Digital Health: Changing the Way Healthcare is Conceptualised and Delivered
E. Cummings et al. (Eds.)

doi:10.3233/SHTI190779

Factors Influencing Implementation of an Electronic Medical Record in a Tertiary Cancer Centre

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Abstract. Background: EMRs are one of a range of digital health solutions that are key enablers of the data revolution transforming the health sector. They offer a wide range of benefits to health professionals, patients and other key stakeholders. However, effective implementation has proved challenging. Method: A qualitative methodology was used in the study. Interviews were conducted with members of a cancer team 12 months post-implementation of an EMR. Data from the interviews was collected via audio recording. Audio recordings were transcribed, de-identified and analyzed to identify the experiences of staff with the EMR.Findings: Data was categorized in to six categories: 1) Standardisation of documentation and completeness of data; 2) Effect on workload; 3) Feature completeness and functionality; 4) Interaction with technical support; 5) Learning curve; 6) Buy-in from staff. Conclusions & implications: Findings from this study contribute new knowledge on barriers and enablers to the implementation of EMRs in complex clinical settings. Barriers to successful implementation include lack of technical support, perceived increase in workload and a learning curve to fully familiarize with the feature set of the EMR.

Keywords. Clinical informatics, EMR, evidence based practice

Introduction

Electronic Health Records (EMRs) are computerized information systems that typically replace paper-based medical records by collecting storing and displaying information on patients [1]. EMRs are one of a range of digital health solutions [2-4]. that are key enablers of the data revolution transforming the health sector [5]. EMRs can have a range of functionalities but can be broadly defined as a system for presenting health, clinical or medical records in a digitized format [6]. The benefits of EMRs for healthcare professionals, patients organisations and other stakeholders have been acknowledged in the literature. Benefits include improving the quality of care for patients [6], improving timely access to data, and to potentially facilitate knowledge exchange for collaboration in multidisciplinary teams [7].

In spite of the wide range of potential benefits, physicians and other healthcare staff can only harness these supports if they use EMRs once they are implemented [1]. For this reason, it is important to understand the barriers and enablers for the implementation of EMRs in clinical settings. EMR implementation is a complex process which requires

a range of technical, human and orgnaisational factors to be considered [7]. A comprehensive review of the literature identified eight categories of barriers to EMR adoption: Financial, Technical, Time, Psychological, Social, Legal, Organizational and Change process [1]. Financial, time/workload and technical barriers are the most frequently cited challenges in the literature [7].

Although the literature has identified some of the barriers and enablers to implementing EMRs in healthcare, much of this research has focused on primary care [8]. There is currently a dearth of literature on the implementation of EMRs in cancer care, which is a unique setting for implementing technology. The gold standard for the delivery of cancer care is the use of multidisciplinary teams (MDTs). MDTs describe a group of health professionals from a range of specialties who work together on a regular basis to deliver evidence-based care to patients [9]. Successful implementation of EMRs in a multidisciplinary setting requires consideration of the unique challenges to implementing EMRs for health professionals across a range of specialties, and for administrative staff.

This article presents preliminary findings on the experiences of health professionals using an EMR 12 months post-implementation. The findings are a component of a broader study exploring how EMR data can be made actionable by health professionals to improve processes and quality of care.

1. Methods

A qualitative methodology was used to collect data on the experiences of health workers with an EMR 12 months post-implementation. The EMR was implemented in November 2017 in a cancer center in Western Sydney and was used by both administrative and clinical staff. A purposeful sample of administrative and clinical staff were recruited to participate in 30 – 60 minute phone interviews about their experiences with the EMR. Each interview was conducted by a researcher experienced in qualitative research methods.

Interview recordings were transcribed and de-identified prior to analysis to identify the barriers and enablers to implementing EMRs. Analysis was conducted by 2 authors (AJ and CD), to identify key themes and subthemes. These themes were then refined to reduce redundancy and emphasize prominent groupings. During analysis, illustrative quotes were identified and grouped them by themes and sub-themes.

2. Results

A total of 8 interviews were conducted with staff within the cancer center. Of these interviews 3 were undertaken with administrative staff and 5 were undertaken with clinical staff. Clinical staff came from a range of specialties including radiation oncology, surgery and pathology.

Data analysed from the interviews was classified into six categories: 1) Standardisation of documentation and completeness of data; 2) Effect on workload; 3) Feature completeness and functionality; 4) Interaction with technical support; 5) Learning curve; 6) Buy-in from staff.

2.1. Standardisation of Documentation and Completeness of Data

Both administrative and clinical staff indicated benefits in all staff having access to the same information in the EMR. This was valuable when patients had been sent to the Breast Cancer Institute (BCI) from other departments as it was patient information was easily accessible, enabling more efficient processing of patients. It was also noted as straightforward to reference initial consult information for patients that the clinical staff member had not seen for a long time.

The EMR has been valuable for improving completeness of data on MDT recommendations. Live data entry in the MDT allows all members to ensure the accuracy of the data as it is being input. The live data entry system also was seen as reducing recall bias that may have occurred prior to implementation, when data was entered from notes after the MDT meeting. The three screens in the MDT room also make it easy to pull up multiple systems to compare patient information and input it into the EMR. One interviewee noted that entering EMR data during the MDT meeting had led to increases in longer-term recommendations being made and recorded.

