ELECTRONIC MEDICAL RECORDS IN MYANMAR: USER PERCEPTIONS AT MARIE STOPES INTERNATIONAL CLINICS IN MYANMAR

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Abstract. Using paper-based records to store patient data is common in a developing country like Myanmar. Implementing electronic medical records (EMR) can have a significant impact on the efficiency and quality of patient care. In this paper, potential users' perceptions around an EMR system was obtained via qualitative interviews conducted with clinic staff from a non-governmental healthcare provider, Marie Stopes International Myanmar (MSI-M). Users' prospective concerns included the extra workload and training required during the transition stage, accessibility and confidentiality of data held under the new system, and the provision of technical support and the suitability of current infrastructure. Generally, respondents regarded EMR favorably, with expectations of knowledge gains from training, and for facilitating their routine work when accessing, retrieving, and reviewing patient data. The findings represent the perceptions and acceptability relating to EMR by clinic staff in an international non-governmental organization operating in Myanmar.

Keywords: electronic medical record, international non-governmental organization, paper based medical record, technology acceptance, Myanmar

INTRODUCTION

Electronic medical records (EMR) play an important role in providing a continuum of care for patients. The ISO 18308 provided a comprehensive definition of electronic health records (EHR), the broader term for EMR, as…*one or more repositories, physically or virtually integrated, of information in computer processable form, relevant to the wellness, health and healthcare of an individual, capable of being stored and communicated securely and of being accessible by multiple authorized users, represented according to a standardized or commonly agreed logical information model* (International Organization for Standardization, 2011).

Paper-based medical records have proven to be less efficient, fail to meet

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health care providers' needs, and make communication between providers more difficult, especially in developing countries. The introduction of an EMR system could help to improve the efficiency and quality of care in developing countries (Girosi *et al*, 2005).

Literature reviews suggest that implementing an EMR system in primary care can lead to positive financial return, (Cook-Moine and Cramer, 2005), simpler patient file and/or dedicated data item retrieval (Girosi *et al*, 2005), improvements in patient safety, and more efficient data analysis. Furthermore, EMR implementation has proven to be effective in providing patient care in developing countries (Frasier *et al*, 2004, 2005, 2006; Douglas *et al*, 2010). While it seems obvious therefore that EMR could improve the quality of care, in reality it cannot be easily implemented. Research exploring the views of EMR users has been conducted internationally (van der Meijden *et al,* 2001; Miller *et al*, 2003; Miller and Sim, 2004). In this study the views of healthcare providers working for a non-governmental organisation in Myanmar were explored. Despite several limitations and concerns regarding infrastructure and financial support, it may still be possible to have an EMR system implemented in some organizations in Myanmar where private funding is available.

The researchers set out to conduct a qualitative study to explore such possibilities from the point of view of individuals who work at an international non-governmental organization (INGO) that provides healthcare services in different locations across Myanmar, Marie Stopes International Myanmar (MSI-M). The success of implementing information technology particularly the EMR system at an organizational level would be driven significantly by the perception and acceptance of those individuals who would be using the EMR in patient case management and care.

Marie Stopes International, a UK-based INGO, has provided healthcare services in Myanmar since 1998 (Marie Stopes International, nd.). At the time of the present survey, there were 25 clinics across the country including the head office based in the former capital, Yangon. Keeping paper-based patient records is common in MSI-M clinics. In general, patient data are collected and kept in three places: a clinic record card, a registration record at the clinic, and a clinic record booklet, which is given to the patient.

The limitation of the current system is that the respective clinics cannot get the complete medical history of their patients, as their medical history is not described fully in the booklet and the record card. The clinic record cards, documented and maintained at the clinic, are sometimes difficult to file and retrieve, and burden the staff with vast daily filing problems at the clinics. Operationally, the current system might lead to a loss of records, a lack of record storage areas, redundant time consumed in filing and retrieval, and an overall error-prone process. In fact, having complete, easily retrievable patient records would greatly benefit physicians when making decisions about their patients' treatment.

