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ORIGINAL RESEARCH

Telenurses' experiences of working with computerized decision support: *supporting, inhibiting and quality improving*

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Abstract

Title. Telenurses' experiences of working with computerized decision support: *supporting, inhibiting and quality improving.*

Aim. This paper is a report of a study conducted to describe telenurses' experiences of working with computerized decision support systems and how such systems could influence their work.

Background. Telenursing is an expanding service in many Western countries, and in recent years centralization of telenursing services has occurred in Sweden. In connection with this, the use of computerized decision support has increased.

Method. Eight Registered Nurses from three telephone advice call centres in Sweden who were using computerized decision support took part in semi-structured interviews in 2006. The data were analysed using qualitative content analysis.

Findings. The findings are presented as one theme and three categories. Telenurses experienced their work with a decision support system as supporting, inhibiting and quality improving. Based on two of the categories – 'supporting' and 'inhibiting' – a theme was revealed: *being strengthened, but simultaneously controlled and inhibited*. This theme represents the individual level. The telenurses experienced that the decision support system simplified their work, complemented their knowledge, gave them security and enhanced their credibility. They also described experiencing the system as incomplete, sometimes in conflict with their own opinions and controlling. The third category referred to the organizational level: the decision support system ensured the quality of telenursing.

Conclusions. Although the telenurses experienced computerized decision support as both supporting and inhibiting, they preferred working with it. They also described how a computerized decision support system cannot replace telenurses' knowledge and competence, and that it should be considered as complementary.

Keywords: communications skills, competence, computerized decision support, experiences, knowledge, qualitative research, telenurses

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Introduction

Patients' first contact with health care is usually by telephone, and telenursing is an expanding service in many Western countries. Telenursing has been shown to be cost efficient, time saving and to increase patients' self-care ability (Marklund *et al.* 2007). Efficient telephone advice nursing is one way of managing limited resources in health care. Developing a nationwide telephone advice nursing system and computerized decision support creates opportunities for introducing nationwide uniform guidelines in patient triage (Swedin 2003, Marklund *et al.* 2007).

Background

Telenursing in general

Telenursing work is complex and knowledge intensive. Telenurses have varying clinical experience, but they should be able to work independently, make decisions about the need for further care, and give self-care advice or refer the caller to another caregiver (Holmstrom 2007). Referring the caller to the appropriate caregiver and level of care requires that telenurses be familiar with the healthcare organization (Wahlberg *et al.* 2003, Marklund *et al.* 2007). When they triage caller, their assessments are based on oral communication. This puts great demands on telenurses' communicative skills and ability to listen (Wahlberg & Wredling 2001, Snooks *et al.* 2008). One of the major problems is that they cannot see the patients (Pettinari & Jessop 2001). This can negatively affect their assessments and formation of an opinion about the caller's credibility (Holmstrom & Hoglund 2007).

Telenurses may experience the contact with patients in telephone advice nursing as a conflict between being a carer and being a gatekeeper. An additional conflict may occur between what is best for the patient and the limited healthcare resources. Telenurses also feel considerable responsibility and have a fear of making the wrong decision (Holmstrom & Dall'Alba 2002). The fact that healthcare resources are limited can lead to ethical dilemmas for telenurses who encounter callers who are not sick enough to be given an emergency appointment and who are therefore at risk of being referred around in the healthcare system (Holmstrom & Hoglund 2007).

Telenursing in Sweden

In 2003, centralization of telenursing in Sweden started with implementation of a national telephone helpline for the entire country. This comprised a telephone network with a total system solution consisting of telephone equipment, electronic documentation and computerized decision support. The telephone equipment contains a queue system that is able to integrate different counties during periods of high demand in a given county. Documentation is linked to the decision support, i.e. when decision support is used, a patient record is created, and this in turn leads to compulsory use of the decision aid software (Andersson Bäck 2008). In Sweden, all Registered Nurses are obliged to make patient records when giving advice to callers (The National Board of Health and Welfare 1993). The national telephone network decision support is named Advice Support System (1177). However, one county has added a system, Peds Advice, that covers various illnesses and symptoms common from infancy to adolescence (Holmstrom 2007). Advice Support System (1177) aims at covering various conditions and symptoms among children, adults and older people. Hence, it does not take the previous medical conditions and high age into consideration when suggesting recommended measures. The two systems are symptom-based, with approximate 121 headings that correspond to common reasons for seeking advice, and are designed as a checklist from which key questions are suggested based on the caller's symptoms (see Figure 1) (Sjukvårdsrådgivningen 2008). Based on the caller's answers to the questions posed by the system, a triage recommendation is presented. Telenurses can also gain access to the system by entering a tentative diagnosis (e.g. migraine) and then receiving information for that specific diagnosis (Strom *et al.* 2006, Marklund *et al.* 2007).

