Research

Implementing electronic health records

Key factors in primary care

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ABSTRACT

OBJECTIVE To examine common themes about implementing and adopting electronic health record (EHR) systems that emerged from 3 separate studies of the experiences of primary health care providers and those who implement EHRs.

DESIGN Synthesis of the findings of 3 qualitative studies.

SETTING Primary health care practices in southwestern Ontario and the Centre for Studies in Family Medicine at The University of Western Ontario in London.

PARTICIPANTS Family physicians, other primary health care providers, and the Deliver Primary Healthcare Information management and operations team.

METHOD The findings of 3 separate qualitative studies exploring the implementation of EHRs were synthesized. In the 3 studies, investigators used semistructured interview guides to conduct one-on-one interviews and a focus group, which were audiotaped and transcribed verbatim, to collect information about participants' experiences implementing and adopting EHRs. Transcripts were coded and analyzed by 1 or 2 investigators, and the research team met regularly for synthesis and interpretation of themes.

MAIN FINDINGS Four common themes arose from the 3 studies: expectations of EHRs, time and training required to implement and adopt the software, the emergence of an EHR champion or problem solver, and the readiness of health care providers to accept the system.

CONCLUSION Those considering implementing and adopting EHRs into a family practice environment should reflect on the following issues: their expectations of the system and what is needed to use the software, the level of commitment to EHR implementation and adoption, the availability of someone willing to take a leadership or champion role, and how much knowledge of computers potential EHR users have.

EDITOR'S KEY POINTS

- Adoption of electronic health records (EHRs) in Canada has been slow. This study synthesizes the results of 3 qualitative studies exploring the adoption and implementation of EHRs into primary health care practices, focusing on the experiences of both health care providers and those who implement the systems.
- The researchers found that novice users might not understand the scope of change required to implement an EHR, as a very large time commitment is required. Some participants, however, found that the outcomes of EHR implementation exceeded their expectations.
- A critical success factor in implementing EHRs is the presence of a champion (leader and problem solver) for the project.
- Training is essential to bringing all users to an appropriate level of general computer knowledge, in addition to learning the specific EHR software.

Recherche

Implantation du dossier de santé électronique

Principaux facteurs pour les soins de première ligne

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RÉSUMÉ

OBJECTIF Extraire de 3 études séparées sur l'expérience des soignants de première ligne et de ceux qui installent le DSÉ les thèmes communs concernant la mise en place et de l'adoption du dossier de santé électronique (DSÉ).

TYPE D'ÉTUDE Synthèse des observations de 3 études qualitatives.

CONTEXTE Des établissements de soins primaires du sud-ouest de l'Ontario et le Centre d'Étude en Médecine Familiale de l'Université Western Ontario à London.

PARTICIPANTS Médecins de famille, autres soignants de première ligne et équipe de gestion et d'opérations du Deliver Primary Healthcare Information.

MÉTHODE Les observations de 3 études différentes sur la mise en place du DSÉ ont été mises en commun. Dans ces 3 études, les chercheurs ont utilisé des guides d'entrevue semi-structurée pour tenir des entrevues individuelles et un groupe de discussion, lesquels ont été enregistrés sur bande magnétique et transcrits mot à mot afin de connaître l'expérience des participants dans la mise en place et l'adoption du DSÉ. Les transcrits ont été codés et analysés par 1 ou 2 des chercheurs, et l'équipe de recherche s'est réunie régulièrement pour faire la synthèse et l'interprétation des thèmes.

PRINCIPALES OBSERVATIONS Quatre thèmes communs sont ressortis des 3 études: attentes relativement au DSÉ, temps et formation nécessaires pour la mise en place et l'adoption du logiciel, disponibilité d'un champion du DSÉ ou d'une personne capable de résoudre les problèmes et volonté d'accepter le système de la part de l'équipe soignante.

CONCLUSION Ceux qui pensent mettre en place et adopter le DSÉ dans un milieu de pratique familiale devraient se pencher sur les points suivants: leurs attentes à l'égard du système et ce qu'il faut pour utiliser le logiciel, la somme des efforts requis pour implanter et adopter le DSÉ, la disponibilité d'une personne capable d'assumer le rôle de chef ou champion et le niveau de connaissance de l'ordinateur nécessaire aux éventuels utilisateurs du système.

