers and patients toward planning, implementation, and impact of EHR.

II. Research Design And Instrumentation

Methodological Orientation

For the present study, a qualitative framework was selected to resonate with the research questions. This also reflected the researcher ontological and epistemological orientation regarding the nature of knowledge

and that what can truly be known (Madill, 2002). An interpretive methodological approach will be used in the present research in order to explore the issues surrounding the implementation and impact of EHR at KFSH&RC, and to examine the expectations, attitudes and perceptions of different stakeholders about the implementation of EHR.

Qualitative Methodology

Qualitative research has lately enjoyed high levels of acceptance in the field of healthcare (Janice et al., 2011; Jacelon and Imperio, 2005). Its improved perception may be attributed to the realization that understanding, commitment, patience and openness are elements of healthcare that can only be understood through qualitative research (Collier, 2008). Because the results are based on cultural responses, the outcome of the study cannot be applied beyond the location where the study was conducted (Van der & Finkler 2004).

Another research method is grounded theory, which attempts to develop a set of strategies to conduct vigorous qualitative research (Glaser & Strauss, 1967). This method accomplishes its goal by using a 'special investigator' stance and approach and through specialized methods of information solicitation, participant selection, a systematic treatment of data, and interview components all of which are assembled into a final report. Closely related to phenomenology is the Interpretive Phenomenological Analysis (IPA) method that is concerned with understanding the lived experience and how the individual participants make their experiences sensible (Larsen, 2007).

The flexibility of this research method and rigorous analysis of the data obtained ensures that the data obtained by qualitative means will be accurate and valid. Moreover, this flexibility allows the researcher to make adjustments on the information obtained until more comprehensive and concrete information is obtained (Saunders et al., 2003).

Interpretive Phenomenological Approach

IPA is appropriate for the present study as it is concerned with examining experiences of the implementation of EHR. The phenomenological school of thought forms of a broad spectrum of beliefs and approaches, although all of them share an interest in understanding what human experience is like (Smith et al., 2010). Interpretive Phenomenological Analysis (IPA) is a qualitative approach which has been specifically developed within the field of health psychology. It is now widely used by researchers in clinical and social psychology (Smith et al., 2004). IPA is phenomenological in that it is concerned with individuals' subjective reports rather than the formation of objective accounts (Flowers et al., 1997), and it recognizes that research is a dynamic process (Smith, 1996). IPA also requires the application of subjectivity in data collection and interpretation, hence a high level of researcher involvement. IPA usually employs small samples for data collection because of its emphasis on achieving a richness of data (Walsham, 2006). IPA is appropriate for the present study as it concerned with examining experience from the perspective of those who are, or have been, experiencing it. It will therefore be effective in exploring the experiences and perceptions of patients, management and staff members regarding the EHR plan and its implementation.

Given this study's epistemological and ontological foundations, it is proper that the theoretical perspectives supporting the research originate from hermeneutics and phenomenology. The researcher opted to use a phenomenological method as she felt that an interpretive understanding of people's perceptions is the most compelling way of accessing and understanding healthcare workers' experiences of working with health information systems.

Limitations

Even though IPA recognizes the significance of the perspective of the researcher, it has also been criticised for not offering guidelines on how to integrate reflexivity into the research process and for not indicating how researchers' conceptions affect their analysis. Walsham (2006), proposes therefore that its results should invoke a sense of discovery instead of a construction, even though Pinar (2013) contends that IPA is a flexible approach instead of a rigid method, permitting flexibility to meet the needs and context of the researcher. Language as a limitation is addressed in this study by assuring the simplicity and homogeneity of the structure of the wording of the study.

Design

Sample

This study has employed purposive sampling. The final sample was comprised of 6 current patients, 4 members of senior management and 18 middle management staff, making a total of 28 subjects. Four key managers were selected: the chief information officer, the chief operations officer, the chief financial officer, and the chief medical information officer. This selection process was necessary in order to involve the majority of the key players in the EHR implementation and planning in the research. The researcher was thus able to

collect valuable data, which would highlight the different perceptions and expectations individuals held based on their specialty. The responses and perceptions of these four key managers were expected to be different from the eighteen stakeholders in the study who covered the majority of clinical areas in the organization, including six medical practitioners, six allied professionals, and six nursing staff.

