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Physicians Perceptions of an Educational Support System Integrated into an Electronic Health Record

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Abstract. The purpose of this study is to determine the perceptions by physicians of an educational system integrated into an electronic health record (EHR). Traditional approaches to continuous medical education (CME) have not shown improvement in patient health care outcomes. Hospital Italiano de Buenos Aires (HIBA) has implemented a system that embeds information pearls into the EHR, providing learning opportunities that are integrated into the patient care process. This study explores the acceptability and general perceptions of the system by physicians when they are in the consulting room. We interviewed 12 physicians after one or two weeks of using this CME system and we performed a thematic analysis of these interviews. The themes that emerged were use and ease of use of the system; value physicians gave to the system; educational impact on physicians; respect for the individual learning styles; content available in the system; and barriers that were present or absent for using the CME system. We found that the integrated CME system developed at HIBA was well accepted and perceived as useful and easy to use. Future work will involve modifications to the system interface, expansion of the content offered and further evaluation.

Keywords. Electronic Health Record, Decision Support System, Continuous professional development, Information pearl

Introduction

Lifelong learning can be defined as the continuous building of skills and knowledge throughout the life of an individual [1]. Because of rapidly evolving medical knowledge, physicians are required to be lifelong learners [2]. In medicine, continuous medical education (CME) is the most common means physician use for this lifelong learning.

A review of CME studies reported that traditional approaches to CME, such as conferences, workshops or rounds did not significantly change educational outcomes, but interactive and mixed educational sessions were associated with changes in medical practice. In a more recent systematic review, similar results were reported and the

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authors concluded that educational meetings alone are not likely to be effective for changing complex behaviors [3]. However when non-traditional educational activities were used results were more promising [4]. For this and other reasons some authors have suggested that physicians will need new methods of learning to become effective lifelong learners [5].

In the early 1970s Malcolm Knowles described adult learning theory, which affirms that adults learn in a different manner than children and that they require different educational strategies [6]. The principles described by Knowles are aligned with many of the recommendations published in the CME literature [7]. Such authors suggest that CME must move from standardized to customized and multi-place content, and from traditional lecture models to interactive learning, respecting individual learning styles and delivering "just in time" information [8]. The new model should focus on designing education that is tailored to individual physicians' needs. On approach to achieve this aim is creation of a practice-learning environment: in this new concept medical education is not a separate activity from patient care, but is driven by clinical context enriched by a variety of resources that respect individual learning styles [9].

Using these principles at Hospital Italiano de Buenos Aires in Argentina we developed a system to help physicians integrate their learning activities with patient care, using the EHR.

1. Description of the System and the Context where it was Implemented

The system developed is embedded in the EHR at Hospital Italiano de Buenos Aires (HIBA) in Argentina. HIBA is a non-profit academic medical center with over 1,500 physicians and 4,000 employees. In 1998, HIBA began to implement a Healthcare Information System (HIS) that was completely developed in-house and currently collects and leverages the clinical and administration information. Within HIS, the EHR is a fully-implemented Web-based, problem-oriented, patient-centered record with customized functionalities depending on the level of care (outpatient, inpatient, emergency care and home care).

Figure 1. Visualization of information pearls in the summary screen of the EHR.

For this project we created items of educational information referred to as "Information Pearls" (Figure 1). Every time a physician accesses a patient record in the EHR, the system presents information drawn from this knowledge base of Information Pearls, always related to the patient's demographic data and disease characteristics. If the physician chooses to read the information, he selects a link to a tab which presents the extended content. In the same section, physicians have access to more information related to the information pearl.

In this study we examined the acceptance of the CME system by doctors at HIBA. For this proof-of-concept study, we evaluated the system with an initial knowledge base of only 21 information pearls available to the CME system.

2. Methods

To assess the acceptance of the system a qualitative study was designed. Data was obtained via individual, face-to-face, semi-structured interviews performed between February and March 2012. To increase the credibility of the results we also used audit logs of participant use of the system as a means of triangulation to validate what participants said during interviews with the actual use of the system. This last data source was automatically recorded in the system.

The subjects recruited for the study are Primary Care Physicians (PCP) from the family medicine and internal medicine departments at HIBA.

The interviews took place during a pilot phase of the system implementation when only those PCPs recruited for the study could interact with the new system. The principal investigator performed all interviews.