2.2. Effect on Workload

The EMR was seen to have both positive and negative impacts on workload. The EMR increased efficiency by making information more accessible and efficient to access. Once familiar with the interface it was described as relatively easy to navigate the EMR and input information for patients. For follow up patients, data entry was noted as particularly efficient, only taking a few minutes, though it can be more time consuming for new patients. Other benefits included decreasing time spent collecting paper files needed for a consult and decrease in time reviewing paper files to find information. Interviewees noted a reduction in time spent by administrative staff completing transcription from paper records, as this is now entered directly into the EMR by clinical staff. One interviewee highlighted that the EMR was not just valuable because it increased efficiency, but because it reduced the risk of errors. Another noted there is increased accountability for clinical staff to input data into the EMR.

Although some interviewees felt the EMR was more efficient, others felt it increased workload. Concern was also raised about the inability to bulk-print letters as individually printing them was a considerable time burden. Navigating across tabs to retrieve all the information needed for certain patients was also noted as time consuming. The EMR was described as having increased workload for administrative staff due to increased time spent on auditing and editing the letters automatically generated from the EMR, following-up clinical staff for completion of letters and repetitively scanning documents in to the system. There were also concerns raised that some senior clinicians had experienced an increased workload as they complete EMR data entry themselves, due to a lack of confidence in junior staff to complete data entry accurately.

2.3. Feature Completeness and Functionality

A number of interviewees raised concerns about issues with features, or functionality of features in the EMR, and ranged in degree of severity, from usability to issues effecting data quality and workload. Some of these issues included not having drop down menus to select a doctor or provider name in the EMR or generating letters in the wrong encounter. Letter generation was a particular concern, with interviewees noticing the

layout was unprofessional, generating a letter was cumbersome or that the letter contained content that shouldn't be in it. Of significant concern, the 'patient summary' function of the EMR had not been implemented successfully. This feature was intended to be fundamental for clinical staff to quickly and easily access all information about a patient in one instance. The patient summary was also intended to be used for MDT meetings.

Another major functionality issue was lack of auto completion of fields in the EMR. Concerns were raised about GP information not auto-populating as it did in the previous system and documents were unable to transfer across clinical encounters. There were some issues that occurred in the first three months of implementation when forms were not auto-populating and there was a loss of data. Finally, some interviewees noted that not all forms suited the type of appointment e.g. second appointment for surgical decision, which could make it challenging to know how to input data correctly in the EMR. The current features in the EMR also weren't flexible enough to incorporate emerging evidence, such new drugs that weren't listed in pre-set tick box options.

2.4. Interaction with Technical Support

Interviewees raised a number of concerns about their interactions and communication with the Vendor ICT team. It was noted that interactions with ICT post-EMR launch were significantly different to pre-launch. During the development process staff felt involved but once the system was launched there was no period of testing and refining the system. This was considered extremely challenging because it was difficult to predict exactly what features of the EMR would be useful before staff had time to use it, but there was no support to address feature issues after the launch of the EMR.

There was a perception that ICT staff had been unrealistic in providing advice on the EMR before it launched. Interviewees thought they were promised features during the development, which post-launch turned out to be completely unfeasible to develop. Major concerns were raised about communication between the ICT team supporting the EMR and the BCI. Many interviewees noted that there was little communication from the ICT team about when features would be fixed, and responses to queries were extremely slow. In some instances, staff had developed workarounds to use the EMR in spite of issues with functionality.

Finally, some interviewees raised concerns about turnover of ICT staff supporting the EMR. Staff supporting the project, and particularly project leaders changed repeatedly. It could be challenging to identify who had ownership for fixing functionality issues. One interviewee felt this problem was starting to improve but noted that it had been a major problem until recently.

2.5. Learning Curve

There were some concerns raised about the challenges remembering how to input data into EMR fields, especially for staff that didn't interact with it regularly. The system was different to that found in other clinical settings which also meant new staff had a learning curve to familiarise themselves with how to use the system. However, it was noted that it had typically taken one to two weeks to learn how to use the EMR and once the learning curve had been overcome the usability was good. One interviewee noted that the EMR may be challenging to learn to use for relief staff who may only use it for one or two weeks.

2.6. Buy-in from Staff

Some interviewees raised concerns about lack of buy-in to the EMR across clinical specialties that work with BCI, which was led to gaps in available information. There were also concerns raised that some people had ceased using the EMR because of issues with the data, feature issues or negative impacts on workloads.

3. Discussion

This study presents preliminary findings one of the first EMR implementation evaluations undertaking in a cancer setting. Findings broadly aligned with the literature on barriers to implementation on EMRs, particularly in regard to the central role of IT support during the post-implementation period [4,7]. However, findings from this study suggested that staff were prepared to overlook challenges in functionality or technical support due to a perception the system would become beneficial over time as errors with the system were addressed.

The literature has shown that physician resistance is a major barrier to EMR implementation as they are the largest frontline group using the systems [1]. However, findings from this study identified some perceived benefits that have not previously been recognized in the literature. The EMR was particularly well received by junior staff who had found it easier for documentation, time saving, effective for improving record completeness and beneficial for guiding clinical consultations and highlighting what should be recorded. Clinical staff also felt the EMR enabled senior specialists to act in a more traditional consultant role, with junior staff completing data entry. Challenges identified in the EMR included feature completeness and issues with features working properly, as well as poor communication from ICT regarding feasibility of achieving required program features and in addressing EMR issues once implemented.

4. Conclusions

This article describes the experiences of health professionals with an electronic medical record for presenting cancer patient data. The findings contribute new knowledge on barriers and enablers to the implementation of EMRs in complex clinical settings. Barriers to successful implementation include lack of technical support, perceived increase in workload and a learning curve to fully familiarisee with the feature set of the EMR. Although there can be challenges in the usability of EMRs in the period directly after implementation, findings from this study indicate that staff will continue to use the system if they perceive improved features are imminent or there is a potential benefit to patient care and workflow.

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