The six current patients were subject to comparable selection across conditions, complexities and experience to determine if there were any improvement during their outpatient visits and to determine their knowledge regarding EHR implementation. This was necessary to create some balance in the sampling process. In the end, one patient with lower limb lymphedema as well as another patient who was undergoing liver transplantation, a third patient with a heart transplant, a fourth patient with acute back pain, a fifth patient with a urology problem and a sixth patient undergoing a total knee replacement were sampled.

The twenty eight research subjects, who included four senior managers and the six patients mentioned above, were asked to participate in a semi-structured interview. The eighteen stakeholders who were covering the majority of clinical areas were assigned to a focus group. The diversity of the participants' roles within the organization and their impact on the deployment of EHR in the organization was wholly representative of the planning as highlighted in this study.

The patients had to be both Arabic and English speaking (with a bachelor degree) in order to be able to read the complete transcript, because it was written in English. They also had to be outpatients with files at KFSH& RC for more than or equal to two years, in order to capture the changes over the time during the transition from Electronic Medical Records to Electronic Health Records. Finally, the study sought three females and three males, of between 18-65 years old, in order to explore the value differences between males and females, and the value differences across ages regarding the implementation of EHR.

Inclusion criteria: Middle and senior managers had to have a minimum of two years' experience in their current position, for the same reason as mentioned under patient inclusion criteria. They also had to be both Arabic and English speaking, as the completed transcript was written in English. They had to currently be involved in the implementation and planning of EHR.

Exclusion criteria: Patients with mental health problems and learning difficulties, or those under the age of 18, were excluded.

Those with experience of less than two years in their current position would not be able to capture the changes overtime during the transition from Electronic Medical Records to Electronic Health Records.

Data collection: In this research, two methods of data collection were employed to generate the primary data: individual interviews and focus group interviews. These data collection methods are discussed below in the following sub-sections.

The interview questionnaires design: Interview Questionnaires were designed to establish the participants' expectations about the EHR implementation and planning at KFSH&RC. Each of the questions was coded directly in relation to the research objectives (RO) and/or the research questions (RQ). The design of the interview questionnaires was strongly influenced by three studies reviewed in the literature and from the researcher's knowledge. These are discussed in turn presently.

III. Findings

The impacts of EHR implementation can be divided into three categories according to who was affected: the healthcare providers, the patients, the senior managers and the KFSH&RC itself. The perceived impacts on the healthcare providers were in relation to increased efficiency in data entry, distribution and retrieval; access to KFSH EHRs; additional information to better understand patients and care services, support for peer learning, staff attitudes toward using the EHR system, and empowering healthcare providers. The perceived impacts on the patients were concerned with the quality of care and facilitating better communication between healthcare staff and patients. The perceived impacts on the senior managers were assessed by taking into consideration the strategic planning and implementation of EHR, the workflow redesign, the resources, support, communication and training made available, as well as levels of engagement. The senior manager and patient relationships explicitly highlight the ignorance of patient views and expectations. The perceived impacts on the KFSH&RC were connected with improving the quality of health records, the work environment, and educating student practice healthcare providers and new staff members, which was achieved by taking into account the role of senior managers and their relationships with employees. Under each category and sub-category, the findings were described with relevant original oral descriptions presented in quotations as supporting evidence.