When telenurses have chosen a symptom in the software system, such as 'coughing', the software forces them to follow it through the whole system (Andersson Bäck 2008). Telenurses in Sweden are allowed to 'override' the system, e.g. make recommendations other than those proposed in the decision support system (Swedin 2003). However, they then have to make a deviation report stating why they chose to make a different recommendation (Andersson Bäck 2008).

Computerized decision support in telenursing

When telenurses work without computerized decision support, their knowledge has been found to be largely based on experience and support from colleagues (Tjora 2000). Experienced nurses base their assessments on subjective and practical reasoning and intuition (Edwards 1994, Benner *et al.* 1999). In previous studies, telenurses have described how both the computerized decision support and

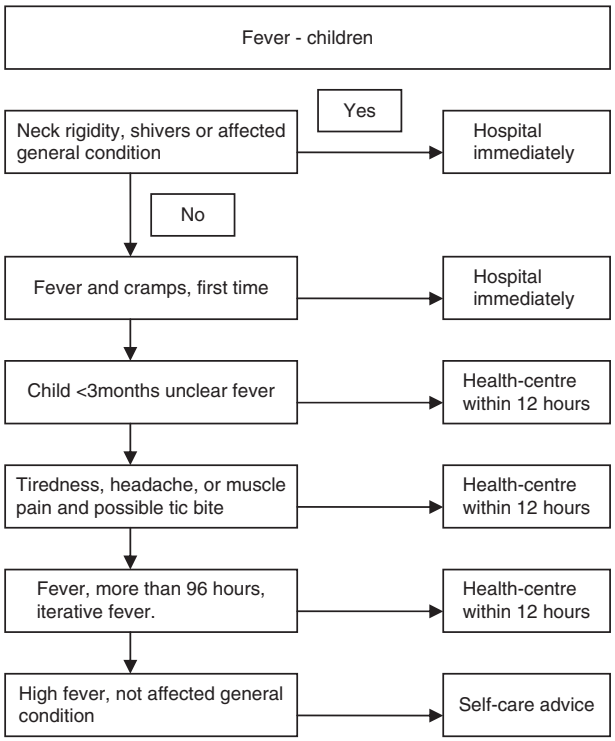

Figure 1 Example of computerized decision support for the telenurse triage in fever children. The text is symptom based, with headings that correspond to common symptoms. Every title consists of a main symptom with a number of sub-symptoms. The symptom boxes work like a checklist and help the telenurse pose relevant questions to exclude or confirm serious conditions. For each symptom there is a recommended level of urgency.

the telenurses themselves had considerable influence over the decision process (O'Cathain *et al.* 2004, Snooks *et al.* 2008). The computerized decision support was described as a safety net to rely on when their own knowledge was limited, and it was also used to confirm their own decisions. However, they sometimes had to give callers advice that was different from the system's recommendations. Some telenurses have stated that the computerized decision support prevented them from using their own knowledge (O'Cathain *et al.* 2004). Those working on the national telephone helpline in the United Kingdom, NHS Direct, described the computerized decision support system as slightly outdated. Furthermore, adapting it to callers' symptoms was difficult, and it sometimes gave irrational suggestions (Knowles *et al.* 2002).

Different decision support systems have been launched in many areas of health care, and their impact on the work situation, patient safety and communication is currently being debated (Knowles *et al.* 2002, O'Cathain *et al.* 2004, Giesen *et al.* 2007, Marklund *et al.* 2007). Because technical development in health care is expected to increase, it is important that systems are user friendly and entail benefits, such as increased patient safety (Karsh 2004). Hence, further research is needed to explore the use of computerized decision support in telenursing and to investigate how it could be optimized so as to achieve the best nursing and caller outcomes.