The use of an EMR system is vital to improve patient care and yet it is not a common practice in hospitals or clinics in Myanmar. One outcome of this is that healthcare service providers cannot track patients over time and therefore cannot reach the overall targeted quality of care (HealthIT.gov, 2005). The need for effective ICT solutions is called for in MSI-M and the particular benefit derived from

an EMR system, which has demonstrated an improvement in the continuity of care at an NGO-supported health post in rural Nepal (Watkinson-Powell and Lee, 2012). However, it is not only healthcare system management issues, but also social and cultural aspects that may be major concerns when planning for EMR implementation.

It is thus important to identify potential users' views on the implementation of EMR. By embracing technology, potential users can help to improve the quality of care they deliver. In principle, information technology may be used to enhance employee performance, and yet the benefits derived from the technology are often lost due to users' unwillingness to accept and use an information system along with their fear of change. This study employed a qualitative approach to assess issues of concern among staff in an INGO providing healthcare in Myanmar. The main purpose of this study was to explore users' perceptions around EMR implementation in an INGO, Marie Stopes International Myanmar.

MATERIALS AND METHODS

Participants

Seventeen study participants were recruited using purposive sampling from 112 respondents who participated in a technology acceptance survey, a quantitative study discussed elsewhere (Thit, Unpublished thesis results, 2014). There were more female (81.2%) working at MSI-M. More than 40% of the survey respondent aged less than 30 years and majority of the participants hold Bachelor degree. Around 60% have been working in healthcare for more than 6 years and 38.4% have been working in MSI-M for more than 6 years. All the surveyed clinics were equipped with at least one computer and only head office had a server.

Approximately 80% of the surveyed participants had computer related training, and 73.2% answered having short course training while 6.3% had training in the University. In general over 50% of the participants still had low level of computer usage. There were differences among regions and head office concerning user acceptance where the head office had the lowest score of acceptance. All the surveyed regions expressed a high degree of intention to use the proposed system. Perceived usefulness was an important construct when determining the participant's intention to use.

In an attempt to take the opinion of the stakeholders at all levels, 17 individuals who participated in the qualitative study comprised both clinicians and non-clinicians, [ten clinicians, four administrative staff (cashiers, receptionists, or accountants), one supervisor, and two laboratory technicians] represented the head office and eleven MSI-M clinic sites.

The interviewees were purposively selected from 25 sites according to the hierarchy of the organization and involved at least some stakeholders from each level. Furthermore, these participants were voluntarily to join the discussion on the topic of medical data recording system.

Ethical considerations

Ethics approval for this research was received from both the Mahidol University Ethical Committee and the MSI-M Internal Committee, together with a permission letter to conduct the survey from the country director of MSI-M. All participants volunteered to participate and were not paid to be interviewed.

Data collection

The PI conducted the one-to-one in-

terviews at the participant's workplace. Selected participants were key people at all levels who would be affected by the new system and/or people suggested by the organizational contact, that is, country director, program managers, and staff from surveyed clinics. Among those, only ones willing to discuss about the data recording system and signed the informed consent were participants in the study.

The PI followed structured interview guidelines and ensured that the questions were clearly worded. The interview started with general introduction; the researcher/interviewer introduced oneself and briefly explained the background of the study, and assured the interviewees/participants that the data collected were kept confidential. The interviewees were told to ask any questions if questions were not clear. Questions outlined for interviewees at the clinics were as follows:

Open questions

a. What is your opinion of the current paper-based system in your clinic?

b. On average, how many patients visit to clinic per day?

c. On average, how long does it take the whole process of treating the patient?

d. Does the clinic receive any complaint from patients regarding their services?

Closed questions

a. Is it easy to use, retrieve patients' information in the current paper-based system?

b. Do you provide medical report to patients?

c. Does the clinic maintain full patients' medical report?

d. Are you concerned about loss of productivity during transition to the new system(s)?

e. Are you concerned about inappropriate disclosure of protected health information?

Additional questions

In addition, other than questions mentioned above, the following additional questions were asked.

a. Can the organization get funding?

b. Does the organization have IT personnel/expertise?

c. Do they have capacity to train their staff?

d. Are they concerned about the ability to keep patients' data private and secure?

e. Are they concerned about obtaining or maintaining wireless access?

Then the research team distributed printed handouts to participants, which described the proposed EMR system that could be implemented at MSI-M. The handouts included a definition of EMR, sample data and scenarios in EMR, its usage and benefits and how it would function within their environment. Particularly in the study, the potential functional and application of EMR system that could be applied to the organization was defined such that EMR could help identify and maintain a patient record and history, manage patient demographics, manage problem and medication lists, manage clinical documents and notes as well as capture external clinical documents, cover care plans, and generate and record patient-specific instructions.

