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ABSTRACT

Background: Electronic records are currently being introduced in both the hospital and the home care setting. However, there are few studies focusing on the evaluation of an electronic nursing record from applicability to technicality and soft- and hardware, and from the perspective of home nurses.

Aim: To evaluate home nurses' experiences with an Electronic Nursing Record (ENR).

Methods: A qualitative, explorative study by means of thirteen in-depth interviews with home nurses, head nurses and Administrators, and four focus groups with a total of 24 home nurses. All participants were employees of the *Wit-Gele Kruis*, an organization for home nursing in Flanders, Belgium.

Findings: This study revealed three levels that feature the implementation and integration of an ENR in home nursing: the preparation, the technicality of the ENR, and the 'user' as an individual. Despite technical difficulties, the home nurses are willing to give the ENR a chance, because they believe in its value. But, at the same time they are trying to find a balance between this belief and their capacity to learn to work with an IT device and to integrate it in their daily work, the responsibility towards the patient that his care comes first, the impact of technical difficulties on their workload, and the integration of the ENR in their personal lives.

Conclusion:

This study provided insights in the necessity for a multilevel approach when implementing an ENR in home nursing.

Keywords: home nurses, Belgium (Flanders), electronic nursing record (ENR), evaluation, health technology

INTRODUCTION

Health care today is confronted with demographic changes, with financial constraints, and with the shift from an acute to a chronic health care model, moving the focus of care from the hospital to the home care setting. These developments and trends highlight the need for an efficient and effective management of health care, resulting in increased attention towards the concept of quality of care, and the direct relationship between quality of care and the quality of information available to health care professionals (Currel & Urquhart 2003, in Oroviogioicoechea et al. 2007) and the process of clinical information and communication (Oroviogioicoechea et al. 2007). It is within this scope that concepts such as information technology, wireless computing, digital technology and (shared) electronic health/patient records are currently introduced in both the hospital and the home care setting. Studies focusing on the introduction, the implementation, the use and the effectiveness of electronic patient/health records, receive much attention in the literature. Greenhalgh et al. (2008) explored the introduction and implementation of the Summary Care Record at individual and organizational levels to draw insights about the process of socio-technical change. They concluded that shared electronic records are complex innovations and that the implementation and integration process are heavily influenced at the micro-meso-and macro-levels. Kramer et al. (2007) evaluated the implementation of an electronic system for medication reconciliation. Some reports were not completed by the physicians before discharge, because they viewed the process as repetitive, since discharge prescriptions still had to be written; an upgrade of the computer system often caused a crash of the system, resulting in taking a lot of time to re-enter the lost data; whilst patients reported a greater understanding of the medications they were to take after discharge from the hospital. Siegler et al. (2009) studied the use of information technology by hospital and home care nurses to improve the communication and the information gap at the transition between care providers. Despite the real time savings from a 15 minutes telephone call to a 5 minutes completion of the

electronic form, the form was rarely used. This was due to the fact that the time savings were only for those who actually were involved with home care orders and because it demanded a change in nursing culture that was not thought to be easily made (Siegler et al. 2009). Nilsson et al. (2008) described district nurses' attitudes regarding the implementation of information and communication technology in home nursing: ICT had to be the result of cooperation between ICT-personnel and the personnel working with the technology. Information and education were found necessary to know how to use the technology; learning and using the technology were subject to individual differences; information was given and received independently, irrespective of where the nurses were; and, based on the anxiety of not being needed in the future, the nurses stated that technology could not replace personal contact. Hardwick et al. (2007) reported that using a personal digital assistant (PDA) decreased nurses' charting time, increased billing, and allowed the managers to reassess time management. Ervin & Berry (2006) recruited attorneys, physicians and members of a home health coalition to explore community readiness for a computer-based health information network, and they pointed out the uncertainties of the participants towards confidentiality and security.

