HOPES AND FEARS IN IMPLEMENTATION OF ELECTRONIC HEALTH RECORDS IN BANGLADESH

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ABSTRACT

Health is seen as a major key for development and many developing country governments invest in ICT-based Health Information Systems (HIS). The purpose of this paper is to explore physicians’ hopes and fears for implementing Electronic Health Record (EHR) systems in Bangladeshi hospitals. Data was collected through interviews and observations at two Bangladeshi hospitals. We found very little use of EHR systems at the hospitals and many physicians were skeptical of using EHR systems. Whereas this skepticism could be seen as a symptom of backward thinking our analysis found much of this skepticism to be reasonable. In this way this research contributes to the ongoing debate on how to implement HIS in developing countries. We articulate and analyze users’ concerns beyond mere “attitudes” and “acceptance”. Our results show that the fears and concerns on the hospital floors are legitimate and should be taken into consideration when HIS projects are initiated.

KEYWORDS: E-health, Bangladesh, Electronic medical records, Electronic health records

1. INTRODUCTION

Health is seen as a major key for development, something which is reflected in how three of the United Nations Millennium Development Goals directly address health issues: the reduction of child mortality, improvement of maternal health and the combat of HIV/AIDS, malaria and other diseases (UN, 2010; WHO, 2010). Health criteria are also included in the United Nations Human Development measure (UNDP, 2007) as better health is seen as central to human development and poverty reduction. Better health is reported to increase human happiness, well-being and economic progress – e.g., healthy people are more productive, live longer and save more money (WHO, 2008). In attempts to improve the quality and access to health services many developing country governments put much hope in health information (Nyella & Mndeme, 2010) and ICT-based Health Information Systems (HIS) (Jacucci, Shaw, & Braa, 2006; Lippeveld, Sauerborn, & Bodart, 2000; Mosse & Sahay, 2005). Research on the use of HIS in developing countries has shown that e-health can be one solution to provide better access to healthcare facilities for patients and healthcare professionals, improve collaboration between different governmental bodies, and increase care quality (e.g., Cecchini & Scott, 2003; Khalifehsooltani & Gerami, 2010; Mostafa et al., 2010). For developing countries HIS are often of particular interest due to a shortage of medical workers coupled with infrastructural problems and often a long distance
between major cities (Buysschaert, 2009). This makes it difficult for many to access much-needed healthcare services, with for instance low life expectancy as a result. E-health is therefore seen as one key tool to improve access to healthcare for poor people in rural areas (Cecchini & Scott, 2003). According to a survey carried out by the World Health Organization (WHO), e-health tools, among them Electronic Health Record (EHR) systems, are seen as very or extremely useful for 70% of the non-OECD countries (World Health Organization, 2006).

The purpose of implementing HIS is to improve the access, efficiency, effectiveness, and quality of clinical and business processes utilized by healthcare organizations, practitioners, patients, and consumers (Broderick & Smaltz, 2003). E-health covers the development and use of a wide range of ICT systems for health care such as an EHR (also called electronic medical record), telemedicine, health information systems, mobile devices, e-learning tools, and decision support systems (Gerber, Olazabal, Brown, & Pablos-Mendez, 2010). EHR systems are the core part of e-health as they provide electronic information as input to other healthcare services (Grimson, Grimson, & Hasselbring, 2000). The term EHR is widely used with varying definitions and extent of coverage. For this study an EHR is defined as a longitudinal collection of electronic health information for and about persons across different institutions and sectors where health information is pertaining to the health of an individual (World Health Organization (WHO), 2006). The type of information included in these records is related to patients’ demographics, past medical history, progress reports, problems that the patient was or is facing, medication, laboratory data and radiology reports (Ouma & Herselman, 2008). Previous studies have shown that EHR systems are efficient, and can significantly reduce serious medication errors, and improve access to patient information (Bates, Leape, Cullen, & Laird, 1998; Thakkal & Davis, 2006; Thielst, 2007). For instance, in case of emergencies, the EHR systems provide access to patient information irrespective of the physical location of the patient (Blair, 2007).