The principal investigator (PI) explained the proposed system and answered any question raised about the proposed system. The participant was encouraged to discussion about issues around EMR. The flow of discussion was allowed to run freely to avoid researcher pre-conceived bias. On average, each interview took around 30-40 minutes. Dur-

ing the interview, the researcher recorded the conversation, clarified any uncertainties, and took written notes. The interview recordings were transcribed and analysed thematically. This paper describes those themes that were mentioned by at least two interviewees during their interview.

Data analysis

The research study collected both quantitative and qualitative data and both sets of data were analysed. The qualitative data outcomes will be used to augment the findings of the quantitative study (Thit *et al*, 2014). For the qualitative data, the researcher first independently analysed the transcripts and coded them into themes. The researcher adopted the content analysis approach focusing on conceptual analysis rather relational analysis.

The conceptual analysis was performed by establishing the existence and frequency of concepts mentioned by the interviewees' words of phrases (Busch *et al*, 2012). At the first step of conceptual analysis, the researcher identified the main focus research questions, which was about the implementation of EMR, then chose samples of key words and examined the text to be coded into manageable content categories. The next step was the process of selective reduction of coding by putting the text from the transcription of the interviewees' statements to categories of a set of words or phrases that were indicative of the research question (the implementation of EMR).

Two statisticians reviewed the data, and consensus was achieved by determining the codes emerging from the data. Phrases that were mentioned from at least two interviewees were examined and later assigned codes based on what the interviewees said. Inductive codes, which were the codes developed by the researcher, allowed themes to emerge from the interviews (University of Southern Alabama, 2014), For example, the phrase "Every evening, it takes time to put the clinics record card back to the shelf" was given two codes, "current system" and "time consuming". In total, there were six codes representing four major themes: a) concerns with the current system, b) concerns with the transition period, c) perceived challenges, and d) opinions on the proposed system. The interviewer conducted debriefing sessions to enhance the credibility of the data analysis.

RESULTS

Generally, the MSI-M clinics treat between 15 to 100 patients per day and are open Monday to Friday, except for a few clinics, which also open on Saturday. Approximately 300,000 patients receive treatment at MSI-M annually. Overall treatment times vary, from 10 minutes to 1 hour, depending on the treatment plan. Clinics provide a medical report if the patient requests it.

Demographic data showed a female: male ratio of 13:4. The median age of the participants was 30 years old (range of 22-63). Regarding education level, over 80% of the participants had a bachelor's degree or higher. Over 40% had been working in healthcare for more than six years and 35% had been working with MSI-M for more than six years. Among 17 participants, all has experienced in using computer technology; however, half of them have been particularly trained in health information technology.

Analysis of the data illuminated four key themes: concerns with the current system, concerns with the transition period, perceived challenges on the proposed system and the end users' perspectives

on the proposed system.

Concerns with the current system

Based on the interviews, three concerns with the current system were identified. These were the amount of time consumed, duplication of effort with the record cards and booklets, and difficulties with information retrieval.

a. Time consuming. For many respondents, the current paper-based system for recording patient information was time consuming. One participant also stated her experience of using the current system: "We have a lot of patients with the same first name. For example, starting with an 'Aung,' and by the end of the year, we have about a few hundreds. When the patient with the same first name comes, it is time consuming to look for the record card."

b. Duplication of record cards and booklets. Patients often lose their health record booklet, resulting in data duplication through a new record being created at each visit. A common situation stated by one respondent was as follows: "Patient usually loses the booklet and does not remember his/her last visit. So we either re-register them or re-issue the booklet."

c. Information retrieval. The most commonly described challenge was the difficulty in retrieving patient information, in this case, the record cards in which patient information was documented, especially of old patients without appointments.

Concerns with the transition period

Two concerns related to the transition period were identified.

a. Training. For many interviewees training was of importance as they anticipated the EMR system as a difficult program. Participants were also worried about other underlying barriers such as probable power cuts at the clinics and extra workload during the transition period. One participant stated: "During transition period, I am concerned about the staff training and double workload. If the staff are not fully trained, it will impact on the workflow and decrease productivity."

b. Workload. Although respondents were optimistic about the proposed system, increased workload emerged as another concern related to the proposed system, since staff would have to handle both paper-based and electronic records during the initial rollout. For example: "Will the organization keep the record card system even after installing the proposed system? I don't want to handle the patient information in both paper-based and electronic based system."

