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Implementation of computerized technology in a palliative care unit

BEATE ANDRÉ,[1,2] GERD I. RINGDAL, PH.D.,[3] JON H. LOGE, M.D., PH.D.,[1,4] TORIL RANNESTAD, R.N., PH.D.,[2] AND STEIN KAASA, M.D., PH.D.[1,5]

[1]Department of Cancer Research & Molecular Medicine, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway
[2]Faculty of Nursing, Sør-Trøndelag University College, Norway
[3]Department of Psychology, Faculty of Social Sciences and Technology Management, Norwegian University of Science and Technology, Trondheim, Norway
[4]Ullevål University Hospital, Oslo, Norway
[5]Palliative Medicine Unit, Department of Oncology, St. Olav University Hospital, Trondheim, Norway

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ABSTRACT

Objective: Symptom assessment is important in palliative care. Computerized technology (CT) is now available for use in such assessments. Barriers against implementation of CT in health care in general are well known, but less is known about how such technology is perceived by palliative health care personnel. The aim of the present study was to investigate the experience with implementation of CT among personnel in symptom assessment at a palliative care unit.

Method: Seventeen respondents from a hospital ward unit and an outpatient clinic unit participated in an in-depth interview. A qualitative approach was used in collecting and analyzing the data.

Results: Respondents at the hospital ward unit were better motivated than respondents at an outpatient clinic unit. It was stated that the health condition of the patient is important in their perception of the tool as useful or not. Conflicts between "high tech" and "high touch" were reported in both units.

Significance of results: When the implementation process is conducted in such a manner that the health care personnel are involved, benefits of the tool can be realized. Thus, effective implementation and use of high tech can lead to more time released for high touch.

KEYWORDS: Palliative care, Implementation, Computerized technology, High-tech, High-touch

INTRODUCTION

Demands for changes in all kinds of health care units can be met by resistance and feelings of loss of control (Lorenzi & Riley, 2000). Several reactions may occur when an individual is introduced to changes where the utilities of the changes are not well understood or where it is difficult to determine how to integrate the changes into an established daily routine (André et al., 2008). Furthermore, computer implementation can lead, both directly and indirectly, to occupational stress. However, understanding a work group's culture may facilitate the change process (Coeling & Wilcox, 1990). The potential benefit of using computer technology (CT) in health care units is improved efficiency, both in reducing the amount of time needed to do a task and in providing more timely documentation (Hendrickson & Kovner, 1990). To overcome resistance and barriers to change and to exploit the benefits of change, it is important to examine the factors that lead to resistance (Lorenzi et al., 2001). Awareness of the benefits may be an important factor in overcoming some of the barriers when introducing computerization in health care.

Address correspondence and reprint requests to: Beate André, Department of Cancer Research & Molecular Medicine, Faculty of Medicine, 5th floor cancer building, St. Olavs Hospital, N-7005 Trondheim, Norway. E-mail: beate.andre@ntnu.no

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We chose to explore a previous implementation of CT to increase our knowledge about the implementation process from the users' view.

The care of dying patients should be based on respect for the patient as well as close attention to her or his distress. Furthermore, this work should focus on care for the patient as a human being, a total care, and not solely treating the patient's disease (Saunders, 1965). When palliative medicine was established as a specialty, the goal was to attain as high a quality of life (QOL) as possible both for patients and their families (Stromgren et al., 2001; van Kleffens et al., 2004). In reaching the goal of increased QOL in palliative care, there is a need for improved assessment and control of symptoms and distress (Kaasa & Loge, 2003). One way to achieve improved symptom assessment is by using CT to register and track symptoms. This can be done by regular assessment with handheld computers. The goal is to minimize the patient's burden while at the same time registering patient data that are available through the institution's data network. CT allows the assessment of the symptoms to be performed faster and more reliably, and it is simpler than with a standard paper format. Palliative care is particularly time-sensitive because of the patients' short life expectancy (Kaasa & Loge, 2003). The introduction of CT both in health care units and in palliative care units is, however, a challenging task, even if it is relevant given the increasingly common role that computers are playing in health care. It is important to explore the ways in which it may be most successfully accomplished, because in palliative care units the possible conflicts between "high tech" and "high touch" are more visible. The focus on being close to the patients and to meet their needs and wishes can easily be seen as opposed to more technical, efficient, and specific symptom registration (Kole, 2003; Bartholomew & Curtis, 2004; Rabinowitz, 2005).