Difficulties with implementing HIS in developing countries have, however, been many. Challenges with HIS implementations in developing countries relate to costs, inadequate infrastructure, scarcity of human recourses, lack of ICT skills, poor strategies and donor policies, as well as more subtle issues such as power dynamics and identity forming (Jacucci et al., 2006; Kimaro & Nhampossa, 2005; Mosse & Byrne, 2005). Above all, the most prominent research on HIS implementation in developing countries (e.g., Kimaro & Nhampossa, 2005; Sahay, Monteiro, & Aanestad, 2009; Sahay & Walsham, 2006) has shown that the challenges are rarely related to (or at least not limited to) the technology itself. Power dynamics, politics, identity formation, everyday-routine-integration and other social aspects are often what makes the difference between functioning and non-functioning HIS (e.g., Chilundo & Aanestad, 2005; Nyella & Mndeme, 2010). Previous studies have also shown that healthcare professionals, especially physicians, have a tendency to be reluctant to new technology (Fitzgerald, Piris, & Serrano, 2008).

1.1 Research Question

In acknowledging the benefits of looking beyond the mere technology aspects of HIS implementations we investigate the rationality, or the motives, for actors’ hopes and fears regarding EHR implementations. We mainly focus on physicians’ fears in relation to EHR implementations and what lies behind these fears. If physicians are reluctant to use new technologies – why are they so? In answering this question we also discuss how these hopes and fears can be understood. The fears and hopes are framed using the Unified Theory of Acceptance
and Use of Technology model (UTAUT) as a point of departure for data collection and analysis. We use the example of Bangladesh where we explore physicians’ attitudes to implementing EHR systems in Bangladeshi hospitals. There are big hopes from the Bangladeshi government that the use of EHR systems will contribute to improved healthcare delivery management, ensure quality of care, increase the capacity of the healthcare delivery system and make health care more available in hard-to-reach areas (Ministry of Science and Technology Bangladesh, 2009).

2. RESEARCH METHODOLOGY

This is a qualitative case study (Kaplan & Maxwell, 1994; Yin, 1994) carried out at two Bangladeshi hospitals. We have chosen Bangladesh as a case since Bangladesh is a good example of a densely populated developing country where ICT is still to be introduced in many hospitals. Furthermore, previous studies have put forward deployment strategies for e-health facilities as a way to improve healthcare in Bangladesh (Mostafa et al., 2010). There is also a strong political commitment in Bangladesh to transform Bangladesh to Digital Bangladesh by 2021 (Ministry of Science and Information & Communication Technology of Bangladesh, 2002; Zakir, 2009), and starting in 1998 the Ministry of Health & Welfare (MOHFW) initiated e-health in Bangladesh. According to the National ICT Policy of Bangladesh (2002), the main focus in the use of ICT in healthcare will be to deliver new capabilities for hospitals and healthcare providers.

This study builds on data from two hospitals. The first criterion for selection was to include one government hospital and one non-government hospital. We also wanted to include one hospital where an EHR was used, and one hospital where an EHR was yet to be implemented. We hoped that the combination of a non-government and a government hospital, combined with a variation in EHR adoption would contribute to a more varied picture regarding the adoption of EHR systems in Bangladeshi hospitals. The two hospitals in question are Bangabandhu Sheikh Mujib Medical University (BSMMU) hospital and the Holy Family Red Crescent Medical College Hospital. The BSMMU is the largest government hospital in Bangladesh which caters to the lower and lower-middle class masses of the country, while Holy Family Hospital is a non-government non-profit hospital that serves people from all backgrounds but mostly middle class. They also charge some minimal fees to the patients. The BSMMU has not yet started to use an EHR, while the Holy Family Hospital has a very basic EHR running.

2.1 Case Study Context

Bangladesh is one of those countries where providing adequate and affordable health care is a challenge due to high population density and poor healthcare infrastructure (Mostafa et al., 2010). Bangladesh is one of the most densely populated countries of the world (Bangladesh Bureau of Statistics, 2009) with more than 75% of the population living in rural areas (Bangladesh Bureau of Statistics, 2009) and 40% of the population living below the poverty line (Central Intelligent Agency (CIA), 2010). The number of people living in Bangladesh is estimated to 142.32 million inhabitants (Bangladesh Bureau of Statistics, 2011). Regarding the healthcare sector, the situation is not very promising. Das (2010) states that most districts lack specialist physicians and most patients come to the physician without previous health records. Even though the number of hospitals has increased from 1,676 in 2005 to 2,860 in 2008 (Bangladesh Bureau of Statistics, 2010) (see Table 1 below), there is still a shortage of healthcare facilities for many people.
Some of the difficulties associated with EHR systems in Bangladesh’s public hospitals are the huge patient load and scarcity of human and ICT resources. There is an ongoing project by The Ministry of Health & Family Welfare to evaluate and develop a plan for adoption of HIS in Bangladesh, which includes the use of EHR systems in Bangladeshi hospitals.