However, recent research studies focusing on the evaluation of an electronic nursing record from the perspective of nurses working in the home care setting are limited (Nilsson et al., 2008, Hardwick et al. 2007) to not existing when it concerns nurses' evaluation from applicability to technicality and soft- and hardware.

The setting and background

The study, described in this article, was undertaken in the *Wit-Gele Kruis*, a service for home nursing in Flanders, Belgium (about 5000 home nurses). In Belgium, home nursing is provided either by a private organization, which has about the same structure as a hospital (director-nursing management-head nurses-basic nurses) or by self-employed nurses. Furthermore, professional home nursing is part of the social security system, being financed by the National

Institute for Health and Disability Insurance (NIHDI). Home nursing is reimbursed for patients who are insured. NIHDI reimburses a limited set of nursing activities that are listed in the nomenclature for home nursing, a coded list of home nursing activities in which every code corresponds with an honorarium or reimbursement fee.

The *Wit-Gele Kruis* developed an electronic nursing record (ENR) in collaboration with an external software-development company to enhance the (multidisciplinary) practice and the information process of home nurses and to increase efficient and effective care to the patients at home. This ENR is an ultra mobile PC (Personal Computer). In a first phase the administrative part of the ENR was developed. This means that the nursing process with for example, patient diagnoses and interventions, was not yet included in the system. At the moment of the study the ENR contained four main screens (round information, patient information, user's information, such as work and holiday schedule, and library module for procedures and protocols) and it replaced the 'pen and paper' version of the nursing record.

Once the administrative part of the ENR was ready for implementation the system was pilot tested in four regional departments of the *Wit-Gele Kruis*. Before expanding the use of the system in the service, it was important to understand and evaluate the implementation and integration of this administrative part of the ENR record from the perspective of the users.

Study aims

The study aimed:

- to evaluate the implementation process of the ENR in the pilot departments;
- to evaluate the impact of an ENR on daily work, on information use and data collection, and on the communication and collaboration within the home nursing departments;
- to describe the system characteristics that positively and negatively influence home nursing practice.

METHODOLOGY

In this qualitative, explorative study the techniques of in-depth interviews and focus groups (FG) were used. The qualitative principles and methods of Polit & Hungler (1995), Baarda et al. (1995), Krueger & Casey (2000), Evers (2007), and Chen & Boore (2009) were studied to underlie the sample and the data collection and analysis.

Sample

The study was performed in four regional departments of the *Wit-Gele Kruis*. A total of 51 home nurses pilot tested the ENR. Between two and fifteen weeks after implementation of the ENR, in-depth interviews were performed with four head nurses, three Administrators and six home nurses. The Administrators were included in the data collection, because of the (in)direct implications of the use of an ENR on their daily activities. Each department consisted of one head nurse and at least one Administrator, involved in the ENR-pilot. In one department the decision was made to end the involvement of the Administrator in the project, so interviews were finally performed with three Administrators and four head nurses.

With regard to the in-depth interviews, the head nurses were asked to include one or two home nurses, using the following criteria: (i) an in between attitude towards working with an ENR (not implementing the ENR extremely easy, but not rejecting it either to avoid that the interview would result in respectively a laudation or a lamentation towards working with an ENR); (ii) mixed age (the implementation process and the perceptions towards working with an ENR can differ between recently graduated nurses, used to working with technology devices, nurses, surrounded by toddlers or teenagers, and nurses, close to their retirement); (iii) willing to talk about their experiences (voluntary participation is crucial to keep the focus of the participant on the topic under research). The focus groups were compiled using the following criteria: (i) one focus group in each pilot department to capture the singularity of each department; (ii) minimum six (diversity of opinions) and maximum eight (everybody should be able to express their

experiences) participants; (iii) at least six weeks after starting to work with the ENR (greater insight in the pros and cons of working with an ENR); (iv) diversity with regard to age, length of service and regime of employment; (v) voluntary participation.

Ethical issues

The members of the executive board of the *Wit-Gele Kruis* gave their consent to the participants, working in the service, to participate in the study. All participants were informed about the voluntary character of their participation.