One study has concluded that the introduction of CT facilitates quality improvement, reduce errors, and may improve patient care (Gloth et al., 2005) whereas other studies have recorded an increase in errors after implementation of CT (Anderson, 2000; Han et al., 2005; Koppel et al., 2005). A study concerning introduction of telemedicine concludes that hospice agencies follow a low-tech approach, that readiness for an innovation will reduce risk for failure, and that success in implementation depends on the extent to which it addresses the users' needs and expectations (Oliver & Demiris, 2004). The experience with handhold computers was investigated and this showed that they helped the users to increase productivity and improve patient care. Barriers were identified to be concerns about the device itself and personal and perceptual constraints, such as comfort with technology, preference for paper, and that the devices are not easy to use (McAlearney et al., 2004). Trying to examine the attitudes and the usefulness of a hospital information system among different groups working in health care concluded that replacing the paper-based medical records benefits the medical secretaries most and lesser the nurses and physicians. This emphasizes, in their opinion, the need for a multidisciplinary approach when evaluating the experience with these kinds of tools (Laerum et al., 2004).

In the course of our investigation presented in this article, we wanted to explore the responses related to palliative care and its goals. Against this background we examined the following research question: How do health care personnel experience the implementation of CT for symptom registration in palliative care?

METHODS

The Earlier Implementation

Computerized symptom registration was introduced by the use of a handheld computer in addition to a special database (PMU-base) at the Palliative Medicine Unit (PMU), the Department of Oncology, Trondheim University Hospital in Norway in 2001. The symptom registration system supports a method based on the Edmonton Symptom Assessment (ESA) Scale. It measures 10 symptoms in the PMU-base; a Palm T-PAT (PalmT is the term of the handhold computer and PAT stands for Palliative Assessment Tool) was used to register symptoms (Lærum et al., 2002). One goal was to improve the symptom registration and to give the patients better and more accurate symptom treatment aimed at the specific symptoms. It was also possible for health care personnel, together with the patients, to record the 10 symptoms on paper instead of using the handheld computer and punching the data into the PMU-base afterwards. This implementation was only partly a success. The handhold computer is currently not in use. On the other hand, the PMU-base is used by some.

Background for This Study

It was of interest to explore both the experience with the handheld computer and the use of the paper registration of the 10 symptoms when we conducted our study 3 years later. A qualitative approach that both could explain and lead to an understanding of this theme was used. This phenomenological approach is based on both the hermeneutics and the more existentialistic oriented

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hermeneutic (Gadamer, 1983). The philosophical tradition of this phenomenological approach is "empathy or indwelling with the subject of one's inquiries" and "understanding of group actions and interactions" (Miles & Huberman, 1994, p. 8). The connection between the different phenomena is also important in this study; "in the investigation of essences one shifts from describing separate phenomena to searching for their common essence" (Kvale, 1996, p. 53).

Subjects

A total of 17 health care personnel at the PMU participated in an in-depth interview for the purposes of this study. The sample consisted of 13 nurses, 2 physicians, and 2 physiotherapists.

The inclusion criteria were that the health care personnel had to be a part of the implementation process when the PMU-base and the Palm T-PAT were introduced in 2001 and that they had experience with using the PMU-base with paper registration and/or the Palm T-PAT. The samples in a qualitative study are usually small and tend to be purposive rather than random. The sample was purposively collected to find the respondents with knowledge about the phenomenon under investigation (Miles & Huberman, 1994). The ward consisted of a hospital ward unit (HWU) and an outpatient clinic unit (OCU). In total, 13 of the respondents were from the HWU and 4 from the OCU. All the respondents were women.

Qualitative Research Interview

The qualitative research interview is an interpersonal situation, a conversation between two partners about a theme of mutual interest. It is a specific form of human interaction in which knowledge evolves through a dialogue. The interaction is neither as anonymous nor neutral as when a subject responds to a survey questionnaire, nor as personal and emotional as a therapeutic interview (Miles & Huberman, 1994; Kvale, 1996). There are some criteria that can establish the quality of the interview. The extent of spontaneous, rich, specific, and relevant answers can be a sign of quality as well as the degree to which the interviewer follows up and clarifies the meaning of relevant aspects. The interviewer attempts to verify the interpretation of the respondents' answers in the course of the interview (Riessman, 1993; Kvale, 1996).