The observed situation regarding the use of ICT and EHR systems in the two hospitals – BSMMU and the Holy Family Hospital – was not very encouraging. Regarding BSMMU hospital, the premier and largest government hospital in Bangladesh, EHR systems have yet to be introduced. This hospital is free of charge for patients. There is a lack of human and ICT resources in this hospital. This hospital has serious problems such as huge patient load, unhealthy sanitary conditions, and insufficient number of patient beds needing urgent attention.

The Holy Family Hospital, run by Bangladesh Red Crescent Society, has internet and some basic networking infrastructure. This is non-government non-profit organization, where they charge a small fee and mainly cater to the middle class. They have a combined EHR and cash registration system (see Figure 1) that is used by the clerk at the reception to check every patient against an ID number.

Table 1: Health care in Bangladesh (Board of Investment Bangladesh, 2012)

<table>
<thead>
<tr>
<th>Facilities</th>
<th>2005</th>
<th>2006</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitals</td>
<td>1,676</td>
<td>1,683</td>
<td>2,860</td>
</tr>
<tr>
<td>Hospital beds</td>
<td>50,827</td>
<td>51,044</td>
<td>74,415</td>
</tr>
<tr>
<td>Registered physicians</td>
<td>41,933</td>
<td>44,632</td>
<td>49,994</td>
</tr>
<tr>
<td>Persons per physician</td>
<td>3,317</td>
<td>3,125</td>
<td>2,860</td>
</tr>
<tr>
<td>Persons per household bed</td>
<td>2,736</td>
<td>2,732</td>
<td>1,860</td>
</tr>
<tr>
<td>Households per physician</td>
<td>691</td>
<td>655</td>
<td></td>
</tr>
</tbody>
</table>
Also, costs, such as room, meal, medicine charges, related to the patient are registered as this system is used to generate a receipt. Although the system has some basic functionality, the physicians and nurses have never accessed this system and so the pages related to e.g. lab report(s) and patient history are never used. Also, a senior administrator who is a physician himself can watch on his office computer live-streaming video from a surveillance camera installed at the reception to ensure the clerks at the reception were not dealing unfairly, e.g. taking bribes (see Figure 2).

Figure 1: The EHR system at Holy Family Hospital
The administrative staff seemed unconcerned with the potential use of the EHR system for benefiting the healthcare system; rather, not losing money seemed to be their main concern as they charged for services using the cash registration system.

Both hospitals destroyed patient medical records after 5 years. In Holy Family Hospital there was a record room full of files from the floor to the ceiling (See Figure 3). This room has a standalone computer used to issue death certificates on a Microsoft Office Word template.
2.2 Data Collection

Data was collected using a combination of interviews and observations. In order to guide the data collection we took use of a technology acceptance model – the Unified Theory of Acceptance and Use of Technology (UTAUT) model. Technology acceptance models have previously been used to explain users’ intentions to use an information system see e.g. (Bankole, Bankole, & Brown, 2011; Shraim & Khlaif, 2010; Wahid, 2007) and the UTAUT model has often been used for investigating healthcare staff’s adoption of health information systems (e.g., Kijsanayotin, Pannarunothai, & Speedie, 2009), especially the adoption of EHR systems (Chisolm, Purnell, Cohen, & McAlearney, 2010; e.g., Hennington & Janz, 2007; Viswanath Venkatesh, Sykes, & Zhang, 2011). We therefore believed that the acceptance indicators used in these models could constitute a ground for capturing the physicians’ hopes and fears.

The UTAUT model is based on the core constructs of eight user acceptance models. Venkatesh et al. (2003) carried out an empirical comparison of the eight user acceptance models, which resulted in the UTAUT model where four main constructs are suggested as direct determinants of user acceptance and usage behavior. These four constructs are performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) (Viswanath Venkatesh et al., 2003). For this study, performance expectancy is defined as the degree to which a user expects that using the EHR system will help him or her perform better in his job. Effort expectancy is defined as the degree of ease associated with using the EHR. Social influence is defined as the degree to which a user perceives that others who are seen as important believe he or she should use the new EHR system. The last construct is facilitating conditions, which is defined as the degree to which the user believes that an organizational and technical infrastructure exists to support the use of the EHR system.