POINTS DE REPÈRE DU RÉDACTEUR

- Au Canada, l'adoption du dossier de santé électronique (DSÉ) progresse lentement. Cette étude résume les résultats de 3 études qualitatives sur l'adoption et la mise en œuvre du DSÉ dans des établissements de soins primaires, en insistant sur l'expérience des soignants et de ceux qui implantent le système.
- Les chercheurs ont observé que les apprentis utilisateurs ne comprennent pas nécessairement l'ampleur des changements requis pour mettre le DSÉ en place parce qu'il faut y consacrer beaucoup de temps. Toutefois, certains participants ont trouvé que l'implantation du DSÉ dépassait leurs espérances.
- Un élément critique pour le succès de la mise en place du DSÉ est la présence d'un champion (personne capable de résoudre les problèmes) pour le projet.
- Tous les usagers ont besoin d'une formation pour atteindre un niveau de connaissance de l'ordinateur suffisant et se familiariser avec le logiciel spécifique du DSÉ.

Implementing electronic health records (EHRs) in primary health care is important, yet it poses many challenges.[1,2] We use the term *electronic health records* throughout this paper to reflect the range of providers, including family physicians, nurses, nurse practitioners, chiropodists, and others, who use EHRs. These records are more commonly referred to in the literature as *electronic medical records.* There is growing recognition of the role of EHRs in the provision of health care, particularly because they can enhance the quality of health care provided through decision-support functions, increase collaboration among members of care teams, and address health care providers' need for information.[1,3] Also, use of information technology systems has been linked to a decrease in medical errors.[4] Using EHRs could improve patients' health outcomes through enhanced disease management and increased levels of preventive care.[5,6] Finally, some efficiencies can be realized through eliminating routine tasks, such as pulling paper-based charts.[5] Despite the benefits of EHRs, particularly in the areas of patient safety and improved quality of health care, adoption has been slow.[1,7] Relatively few family physicians in Ontario and throughout Canada currently use EHRs in their practices.[8,9]

Research on the usefulness of EHRs in primary health care has focused on practitioners' performance and system efficiencies; however, there is a need for further studies to examine the effect of computerization on patient and health care team outcomes.[6] A lack of research describing specific, individual experiences of implementing information technology in health care has been noted.[7]

Researchers at the Centre for Studies in Family Medicine at The University of Western Ontario in London conducted 3 studies to explore the acquisition, implementation, and use of information technology by primary health care providers (the AIUPC study)[9]; the challenges and opportunities associated with EHR implementation from the perspective of those facilitating implementation (the FEHRI study)[10]; and the experiences, ideas, and perspectives of primary health care providers adopting EHRs in their practices (the EHRPC study).[11] These studies were conducted separately. Recognizing that common themes on EHR adoption existed in all the studies, we set out to further examine these themes. The purpose of this paper is to share these emergent themes as examples of what might be experienced by primary health care providers who embark on implementing EHRs in their practices.

METHODS

Participants

Nine family physicians, 4 administrative staff members (office managers and clerical and computer staff), and 2 practice management consultants participated in the AIUPC study. Key informants in the AIUPC study were identified by investigators at the Thames Valley Family Practice Research Unit in the Centre for Studies in Family Medicine and by the Ontario Ministry of Health and Long-Term Care in Toronto. In the FEHRI study, in-depth interviews were conducted with 2 participants from the Deliver Primary Healthcare Information (DELPHI) project's management and operations team, and 4 members of the team participated in a focus group. In the EHRPC study, 39 health care providers who were newly using EHRs in the DELPHI project were asked to participate; 13 family physicians, 9 nurses, and 7 administrative staff members (receptionists, secretaries) participated.

Most participants interviewed in the AIUPC study were in the early stages of adopting EHRs. In the FEHRI study, participants reflected on their experiences facilitating implementation and adoption of EHRs in primary health care practices. Participants in the EHRPC study ranged from new to advanced EHR users. Practices in the AIUPC and EHRPC studies were from both rural and urban settings and included a range of team sizes and configurations.

All 3 studies were approved by The University of Western Ontario's Research Ethics Board.

Data collection

All 3 studies used one-on-one interviews to collect data, and the FEHRI study used a focus group also. The

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interviews and the focus group were audiotaped and transcribed verbatim. Semistructured interview guides were used in all 3 studies, and the interviews and focus group were conducted by study investigators. In the AIUPC study, questions focused on health care providers' experiences of acquiring, implementing, and using EHRs, and on their reflections on the process. In the FEHRI study, questions on challenges and solutions to implementing EHRs, as well as on training and team functioning, were posed to participants. In the EHRPC study, questions focused on the feelings and experiences of team members in relation to the introduction of EHRs and the effect of EHRs on team functioning.

Data analysis

In 2 studies (AIUPC and EHRPC), a minimum of 2 investigators independently reviewed and coded the transcripts to determine key concepts emerging from the data. The research team then met to compare and contrast their independent coding and reached a consensus that informed development of the coding template. This template was applied to subsequent interview data and adapted by the team as new themes emerged. The research team held regular meetings for further synthesis and interpretation of themes.[12] In the third study, transcripts were coded and analyzed by 1 study investigator in consultation with a second investigator. This analysis used a "framework" approach.[13] Analysis of data in the 3 studies was interpretive and iterative. Credibility and trustworthiness of data analysis were enhanced by rigorous checking of interview transcripts, detailed field notes, debriefing sessions after interviews, and team analysis.