Data collection

The semi-structured in-depth interviews and focus groups were performed from December 2007 to February 2008 in three departments and in August 2009 for the fourth department that started in May 2009. The in-depth interviews covered the following main topics: (1) preparation; (2) support system; (3) changes compared with working with pen and paper; (4) impact on communication; (5) advantages; (6) disadvantages; (7) applicability; (8) added value. All participants were contacted one week prior to the interview/focus group to explain the purpose and the design of the study and to inform them about the digital recording and the anonymous analysis of the data. The participants in the focus groups (who did not participate in the in-depth interviews) also received an e-mail or fax with core questions to help prepare them for the group discussion. The focus groups covered the same main topics as the in-depth interviews.

Data analysis

All in-depth interviews and focus groups were tape-recorded (Minidisk) and fully transcribed before the next interview took place. The data were analysed using Nvivo 7.0. The analyses and interpretation of the data were performed in five steps (content analysis): (1) removing irrelevant information; (2) marking meaningful sections; (3) labelling meaningful sections with the words of the participants; (4) sorting the labels by characteristics in order to discover dimensions; and (5) validation of labels and corresponding dimensions. With regard to the validation and the

reliability, the project leader and representatives of the pilot departments critically revised the data and evaluated the distinction that was made between main themes and subthemes.

FINDINGS

Three main themes, with several subthemes, could be derived from the results: implementation process, impact on daily home nursing practice, and (dis)advantages of the system.

These themes and subthemes are illustrated with quotes, which are selected because they strongly reflect the participants' experiences and because they highlight the essence of the participants' stories. To give a clear idea on the quotes made by the Nurses in the individual interviews or in the focus groups (FG), by the Head nurses and the Administrators, the corresponding job titles were included after each quote. When more than one job title was included, this meant that more people gave the same reply.

Theme 1: Implementation process

The implementation process in this study is related to a manual, an education and a support system.

Manual

In three departments the home nurses received a manual prior to the actual use of an ENR. There was no manual in the fourth department.

'It is reassuring to know that you can always fall back on it when you have doubts about putting things in the right screen and when you have to register activities that are not performed on a daily basis (Nurse). A manual is necessary, especially in the weekends, when it is hard to contact someone (Nurse).'

'I would like to have a manual here in the department... Sometimes it can get very busy here and the nurses come in with their questions and now you can't help them right away (Head nurse).'

‘A manual, especially for the administrators, explaining the validation screen, would come in handy, because we don’t work with the ENR in the same way as the home nurses (Administrator).’

Education

Besides a manual, all the home nurses in this study received education with regard to the use of the ENR. This education covered two afternoons of four hours. One theoretical afternoon, in which the content of the manual and the projection of the different screens in the ENR were highlighted. One practical afternoon, in which the home nurses received a fictitious list of patients to try out the different screens. The head nurses and the Administrators did not receive individual education. They followed the education with the home nurses.

‘It was an excellent starting point, but exercise is everything (FG). At first, it is overwhelming ...everything is new ... we had to learn all that in a very short period of time (FG) ... It was nice that it was a group session ... because you really learn from each other’s questions (FG).’

‘I frequently had to leave the education session because of urgent phone calls and therefore I missed a great deal of the information (Head nurse).’

‘It was very interesting to follow the education with the nurses... now I know what they are talking about when they come to me with their questions. However, an education about the validation screen especially for the administrators is necessary. (Administrator)’

Support system

With regard to the support system, the home nurses first contacted the Administrator with their questions or problems, secondly the head nurse, and thirdly the IT manager, in charge of the soft- and hardware. The Administrators and the head nurses first tried to solve the problems themselves before turning to the IT manager.

‘We were well supported. Questions or problems, the administrator was just a call away. (FG)’

‘Problems are solved the same day or they tell us that they are working on it. What more can you expect? (Administrator)’

‘It is a pilot, so no high expectations. We have to face the growing pains. (Head nurse)’

Theme 2: Impact on daily home nursing practice

The impact on daily home nursing practice is related to the impact of working with an ENR on the workload and on the communication and collaboration within the home nursing team.