For this study ten physicians (five men and five women) were interviewed separately for 15-20 minutes. The interview guide (See Appendix 1) was based on the UTAUT model, and the interviewees were asked about their expectations – hopes as well as fears – regarding the use of
EHR systems, as well as asked to provide background information such as gender, age, and computer experience (see a compilation in Appendix 2). We conducted two visits to the hospitals and six interviews were carried out in person in March 2011, and four more interviews were carried out using online voice calls in April 2011. Interviewees were selected based on availability, and this resulted in the first six interviews, which we complemented with four more interviews using snowball sampling (Bryman, 2008). Three of the interviewees were from BSMMU and seven came from the Holy Family Hospital. At the BSMMU, being a government hospital, we could not get access to more than three respondents. And at the Holy Family Hospital, the seven respondents were the ones that were accessible for interviews. The first six interviews were recorded, and subsequently transcribed, while the last four interviews were documented by taking notes. Before starting to record the interviews, we made sure that we had permission from the interviewees, and we also offered the interviewees to review the transcripts before analysis. Moreover, observations were also used in this study based on the field visit of one of the authors to Bangladesh in March 2011 in which she had an opportunity to observe the use of ICT at BSMMU and the Holy Family Hospital.

2.3 Data Analysis
The data was analyzed in two steps. First, the data was related to the UTAUT model and the moderators gender, age, experience, and voluntariness of use. The result was presented as a data matrix (Marshall & Rossman, 2006) where the answers from each respondent was deemed the units of analysis. The answers were subsequently related to the four constructs PE, EE, SI and FC (see an example in Table 2).

<table>
<thead>
<tr>
<th>Respondent #</th>
<th>PE</th>
<th>EE</th>
<th>SI</th>
<th>FC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Saves time, solving ethical issues, identifying medical records and patient history easier, improved job performance, no effect on decision quality</td>
<td>Will find it easy to use because of familiarity with computers</td>
<td>Will use an EHR if I have to and if I am familiar with it. Colleagues’ use of an EHR will not influence my usage.</td>
<td>Sufficient internet infrastructure. The EHR is very basic and outdated. Older physicians are more resistant to change and use of technology. Not enough resources.</td>
</tr>
</tbody>
</table>

Second, as one of the important implications from the study by Venkatesh et al. (2003) is to take contextual factors into considerations, we related the results from the first analysis to the underlying motives of our informants’ hopes and fears in order to move beyond simple conclusions about attitudes, motivations and awareness. We did this by reading through the narratives of our informants while looking for themes in the texts to see what they were saying about their hopes and fears and how these hopes and fears were explained. These textual analyses were summarized and related to previous literature on the topic.
2.4 Limitations

This study has several limitations. We were only provided with access to physicians. We believe that including other categories of staff would be beneficial to this study, as it would provide a more nuanced and varied picture. We also believe that this study would have benefitted from including more physicians, but we were unfortunately not able to interview more than three physicians at one hospital, and seven at the other hospital, raising an imbalance in the responses. This is something that we would like to do in a following study. Another limitation concerns our choice of hospitals, where both were located in Dhaka. Including hospitals outside the capital might have provided us with slightly different answers.

3. RESULTS

First the hopes and fears of the physicians will be described, followed by a discussion of how these hopes and fears can be understood. In the discussion, we also relate our results to earlier research.

3.1 Hopes

Most interviewees seemed to expect EHR systems to be time saving, convenient, efficient and productive and thought using EHR systems may have a positive impact on the professional decision making as they could get better information about patients’ medical backgrounds. This advantage was noted by all respondents. As a 25 year old female doctor said, using an EHR could help her to ‘identify patient records and history more easily and make her work easier’. Most interviewees were familiar with computers, could use the internet and Microsoft Office packages to some extent. Two male interviewees had prior experience of using an EHR system in private-sector hospitals. One of them thought that using an EHR system would positively affect his decision-making while the other perceived there to be no such effect. One female doctor, age 25, also reflected that using an EHR would help ‘solving ethical issues’. Age and Gender seem to have no role in interviewees’ perceptions of performance expectancy, but computer usage experience seems to help interviewees realize the performance benefits of adopting EHR systems more.