The study

Aim

The aim of this study was to describe telenurses' experiences of working with computerized decision support systems and how such systems could influence their work.

Design

A qualitative approach was chosen, and the data were collected in 2006 in Sweden.

Participants

Maximum variation sampling was used. According to Polit and Beck (2008), this involves including participants who vary greatly on dimensions of interest for the study, the goal being to increase the variation in their descriptions and experiences and to increase credibility. In this study, we included participants from different call centres and with a wide range of years of clinical experience as nurses. Three telephone call centres located in different parts in Sweden, one large town and two small towns, were informed about the study through their Head of Department. A minimum of 1 year of clinical experience as a nurse was set as the inclusion criterion. Eight telenurses participated in the study.

Data collection

Data were collected using semi-structured interviews, which involved asking questions about the topic of interest (Polit & Beck 2008). The participating telenurses were encouraged to talk freely about their experiences of working with computerized decision support systems in telephone advice nursing. An interview guide was used comprising open-ended questions such as: *What are your experiences of working with computerized decision support? What advantages do you experience when working with computerized decision support? What disadvantages do you experience when working with computerized decision support?* The telenurses were

also asked to give concrete examples of when they felt that the decision support system was helpful and when it was not helpful. Probes were used to obtain richer descriptions. The data collection was carried out by the first author. Interviews were carried out in a separate room in the nurses' workplace and lasted for 45–60 minutes, and were tape-recorded and transcribed verbatim.

Ethical considerations

Ethical regulations and guidelines, according to Swedish Law 2003:460, were followed (Codex). A study of this kind, which does not involve patients, does not require full ethics committee approval in Sweden. All participants received written and oral information about the study and gave informed consent to participate. Participation in the study was voluntary, and all participants were informed that they could stop participating at any point without having to give an explanation.

Data analysis

The interviews were analysed using qualitative content analysis (Graneheim & Lundman 2004). They were listened to and read through several times. Text related to the study aim was identified as meaning units, condensed and then abstracted and labelled with a code, and sorted into subcategories, and later into categories. The whole text was considered while condensing and labelling meaning units with codes, and the various codes and categories were compared for differences and similarities (see Table 1). According to Berg (2004), researchers should perform both manifest and latent analysis when possible. Later, during the analysis, the underlying meaning of two of the categories – *supporting* and *inhibiting* – was identified. This underlying meaning is presented as a theme. Data in the third category were descriptive and manifest, and revealed no deeper meaning related to how the participating telenurses perceived the topic. According to Graneheim and Lundman (2004), a theme is at an interpretive level and answers the question 'How', often found as a thread of underlying meaning running through codes, subcategories and categories. A category, on the other hand, answers the question 'What?' and mainly refers to the descriptive level of the content.

Rigour in qualitative studies

The quality criteria described by Graneheim and Lundman (2004), which involve credibility, dependability and transferability, were met in the present study. Credibility deals with thoroughness in both data collection and analysis, and was achieved here through collecting data in three different locations and the use of quotes in presenting the findings. Patton (2004) suggested that choosing participants with as varying experiences of the topic as possible is one was to achieve credibility, and such an approach was used here. Dependability includes the concept of consistency, and achieving it involves describing the research process so that readers can easily follow it. By seeking agreement among fellow researchers, i.e. researcher triangulation, both credibility and dependability can be strengthened. During the analysis, the third author read four of the interviews and during condensation, coding and categorization, a discussion was held between the first and third authors until agreement was reached. The first and second authors have previous experience as telenurses. This preunderstanding, as well as the whole study, was repeatedly discussed at research seminars. Finally, transferability establishes the degree to which the findings can be transferred to other settings, and readers are probably the best judge of this. To achieve transferability, authors should clearly describe the sample and setting (Graneheim & Lundman 2004).

Findings

The participants (n = 8) were all female and between 35 and 61 years of age (mean age 55 years), and their work experience varied from 1 to 37 years (mean 8 years). Four worked full-time and four part-time. All used the computerized decision support '1177', and two also used the 'Peds Advice' software [4].

