Information Technology in Patient Care: Challenges of using IT in Small Ambulatory Healthcare Organizations

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Abstract

Health information technology (HIT) is broadly considered a tool for providing better care for the patients, minimizing the medical costs, minimizing the errors during their visit. With raising healthcare cost in mind and to improve the patient care, every healthcare provider must adopt and implement HIT. Patients are experiencing quality problems during their every visit to the doctor's office. We found that small healthcare organizations are facing many challenges and issues with implementing HIT, learning and obtaining knowledge on HIT. Small healthcare leaders should plan implementation carefully, ensuring that members of the organization prepare for the effective integration of this technology into clinical workflow.

Keywords: Healthcare, IT, Challenges, Small healthcare

1. INTRODUCTION

As we continue to strive for advances in health information technology (HIT), we must confront several barriers to its success. The healthcare industry represents a major part of today's economy. We have speed, resources availability, cost and interfacing or communication with ancillary systems are no longer significant issues (Thompson and Dean, 2008). It is evident that inadequate design of an information system (user interface) or its poor performance (slow response) will reduce its chances of being implemented and using successfully (Berg, 2001).

There may be other implementation barriers that have not been recognized or widely reported, or various factors may interact differently in different types of organization such as small and medium private physician practices (Davidson and Heslinga, 2007). This paper focuses on the challenges and issues that small and medium sized healthcare organizations are facing with the implementation of HIT.   More specifically, focus is on small healthcare organization within the public healthcare of New York, with 96 providers providing patient care at 7 different locations. Researcher adopted interpretive case study based approach in the context of small healthcare organization.

There are many potential advantages from the application of HIT when compared to traditional method.   These include improved communication between patient and with their primary care provider or clinical people (Providers and Nurses) via patient portal, improved quality of care, improved patient safety, patient orders and results processing which helps to make quick decision, needless medical tests, decreased making medical errors, improved legibility and mainly decreased paperwork (Cantrill, 2010).

Although considerable research and implementation of HIT has occurred over the past 15 years, very little progress in the adoption of healthcare systems has been observed in the small and medium healthcare organizations (Bahensky, Jaana, and Ward, 2008).   The progress of implementation of HIT

in some small and medium healthcare environments is lagging, implementation of EMRs raises serious concerns and doubts as whether future efforts will succeed or not (Bahensky, Jaana, and Ward, 2008).

Small and medium hospitals are often still lifeblood for rural communities but operate under limited resources, there are specific technical challenges that apply which affect the development and implementation of EMRs, including: Scalability, consistency, ease of access, usability, standardization, integration and security of health care information (Bahensky, Jaana & Ward, 2008). Healthcare Organizations with 1-40 beds that are considered to be small organizations (Coyne et al, 2009).

At the low rate of HIT adoption and health information exchange may seem surprising, as HIT has been widely adopted in larger healthcare organizations for more than few years, however quarrying more deeply reveals that less research has been done on challenges in implementation of HIT in small and medium organizations. Additional research is needed to further refine recommendations for implementation of HIT for the small and medium sized healthcare organizations.

The end result is that most information systems currently used in healthcare organizations are designed to support ancillary services (Such as laboratory reporting, logistics and materials management, billing and medical records). They do not serve the overarching process of providing patient care (Thompson & Dean 2008). The question arises as to what's going wrong with the healthcare system? Is it that the cost of technology or the system of insurance or decision making or the health information exchange or flow of information?

Healthcare researchers have spent last 10 to 15 years in identifying, studying and analyzing the major problems that healthcare organizations are facing and researchers have unified available data from multiple sources to answer today's tougher questions. This research will mainly focus on studying the role of information technology in healthcare and intends to examine the following question
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What are the main IT related challenges at small healthcare organizations affecting the efficiency of patient care and challenges of integrating to exchange health information between small physician practices with ancillary applications?

In the next section we outline about use of HIT in small and medium sized organizations, we then outline the research methodology that we have utilized for this research, preliminary findings from the research. Finally we conclude with identifying the major challenges small and medium healthcare organizations facing.

2. SMALL/MEDIUM SIZED HEALTHCARE PRACTICES AND THEIR USE OF HIT

In the current US economics, small organizations play a vital role on the world stage. Increasingly healthcare leaders and policy makers are looking to information technology to address quality, cost, and access issues in small healthcare organizations delivery (Davidson and Heslinga, 2007). During recent decades, the field of healthcare organizations, particularly in the United States presents a marvelous opportunity to examine small healthcare organizations undergoing rapid, even profound change, delivering services (Scott et al, 1992).

