A Cognitive Walkthrough and Focus Group Study of Nursing Personnel to Improve EHRs Used in Nursing Homes

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Abstract

The use of electronic health records (EHRs) to support health care has dramatically increased in the past several years; however, the efficiency of these systems in supporting nursing personnel's workflow remains unclear. The purpose of this paper is to examine nurses' experiences using an EHR system and how nursing personnel evaluate the usability of the EHR system. Three focus group interviews and a cognitive walkthrough with four nurses were performed in the spring of 2010. A major finding was that the nursing personnel were satisfied overall with the implemented EHR system. The most commonly mentioned problems were lack of training and organizational challenges during implementation. Strategies to improve the efficiency of EHRs were reducing the amount of information displayed and the number of opportunities to perform a certain task in the system.

Keywords: focus groups, medical health records, nursing evaluation research, nursing staff

Introduction

Nursing personnel, including registered nurses (RNs) and nursing aides (NAs), are legally required to document the planned and performed care of patients in nursing homes [1]. The patients' electronic health records (EHRs) play a key role in nursing homes when nursing personnel perform the documentation. The EHRs are to support nursing personnel as they carry out their work and assist them in making high quality, evidence-based decisions. The goal of the government is that electronic devices should be used for documentation and communication in all situations in health services to increase efficiency and save money [2]. Understanding nurses' experiences is important in fulfilling the goal of using the electronic devices efficiently and effectively in health services.

Usability is the lack of frustration when using something [3]. Frustration is often caused by a discrepancy between the number of tasks required and the available time to perform them. When there are too many tasks waiting for the nurse's attention, s/he might not want to use the computer if it leads to more frustration. Nevertheless, documentation is necessary, not only because it is legally required but also because it is essential for all involved nursing personnel to know whether the patient's situation has changed.

High usability requires that the product should be useful, efficient, effective, satisfying, learnable and accessible [4]. Usefulness is the most important attribute; if a product is not considered useful, it will not be used at all [3]. The other attributes of usability, such as efficiency, give the user the opportunity to achieve his/her goals in the shortest possible time. This is also quite important in nursing home settings, as are the effectiveness and the learnability of the system. We know that many nurses are not given sufficient time to learn the system but are required to learn while actively performing the documentation. This can be problematic. Satisfaction with a system is often determined by the previously mentioned attributes. Shneiderman and Plaisant [4] claim that in life-critical systems, subjective satisfaction is less of an issue because the users are well-motivated professionals. Nevertheless, this may affect both use and the frequency of use.

Accessibility is a sibling of usability [3], and in healthcare settings there are strict guidelines regarding who has access to information in the EHR. This might be an obstacle, although it is necessary to keep the information about each patient secure. Nevertheless, this is a problem when nursing homes must use temporary staff, which they often do. Temporary staff often lack the necessary usernames and passwords to access the computer. This may be an organizational problem; however, it is closely connected to the user's perception of the computer and therefore must be considered. Because of work pressure, the staff often needs to identify different methods to circumvent these obstacles, and some solutions may not be completely legal. The five attributes of usability mentioned above are the focus of this study.

Background

In Norwegian nursing homes, the main users of EHRs are physicians and nursing personnel. Because the physicians and

the nursing personnel work in different settings and have different needs and nursing personnel complete most of the documentation, this study will concentrate on the nurses' evaluations of the software. The nurses' working conditions in a nursing home setting are quite often characterized by many events and tasks occurring simultaneously. When sitting at the computer documenting the records of different patients, there are usually many interruptions, such as telephones to answer, that occur mid-sentence. People asking questions is another type of interruption that might result in the nurse having to leave the current record incomplete to consult another patient's record. The lack of computers is another challenge to take into consideration; there are seldom more than two computers in each ward; thus, nursing personnel must share.

There are different EHRs, and not all of them are considered beneficial [5] and useful by the users [6]. Nevertheless, nurses must use them because this is the only way to complete the documentation. Experience with certain types of software might influence the user's opinion of a new system before s/he has even tried it.

The participants included in this study had previously used EHR software (EHR 1) before they started to use the current EHR software (EHR 2). EHR 2 was developed by a physician, and the main differences between EHR 1 and EHR 2 were that EHR 2 included decision-support capabilities [7]. EHR 2 has been implemented in three nursing homes in Norway. For two years the nursing personnel in these nursing homes participated in the development of EHR 2 by continuously giving feedback to the software developer concerning areas that required improvement. Despite this involvement, there are nursing personnel who avoid using the EHR 2 documentation functions. More knowledge about nurses' experiences with using the EHR 2 might increase its use. The aim of this study was to examine nursing personnel's experiences with the EHR 2 software and how they perceive its usability in their nursing home.