Perceived challenges around the proposed system

After looking at the proposed EMR system that could be implemented at MSI-M clinics, staff expressed several points of concern. The interviewees' perceptions around the proposed system were classified into three categories:

a. Patient confidentiality. There were concerns that patient confidentiality might be compromised and one participant stated: "Currently, though data are not particularly protected, they are not easily accessible. With the proposed system, due to increased data accessibility, patient's privacy might be breached and compromised."

b. Technical support, unstable power supply. Among participants, the potential advantages of EMR were overshadowed by an unstable power supply, technical support issues, and availability of training. Power cuts are common and most interviewees were worried about the effect this kind of downtime would have on the EMR system, with one participant

stating: "I am worried about the technical support. We had a computer breakdown in the past. It took more than a week for the technician to come and check what was wrong with it", while another asked, "What will happen when the power is cut off? If it happens, do we have to use paper-based system or electric generator will be installed?"

c. Sustainability. The concerns around the current technological infrastructure in Myanmar led to the ultimate question of sustainability, an issue raised by clinicians and head office staff: "It is quite clear that everyone wants the new system as it seems to solve problem related the patient information retrieval at the clinic. However, given the current situation in Myanmar, will the system be sustainable?"

End user perspectives around EMR

Interview participants highlighted the advantages of having an EMR system in place, which are summarised as follows. The patients' files will contain related care plans and notes, which are helpful. Records can be retrieved and any data redundancies can be removed at any time. There was general consensus that an EMR system would provide more consistent and detailed patient information than the paper-based system. This would improve the coordination of care. Specifically, the clinician or nurse could write down a detailed treatment plan, laboratory technicians could upload results, which could later be searched electronically, and administrative staff could update a patient's personal information, record the current visit, and schedule the next visit in the system.

Many interviewees supported the envisaged EMR implementation and they stated their expectations with respect to the system: "Days like Monday or Friday, we see 80-100 patients. It is quite difficult to handle patient record card and hope that the EMR implementation could solve the problem." or "EMR would allow the clinic staff to access patient information more easily and I hope it could provide more security than paper-based system."

Regarding the balance between perceived benefits and accessibility to patient information, most interviewees did not want their work routines to change radically in any transition from paper-based records to EMR. From their point of view, writing is easier than typing as most staff only had basic computer training. However, they also believed that retrieving patient information from EMR would be much easier. One interesting concern was that "I am more concerned with the relationship with the patient. Current system allows us to interact with patient. If EMR installs, I am afraid we don't spend much time with patient." Staff from the head office were particularly interested in the ability to remotely access patient information. According to one center manager, since the implementation of EMR would allow healthcare providers to review patient data, decision-making could be improved and patients would not need to keep their own record booklet.

Administrative staff sought usability and facility with the proposed EMR system. The interviewees were positive about EMR implementation and most of the clinics were willing to participate in the pilot stage. However, they were concerned about using the EMR software. They would like to have software that is accessible for users with different ICT skill levels. In addition, the potential users hoped that an EMR system would be simple to use and easy to learn. However, some interviewees showed their reluctance to use the proposed system: "EMR seems to be

promising ideas for the problems currently faced at the clinics, but is it, really?"

Given the perceived barriers and users' expectations, a range of organizational support is required to ensure the successful implementation of EMR. The findings highlighted the importance of training and technical support for which the study participants were concerned with during the transition period. In addition, one center manager/clinician expressed that "We had a computer breakdown in the past. It took more than a week for the technician to come and check what was wrong" and "Even though the studied clinics were situated in different regions, overarching themes were identified across sites."