Implementation of HIT in small hospitals and outpatient clinics is accelerating, but some small hospitals face considerable personnel and financial resources shortages which hinder their efforts to implement complex HIT. Hospital size has been shown to have a systematic relationship to progress on implementation of HIT (Bahensky et al, 2009). Classification of healthcare practices by size or clinical specialization may need to be stretched to include patient population served, staff size, reimbursement models and practice belongs to manage care plan (Lee et al, 2005).

The process of implementing health information systems at many small healthcare organizations and their affiliated clinics is challenging (Barnas et all, 2011) Due to inadequate infrastructure and data, financial pressure, lack of experienced clinical and non-clinical people, limited staffing and demographic population small hospitals are lagging behind in health IT adoption and are far less likely to have adopted EHR and other applications than large hospitals that are required for meaningful use (Barnas et al, 2011).

The small healthcare organizations includes diverse delivery systems with difficult workflows that are poorly addressed by standardized HIT systems, lack of strong leadership, strategic

planning, change control management, and customizing IT systems to support the workflows and outcomes. HIT implementation requires more than structuring, designing, or obtaining and customizing a system (Lee et al, 2005).

Current commercial EHRs on the market were clearly designed by IT personnel without a thorough understanding of small practices workflow, EHRs cannot tolerate a great deal of customization have poor usability for the small practices and impede workflow instead of stream ling it (Mendel, 2009).

Many small organizations face problem in implementing and maintaining due to lack of resources, project management tools, process management, lack of direction, lack of competence, and strategies, which are basic components for any organizations to be successful (Rautiainen et al, 2002). Examination soon after implementation is important to discover any additional modifications in customization or workflow reengineering that need to happen to the out of the shelf applications (Mendel, 2009).

In any small organizations management of resources is the another key challenge such as, staffing, budget and timing, providing regular and proper training to employees on implementing and using new systems and upgrades, and maintaining supporting documentation (Hassan and Chakraborty, 2011). Typically in small healthcare organizations with minimal knowledge on distinctive healthcare workflow finds it hard to allocate available resources to enact multiple roles. Some small hospitals lack any IT staff, or have previously been unable to justify even one full-time equivalent IT staff member. Beyond the IT staff, users of the health IT systems may only work part time at the hospital, creating gaps between times when they may interact with a system, this creates a challenges of fully learning how to use health IT or addressing workflow changes (Barnas et al, 2011).

Deploying HIT in small healthcare organizations has significant potential to improve patient safety, organizational efficiency and patient satisfaction in healthcare. Despite this several studies have suggested that the adoption of HIT in the United States limited to certain large scale organizations (Poon et al, 2006). While small healthcare organizations systems offer similar types of functionalities as large inpatient hospitals, but the systems are less complex, in part because the nature of care being providing is less complex (Milstein and Bates, 2010).

Having well integrated HIT at small practices, particularly in primary care settings with small outpatient environments, EHR and IT tools facilitate a culture of health data management and sharing with ancillaries can greatly improve the patient care and efficiency (Milstein and Bates, 2010).

3. METHODOLOGY

Adopted an interpretive case study based approach following the guidelines of Walsham (1995). In addition researcher followed perspectives from Grounded Theory Method (GTM) to do the data analysis (Strauss and Corbin, 1990). GTM is general methodology for developing theory that is grounded in data systematically gathered and analysed (Strauss and Corbin, 1990). GTM is a qualitative research method that uses a systematic set of procedures or coding hierarchy to develop an inductively derived grounded theory about a phenomenon (Strauss and Corbin, 1990). Specifically open coding was done, researcher completed initial data collection for a small healthcare organization and report few sample initial findings in this paper in table 3.

The required data for this research was collected by the first author while working in a small healthcare organization in New York as a part of IT team. The medical group has 96 providers at seven different locations across New York. Working with the IT team helped author to understand the existing gaps and workflows of healthcare organizations. Interacting with clinical and non-clinical people and with other supporting ancillary departments of the organization, helped author to identify the problems and major issues that are affecting patient care.

The small healthcare practice selected for this study is a multi-specialty group, with seven convenient location throughout New York, serving the local community. An executive leadership team comprised of clinical and corporate individuals manages the site. To support business operations and patient care needs, practice decided to adopt Health Information Technology (HIT) and decided on selecting small outpatient healthcare application with few modules. Due to lack of integration within the application system to communicate with different modules, application slowness,

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and failed to communicate with other ancillary applications led to affect clinical people workflow, which in-turn directly or indirectly affected patient care. The details of the source of data and actors involved in this research are provided in the table 1 and 2.

