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Medical Education & Health Informatics: Time to join the 21st Century?

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Abstract

This paper reports a component of a larger study, Informatics: enhancing the Clinical Experience? (ICE), which explored the impact on the therapeutic relationship of the implementation and use of Electronic Medical Records (EMR) in British Columbia, Canada. As anticipated, EMRs were found to negatively affect the relationship in many clinics. However, surprisingly paper-based clinics were as likely as EMR-based clinics to report problems with maintaining eye contact with their patients. This led to an interesting finding; that as a result of this difficulty few family care providers actually chart when their patients are with them, preferring to build rapport and chart at a later time. Consequently three recommendations are made: 1) Improve medical education in the area of charting (paper & EMR-based) with the patient present; 2) Explore the affect different technologies and skills have on the ability of providers to chart with the patient present and 3) Develop an understanding that unless the technology and training improve Canadian family medicine will never gain the asserted benefits of EMRs, and that other incentives are needed if Canada is to meet its target of delivering Electronic Health Records (EHR) to 100% of all Canadians by 2015..

Keywords:

Medical education, Charting, Therapeutic relationship, EMR/HER

Introduction

Traditionally general practitioners have been taught that the way to develop and maintain a good relationship with their patients is through developing a personal interaction style that relies a great deal on direct eye contact with the patient. Likewise, it is the nuances of body language and facial expression that often cues a doctor in to what is really troubling a patient as opposed to the words they are speaking. Consequently, the introduction of an Electronic Medical Record (EMR) into family medicine brings with it a number of challenges. Not least of which is the interference the use of an EMR could potentially cause with this requirement for direct eye contact.

Methods

This paper reports part of a much larger study (ICE) undertaken in British Columbia, Canada during 2005-2008. It involved 30 family medicine/general practitioner clinics representing all demographic populations as well as rural/inner city and large and small (single-handed) clinics. Extensive interviews were undertaken with all members of staff within each clinic, on three occasions, during the three-year period. Additionally, interviews were also undertaken with random patients from each clinic over that same three-year period, a program of information management facilitation was conducted with 2/3 of the clinics, and a mail-out survey and a workshop were held with all participating clinics. Data from these activities are not reported here.

Clinics were categorized into one of two groups: Paper-based (a computer was used for billing and administrative activities only), or EMR-based (a full EMR was used, with charting conducted on the EMR and not in paper charts). The focus of the ICE study was the impact of charting method (paper vs. computer) on both the therapeutic relationship and patient outcomes.

We purchased a mailing list from the British Columbia College of Surgeons and Physicians, and then sent a recruitment letter to all 4,319 registered family physicians in B.C. inviting them to take part in the study. Several hundred physicians responded, representing a total of 78 clinics.

Clinics which had been using an EMR for more than twelve months were then excluded from the sample as we wished to investigate clinics in the dynamic early stages of implementation, rather than those whose work practices had already adapted to the EMR. There were no exclusions based on culture, religion, race, disability, sexual orientation, ethnicity, gender or age. Clinics were geographically dispersed, and represented each of the five Regional Health Authorities in British Columbia.

Clinics were then categorized into three groups. Group 1 clinics had had an EMR in place for less than 12 months as of January 2005. Group 2 and Group 3 clinics did not use an EMR at the time of enrolment, and did not plan to do so for several years.

Knowing that our EMR-based clinics had encountered varied training experiences from their EMR vendors, we provided all our EMR-based clinics with training in information management. Thus, in addition to participating in data collection, all clinics from Group 1 participated in a facilitation program led by myself. Additionally, Clinics from Group 2 and Group 3 were also randomly selected for participation in this facilitation program. These sessions, held over the lunch hour at the

clinic involved all staff. Sessions consisted of a program of change management, information management, and skills training and development designed to improve practice function regardless of the type of information management system in place.

Clinics in the three groups were clustered geographically. That is, Clinics 1a, 2a and 3a were all located in the same town, or region within British Columbia.

In the interest of retaining the desired goal of 30 participating clinics, the research team over-recruited and initially included 33 clinics in the study (11 in each group). As anticipated, three clinics did not complete the entire study. Two clinics withdrew from the study and the research team de-enrolled one clinic. Thirty primary care clinics completed the entire study during 2005-2008. The clinics selected for data collection were randomly assigned to the two project interviewers.

Data Collection

The ICE study employed a mixed methods approach to data collection. Qualitative interview guides were developed to interview health professionals. Patients were both interviewed and completed surveys; using semi-structured interview guides and questionnaires (see details of data collection below). General observations about each clinic environment were documented within the field notes and in sketches of the clinic layout. Facilitation data included a combination of field notes and survey instruments. In addition, the final stage of data collection involved administering a mail-out survey, designed to tap into organizational culture issues as well as patient information management and patient care. This paper reports on the face-to-face interviews with healthcare providers only.