The interviews were held over a 2-month period and lasted from 30 to 50 min each. Two interviewers participated in each interview. The respondents were told that their experiences and perceptions were important. In addition, they were assured that their information would be treated anonymously and would have no effect on their personal situation in the unit. The latter point was also important with regard to the respondents' sense of safety in commenting on the negative aspects of the implementation process. The interviews were taped and transcribed by the interviewers.

With regard to data saturation, it had been possible to reduce the number of respondents. However, because a total overview of the experiences was important, we decided to include all the respondents that fulfilled the inclusion criteria (Miles & Huberman, 1994).

Interview Guide

The present interview is based on a guide that was created by the Centre for Quality Management Concept Engineering "CQM Quality Improvement Toolkit" (Center for Quality Management, 1997). The interview guide was arranged in thematically relevant areas as regards the research themes. The interview guide was used as a guideline, and the respondents were requested to speak freely about the themes they were introduced to. In some of the interviews where the respondents did not talk about all the subjects the interviewer guided them back to the theme in question. The interviewer also asked questions to ensure that the content of the statements was understood. If there was any uncertainty, the question was repeated. The four themes, each consisting of a variety of questions, are needs, demands, and expectations; motivation; benefits and obstacles; and critical factors for success.

Analyzing the Data

After each interview, the two interviewers discussed their own participation and formulations in order to be sure that the respondents' actual intent regarding the reported information was understood. One method to check the creditability of the material and the interviews is to use two persons to read the transcription (Kvale, 1996). Each of the transcribed interviews was gone through at least three times by both researchers.

Transcription of the interviews was conducted with a great deal of attention to preserving the meaning of the text (Riessman, 1993; Kvale, 1996). The material was sorted and worked through, and the information from each of the respondents in the sample and each of the themes was discussed. At least two views of each statement were made to focus on the dependability of the material (Kvale, 1996). Thereafter, the material was condensed. Five approaches were used for this purpose: categorization of meaning, condensation of meaning, structuring of meaning through narratives, interpretation of meaning, and

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ad hoc methods for generating meaning (Kvale, 1996). The categories were made after emerging from the data (Kvale, 1996). Each statement from the respondents was categorized. The meaning of the statements was highlighted and condensed into groups, still with their original words intact. After the material was condensed, we quoted narratives in each theme. In this process the interpretation of meaning took place in such a way that the interpretative meaning was discussed and seen in connection with the total statement before the final selection was made.

Ethical Issues

Each of the respondents received information about the study and the importance of their participation. Participation was voluntary, and the respondents could at any time withdraw from participation in the study. All registration of the respondents' information was anonymous, and the low numbers of respondents made it necessary to give extra attention to avoiding identification of a single respondent in the presentation of the results. The management at the unit sanctioned the study. The researchers were independent of the unit and of those responsible for the implementation of the CT.

RESULTS

The result are organized in categories that emerged from the data. These are motivation, severely ill patients, high tech and high touch, routine, utility, and critical factors for success.

Motivation

Differences between the HWU and the OCU were reported. At the OCU, respondents reported that they were more motivated at the beginning of the implementation than at the time of the interview. The change in motivation was due to technical problems, lack of results, and nonworking computers, as one respondent explained:

> My motivation is decreasing, and I ask myself: What is the point? I am spending time on the database, but it is not used by everyone and it is not complete.

The respondents at the HWU reported generally lower motivation than respondents at the OCU. Some of them stated that they were motivated but did not have the time to use the database or that they were not certain about how to use CT. The lack of motivation could also be due to negative attitudes that were contagious. This was expressed in different ways among the respondents, as for instance like this:

> I suppose that I am as motivated today as I was when I started, but I have become a part of the working environment at the unit.

Some respondents stated that it would be most challenging to make the patients use the CT whereas others believed that the biggest obstacle was to persuade health care personnel about the benefits in using it. The barriers and resistance to change were expressed this way:

> The resistance is a bit contagious; if you are in a group, it is more acceptable to be negative. It is the attitude that needs to be worked on.