Methods and Materials

To examine how the EHR 2 supported the nurses' workflow, we chose to conduct cognitive walkthrough observations in real working situations to gain an understanding of the surroundings in which the EHR 2 system is typically used. We chose the cognitive walkthrough observations method to gather information about potential integration problems with the process and use of the system [8]. Alexander and Staggers [9] claim that understanding competing demands in natural settings is important for researchers who want to understand how clinical technology affects nursing workflow, patient care and the efficiency of nursing services. The natural setting cognitive walkthrough observations were conducted when four RNs on four different wards were conducting documentation using the EHR 2.The RNs were asked to perform their documentation in their usual manner and were free to express their thoughts aloud while they were using the EHR 2. They were not asked questions during the cognitive walkthrough observation.

Moving from a cognitive walkthrough observation to a focus group is moving away from realistic usage situations [10]. By using data from the natural cognitive walkthrough observations, the moderator (MB) could help the participants recall how a particular feature was being used. The participants in the cognitive walkthroughs were from four different units in the three nursing homes that had used EHR 2 for two years. The focus group participants were from the same three nursing homes; however, they were not the same nurses who participated in the cognitive walkthroughs. The focus group participants were as homogeneous as possible to make the participants feel comfortable enough to express their opinions during the focus group interview sessions. The moderator led the interviews and used a semi-structured interview guide.

Sample

The participants in the focus group interview were recruited by the managers of the wards. The inclusion criteria were that the participants used EHR 2 on a daily basis and had more than one year of experience working in a nursing home. A total of 19 nursing personnel, twelve RNs and seven NAs, participated in the three focus group interviews. Six from nursing home A, five from nursing home B and eight from nursing home C participated. Table 1 displays the participants' characteristics.

Table 1. Focus group participants' characteristics (n=19)

Characteristics	
Gender, female, n (%)	16 (84)
Male, n (%)	3 (16)
Age (years) n (%)	
20-29	5 (26)
30-39	7 (37)
40-49	1 (5)
50-59	6 (32)
How well do you know the system? n (%)	
Very well	4 (21)
Well	13 (68)
Not well	2 (11)
How often do you use the system? n (%)	
Daily	18 (95)
At least once a week	1 (5)
At least once a month	0

Observation and focus group interviews

During the cognitive walkthrough observations, the observer did not participate in any way other than to observe and take notes; the purpose was to understand the setting in which the EHR was being used and the issues that arose and to subsequently use this knowledge to create in-depth questions for the follow-up focus group interviews. The focus was on the use of the computer and not on all the other tasks a nurse performs during her/his shift. During the observation, handwritten field notes were taken. For example, the observer noted when the participant seemed frustrated, expressed positive or negative comments, and when there was missing information or s/he did not know how to use the system.

Focus groups should be as homogeneous as possible (e.g., the same age, the same sex, the same educational level) to make the participants feel comfortable enough to express their opinions on the questions [11, 12]. The questions are preset and should allow enough room for the conversation to flow without deviating from the focus. Focus group interviews are challenging but quite useful in evaluating user interfaces, and as Lazar states [10:178], "If you don't listen to your users you might miss some of the most important feedback that you can get." The moderator included questions that attempted to uncover situations in which the participants had different opinions of the various situations. The questions were open-ended and exploratory to encourage the participants to delve deeply into the questions during their conversations. Brender [13] argues that focus group interviews are especially well suited for evaluating health informatics systems because they can identify possible patterns in nursing personnel experiences using an EHR system and how nursing personnel evaluate the usability of the EHR system. Recording equipment was used when conducting the interviews, and a co-moderator took notes.

Data analysis

Qualitative content analysis [14] was used on the transcribed data from the cognitive walkthrough observation and the focus groups. The analysis consisted of descriptive narratives, which in Sandelowski's [15] opinion are appropriate for seeing the situation as it is without the need to interpret. This requires that one write down what occurs using natural language. If there is anything in the situations the observer does not understand, s/he must write down what occurred. In this situation the questions were written down and used in the focus groups interviews conducted subsequently.

In analyzing the cognitive walkthrough observations and the focus group data, the researchers coded openly, line by line, and identified and compared categories. The categories were compared to detect similarities and differences among them. This will elicit information about the nursing personnel's experiences with the EHR 2 software, how they perceived the usability of this new software in their nursing home, and whether the software was used as intended.

Findings

All the participants had experience with EHR software systems other than EHR 2. The nursing personnel stated that after they started to use EHR2, there was no time-consuming duplicate documentation, as there had been previously. Table 2 shows the summary of the six categories from the cognitive walkthrough observations and the focus group interviews, in which issues were identified. We organized the comments into categories that analyzed the usability aspect and suggested implications for practitioners.