Impact on workload

‘I get up in the morning and I start up my ENR. This ensures me that my ENR is ready for use when I get to my car, because the synchronization can easily take 15 to 30 minutes. I check my patients and messages at the breakfast table, because then I have all the necessary information before I enter the patient’s home. (Nurse)’

‘The patients and their care always come first. So I register everything in the car in between patients (Nurse) ... I register the most important data at the patient’s home and the rest in the car (FG) ... I always register a new patient or a new profile at home after hours, because it takes too much time and I am still learning to work with it. I don’t want patients to see my tinkering. (FG)’

‘We have to work double now: faxing information to nurses not working with an ENR, registering everything in the ENR and in the paper file at the patient’s home for the nurses working with pen and paper and for the doctors to read (Nurse, FG, Administrator).’

‘It is frustrating when you enter certain (geographical) regions where there is no wireless connection. Then you have to call the head nurse or a colleague to give you the names of the patients, because the device doesn’t work and you have nothing. (FG)’

‘It is the extent of the work that is sometimes underestimated and the new role of given feedback to the nurses comes on top of the regular work that has to be done (Administrator, Head nurse).’

‘I asked the head nurse if I should fear for my job, because in the long-run certain tasks will disappear, such as printing out the lists and stabling lists, faxing information, etc. ... but she assured me that the new available time will be filled out in another way, for example, in taking over tasks of the head nurse (Administrator).’

Impact on communication

‘We explain the goal of using an ENR to the patient, but we don’t go into it too much, because we want to give the patient and his family the message that his care always comes first and that using an ENR doesn’t change that (Nurse).’

‘To the colleagues, yes, it’s true that it is not always necessary to call them, and normally that will decrease in the long-term, because you can do everything through your ENR. But we like to hear each other. Working in the homecare means that we already communicate at a low level and yes, I fear that we will not hear each other anymore. (Nurse)’

‘I can look up the names and addresses of doctors and other health care workers, but we can’t yet send them patient information (Nurse).’

Theme 3: Advantages and disadvantages of the system

Most important advantages

‘You can register everything in one single device. No yellow form for this anymore, or a green for that, or a red for that (Nurse). We are more aware of the things that really matter and the information that is really necessary to communicate with others (Nurse). I have the feeling that I have a better follow-up of my patients and that I register more observations and more specifically (Nurse).’

‘Before, we always had to call or fax the nurses to communicate new information about patients or from doctors and then the nurses were not at home and you had to call back. Now, you just put everything in the ENR and you know that they will get it. (Head Nurse, Administrator). The ENR participates at the professional presence of the nurses at the patient’s home. Quality of care depends on the way the care is given, but also on the continuity of care. Now, all nurses have the same information. If patients ask which nurse will come tomorrow or until when their prescription is valid, the nurses can find this information immediately in their ENR. (Head nurse)’

‘The nurses get an alarm in their ENR when, for example, prescriptions are not in order or a profile is missing, and this alarm will stay there until the problem is solved. That is really a good thing. Before, I had to call the nurses again, and again, and now it is their problem to solve. (Administrator)’

Most important disadvantages

‘Not all the nurses in the department work with an ENR. So we have to register data in the ENR and on paper. That makes it very time-consuming. (Administrator, Head nurse, Nurse, FG)’

‘The synchronization takes too long, sometimes up to 30 minutes and resulting in a system crash (Nurse, FG).’

DISCUSSION

The combination of the themes and subthemes in this study revealed that there are three levels that feature the implementation and integration of an ENR: the preparation, technicality of the ENR, and the ‘user’ as an individual.