Most interviewees were familiar enough with computers to be able to use internet and Microsoft Office packages and social media applications/utilities. Those who were familiar with computer usage also believed that an EHR system would be easy to use. Only two interviewees had prior experience using an EHR, one being a 32 year old male and familiar with computers, and the other a 40 year old male with limited computer experience. As the 32 year old male said, ‘I used an EHR system in a previous hospital’.

Most of the interviewees stated that they would use an EHR if it was mandatory. A 24 year old female told us that she ‘would use it if the rules says so’. As did a 55 year old male doctor who said that ‘If it is mandatory to use the EHR, of course I will use it, I will have to use it.’ Also, most interviewees said that peer pressure would make them use the EHR system, and that colleagues’ usages would be influential. It was notable that the younger (24-32 years) interviewees were less certain that they would be influenced by their peers using an EHR. The younger doctors seemed more individualistic and thought that they would use the EHR without the influence from peers. One exception was the 24 year old female who stated ‘If my colleagues would use an EHR, I would use it as well’. According to our informants, compulsory usage rules
and policies could have a positive effect and might get more physicians to use EHR systems, since introducing a rule for mandatory usage might work as an incentive to make people adopt the system.

3.2 Fears

The most repeated perception among interviewees regarding facilitating conditions was a resistance and lack of will on the part of Hospital Administration to be open to the idea of new technology. Several of the respondents voiced this as a fear of ‘being replaced’ by computers. One 29 year old male doctor meant that this fear of new technology mainly related to senior administration consisting of older physicians and personnel, while the younger employees were more open to technology and new ideas. Staff also felt a lack of motivation and encouragement regarding introducing and adopting new ICTs. Interestingly, opinions at the two hospitals seemed to be along the same lines, although Holy Family Hospital had a basic EHR system.

There were also concerns regarding scarcity of funds and lack of much needed infrastructure. A 27 year old female doctor noted that ‘Funds are limited and the administration lacks motivation to allocate funds for this [the EHR] system’. At the Holy Family Hospital, the interviewees thought the EHR system in use was ‘very basic and outdated’, although they had never used it, and only seen the interface. Two of the physicians thought that if they had to use an EHR in their current hospital they would not find it very difficult to use, but they also thought that training is important in order to introduce the new EHR. One 29 year old male doctor said that ‘If we first get EHR training it would be better because then we would know how to deal with the system, so it will be easier’. There seems to be a lack of general ICT training and regarding EHR training they thought the EHR implementation would not be very effective if not accompanied by necessary training. Also here, previous experience seems to be an important factor.

Other fears related to how some interviewees did not seem to trust the idea of using only computers to record patient data, as one physician stated: ‘Manual is great, because computers can crush down and we could lose all the records on it while manual system is more safe.’ This is interesting as the very same respondent who said this recognized many benefits of adopting EHR systems, but seemed to have reliability and trust issues regarding completely switching to an automated system and having no manual record at all. Additionally, one 42 year old female interviewee without much computer experience pointed out that the adoption of EHR systems by older physicians might be counter-productive as older physicians might have less previous experience and familiarity with technology, making their patient-dealing time decrease, as using new technology might increase time for administration.

We also evidenced some strong preferences for the old manual system. One interviewee stated that: ‘Even if it is mandatory I won’t use it, I prefer manual. I am more comfortable with manual.’ For some users even making EHR use mandatory cannot get them to use an EHR system.

3.3 Fears in a Context

In summation, whereas many of our informants had positive hopes of the use of EHR systems, there were also many concerns raised. In order to better understand these concerns we relate them to previous research on the use of HIS in developing countries.
3.3.1 Time
The senior physicians were skeptical towards new technologies such as EHR systems. They thought that using an EHR would be more time consuming, which would negatively influence the time they could spend with patients. They were afraid that using an EHR system would mean that they could see fewer patients, as each patient contact would take longer if they were to use an EHR. To them, the adoption of an EHR might thus be counter-productive regarding the efficiency and time saving aspect since their patient-dealing time might decrease. This is a justified concern as previous research has shown that physicians sometimes prioritize taking care of patients instead of attending scheduled training classes to learn the new HIS system (Mosse & Byrne, 2005). Another time-consuming factor is the redundancy of work required when there is also a need for keeping paper records – simply because computers crush and the well-known fact of erratic electricity supply in developing countries (Lawrence & Tar, 2010).