The findings are presented in three categories, *supporting, inhibiting* and *quality improving,* consisting of nine subcategories. Two of the categories, *supporting* and *inhibiting*, formed the theme: *Being strengthened, but simultaneously controlled and inhibited.* These two categories represent the level of individual telenurses, while the third category represents the organizational level. All participants made statements that were placed in the three categories.

Supporting

The *supporting* category consisted of four subcategories, all of which described how the system supported the telenurses in their work: *simplifying work, complementary support, professional security*, and *enhancing telenurses' credibility*.

Simplifying work

In the subcategory *simplifying work*, telenurses described how decision support simplified their work, for example, the

Table 1 Xxxxxxxxxxxx

Theme	Being strengthened, but simultaneously controlled and inhibited									
Category	Supporting				Inhibiting				Quality improving	
Subcategory	Simplifying work	Complementary support	Professional security	Enhancing Telenurses' credibility	Incomplete software	Disagreement between telenurses and decision support	Controlling and obstructing work	Uniform advice	Increasing accessibility	
Code	Facilitate work	Provides support	Safety net	Enhances telenurses' advice	Content missing	Do not follow decision support	Controlling telenurses	Same advice to all	Shorter waiting time	
Condensed meaning unit	Quickly get into the whole thing rather than sitting and flicking in books	When you can't remember everything you find it in the decision support	You fulfil your obligation s as telenurses If you follow the decision support	The decision support can be an enormous help to the telenurse in the contact with a hesitant parent since it is the paediatric clinic that stands behind the decisions	There is information missing that should be there	Sometimes don't follow advice in decision support because doesn't agree with decision	It is too controlled, can't say what you want	The decision support contains correct advice that should be given	Use of decision support shortens waiting time	

decision process and patient documentation. They reported already having the required knowledge, but that the decision process was faster and easier when they used the decision support system. Decision support decreased the use of paper and books. It was also easier to search for specific information in the system compared to manual searching. Participants stated that the system helped them save time when searching for information, and that without it they would not be able to handle the same number of telephone calls. Another aspect mentioned was that the decision support system gave a rapid overview of the callers' problems and how to manage them. The system provided all information with a good overview, because all parts of the system, i.e. the telephone equipment, decision support and patient file, were in one place:

> You quickly get the big picture, more quickly get into the whole thing than sitting and flicking through books for example. (Telenurse 6)

Complementary support

Computerized decision support was described as *complementary support*. Participants had varying previous work experience, and decision support helped them and was complementary in areas where their own clinical knowledge and experience were limited. Even those with extensive professional experience stated that the computerized decision support system was complementary to their own knowledge in the decision process. Their standpoint was that they already had the required knowledge, but that circumstances such as tiredness and stress sometimes prevented them from thinking clearly:

> You get tired too after a certain number of calls, and then I think that without the decision support you could lose your train of thought when you can't read through them. (Telenurse 7)

Some of the more experienced telenurses stated that a newly educated and inexperienced colleague would probably benefit more from the decision support system. On the other hand, all interviewees were adamant that the system did not compensate for lack of individual experience and knowledge.

Decision support was experienced as a valuable source of information, where users could search for and gather information. The telenurses handled telephone calls from patients of all ages, and it was not possible to keep up-to-date in all areas. The decision support system gave them accurate information on how to manage the different situations with which they were confronted. It gave more information in specific areas, so that they could better assess the patient's condition:

> So you know with head injuries, like concussion, Ped's advice is extremely good, precisely what you would expect that children of

different ages will manage or what to think about, which interval you should look at, how, what you should check for. (Telenurse 8)

Professional security

Participants also described how decision support offered them a sense of *professional security*. It was experienced as a kind of guarantee that they had not missed any important questions, and thus helped them to fulfil their obligations. Fear of making the wrong decision and of being reported to the government agency (that responds to patient complaints) was common among telenurses. They thought that this risk was minimized when they used the decision support system:

If you have asked the questions in the decision support you have gained a full picture of the patient that surely, in case of a report, you see that, could I have done more? (Telenurse 8)

Enhancing telenurses' credibility

Interviewees described how decision support *enhanced telenurses' credibility* in relation to patients. Often telephone calls were described as being from worried parents of sick children. In many such calls, the caller was initially persistent about getting a doctor's appointment, even if the telenurses did not consider that this was medically necessary. These telephone calls were difficult to handle, as some callers were aggressive and did not want to listen to telenurses' advice because they were 'only nurses'. The texts in the decision support system could then be used to enhance telenurses' credibility and, for example, increase parents' willingness to listen to their advice:

Sometimes it provides substantial reinforcement. If you say, 'Now let's look at what the child clinic's computerized decision support system says about this' to a slightly hesitant parent, 'Now let's see what it says about this from the child clinic.'(Telenurse 3)

Inhibiting

The *inhibiting* category consisted of three subcategories: *incomplete software*, *disagreement between telenurses and decision support* and *controlling and obstructing work*, which described how telenurses experienced that computerized decision support inhibited them in their work.

Incomplete software

In the subcategory *incomplete software*, participants reported that the decision support system was incomplete regarding both content and technology. Information on important symptoms was lacking. Further, some of the self-care advice was perceived as highly incomplete, and telenurses' credibility was hence threatened:

You are not credible - if you say that you don't know whether you can give ibuprofen to reduce fever in children over 2 years, they do not believe in you. (Telenurse 3)

Lack of information in the system led to frustration among the nurses, and they spent time searching for information that was not there. In addition, the software was sometimes experienced as user-unfriendly. Interviewees did not find the search paths clear, and sometimes they could not find information. How the system should be used was not always clear, as the work procedure was muddled and not obvious:

You just can't sit there reading loads of text when you have a patient on the phone, and there's a time limit on how much time you can give to each patient. (Telenurse 8)

The software was experienced as new and untried. It sometimes malfunctioned or shut itself down, and the telenurses then had to work without decision support and write records manually.

Disagreement between telenurses and decision support

Participants made statements describing how they sometimes *disagree with the decision support*. This could concern both the content of the self-care advice, which might be trivial, and the fact that documentation was done in a way of which they did not:

It says urinary tract problem and incontinence, but…it does not necessarily mean that they are incontinent because they have urinary tract problems - it should not say that - and then it follows as reason for calling…And then you can't delete it. (Telenurse 8)

Sometimes telenurses felt as if the developers of the decision support systems were not aware of the way they worked, and that telenurses made decisions that did not agree with the system. The referral suggestions made by computerized decision support were sometimes seen as irrational and unnecessary. The security level was perceived as too high, and this was a common reason for disagreement between telenurses and the system:

And many of the decision supports are very much like this 'To the doctor urgently'…It doesn't always really correspond to how we *think we have to handle things - it is a 'safeguard' the whole time.* (*Telenurse 6*)

However, sometimes the security level was perceived to be too low, and telenurses disagreed with a wait-and-see suggestion.

Controlling and obstructing work

Telenurses described how they experienced their work as *controlled* and directed, and they also reported feeling passive when working with the decision support system. There is a risk inherent in not thinking for yourself, and perhaps forgetting to give obvious self-care advice that is not found in the computerized decision support system:

> You're keen perhaps to say what the decision support says about for example impetigo even though I perhaps have some other good tip, you sometimes forget to give that advice somehow. (Telenurse 4)

Descriptions of computerized decision support as rigid and inhibiting were given, resulting in professional knowledge and expertise not being used to their full potential.

When telenurses felt controlled by the system, they expressed a sense of being less attentive to the caller. Thus, the system forced them to spend a major part of the call handling the software, and consequently they could miss or misunderstand something the caller said:

> The disadvantage can be that you sit and talk and search at the same time and that you don't understand everything that is said.(*Telenurse 5*)

Quality improving

The *quality improving* category consisted of two subcategories, *uniform advice* and *increasing accessibility*, which described how computerized decision support improved quality in telenursing at the organizational level.