All the respondents reported that their motivation was better than their colleagues. In the systematic comparison we found that there was a distinct difference between the respondents' perception of their own motivation and their understanding of the whole unit's motivation. As stated:

> My motivation is good; I cannot answer for my colleagues.

> My colleagues' motivation is not good, I use it, and at least I used it in the beginning.

Severely Ill Patients

To enable the patients to use the symptom registration form is more than just a matter of spending time with them; it is also a question of convincing them that the exercise is useful and necessary. Whether or not to use the symptom registration form with the most severely ill patients was also perceived as an ethical issue. Convincing severely ill patients to participate is made more difficult by both the medical status of the patients and by the fact that not everyone is using the system, which means it does not operate at its full potential, as expressed below:

> I feel that I have to motivate the patient to fill in the form, and that I need good arguments. . . . I feel that I'm lying, because the tool is not used by everyone and then you cannot systematize the data.

The symptom registration form, on paper or with the handhold computer, is supposed to be filled in twice a day. This was perceived as an extra burden on the patient, even if the patient did not fill in the form by themselves, but answered questions orally. These

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concerns were mostly connected to a special patient group in palliative care:

> The severely ill patients need time to think. It is not satisfactory to just rush in and ask them to check the symptom registration form. We have to sit down and explain to them several times a day.

The medical condition of the patients in PMU was also used as an explanation of the barriers to using the tool. Both the condition of the patients and the high average age of the patients were reported as important factors. The barriers among the patient groups were reported to be difficulties in expressing emotion with numbers, no desire to use the tool, lack of control over CT, and not able to use CT. For instance, one of the respondents explained it in this way:

> Many patients refuse at once when we come into the room with the symptom registration paper. They are tired and they don't have the energy to relate to it.

High Tech and High Touch

Some of the respondents said that they did not use the symptom registration form of the handhold computer because it did not correspond to their professional way of thinking. These respondents said that the system was based on a purely scientific approach and stated that

> this creates an artificial way of communication.
>
> I like to be able to relate to the patient without this tool—it suits me best to sit down with the patient and talk about things, and not to systematize the conversation.

It was also stated that information technology itself could be an obstacle for communication and interaction with patients:

> I want to focus on helping the patient on the short term, and I push all other things aside.

Routine

Health care personnel at the HWU had less experience with the PMU-base because it had not become a part of the routine and they did not have the time to use it. Common statements were

> It doesn't fit into a busy day.
>
> This system does not fit into our daily workload; it is more suitable for research.

Respondent said that they did not have time to use the PMU-base. Although lack of time was commonly stated as a reason not to use the tool, some of the respondents said that time and opportunity were not sufficiently acceptable reasons for avoiding using the system. This was expressed in different ways, such as,

> It is like everything else, you have to take the time.
>
> A lot of other units are busier than we are.

Utility

Respondents reported that the PMU-base was a useful tool and that the purpose of the database was good. However, some respondents said that the system demanded double the amount of work or simply extra work and that they were uncomfortable in using the database because they did not remember how to use it. As stated,

> It does not work today; it means more and double work and change in routine.
>
> If you use the tool seldom, you forget how to use it.

Whether or not this tool represented an improvement was also commented on:

> The goal has to be that this can be a useful tool.

When the respondents explained why they did not use the tool, several mentioned the utility of the tool and that the results were not useful for them. They did not agree or did not have relevant information about the reasons for the introduction of the tool, saying,

> I feel that this has been decided above our heads.

This together with technical problems makes the tool even more inaccessible:

> You get irritated when you sit down and are going to work on the computer, but it doesn't work.

Critical Factors for Success

Some respondents mentioned that the cost of the project should be closely compared to the expected benefit, saying,

> Productivity is a crucial factor, and everything must be measured towards that, including the usefulness of this project.

Also usefulness was commented on:

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> The tool must be more useful in a clinical setting, more useful in a busy day.

Also, participating was stated as important:

> Every one must participate in the decision process from the start; at least we must understand why we shall use this.

And about motivation:

> I can very easy lose motivation.

About high tech and high touch the respondents said:

> That patients are able to express their need and what they perceive as their reality is the most important aspect, not systematizing.