To obtain rich data about a clinic's patient information management practices, and insights into the therapeutic relationship between the patient and health care providers in clinics, semi-structured face-to-face interviews were conducted. In addition to obtaining general demographic information about the respondent (age, sex, educational/training background of health care providers and the primary contact physician, employment status of patients/providers, and a profile of the clinic), we asked physicians and other clinic staff a series of questions about patient record management practices, both in paper-based and EMR-based clinics, including questions about:

- charting practices, record transfer practices, administrative tasks involved in the management of patient records;
- accessibility to all patient information during and after consultation, stewardship of the record, confidentiality and privacy issues;
- training opportunities;
- perceived competence in technology use, the perceived effects of EMR versus paper-based system on patient relationship/care, including patient self-care training/education, decision support capacity and use; perceived effects on interface/communication with external providers;
- overall perceptions of problems with current information management practices (and desire for improvements/changes).

Interviewers were careful to avoid asking specifically about the clinic's EMR system. They remained neutral in their questioning, asking only about the nature of patient information management practices, to collect both positive and negative evaluations.

Interview guides were semi-structured and flexible. Over the three interview periods the guides evolved to respond to the unique management and performance practices of each clinic, and accommodate changes occurring in the clinics.

Sample Characteristics

During the three interview phases, the research team conducted 263 semi-structured, face-to-face interviews with 124 physicians, nurses and office staff [such as medical office assistants (MOAs)]. Of the 30 clinics that completed the study, 38 physicians were interviewed, with a total of 99 interviews taking place over the three interview periods. Seventeen of the 38 physicians worked in EMR-based clinics, while 21 of the 38 physicians were from our paper-based clinics.

The majority of clinics served patients in an urban/suburban setting (13 paper-based clinics, 6 EMR-based). Four paper-based and 2 EMR-based clinics served patients in a small town. A small minority of clinics served patients in a rural region (2 paper-based, 1 EMR-based), while 2 EMR-based clinics were located in a geographically isolated/remote region of B.C.

Data Collection Period and Procedures

Data collection was spread over three interview phases, each about five months apart. The first set of interviews provided us with baseline information about patient information management practices. To examine any changes over time, we conducted our first set of follow-up interviews approximately five months after the baseline interviews. A second follow-up interview occurred approximately five months later. We chose to interview in 5-month intervals in order to ensure that we interviewed participating clinics at different times of the year.

The first interview phase began in July of 2005 and extended to October of 2005. Phase-three site visits were completed by September 2006. All interviews took place inside clinics, during regularly scheduled office hours. The interview date and time was negotiated with clinic participants, giving priority to their availability.

When the ICE study commenced, the research team planned to conduct five interview phases. In 2006, however, those plans changed. The British Columbia Physician Information Technology Office (PITO) was established as part of an agreement between the British Columbia Medical Association and the provincial government to develop and implement a standardized system of EMRs in B.C. As a result we found during our third round of interviews that our EMR-based clinics were on hold waiting to hear if their specific system would be approved for funding and our paper-based clinics were concerned about being forced into using EMRs. As a consequence, we suspended plans for interview rounds 4 and 5, anticipating that we would recommence them once the PITO had established guidelines for progress in the province. When it became apparent that this wasn't going to occur within our timelines we

adapted our protocol and replaced interviews 4 and 5 with the mail-out survey and a workshop, including all participating clinics.

Ethics and Analysis

Ethical approval was received and maintained from the University of British Columbia and the University of Alberta's human research ethics boards. Informed consent was obtained from all participants prior to each interview. All interviews were audio-recorded and transcribed verbatim. Following transcription, interview transcripts were anonymized, with references to names, places, clinic names and websites removed and replaced with codes. All transcripts were then independently analyzed by two researchers using the constant comparison technique and the framework approach.

Results

The results reported here pertain to the impact on the therapeutic relationship during the use of paper-based or EMR-based charting, and based on the interviews with healthcare providers only. Future papers will report on other findings from this and from other data collected during the ICE study.

Interference with therapeutic relationship

As anticipated providers reported that both they and their patients found that using the EMR for charting interfered with their relationship:

"But they don't like a person spending time with the computer and not with them."

(Clinic C4 PH2 Int. 1)

"They'd rather you take the time to talk to them."

(Clinic C5 PCP Int. 1)

Eye contact

The main issue for providers was the inability to maintain eye contact during charting. However, much to our surprise, paper-based providers reported this to be an issue just as commonly as EMR-based providers.