Uniformity

All callers should receive standardized advice, regardless of which telenurses they talked to. Telenursing is often lonely work, with little contact with colleagues. By using a computerized decision support system, the telenurses could give the same *uniform advice* without consulting each other. They also mentioned that it was possible to make use of national guidelines and evidence-based advice and that these were easily accessible in the system:

> That we can give the same advice. That I can get the same answer regardless of where I call. That I believe is the biggest advantage. (Telenurse 4)

Increasing accessibility

Participants also described their belief that use of the computerized decision support system seemed to lead to *increasing accessibility* for callers. They felt that the new system shortened callers' waiting times:

> We have increased our accessibility by having a computerized decision support system, I think. (Telenurse 7)

Discussion

Study limitations

The study was qualitative and based on a small sample of telenurses. The findings may be transferable to other call-centre settings with similar working methods, but this will need to be assessed in further research. The telenurses interviewed had experience of one or two different computerized decision support systems, and the findings reveal their experiences of these systems. The findings are presented both as manifest and latent content, because the data differed in level of abstraction. Data in the category *quality improving*, dealing with organizational aspects, presented a surface structure that only allowed manifest analysis, while data in the other two categories, dealing with personal/individual aspects, presented a deeper structural meaning that enabled latent analysis. According to Lundman and Graneheim (2008), interpretive approaches imply working at different levels of abstraction, and difficulties may arise in developing sustainable and logical categories and themes. Hence, there is a risk of material being pressed into existing themes and categories.

Duality of perceptions

The major feature of our findings is the duality in telenurses' experiences of working with computerized decision support. They described how working with computerized decision support was simultaneously supporting and inhibiting. Interestingly, every participant made statements about both positive and negative experiences and, although they had negative experiences of the system, they did not want to work without it. We assume that the negative experiences can be explained by the fact that use of the decision support system is compulsory and sometimes rigid. Once the nurses have chosen a symptom, they have to follow it through the system. Swedish telenurses are obliged to make a patient record, and the only way of doing this is to use the decision support system, which makes use of it compulsory. This rigidity in the software may have contributed to participants' feelings of being controlled and inhibited. On the other hand, the software provides structure, information and suggestions on how to deal with callers' problems. These findings, i.e. positive as well as

negative experiences of computerized decision support, are in line with those of previous research (O'Cathain *et al.* 2004, Andersson Bäck 2008, Snooks *et al.*2008). Although telenurses found the system supporting, they also experienced it as incomplete, both technically and as regards content. The incompleteness was thought to lead to extra workload, because they were forced to search for information elsewhere. In the telenurses' view, the system was premature - it was not sufficiently user-friendly or useworthy. Useworthiness is defined as the individual user's assessment of how the system meets their needs, focusing on the systems functionality in user's work situation (Scandurra 2008). Lack of user-friendliness was also reported by Holmstrom (2007). The search paths in the system were described as muddled, and information could not be found in an obvious way. The experience of usability is a combination of many different properties of a system, depends on how the system is designed and is often described as 'user-friendliness' (Scandurra 2008). Hence, usability could be further improved in the present systems.

The present computerized decision support system complemented telenurses knowledge and experience, and also gave them security, a kind of safety net to rely on when their own knowledge was limited; again, this has been reported previously (Holmstrom & Dall'Alba 2002). Interviewees used the system as a checklist, as a means to avoid missing important information. However, according to Benner *et al.* (1999), the need for such checklists is common among inexperienced nurses, whereas experienced nurses base their assessment on intuition and clinical competence. This was not confirmed in the present study, where even more experienced telenurses described information in the system as valuable. This can partly be explained by the fact that telenurses handle calls concerning all ages and a broad variety of problems, and it is clearly difficult to gain expertise in all fields of nursing.

Fear of making errors is common among telenurses (Holmstrom & Dall'Alba 2002). However, in accordance with Swedish Law (The National Board of Health and Welfare 1982), all Registered Nurses are personally responsible for their work, e.g. the advice and referrals given to callers. Taking this law into consideration, it is questionable whether a telenurse really can rely wholly on decision support. In our view, there is a risk in relying too heavily on it. Nurses may lose competence and their critical thinking capacity, and may become less motivated about their professional development. There is, hence, a risk of undermining and reducing professionalism.

Our interviewees also described how they sometimes did not agree with the content of the decision support. For example, they considered the security level to be too high, and this led to disagreement about the healthcare providers to which the patients were referred. Similar findings were presented by Holmstrom (2007) and Knowles *et al.* (2002).

In our study, telenursing work was experienced as controlled, and nurses described a risk of becoming passive by working with computerized decision support. Those studied by Knowles *et al.* (2002) also expressed fear of being de-skilled by computerized decision support. They described work setting as a 'sweat shop' and they felt like a 'battery hen'. A sense of autonomy is an important part of work satisfaction for nurses (Finn 2001).