3.3.2 Training
The senior physicians were unfamiliar with computers, and did not have knowledge about how to use them, and the benefits they might bring. There is a need for training concerning basic ICT skills as well as the usage of EHR systems. The interviewees reported lack of ICT training, EHR awareness and training workshops/courses in public hospitals. There was consensus that no ICT related training about EHRs or such had ever been offered at the two hospitals. Some employees had been sent to attend Microsoft Office packages’ training workshops. ICT skills are not something that is considered when hiring physicians. An EHR implementation would not be very effective if not accompanied by necessary training. That the technical complexity of HIS requires users to have a high level of technical competence is also something that has been shown before (Sahay & Walsham, 2006). Also there is a need for training for mitigation of problems such as the use of information seen as a burden by the staff when implementing HIS, poor preparation of data for use, and low initiative for using the data, as shown by the empirical findings from Tanzania (Smith, Madon, Lazarro-Malecela, & Michael, 2008).

3.3.3 Resistance of Change
Younger staff pointed out resistance from older administrative staff as a huge problem. They thought it would be a great challenge to make this category of staff, open up to, and encourage the use of, new technology such as EHR systems. Interviewees reported that lack of motivation and encouragement from administration was a great barrier, and that this problem seems to be related to the hospital culture in the public sector in Bangladesh where the same familiar manual system has been prevailing for decades and nobody wants to risk implementing new ideas in an old setup. This is a big problem. The administration has to be motivated in order to encourage others to adapt to new technology, and create a successful implementation. This lack of motivation and encouragement is a well documented challenge, typically described as resistance to change (Khalifehsoltani & Gerami, 2010) or reluctance to new technology (Fitzgerald et al., 2008). This reluctance to new technology may, however, not have very much to do with technology - old habits, whether changed manually or by technology, do take time to change. Daily routines can be disturbed and there is a need for gradual changes of existing everyday practices to the new procedures, at the same time as systems need to be integrated with daily routines (Kimaro & Nhampossa, 2005; Sahay & Walsham, 2006).

Need for incentives is a significant challenge and when asked about making an EHR system mandatory to use, some interviewees thought that even if EHR systems were
implemented and then made mandatory, they still might not use it unless they were properly introduced to the system. So making it mandatory might not be a productive incentive unless backed up by training. In Holy Family Hospital, physicians were not granted access to the EHR system as it was used for administrative and billing reasons only.

3.3.4 Technical
Users not trusting using an EHR for documenting patient information will negatively influence the will to adopt and use an EHR. Moreover, lack of ICT department and ICT personnel is an issue related to the lack of skilled manpower. There is also a lack of ICT resources and basic infrastructures such as networks. Poor infrastructure is a well documented concern, for instance empirical findings from Kenya show e-health adoption is still in its very early stage due to the lack of infrastructure and basic ICT skills (Ouma & Herselman, 2008).

3.3.5 Policy
A need for rules and policy for adopting EHR systems was reported by interviewees from both hospitals. The hospitals had a rule that stated that they had to destroy manual medical records after five years. This seems to be a counter-productive rule that even could lead to loss of life. Rules and regulations are important for an environment where a new system will be introduced or current system will be implemented more thoroughly. Healthcare is a sensitive domain where people’s lives are at risk. If some system is going to be used, proper procedures and rules need to be devised and followed to ensure safe practices of healthcare services otherwise it could lead to serious consequences. Although the Bangladeshi government in 2009 adopted a national ICT policy (Ministry of Science and Information & Communications Technology (MoSICIT), 2008), it has not yet had any effect on the two hospitals participating in this study. Having a policy in theory is not enough either, implementing rules and policies are an urgent need. The importance of legal support as well as organizational and national standards and policies is also a great concern in the study reported by Khalifehsoltani & Gerami (2010). It is also important, as noted by Walsham (Walsham, 2010) to view ICTs as an integrated part of more general development policies and projects if we want to reach everyone, including the poor and disadvantaged.

3.3.6 Financing
In the public sector hospital setting in Bangladesh finance was a major challenge regarding the adoption of EHR systems. Patients from urban as well as rural areas come to these government hospitals because of low or no fees. Expected challenges such as need for training, lack of ICT resources & infrastructure, lack of ICT department and ICT personnel all have their roots in the financial constraints of the public health sector which got only 1.1% of GDP in 2008 as compared to 2.3% of GDP for private health sector (Trading Economics, 2010). That this is a real concern is well reflected in the vast amount of literature addressing challenges of cost and risks involved with the integration of systems needed (Khalifehsoltani & Gerami, 2010; Sahay et al., 2009).