The results showed that the healthcare worker participants preferred using EHR and overall found the system to be more effective and efficient than the old handwritten files. This finding lends support to the role of “service quality & user satisfaction” in driving and measuring IS success, as suggested by DeLone and McLean (2003) & Petter, et al. (2008). Furthermore, the findings showed that the senior managers played an important role with regards to the cost, sources, and continuous support to the staff. Moreover, all the managers had an excellent experience about the IT, as espoused by Petter, et al. Model (2008). The results also suggested a certain degree of negativity to exist towards using the EHR system in the KFSH&RC; according to DeLone and McLean (2003) & Petter, et al. (2008), end-users’ lack of intention to use an information system is often caused by a lack of training which should be conducted to prepare potential for healthcare providers. In the present setting, the training was not well-structured and the support given after the training was not uniform and was perceived by some participants as inadequate. The initial training they received was too short and inadequate to address all of the content necessary for implementing the system so that it will be understood and remembered. However, after the implementation of a new training program for the last three months by the senior managers, most healthcare providers were happy and satisfied and reported that the senior managers were very supportive to staff needs.

The findings also showed an issue to exist in the form of ignorance of the patient voice during the strategic planning and implementation process of the EHR system. Most of the healthcare providers who participated in the present study felt that using the EHR system improved the organization’s internal communication and also its external communication with other healthcare providers in different organizations.

IV. Discussion

The findings of the present study on healthcare providers’ perceptions of the benefits of EHR clearly indicated that EHR was believed to increase the storage capabilities of patient records for considerably longer periods of time. These records can be accessed by many people from remote sites at the same or different times and the retrieval of the required information can be achieved almost immediately. Of even greater importance is the fact that the EHR are automatically updated and concurrently available for use at any time and in any other linked medical facility, which indicate completeness medical record, accuracy, and guaranteed legibility, and this has helped healthcare providers to save considerable time so that they can concentrate on the provision of physical care to the patient.

Further, the healthcare providers (i.e. physicians and nurses) have found that after the implementation of EHR, they are able to spend more time with their patients, concentrating on physical examinations and medical history rather than spending time filling in paper-based records, but nothing was measured regarding savings of time or money due to the lack of pre-post-test measurement tools. EHRs can provide medical reminders and alerts. EHR systems are designed in such a way that they contain built-in intelligence capabilities, such as recognizing drug interactions that are potentially life-threatening or recognizing anomalies in lab results.

Theoretical Contribution

Explored the drivers behind EHR implementation plan: With the advent of EHR in developed countries, the KFSH&RC decided to introduce EHR system in order to enhance the accountability and efficiency requirements. It was noted that the EHR implementation at the KFSH&RC was a top-down organizational initiative. The Ministry of Health made the decision to introduce the EHR system, formulated the policy and planned the implementation process. The findings of the study confirmed that the implementation of EHR fully supported the KFSH&RC broader policies which was designed to decrease patient waiting times, reduce unnecessary repeated tests, enhancing access to treatment, improve communication between healthcare providers and between patients and the healthcare providers, enhance the quality of care, while extending the geographic reach of specialist resources.

Explored the expectations of the healthcare providers and patients regarding EHR implementation plan

The study explored three categories of impact including positive and negative issues with their resultant effects on staff, patients, and KFSH&RC organization. The most frequently mentioned benefits that affect the healthcare providers were as following: improved clinical practice, improved administrative efficiency, enhanced patient centered care, and improved learning and professional development opportunities.

Benefits to the patients includes: improved patient safety, decrease medication errors, improved quality of care increased accessibility, decrease waiting time, and improved communication between HCP and patients.

Benefits to KFSH &RC includes: improved clinical and professional development, improved quality of care, improved communication and improved administrative efficiency. The challenges that the healthcare providers and patients faced during and after EHR implementation were mainly related to the role of senior managers such as inadequate training for healthcare providers, ignorance of the patient’s voice, lack of ability to

initiate cultural change and the absence of pre-post test tools to measure the outcome of healthcare quality. The quality of the system related to slowness and shutdown plus organizational difficulties related to different software platforms. Those negative impacts discouraged staff members from using the system but the overall benefits led to a smooth organizational transition to EHR. All patients were satisfied with this transition.

Explored the role of senior managers: The study showed that the senior managers played an important roles with regards to the cost, sources, and continuous support to the staff by providing extra computers to meet with the healthcare provider's workloads, and initiating extensive ITA 24/7 support. However, it explored the various issues which the senior managers did not successfully resolve. These unresolved issues included a clear lack of communication between the staff /patients and senior managers; a lack of role delineation among senior manager's engagement; as well as other issues outlined under the challenges that faced the healthcare providers and patients.