Source	Description
1. Interviews	Data was collected by asking set of questions to both clinical and non-clinical users.
2.Direct and participatory observation	Worked at this group as an intern and interacted with different clinical and non-clinical staff members on a daily basis to understand the system needs and apply the changes to HIT.
3. Physical Artifacts	Examination of existing IT systems, their design features and potential issues in their use.

Table 1: Data Sources

Qualitative data for this case study was collected by interviewing the clinical and non-clinical staff, which helped to understand the scope of different healthcare projects, strategies and about healthcare management, which added more value to this research to identify the major issues within small healthcare organizations. Table 2 below exhibits data related to the actors.

Actors Involved	#of Actors Involved	#of Patient charts Retrieved/ day by user	Type Health Information System use
Providers	5	40	Clinical information systems
Nurses	3	60	Clinical information systems
Patient service representatives	3	100	Patient centred information system
Practice administrator	1	10	Administrative information system

Table 2. Project Actors

Application design issue: It is critical to understand the end user requirements for an application for successful design and implementation. Not so clear understanding of the change request is resulting in poor system implementation design issues. This in turn results in multiple design issues resulting in productivity and support issues.

Integration issue: With having multiple modules within an application, it is imperative for efficient integration of those modules to provide accurate visibility of the patient information. Without which critical information can be missed from being considered for better patient care decisions. For instance, if the patient had a diagnosis from the hospital admit, if missed from being captured or displayed in the clinical modules, a physician might miss addressing the medication being taken for that condition, resulting in sub-optimal patient care.

User accessibility issue: Due to application design issues and integration issues, end users will be presented with multiple interruptions during the visit. These interruptions resulting in reduced productivity, increased frustration, inability to function efficiently. Negative experience becomes an impediment to patient care.

Cause for Issue	Tasks	Quotes
Application design issue; User accessibility issue, Integration issue	Scheduling an appointment	Real time insurance verification
Application design issue	Patient appointment reminder	Call the patient, remind appointment
Application design issue, User accessibility issue	Check in the patient	check-in, verifying insurance, provider and appointment type,

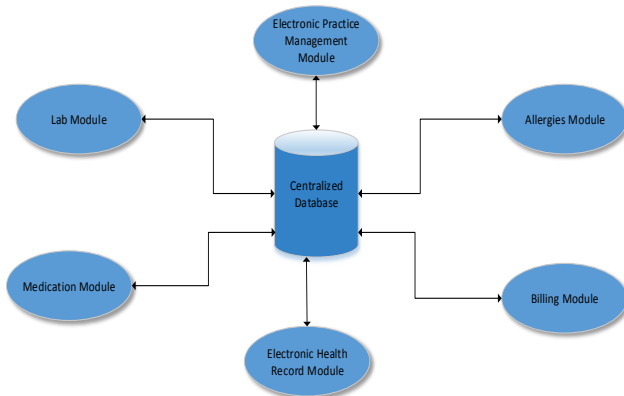**Table 3: Clinical and Non-clinical staff tasks, Issues and Quotes**

Figure 1 depicts different user types accessing the patient information via different modules of an EHR system. Different users will and can access the same patient via different modules

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for different part of the process simultaneously. Due to poor application design and integration issues, concurrent access is resulting in missed visibility to the data being captured by different users between different modules.
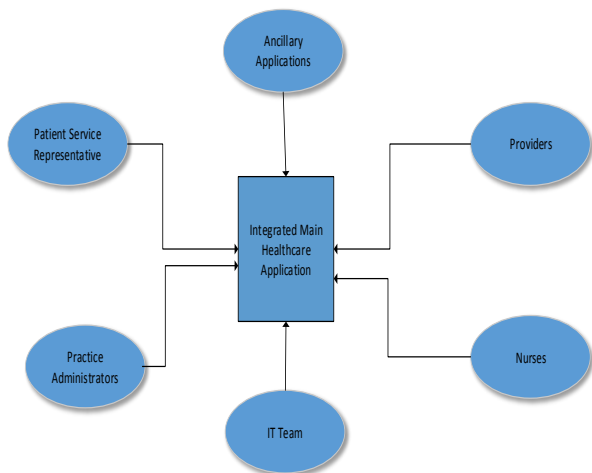
Figure 1: Different user types accessing the patient information

Figure 2 represents how different modules within the main application communicate with each other. All modules will pull the information from the central database for the organization. This will some time result in slowness issues, causing user inconvenience and reduced productivity. The slowness can result in application crash resulting in lost data/documentation.