The results of a pilot test, of a newly-developed IT device, is a very important indicator for a successful large-scale production, implementation and integration in the home nursing

organization. Therefore, much attention needs to be paid to the preparation phase in the pilot test. Overall, the participants felt that they were adequately prepared and supported to start working with the ENR. However, the following consideration has to be made. In this study the participants were prepared by means of an education session, a manual and a clear support system. This means that they were well prepared with regard to the content of the ENR, the functioning of the ENR and what to do in case of problems or questions.

However, the participants were insufficiently prepared for what it meant to switchover from pen and paper to an ENR. The impact of the fact that they still had to register on paper for the nurses without an ENR and at the patient's home for other disciplines was underestimated. Together with the fact that no considerations were made with regard to the work load of the nurses, pilot testing the ENR, and that the device still suffered from considerable growing pains. These findings are confirmed by the fact that some participants sometimes felt that the management focused too much on the functioning and the content of the ENR, rather than on the integration of the device in their actual work.

In the first three weeks the participants experienced some technical difficulties. The home nurses especially suffered from long synchronizations and system crashes. This resulted in a longer waiting time for the patients and in longer working hours for the nurses. They also had problems with the battery that was not strong enough, which resulted in either going home to recharge, or in recharging the battery at the patient's home. The administrators and head nurses spent a lot of time trying to solve problems, passing on the patients' list when the system crashed, verifying if the nurses registered the data correctly, and at the same time trying to figure out where they can get a clear overview of all the registered data. However, despite these difficulties the participants in this study did not want to go back to their 'pen and paper' files. The fact that they felt honored to pilot test this new ENR and that they felt responsible for creating a flawless ENR for their colleagues in other departments are possible explanations for

this positive attitude. Other explanations are the fact that they really believe in the value of the ENR, and especially in the all-in-one character of the ENR, and in the administrative and communicative simplification.

Finally, in the implementation process of the ENR, there has to be room for the individual user. This study revealed that the users are willing to give this ENR a chance, because they believe in the value of the ENR. At the same time they are trying to find a balance between this belief and the confrontation with a new method of administration and communication. This new method confronts them with their capacity to learn to work with an IT device, with the fact that they have to integrate this system in their daily work and with their responsibility towards the patient that his care comes first. They are also confronted with the impact of the technical difficulties on their workload and with the integration of the ENR in their personal lives, since they always have to take it home and recharge it at home, which makes it part of the furniture.

In comparison with other research, specifically conducted in the home care setting, this study confirmed the results of Nilsson et al. (2008). Two head nurses in this study were involved in the development of the study and they were convinced that this helped in ensuring the system was adjusted to the home nursing practice. The uncertainties of the participants in the studies of Nilsson et al. (2008) and Ervin & Berry (2006) towards confidentiality and security were not expressed in this study, since there was not yet an exchange of data between other health care workers or professional disciplines. The reported results of Hardwick et al. (2007) with regard to decreased nurses charting time, increased billing, and the possibility to reassess time management by the managers, were not confirmed in this study, since this study is only pilot testing the administrative part of the ENR.

Limitations

In this study some methodological limitations occurred. First, the results depended on the functioning and organization in each department, which limits the possibility to generalize the

findings. Second, the users in this study used the ENR between two and fifteen weeks prior to the interview. This means that the experiences can differ from someone who started working with the ENR two weeks versus someone who started fifteen weeks prior to the interview.

CONCLUSIONS

The results of this study provided insights in the necessity for a multilevel approach when implementing an ENR in home nursing. A profound preparation of the users by means of an education session and a manual, providing the users with an efficient support system and constantly up-dating and finalizing the soft- and hardware of the device are well known levels of an implementation process. The most important implication of this study for (home) nursing practice is the fact that management needs to be as sensitive to the individual nurse as to the Administrators and head nurses. More attention needs to be given to a balanced integration in the workload, in the patient's home, since home nurses really do not want to give the patients the impression that using an ENR will negatively influence their care, and in their personal lives, since some participants felt that the ENR was dominantly present in their homes.

Furthermore, future research will be necessary when a holistic system, including the administrative part and the nursing process, is ready for implementation in the home nursing practice.

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