FINDINGS

Four common themes arose from the 3 studies: expectations of EHRs, time and training required to implement and adopt the software, the emergence of an EHR champion or problem solver, and health care providers' readiness to accept the system.

Expectations of EHRs

In all 3 studies, participants provided their perspectives on what they expected from the implementation and use of EHRs. In the AIUPC study, a participant noted the importance of expectations in implementing EHRs, "It's just, it's so important to understand all your needs. From the receptionist to the person that's going to be entering the data if it's not the physician, and also what you hope to get out of that system."

Participants in the FEHRI study noted a mismatch between what providers expected to achieve with EHRs and the amount of effort they anticipated would be required for implementing and adopting them into practice: "They are 2 sides of the same coin … what is the value [of the EHR] for me? Number 1 … So on the one hand there could be an enormous sort of value question. Number 2 is those who have done it sort of had a really low sense of what the hurdle really was in doing this."

New users in particular might not have fully understood the scope of the change required to implement an EHR system. A participant in the FEHRI study said that users do not have "knowledge of what an electronic health record package will do to their work flow in their office and how it will just throw the whole office on its head essentially because it does require massive undertaking with regard to reorganization."

For some participants, the outcomes of EHR implementation exceeded their expectations. A participant in the EHRPC study said, "It's doing a lot better in this office than I thought it would. Because I just thought … that it would just be like some big horrible mistake. But it's going smoothly, he is using it well, and we're doing well with it. It's going over a lot better than I thought it would."

Given this information, it is important for health care providers to examine their expectations of EHRs before embarking on implementing and using them.

Time and training

In the AIUPC study, the enormous time commitment required to implement an EHR system was identified as a challenge. One participant noted, "The time [for family doctors] has been amazing …. Astounding, astonishing, overwhelming."

Learning to use EHRs was difficult when there was little time available in a busy workday. Another participant in the AIUPC study described a phased-in implementation process: "Initially, it was strictly demographics and appointment scheduling, period. Then the billing clerk was being trained … We lived with that for about 4 or 5 months before we went to computerized medical records."

The experiences of DELPHI team members participating in the FEHRI study indicated how time was a crucial component in the implementation process and how it was important not to underestimate the time required: "Time is the biggest [consideration] of all isn't it? It's going to take 10 times longer than you think it's going to take."

Participants in the FEHRI study noted that family physicians' principal commitment was the delivery of patient care, so it was difficult for them to allocate the time needed to learn to use the software and redesign the work flow in their practices: "They're … awful busy. There's a lot of physical running around in family practices … and so as a result of that there wasn't a lot of time to be able to navigate through 5 screens … so that learning process was too slow for them and led to frustration."

The experience of participants in the FEHRI study illustrated how the type of training available was also very important. For example, some of the care providers in DELPHI practices attempted to learn through remote telephone-based training, but ultimately requested on-site help. As one participant in the FEHRI study noted:

> They liked real people sitting beside them responding to their expressions, pausing when they looked confused ... I mean you can imagine people that are not accustomed to technology at all, have to do a pretty high processing technological thing which is taught remotely. I mean that's pretty fancy even for people that are comfortable with computers.

A participant in the EHRPC study described a solution to the challenge of learning to use the EHR system given the time constraints posed by their workday by stating:

> There's got to be a balance [during the implementation stage]. I think if you could even have a couple of days of just not as many patients, someone behind you showing you all the little routes that you go, instead of trying to find out on your own, then I think it would have been much less stressful.

Similarly, learning to use EHRs and trying to care for patients at the same time was difficult. A participant in the EHRPC study said:

> [W]e were doing 1 step wrong that we couldn't actually get into it. We had to really think about what did we do wrong. So it was taking the 2 of us, and by the end of the day we had figured it out. But it becomes frustrating that sometimes you don't have the time when you're trying to see all your patients. If you're frustrated with that particular problem, to take time to solve it might be, "Oh forget it, we won't worry about it today."

Thus, implementing the system posed a substantial challenge for physicians both in meeting patients' needs and in finding time for learning.

Champion or problem solver for EHRs

The presence of a champion, someone who is the leader for an information technology project, was often identified as a critical factor in successful implementation of EHRs. This concept was echoed in the AIUPC study, where the presence of a champion was cited as an important factor in the implementation process: "I think every [practice] has sort of had to try to find one person, and sometimes it's a nurse, sometimes it's a doctor, some person that just has a little bit of an interest. And we found that [is] sort of what keeps the ball rolling and keeps people from getting too frustrated."