"I think it looks very impolite to do it [chart on the EMR] during the consultation and I've tried it but I feel like I'm losing eye contact with my patients…"

(Clinic C3 PCP Int. 1)

"Because I'm always a person who talks to the patient I very rarely ever - the only time I ever look down [at my paper chart] is if we're looking through the chart for old lab work or something..."

(Clinic A5 PCP Int. 1)

Charting after the patient leaves

Interestingly, although they reported that the inability to maintain eye contact and chart at the same time was an issue, providers didn't report that this impact was as significant as we thought that it would be. Consequently, we spent a considerable amount of time exploring how providers were managing their charting.

We found that it was very rare for providers, whether paper or EMR-based, to chart while the patient was with them. Even clinics which had invested heavily in their EMR, and were proficient with the technologies, opted to chart after the patient left.

"Well I think it's easier on the patient they feel that you're not sort of looking down all the time and writing. I find it much more easier for them."

(Clinic A5 PCP Int. 1)

"Because it detracts from the interview. It detracts from the building up of rapport. And it detracts greatly the ability to, the clinical skills, to take a history and do an examination. You just become much less observant because you're looking at the computer all the time."

(Clinic C4 PH2 Int. 1)

Communication style

Despite a prevailing tendency to chart after the patient left we did find cases where charting was undertaken with the patient present, and where the providers and patients didn't complain about charting being a negative impact on their relationship, but rather spoke glowingly of their ability to communicate. Invariably these cases were ones where the communication style of the provider was exceptionally interactive and personable. Whether using paper or EMR-based charts the providers drew the patients into a mutual review of their charts and discussion of their ailments and treatment plans.

"They feel more involved. It's not like I'm looking into a little book and secretly writing things."

(Clinic C7 PCPC Int. 3)

Mitigating technology

For some it was the choice of specific technologies that allowed them to chart with the patient present and to engage them in their own care:

"..that's probably the best way so that you can talk to them and introduce the information at the same time. If you have a tablet you can face them, … is a little bit better, because you don't have to sit it any way, you can just hold it with you in your hand. It looks like a famous paperclip [clipboard] thingy."

(Clinic C1 PH1 Int. 2)

"They [patients] really like the graphs, I mean if you show them the graph, you know, how their weight is going, how their blood pressures are going, they like that 'cause it lets them see, you know, am I getting better?, am I getting worse?. I really think they like going through the results at the same time as you are going through them. I think they think, yeah, "They actually did get a result and it really is there," you know. Pointing out, you know, well see here - this is good, you know, this is excellent."

(Clinic C3 PCP Interview 3)

Discussion

To my knowledge this is the first time that such a study has investigated the impact on the therapeutic relationship of charting including both paper-based and EMR-based charting. When planning this study I expected that we would find that EMRs interfered with the interpersonal relationship, that the forced lack of eye contact necessitated by computer-use would negatively impact the patient. However, instead we found that:

1. Providers often find that the use of a paper chart also directly affects their ability to maintain eye contact and to develop rapport with their patient. Consequently, many professionals do not chart, on either paper or computer, when the patient is with them;
2. When the EMR is used with the patient, providers report that patients find the encounter satisfactory. However, we noted that this was true only when the provider's personal interaction style led to the patient being actively included in the documentation and review process;
3. Some technologies can mitigate some of the negative impact of charting while with the patient.

Given that many of the anticipated benefits of an EMR rely on the provider charting while actively engaging with the patient, it is discomforting to realize how rarely this actually takes place. Let's just look at one example: the use of computerized alerts and prompts within an EMR which have been reported to have a positive impact on clinical outcomes[1].

Consider the instance of a female patient taking oral contraceptive medication being prescribed an antibiotic. Common belief suggests that when the provider is prescribing the antibiotic the EMRs integrated decision-support system would first check for allergies and other contraindications, and then remind the provider to inform the patient to be sure to use other precautions against pregnancy while she completes the course of treatment. Therefore if the provider doesn't chart until after the patient has left the clinic this alert and decision-support will not be provided. This timely informational discussion and relationship building opportunity would then be left to the dispensing pharmacist alone.

Perhaps this is acceptable in this scenario. However, what about when the provider misses the alert to remind them that their patient, who rarely comes in to see them, is overdue for their PAP smear, again? Since the patient has left it's now up to the provider to follow-up with that patient at a later time. Or will it slip their mind with the result that the patient may miss an opportunity for preventative care potentially leading to a delay in treatment for an, as yet, undiagnosed cervical cancer.