For the analysis we developed a classification schema using the interview guide as a rector for the categorization, using spreadsheet software (Microsoft Excel, Redmond, WA) to organize the work and sort the themes that emerged in the interviews.

3. Results

All the recruited subjects participated in the study. We interviewed a total of 12 primary care providers (PCPs). Of these, there were six from the department of family medicine, six from the department of internal medicine, six were female, six were male, seven subjects had more than ten years of work in their specialties.

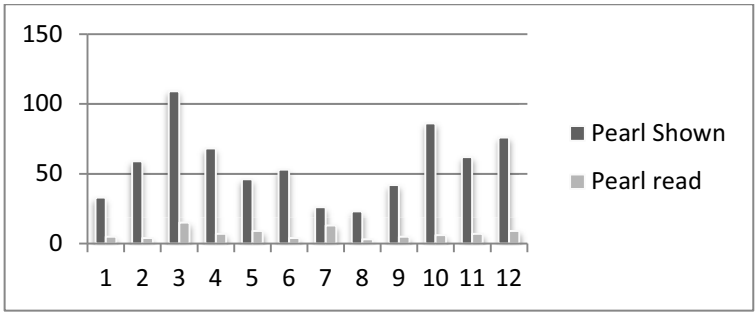

Figure 2. Information pearls shown to and accessed by participants

3.1. System Usage

During the study, information pearls were shown 683 times to study participants. Of these, doctors accessed the information 97 times (12.7% of the total number of sessions). Participants clicked on the information pearls and accessed at least three different types of content during the study duration. Figure 2 details the number of information pearls shown to and accessed by participants.

3.2. Interviews and theme analysis

One of the themes related to the acceptance was the use of the system and the willingness to use it. We assessed system use with directed questions and answers were validated via audit logs. All the participants indicated they used the system. When doctors were asked why they used it, they cited curiosity of the new functionality in the EHR, as well as the request from the investigator as reasons to use the system. Almost all participants mentioned that it was very easy and to access to the information rapidly. One of the physicians also said it was very useful.

The value participants afforded to the CME system was another factor that was considered. And one value physicians noted was that reading clinical information from the EHR afforded a sense of trust related to the process of development of the information pearl.

One of the factors mentioned by participant was the time that they need to spend searching for scientific information. Having the information there in the same screen that they were using was something appreciated by the study participants.

To avoid any controversy regarding the validity or accuracy of the content, we decided to only include information with a high level of evidence. So all the information pearls available for this pilot phase were class A and B recommendations from the US Preventive Services Task Force (USPTF). But this decision had unintended consequence that some participants thought the content was too basic, causing them to doubt the usefulness of the CME system as an educational adjunct.

We wanted to know if the CME system and the idea of receiving educational information could affect the patient physician relationship. But we did not record any negative comments about this aspect. Almost all participants thought the system was concise and very easy to read, without interfering in their workflows.

4. Discussion

The findings from our study help us to understand how a CME system embedded in an EHR can be accepted by PCPs and used during the patient encounter. All physicians recruited for this study used the system and almost all of them agreed in its usefulness as a strategy to promote continuing medical education. Participants appreciated the manner they receive the information, but they mentioned some limitation in the content presented by the system

The use of technology in medical education is well described [9], but the use of a clinical system to provide clinicians with contextual information with the aim of continuing medical education is not. There are scientific reports in the literature about the effectiveness of clinical decision support systems, but when the learning effect was assessed not positive results were found [10], but those systems were not designed to

support CME, they were thought as tools to change behaviors and not to change knowledge as it was designed in our study

We can compare the use of our system with a similar implementation with physicians accessing educational and patient information during clinical care. Rosenbloom et al. found a 0.07% rate of accessing the information [11], a much lower rate than the one we found in our study (14.2%). An important aspect to mention is that in our study all participants were asked to use the system, potentially overestimating the long-term use of the system. A long-term evaluation is needed to estimate whether this level of use would persist. The content available in the system was another limitation, with only preventive care type of information pieces with high level of evidence and almost all the participants focused on this.

As it was proposed by the study participants we need to make some modifications to the system, for example adding new and more diverse type of content. One of the new evaluation strategy will be to test the system in other setting, like the inpatient and with other groups of doctors, like medical residents more specialties. As it was suggested in the CME evaluation model [12], we will have to perform and effectiveness evaluation, to see if it can change physician knowledge, that is the objective of the system.

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