Figure 2: Integration of Modules within the Application

The interviews with clinical and non-clinical staff was semi-structured, interviewer had a prepared questionnaire. Twelve interviews were conducted individually during normal working hours, included five Providers, three nurses, three patient service representatives and one practice administrator. They were interviewed in-depth to know their daily tasks, challenges and their understanding about the healthcare application that they use at the organization. All interviews were carefully recorded to review and analyze later each recorded interviews were transcribed.

The open codes were identified through analysis of the text and by writing our impression as a small memo by highlighting the text. These memos explain our impressions to actors' responses to our questions, and were also explanatory of initial open codes. At the end of the initial open coding we were left with numerous concepts from the transcribed data. The second phase of open coding required us to review the transcribed interview data to identify the concepts at higher level to classify, we were able to identify higher level codes and contextual memos. During first and second phase of open coding, an effort was made to identify codes related to the healthcare organizations workflow and the role of HIT.

4. CONCLUSION

As the United States moves forward with an ambitious and expensive plan to increase the use of HIT and HIE, an array of challenges lies ahead for the small healthcare organizations. Most evaluations of EHR implementation apply to large healthcare organizations. There is a great potential for HIT to contribute to the goals of improving quality of care, access to healthcare and cost containment in small healthcare organizations. Even small healthcare environments are providing quality healthcare as equivalent to large inpatient hospitals and meeting patient needs. The majority of physicians are ready to learn new healthcare systems, workflows and for transition to new era to provide better healthcare. With the increased HIT implementation across various healthcare environments there is a need for additional research in order to adequately understand the issues, challenges, barriers and potential benefits in small healthcare organizations.

5. REFERENCES

Bahensky, J., Jaana, M. & Ward, M*. "Healthcare Information technology in rural America: Electronic medical record adoption status in meeting the nation agenda", the journal of rural health, 24, 101-105.*

Bahnesky, J., Ward, M., Nyarko, K & Li, P. 2009. "HIT Implementation in Critical Access Hospitals: Extent of Implementation and Business Strategies Supporting IT Use", Journal *of Medical System, 35, 599-607.*

Barnas, J et al 2011. "Overcoming Challenges to Health IT Adoption in Small, Rural Hospitals", *Altarum Institute, 1-37.*

Berg, M. 2001. "Implementing information systems in healthcare organizations: Myths and Challenges", *International Journal of Medical Informatics, 64, 143-156.*

Cantrill, S. 2010. Computers in Patient care: The Promise and the Challenge, *Communications of the ACM, 53, 42-47.*

Coyne, J et al, 2009. "Hospital cost and efficiency: do hospital size and ownership type really matter?", *Journal of Healthcare Management*, *54-3.*

Davidson, E. & Heslinga, D. 2007. "Bridging the IT adoption gap for small physician practices: An action research study on electronic health records", Information systems management, 24, 15-28.

Hassan, R & Chakraborty, S 2011. "Investigating Software Maintenance Challenges in Small Organizations". AMCIS.

Lee, J., Cain, C., Young, S., Chockley, N and Burstin, H. 2005. "The Adoption Gap: Health Information Technology is Small Physician Practices, *Health Affairs, 24, 1364-1366.*

Mendel, S. 2009. "An implementation strategy for EHR in the small primary care physician offices incorporating human factors engineering principles, *Scholar Archive, 410.*

Milstein, J. A., and Bastes, D. 2010. "Paperless healthcare: Progress and challenges of an IT-enabled healthcare systems", *Business Horizons, 53, 119-130.*

Poon, E. G. et al 2006. "Assessing the level of healthcare information technology adoption in the United States: a snapshot", *Bio Medical Informatics and Decision Making, 1-9.*

Scott, W.R., Ruef, M., Mendel, J.P and Caronna, A. C. 1992. "Institutional change and Healthcare Organizations", *American National Standard for Information Sciences., Z39-48.*

Strauss, A & Corbin, J. 1990. "Basics of qualitative research techniques and procedures for developing grounded theory", *SAGE Publications. 1-312*.

Rautiainen, K et al., 2002. "A tentative framework for managing software product development in small companies", *IEEE, 1-9.*

Thompson, S. & Dean, M. 2008. "Advancing information technology in healthcare", *Communications of the ACM, 52, 118-121.*

Walsham. G. 1995. "Interpretive case studies in IS research: Nature and Method", *European Journal of Information Systems, 4, 74-81.*