Table 2. Experiences reported in the focus group interviews (n=3)

Comments	Analysis	Implication for practice
Login, not available Not enough computers available during peak time	Accessible – Administration problems	Automatic request for login id- and password Approval for guest, temporary 24 hour access
Lack of training	Learnable-Training/education	Tutorial
The software has limited capability for documenting planned interventions	Useful-Software	Add care plan documentation capability
Terminology not consistent or standardized. Problems with different dialects	Effective-Functionality	Interpretation of standardized terms
Documentation may be improved if images could be included (e.g., follow-up wound care)	Usefulness - Visualization	Add opportunity to upload images to include, e.g., progress notes and the care plan in the EHR software
Do not require the nurse to re-enter or use "copy", "cut" and "paste". Opportunities to extract information, search the data (e.g., number of falls on the ward level.)	Efficient-Reuse data	Automatic trend reports for individual report generation. Customized set of parameters, search criteria

The cognitive walkthrough observations revealed that the EHR 2 provides ample opportunities to use free text; however, if the nursing personnel were provided with standardized text, they would prefer to use that instead. Some sections of documentation were still performed using paper notes. One of the nurses summarized her experience as follows: "After we got the EHR 2, we have been better overall at doing documentation."

Findings from the cognitive walkthrough observations showed that EHR 2 provided a good overview of resident data, medical diagnoses, medications and laboratory data for the nurses. We also found that there were many different methods to perform the same documentation task. Different methods altered how much the RNs had to read or browse in the EHR 2 to identify essential data. One nurse said, "EHR 2 software gives a good overview of the residents' data, and we will absolutely not change software again."

Discussion

In this paper we examine how nursing personnel experienced using the EHR 2 software for documentation in nursing homes. Overall, the nursing personnel stated that they better performed documentation when using the EHR 2 software and compared their experiences with using the EHR 1 software. EHR 2 gave the nurses a good overview of patient data, medical diagnoses, medications and laboratory data. Six categories summarize the nurses' experiences using EHR 2 and can be prioritized as areas needing improvement.

First, nursing personnel describe a lack of guest or temporary login capabilities and a lack of computers available at peak times. Because of these problems, some of the nursing personnel (e.g., temporary nurses on weekends) do not document the planned and/or performed nursing care of residents in nursing homes using EHR and instead use paper notes. This lack of documentation may potentially generate safety issues, and parallel documentation causes inconsistencies in both electronic and paper documentations [16]. A recent study has shown that EHRs can increase the quality of care in nursing homes; however, managers and policy makers must be aware of the increased hardware and software expenses [17].

Second, nursing personnel reported that they required more opportunities for training. This concern aligns with findings from other implementation studies [6, 18, 19] that label training as a critical factor to the success of implementation projects. A well-planned, descriptive tutorial may support the training and implementation process.

Nursing personnel noted the inability to document planned interventions as a third category in which the software needed to be improved. This confirms the results from another study [20]. Our results indicate that the nursing process is a part of nursing personnel's daily routine and needs to be incorporated

into the EHR software as a strategy to support nurses' workflow.

As a fourth category, the participants also noted that there is no standardized terminology. However, there seems to be a trend in nursing care to increase the use of standardized terminology to increase resident safety and improve documentation [21, 22]. Category number five recommends including a method to upload images to improve quality and reuse data for visualization.

The theoretical framework that we chose broadens our understanding of the data collected. The positive results align with the findings of other studies that show that less time is spent on documentation when information systems are used [23]. An increased focus on including advanced technology for support and a close collaboration between the vendor and the users create an overall high usability of EHR 2. These implications should, however, be interpreted in light of the limited amount of EHR software and nursing homes included in this study.

Methodological considerations

A limitation of this study may have been that group dynamics play an important role in focus group interviews. Outspoken individuals might sway the group or dismiss the comments of weaker participants [14]. Homogeneity among the participants is preferred because the group dynamics are affected if someone has a higher status or greater expertise than the rest [24]. Elwyn et al. [11] point out that people tend to be more truthful and reveal more about themselves when they are with strangers. In our focus group interviews, the participants were with colleagues, some of whom they knew. Hopefully the discussion in the focus groups made the participants feel safe enough to be honest about how they work with the computers and software even if some might have felt they were revealing their own lack of knowledge.

The findings from these observations and focus group interviews might not be valid for all systems used by nursing personnel. However, in this particular study, the objective was to examine how the user interfaces with EHR 2.

The participants were asked to participate in the study, and the ones who agreed might be the ones performing the best at using the system. Therefore, there may be a bias in the overall positive results; nevertheless, important issues were revealed. People who are not too familiar with a program usually perform worse when they are being observed [10].

Conclusions

This study made several contributions to identifying areas for improving the usability of EHRs in nursing homes. We used a novel data gathering research method: cognitive walkthroughs in a natural setting to frame our questions for in-depth focus group discussions. We suggested viable solutions to improve

usability of the EHR and reported the increased satisfaction of nursing personnel who used a newer version of the EHR in their nursing home on a daily basis. Further research that measures the relation between the implemented proposed enhancements to the EHR system and the satisfaction of the nursing personnel would be a good follow-up study.

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