DISCUSSION

This study examined the views of MSI-M staff regarding a proposed EMR system implementation. Four main themes were identified: concerns with the current system, concerns around the transition period, perceived challenges, and end user perspectives on the proposed system. Major limiting factors for the paper-based system listed by interviewees in MSI-M were that it was time consuming, there was duplication of record card and booklet data, and that there were difficulties around information retrieval. Previous studies have confirmed that implementing an EMR system reduced the time spent by administrative staff to retrieve patient data (Girosi *et al*, 2005; Frasier *et al*, 2008; Schoen *et al*, 2009; Canada Health Infoway, 2013). As for the proposed system, training, workload, patient confidentiality, technical support, an unstable power supply, and sustainability were factors that concerned potential users the most. A lack of reliable electricity, lack of infrastructure, and insufficiently-trained health professionals with insufficient training were also found to be limiting factors in Rwanda's health information technology implementation (Frasier *et al*, 2008).

The users felt that there were challenges to be faced if an EMR system is to be deployed; this is often the case for any ICT-related project (Lewis *et al*, 2012). A survey carried out across eleven countries found that financial incentives and technical support played a major role in improving health ICT adoption (Schoen *et al*, 2009). A lack of technical support and unstable power supplies were, again, major challenges listed by EMR implementers in developing countries (Sood *et al*, 2008; Lewis *et al*, 2012). A lack of necessary infrastructure for a stable power supply and internet access were major concerns (Lewis *et al*, 2012). A further concern regarding EMR implementation is its sustainability, and it has been argued that e-health projects in developing countries have failed because of a lack of ICT professionals and knowledge about the system (Williams and Boren, 2008).

Another research has confirmed that the availability of a stable power supply is of utmost importance in healthcare delivery development (Williams and Boren, 2008). Our survey found that some potential users were concerned about system downtime, which is consistent with actual incidents mentioned in a qualitative study conducted in Norway, where some physicians in Norwegian hospitals described the problems they experienced with computer downtime, which influenced the attitude of users towards the system (Lium *et al*, 2008).

The majority of respondents in this survey had received some computer-related training, but very few had an ICT background. At this point, it is worth mentioning MSI-M's current (unwritten)

policy: since English language skills and computer skills are part of the job candidate selection criteria, the organization does not provide any training support for those capacities. The policy unknowingly poses a challenge: ICT capacity building is a critical component if an EMR system is to be successfully employed at MSI-M. Implementing an EMR system at MSI-M has raised hopes among MSI-M staff that there will be opportunities for training to improve their ICT knowledge and skills. In fact, the initiation of such training should be an integral part in any EMR system implementation.

Patient data confidentiality and increased workload were the two concerns raised most by the interviewees in this study (McGinn *et al*, 2011). Data confidentiality is a key element of electronic health information exchange (HealthIT.gov, 2015). Using a web-based EMR system raises concerns for confidentiality as medical records may become available to unintended third parties (Rash, 2005). The implementation of an EMR system will present challenges concerning patient confidentiality. Though the code of conduct for health professionals ensures patient data confidentiality, any organisation using EMR should become more vigilant for external cyber attacks. In 2004 Myanmar enacted an Electronic Transaction Law, however, there is no comprehensive legislation about data protection in place (Union of Myanmar, 2004).

According to a few studies in which researchers tried to gain insights into negative emotions related to proposed national EMR implementation, the participants expressed concerns around the additional workload caused by the new system and data confidentiality (Hackl *et al*, 2011). As stated by numerous interviewees in the present study, the burden of double workload was considered inevitable during the transition period as users would have to handle both the paper-based and the electronic-based systems. A similar burden during the implementation of a computer-based patient record system was mentioned in a study from Sub-Saharan Africa (Rotich *et al*, 2003). Workflow and confidentiality issues were also of concern for most physicians from a study of EMR use in Massachusetts (Simon *et al*, 2007).

This study was an attempt to assess the possibility of improving the healthcare management system in Myanmar. This study could be considered as one of the early attempts to assess the perception of health worker on EMRs in clinical practice in Myanmar where ICT adoption health sector is expanding rapidly. In order for the implementation of EMR at MSI-M to be successful, staff confidence around the issues they have concerns which should be addressed, and the potential benefits of switching to EMR should be clearly demonstrated.

A feasibility assessment to investigate technical support provision, training, and infrastructure should be performed in order to maximize the sustainability of EMR. Although it focused on just one iNGO, MSI-M clinics have been operating in all regions of Myanmar, and taking care of over 300,000 patients per year. Should the EMR system be introduced by this organization, it would potentially be a model that could be applied to similar or comparable processes within other NGOs, as well as for improving the national medical record system in Myanmar.

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