4. DISCUSSION
Public sector healthcare is a much neglected field needing urgent attention in a poor country like Bangladesh. The main fears, as described by our informants, are related to financial constraints and the socio-cultural aspect of the government hospital organization. Moreover, the practical implementation of the e-health policy devised in 2002 seems to be nowhere in sight. The urgency
for government initiative and attention arises from the need for improving life standards by providing better healthcare services for a better and prosperous Bangladesh. In many cases patients are unaware of their own health history, and if hospital records are to be destroyed after five years, there are no records of the patient’s medical history. Instead of saving space by destroying records, hospitals could avail the benefits of EHR systems if government combined forces with the public health sector and supported it more. EHR systems would not only help save the space, time and money that manual records consume, but could also be a solution to healthcare problems in a country that is pressed under the problems of huge patient load, scarcity of human and ICT resources, high population density and poor healthcare infrastructure. Having said this, the fears addressed by our informants need to be taken into consideration when implementing a HIS. Resistance to change, lack of motivation and encouragement and so forth are socio-cultural challenges within the organization of hospitals. Challenges and fears for which there is reasonable ground. Current literature about USA, UK and Spain (Fitzgerald et al., 2008; Hier, Rothschild, LeMaistre, & Keeler, 2004) shows that the barriers in the developing and the developed countries are very similar and they are facing the same challenges although the developed countries have more potential to overcome these challenges because of the socio-economic factors. Slow speed of computers, lack of computers, lack of training on EHR, lack of computer skills, are some of the common challenges. The results from our study did not stress confidentiality and privacy related issues as important, perhaps as the adoption of EHR systems in the two hospitals was very limited. But in Tanzania confidentiality, privacy and security concerns were reported which shows that ICTs are vulnerable to security, privacy, technological dependence issues, and technology ultimately has problems too and it will probably continue to be so (Omary, Lupiana, Mtenzi, & Wu, 2009). Therefore, some caution is needed while implementing EHR systems. Completely switching to an automated system and having no manual record at all in the beginning in Bangladesh’s context might be a problem, so the transition needs to be slow and steady with consequently switching to automation. The overall aim is to save lives and minimize pain. If ICTs, and hence EHR systems, can be used to contribute to that, it is relevant to consider adopting EHR systems. Moreover, economical and organizational barriers have been identified in UK and Spain (Fitzgerald et al., 2008). This shows that implementation of EHR systems is an on-going process which does not end with just introducing the system.

5. CONCLUSION
This study sets out to answer the question about what the hopes and fears are with implementing EHR systems in Bangladesh. From our interviews with physicians at two Bangladeshi hospitals we found that whereas there were many hopes of EHR systems to be time saving, convenient, efficient, productive and to have a positive impact on their professional decision making, many more fears were raised. These fears were related to time consumption (less time spent with patients and the redundancy of work required when in need to also keep paper record due to erratic electricity supply), lack of ICT skills and training, resistance of change (old habits making physicians prefer the manual system in conjunction with lack of motivation and encouragement) and technical insufficiency (i.e., poor infrastructure with erratic power supply). In analyzing the physicians’ concerns we also found the concerns to be highly relevant and documented in previous research. The results from this study can in this way be used to inform decision makers and healthcare providers about expected challenges to e-health in developing countries in general, and in Bangladesh in particular.

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So, in what way have these findings lead us any closer to understanding how e-health can improve the lives of people? If we believe, just as the UN and many researchers in our field, that ICTs can contribute to better health services for the poor; we need to understand how these systems can (and should be) designed and implemented. In following up on previous research stating that HIS implementations are socio-technical processes including technology, people and certain settings (e.g., Sahay & Walsham, 2006) we have shown that any HIS implementation needs a participatory approach. Participatory design can be used to create awareness of the specific context in which the information system is to be implemented (Byrne & Sahay, 2007) and make us listen to the real users at place. Resistant physicians and nurses should not carelessly be written off as conservative technophobes. This research contributes to the ongoing debate on how to implement HIS in developing countries by articulating and analyzing the users’ concerns beyond mere “attitudes” and “technology acceptance”. We have shown that the fears and hopes on the hospital floors are legitimate and should be taken into consideration when HIS projects are initiated.

6. REFERENCES


Trading Economics. (2010). Health expenditure; total (% of GDP) in Bangladesh.