Initially I wondered whether this choice to chart after the patient had left was a behavior specific to British Columbia however our recent (2008) series of 20 Canadian case studies of EMR use that included representation from all Canadian provinces and one of the territories also observed the same behavior [2-3] suggesting that this is a general behavior in Canadian family practice.

Therefore, it is clear from the fact that so many providers opt to chart after the patient has left that much remains to be understood about how charting impacts the therapeutic relationship; specifically when using an EMR. Consequently I turned to medical education* to ascertain what new providers are being taught in this area.

Medical Education

Sadly, it quickly became apparent that while informatics is recognized [4] as a necessary component of training for our new providers it tends to concentrate on either 1) the use of information technology as a teaching tool for educating (E.g. [5]); or 2) information retrieval and appraisal (E.g. [6]). Additionally, it seems that not only is EMR training currently inconsistent but that actual use of an EMR is rarely considered a training need. As one faculty respondent stated in this 2007 scan *"The teaching on the use of health informatics and EHRs is very limited but that doesn't seem to be an impediment for new grads. They learn on the job."* [4 p.5].

Personal experience suggests that this attitude is pervasive within medical faculties internationally. Additionally, while the vast majority of medical schools do evaluate clinical skills in terms of history taking and the ability to synthesize information to arrive at a diagnosis or management plan [7] such evaluations do not take into account the impact that an EMR has on these skills.

Given that we are also continuing to graduate new providers with doctor-centered and paternalistic attitudes despite a greater emphasis on patient-centered attitudes in medical schools [8] it is of great concern to me that we are not addressing these technologies within our medical curriculum.

If you give a child a stethoscope they can fairly quickly work out which ends to put in their ears and that you can hear things through it - learning on the job. Yet, we still spend hours in the medical curriculum teaching our students how to listen with a stethoscope and how to interpret what they hear. How then can we justify *not* teaching our providers how to use a new tool that can have such a strong impact, both positively and negatively, on their relationship with patients?

It is clear from the fact that so many providers opt to chart sent.

Conclusion

Canada has a mandate, charged to Canada Health Infoway, to provide Electronic Health Records to 100% of all Canadians by 2015 [9]. Whilst progress towards this target is ever-increasing with 5 jurisdictions on target for the former goal of providing EHRs to 50% of Canadians by 2010, the prior lack of support for EMRs in primary care within Infoway's remit was a significant omission. The revised mandate [9], which recognizes this gap, specifically addresses support for chronic disease management across the continuum of care. For this to be achieved in primary care EMRs (a necessary foundation for EHRs) must contain clinical decision support [10] which means that providers must chart while the patient is present to gain the benefits of these technologies.

* Medical Education being that training provided to educate new health professionals whether that is doctors, nurses, pharmacists etc

It is clear from the fact that so many providers opt to chart after the patient has left that much remains to be understood about how charting impacts the therapeutic relationship. Therefore my first recommendation is that this be explored further both in research, and also within medical education. Subsequent to developing an understanding as to how charting affects the relationship we need to improve medical education in the area of charting with the patient present. Using a chart, paper or EMR-based, with the patient present is a skill that needs to be developed and taught within our medical curricula.

This leads to my second recommendation, which is that we need to explore how different technologies such as tablets, or the development of skills, such as touch typing, affect the ability of providers to chart with patients present.

Providers are voting with their actions and only using EMRs *with* their patients when they can use them in an interactive manner, drawing the patient into the documentation and review process. Therefore, EMR designers must seriously reconsider the way that their product supports workflow. Rather than simply presuming that providers will use the EMR with a patient present they must design their applications so that they make it easier for the provider to build a rapport with their patient, as they chart. This may mean that EMRs should be keyboard driven (rather than mouse driven) during charting as it is possible to maintain eye contact and touch type whereas it is not possible to maintain eye contact and use a mouse.

Finally, proponents of electronic records must understand that many of the benefits they attribute to EMRs will never be fully realized until these issues are addressed. Chronic disease management relies heavily on primary care where the therapeutic relationship is of the utmost import. Anything that negatively affects this must be mitigated. Critics have decried Canadian providers for being behind other countries in their take-up of EMRs. However, this research suggests that there are good reasons for these delays which must be addressed. I believe that the willingness to engage exists but that our knowledge, understanding and most importantly our provision of medical education in the area of charting with patients present is distinctly lacking. As one provider succinctly summarized:

"Some [patients] are quite impressed that we're-have entered the 20th century. Shame it's the 21st Century now!"

(Clinic C7 PH1 Int. 3)

If we want to provide 21st Century care isn't it time we left the 19th Century?

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