DISCUSSION

An implementation process is characterized by both general and context-specific elements. Our main focus was to investigate factors that are specific to palliative care. Even though all the respondents came from a palliative care unit, they also expressed statements of a more general character that one could expect as responses in health care units in general.

In any changing process one must question if the change will improve the conditions, in this case for the health care personnel and for the patients. Introduction of CT can lead to both unexpected and to negative consequences (Anderson, 2000; Han et al., 2005; Koppel et al., 2005). This study was limited by the fact that it consisted only of 17 participants from one single PMU, with few respondents in each profession. The transferability is, however, not only dependent on sample size, but also of representation (Miles & Huberman, 1994). Although it is difficult to know if the sample is representative for health care personnel on these units in general, the main groups working at these kinds of units were represented. In the following the main findings from the research question will be summed up.

How Do Health Care Personnel Experience the Implementation of CT for Symptom Registration in Palliative Care?

Several respondents described the process of making a change as difficult and not very satisfying. When changes are introduced, it is natural to feel resistance to the change (McAlearney et al., 2004; André et al., 2006). The respondents stated that the project was initiated by and provided benefits only to research. Respondents stated that their view had not been taken in consideration from the start, and that can make people less open and motivated for the change (Anderson, 2000). This is consistent with other findings stating that success is dependent on the extent the users' active participation is addressed (Oliver & Demiris, 2004). Previous studies have found that introduction of such equipment requires substantial involvement from the users (Oliver & Demiris, 2004). Respondents in this study reported a lack of feeling of participation in the decision-making process.

Respondents in the present study also stated that the new tool did not fit into their routine and resulted in extra work. Furthermore, resistance was perceived as contagious, and several respondents stated that they had been more motivated at the start of the project, but had subsequently become less and less motivated. Decreased motivation and changed attitudes are typical problems of implementations and changing processes. However, both motivation and attitude can be influenced by training (Harrington & Walker, 2002). Also, awareness of the benefits can be a motivational factor in an implementation process and may thus influence attitudes (Laerum et al., 2004; Oliver & Demiris, 2004).

The respondents at the HWU reported they were less motivated and did not see the benefits of the tool, whereas the health care personnel at the OCU reported they were more motivated and that they used the PMU-base, except the handheld computer, on a daily basis. Both the work conditions for the personnel and the health conditions of the patients are different in the two units. At the OCU, the patients live at home and their health condition is better. The health care personnel meet more independent patients, and their own work tasks are more independent as well (Smith et al., 1999). Thus, both the health condition of the patients and the tasks of the health care personnel can affect their attitudes toward the implementation process (McAlearney et al., 2004; Horsley & Forster, 2005).

Technical problems were also reported as barriers to the use of CT. These problems can be both personal and organizational errors. The present study did not investigate these factors further, but applicability is relevant in the implementation process (Horsley & Forster, 2005).

CT can influence communication between the patient and the health care personnel. The high tech was looked upon as an obstacle to high touch. The respondents stated that using CT could make communication too artificial and systemized. If the CT does not become a part of the daily routine, this observation can become a self-fulfilling prophecy.

The respondents stated that because the severely ill patients often are more tired than other patients and have less energy, they need more time to answer

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questions than other patient groups. The respondents perceived this as an ethical issue and did not feel comfortable using the limited time these patients have to fill in the forms. Because this patient group has a limited survival time, time itself is a valuable resource (Kaasa & Loge, 2003). Several respondents stated that the condition of the patient is important in their perception of CT as useful or not, which is in accordance with other findings (Oliver & Demiris, 2004).

Conclusion

This study was designed to provide insight into the implementation process of CT in a PMU. Participating in the decision-making process and understanding the utility and benefit of the tool were said by all the respondents to be factors of vital importance in the implementation process. The readiness to adopt information technology in palliative care must be assessed because the conflict between high tech and high touch is very visible in these units. The implementation process can otherwise be hampered. If implementation of CT is successful and the implementation process is conducted in such a manner that the health care personnel are involved, the full benefit of the tool can be realized. This effective implementation and use of high tech can lead to more time released for high touch and possibly more QOL for the patients. Further research in this field should focus on gaining more knowledge about the main factors, such as motivation, high tech and high touch, routine, and utility in the implementation process in palliative care units.

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