Relevance to Practice

The findings obtained from this study provide important information to the KFSH & RC senior management team as well as the Ministry of Health in the Kingdom of Saudi Arabia. The information gathered implies that the introduction of EHR has had a positive impact on the healthcare providers, patients and the KFSH&RC in general. The study should also ensure that senior managers will be better informed on the impact of the barriers identified, with the chance of overcoming them in areas such as the lack of training for healthcare providers; lack of inclusion of the patient voice during the strategic planning and implementation stages of the new EHR system; lack of initiate cultural change; and the absence of pre-post-test tools to measure the quality of care outcomes after the EHR system was implemented and compare them with the outcomes pre-implementation. Other negative issues identified were the quality of the system (e.g. problems with slowness and shutdown), and incompatibility through different organizations using different software platforms.

The EHR workflow implications for healthcare providers may vary according to the type of patient care facility and professional responsibility involved. However, the most reported changes EHR fosters involve increased efficiencies, and improved accuracy, timelines, availability, and productivity. Healthcare providers have greater access to other automated information such as information on certain diseases, improved organizational tools, and alert screens. Alerts are a significant function of EHRs because they can be used to identify medication allergies and to generate other needed reminders. For clinical researchers, alerts can be established to assist with recruitment efforts by identifying eligible research participants.

Interestingly, the national attention towards, and adoption of, EHRs comes at a time when the nursing industry is experiencing a substantial decrease in workforce and an increase in workload. To help to compensate for this workforce discrepancy, EHR implementations must coincide with workflow redesigns to ensure increased efficiencies, to generate improvements in quality of care, and to realize the maximum benefits of an automated environment. The rapid identification of potential research subjects before the undergo an intervention that will preclude their participation in a clinical trial also is important. Access to an EHR may be used for such rapid case findings (Serguei et al. 2005).

Limitation: The possibility of misreporting or under-reporting by participants cannot be entirely eliminated. The interview selection criteria were congruent with the researcher's subjectivist epistemological position, and enabled the participants to reflect on their perceptions and expectations of the impact of the new EHR system. However, the participants may have modified their answers in order to please the researcher and appear in a positive light (Holloway and Wheeler, 2002). Being aware of this possibility during interviews enabled the researcher to monitor and minimize the 'interview effect' by further questioning, following up, and probing more deeply into participants' responses. This study was limited to only one organization, the KFSH &RC. However, it would be interesting to examine the strengths and weaknesses of the other five organizations involved in implementing EHR within the country and the kind of challenges faced by them in this regard.

V. Conclusions

This research has aimed to critically review the issues surrounding the implementation and impact of an EHR system at KFSH & RC and the role of the senior managers in the planning and implementation. Three categories of impacts were identified according to who was affected. These related to the healthcare providers, the patients and the KFSH & RC respectively. The impact on the healthcare providers included increased convenience and efficiency in data entry, retrieval, storage and distribution; access to the EHR system; information and knowledge growth; empowering the staff; and impacts on healthcare providers attitude toward using the EHR system. The impact on patients was mainly felt in terms of the quality of care and the communication flow between the patients and healthcare providers. The KFSH & RC was affected by providing a better work environment to its employees by reducing the number of paper files stored; the educational

benefits and learning experiences gained; and improved communication between staff members and patients while increasing their ability to control the quality of care.

In this study, the positive impacts of the EHR implementation far outweigh the negative impacts. Therefore, it is logical to conclude that the benefits of the EHR systems are outweighed their negative impacts. In descending order, the most frequently mentioned benefits are: quick data retrieval, easy and quick data input, easy access to KFSH & RC EHR, facilitating smooth communication with external healthcare providers, enhancing the flow of information about patients, facilitating communication among staff members, improving the format of records, and increasing patient safety. These findings lend support to the role of “service quality” and “user satisfaction” in measuring IS success, as suggested by DeLone and McLean (2003).

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