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Appendix 1

Interview Guide:

a. *Name (if he/she wants to disclose):*

b. *Name of Hospital/or institution you currently/previously work(ed) at:*

c. *Was it private or public or semi government hospital:*

d. *Position (administrator, doctor, medical college student, public health student etc.):*

1. *Age: _______*

2. *Gender: _______*

3. **Computer Experience:** What kind of experience do you have with using computers? For example you have taken a computer training course, have a computer at home, can use the internet etc.

   3.1 Have you ever used electronic health record (EHR) system?
   3.2 If you have used, which hospital was it (i.e. name of the hospital), and if it was a public hospital?

4. **Performance Expectancy:**

   4.1 (If you have or have not used) Does using (OR If you could use) the EHR system, do you think it would help you to perform better at your job like saving time, is it useful for looking at patient history etc.

   4.2 In general, if you have not used before, do you think it would affect your performance and in what way.

   4.3 Does using the system affect the quality of your decision?

5. **Effort Expectancy:**

   5.1 In what way has your previous computer use experience affected the use of EHR system? Do you find it more easy to use because of being familiar with computers?

   5.2 If you have not used an Electronic Health Record system yet, what are your expectations regarding the effort required? Such as do you expect it will be easy or difficult etc.?

6. **Social Influence & Voluntariness:**

   6.1 What kind of pressure did/do you have from administrator/colleagues to influence you to use the system?
6.2 If you were to use an EHR system, would you use it more if it was mandatory to use, or for example more of your colleagues at work used it?

7. Facilitating Conditions:

7.1 What kind of infrastructure for EHRs (for example continuous supply of electricity, electricity generators to enable continuous supply of electricity, internet, computers, local area network etc.) do you think is/was provided at the hospital you work/worked? Mention if it was a government or private hospital.

7.2 What kind of learning or training program you have/had at the hospital you work/worked regarding how to use an EHR System (or how to use a computer or Microsoft office etc.)?

8. Challenge Expectancy:

What do you think are the challenges to adoption of Electronic Health Records in your hospital OR Bangladeshi public sector hospitals?
Appendix 2

Respondents’ data regarding age, gender, computer experience and voluntariness of use

<table>
<thead>
<tr>
<th>Respondent #</th>
<th>Age</th>
<th>Gender</th>
<th>Computer Experience</th>
<th>Voluntariness of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25</td>
<td>Female</td>
<td>Familiar with using a computer. Can use Internet. Never used an EHR system. No ICT training at the hospital.</td>
<td>If familiar with the system and if mandatory.</td>
</tr>
<tr>
<td>2</td>
<td>24</td>
<td>Female</td>
<td>Familiar with using a computer. Can use Internet. Never used an EHR system. No ICT training at the hospital.</td>
<td>If mandatory.</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
<td>Female</td>
<td>Familiar with using a computer. Never used an EHR system. No ICT training at the hospital.</td>
<td>If mandatory.</td>
</tr>
<tr>
<td>4</td>
<td>32</td>
<td>Male</td>
<td>Familiar with using a computer. Can use Internet. Have used an EHR system in another hospital. No ICT training at the hospital.</td>
<td>If mandatory.</td>
</tr>
<tr>
<td>6</td>
<td>27</td>
<td>Female</td>
<td>Familiar with using a computer. Can use Internet. Never used an EHR system. No ICT training at the hospital.</td>
<td>If familiar with the system.</td>
</tr>
<tr>
<td>7</td>
<td>40</td>
<td>Male</td>
<td>Familiar with using a computer. Have used an EHR system in another hospital. Not familiar with Internet. No ICT training at the hospital.</td>
<td>If familiar with the system.</td>
</tr>
<tr>
<td>8</td>
<td>42</td>
<td>Female</td>
<td>Not familiar with using a computer. Never used an EHR system. Not familiar with Internet. No ICT training at the hospital.</td>
<td>If familiar with the system. Training is necessary.</td>
</tr>
<tr>
<td>9</td>
<td>38</td>
<td>Male</td>
<td>Familiar with using a computer. Can use Internet. Never used an EHR system. No ICT training at the hospital.</td>
<td>If mandatory.</td>
</tr>
<tr>
<td>10</td>
<td>55</td>
<td>Male</td>
<td>Familiar with using a computer. Can use Internet. Never used an EHR system. No ICT training at the hospital.</td>
<td>If mandatory.</td>
</tr>
</tbody>
</table>