In the FEHRI study, members of the DELPHI team experienced a more nuanced version of what constitutes a champion: "Having one champion doesn't necessarily mean that the practice is going to be successful because each of these physicians are technically champions in their own right, but they have slightly different processes."

As implementation moved forward in family practices and novice computer users became more proficient, someone often emerged as the problem solver for the practice. In some smaller practices, one physician was the champion for the entire EHR implementation process; in other practices, the champion was a member of the staff who became the problem solver and facilitated EHR implementation. This concept was reflected in the EHRPC study, where one participant described the characteristics of a problem solver in the organization: "If we've got an issue, instead of calling somebody and she knows it we might say '... how do we get to fix this up?' [She] knows an awful lot about it as well, [she's] got ears in the back of her head, so if she hears us doing something she comes to the rescue, whether we need her or not, so it's just a convenient source to go to."

An EHR champion can be a traditional leader or another team member who is the problem solver.

Providers' readiness to accept EHRs

Health care providers' readiness is connected to baseline levels of computer knowledge. In each of the 3 studies, participants had varying levels of knowledge of and experience with computers. A participant in the AIUPC study noted the importance of computer knowledge by stating, "What we could have done prior to that probably to be even more prepared would have people do some more Windows training, keyboarding training, that kind of stuff. Because I think that's maybe where we fell apart as I assumed that people had that knowledge, and not everyone did."

Those who had little experience with computers were challenged by the process of learning how to use the computer in addition to learning the software. The level of computer experience primary health care providers had before EHR implementation was a key factor in how the process moved forward. A participant in the FEHRI study said, "For the doctors, I find that, and actually this is true again across the doctors, nurses, and other admin support staff ... their beginning level of computer savvy-ness really dictates how quickly they will progress through this whole implementation process."

The need for additional time to be set aside for learning if a person had little computer experience was highlighted by a participant in the EHRPC study who said, "For people who are unfamiliar with computers, you really need to put some time in, and you know there are things that as you use the program it becomes easier and easier and easier."

These experiences reflected the importance of assessing baseline levels of computer knowledge when considering implementing EHRs and of estimating the length of time and amount of effort required to adopt the software into practice.

DISCUSSION

Primary health care providers seeking to use EHRs in their practices face many challenges. A lot of these challenges can be ameliorated by understanding what can help or hinder the process of implementing and using EHRs. The findings of the 3 studies illustrate 4 things to consider: the implementation process might take longer and be more of a commitment than initially expected, dedicated time for training is important, having a champion or EHR problem solver is beneficial, and baseline levels of computer knowledge influence the implementation process.

Prior expectations of EHRs played a role in the 3 studies. Our findings reflect a similar pattern of barriers and facilitators to those identified in previous studies: the need to set aside time for implementation and training as well as prior expectations of EHRs.[14] Training is an important component of EHR implementation; however, attempting to provide the same type of training (eg, telephone-based) to everyone is not likely to succeed.

While the importance of information technology champions has been noted in previous studies, in our experience, this concept was slightly more nuanced.[7,9,15] Some physicians acted as leaders, while other family practice team members came forward as the EHR implementation and adoption process progressed. Identifying a champion for an information technology project might involve seeking out someone who does not fit the usual profile of a leader. Given that primary health care providers are very busy, leaders in principally clinical roles might require the assistance of problem solvers to make the implementation process more efficient.

Evidence of the importance of prior knowledge of computers is mixed.[16,17] In contrast to our findings, a study of family medicine residents found that prior experience with computers was not associated with perceived satisfaction with using EHRs nor with implementation challenges.[16] In concert with our findings, however, prior computer experience was a positive predictor of the perceived usefulness of EHRs among physicians, nurse practitioners, and physician assistants in American ambulatory care settings.[17] In particular, the important role of baseline computer knowledge was evident in our findings.

Limitations

One limitation of the studies summarized in this paper is that all data are based on the experiences of a relatively small group of primary health care providers and staff (n = 42) and those implementing EHRs in a specific area of Ontario. We were able, however, to examine EHR implementation and adoption at various stages in a variety of practices and in both rural and urban settings.

Conclusion

Although research on barriers and facilitators to EHR implementation exists, limited research examines the effect of organizational dimensions on implementing information technology more broadly or examines individual experiences with implementation more specifically.[7] This paper highlights the importance of factors that influence implementation of EHRs and provides direction for future research on this important change in the practice of family medicine.

Those considering adopting EHRs in family practice should reflect on the following issues: expectations of EHRs and what is needed to use the software, level of commitment to implementation and adoption of EHRs, availability of someone willing to take a leadership or champion role, and potential EHR users' baseline knowledge of and experience with computers. Future research could focus on exploring the implementation and adoption of EHRs in relation to organizational dimensions within primary health care practices. 🍁

Competing interests
None declared

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