There is also a risk that technology will be detrimental to nurses' ability to take individual measures for patients (Barnard 2000). This could explain why our participants felt inhibited and that use of decision support lowered their professional autonomy. The software caused them to spend less time with callers because of the time spent searching in the system. Hence, technology could prevent them from focusing their time and energy on the caller. This could lead to misunderstandings and misinterpretation of information given by the caller, and perhaps to a decrease in safety for both telenurses and callers according to Barnard and Gerber (1999), who state that technology can be perceived as a barrier between nurse and patient and that personal relations are complicated when technology demands telenurses' attention (Barnard & Sandelowski 2001).

Finally, telenurses in this study described their belief that use of a computerized decision support system improved quality. This finding is related to the organizational level, while the other findings concern the individual level. Telenurses emphasized the importance of callers being given the same advice, as in studies by Giesen *et al.* (2007) and Marklund *et al.* (2007). Use of a computerized decision support system made this kind of uniformity possible, although the telenurses felt that their work was lonely. Use of decision support can lower the risk of subjective assessment in a single telenurse. From a political and managerial perspective, use of computerized decision support is preferable, because it provides opportunities to direct the telenurses' work (Tjora 2000, Andersson Bäck 2008). However, the nursing knowledge applied in telephone advice nursing is far too complex to be captured in software. Because decision-making is not a strictly technical matter, but based on a mixture of professional and personal knowledge, experiences and common-sense, the hierarchical

What is already known about this topic

- Telenursing has been shown to be cost efficient and time-saving and to increase patients' self-care ability.
- Use of decision support software affects telenurses' skills both positively and negatively.
- Use of computerized decision support can enhance medical safety in telenursing.

What this paper adds

- Technology could undermine professional competence, responsibility and ability to individualize care.
- A computerized decision support cannot replace telenurses' professional knowledge and competence, and should be considered as complementary.
- Although telenurses report some negative experiences of computerized decision support, they do not want to work without it.

Implications for practice and/or policy

- There is a risk that decision support systems will mechanize and undermine the communication between telenurses and callers.
- It is essential that the caller be given not only a correct estimation of the condition, but also a sense of security and confirmation.

structure of the decision support system squeezes the nurse–patient dialogue into a rigid procedural framework (Tjora 2000). Only a few of the calls concern emergency/life-threatening conditions, and most are about sick children and are made by worried parents seeking advice and support from telenurses (Wahlberg & Wredling 2001); thus, support is the most important intervention but is not suggested in the system.

Implications for nursing practice

There is a risk that decision support systems will mechanize and undermine the communication between telenurses and callers. To increase telenurses' professional competence and the feeling of tele-presence, it is essential that callers are given not only a correct estimation of the condition, but also a sense of security and confirmation. Otherwise they may seek emergency care solely because of this insecurity and anxiety. It is important that telenurses do not rely too heavily on the decision support system and its content, and that they not only ask the preset questions but also allow the caller to present their problems freely. Telenurses should not take command in the conversation, and in this way risk leading the caller along the wrong path.

Further studies are needed on how communication is affected when using a decision support system. The risk that telenurses will lose their professional competence and begin relying too heavily on the decision support system is indicated in the present study. Managers need to be aware of these risks and encourage telenurses to develop themselves professionally and to listen carefully and allow callers to present their problems in their own way.

Conclusion

Companies that develop decision support systems should consider users' knowledge, competence and requirements in order to make the systems user-friendly and useworthy. A computerized decision support system cannot replace telenurses' knowledge and competence and should be considered as a complement. Managers should also gather telenurses' views about problems and errors in the system and forward this information to system developers. A continuous compilation of reported unwanted events in telenursing could lead to development of cooperation between telenurses and other caregivers. It could also lead to further development of and improvements in the systems.

It is important that telenurses do not to feel controlled, inhibited and passive. Perhaps decision support on demand would be preferable. This possibility should be further explored, and caller outcomes should be studied.

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Conflict of interest

No conflict of interest has been declared by the authors.

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Author contributions

AE & ME were responsible for the study conception and design. AE & ME performed the data collection. AE, IH & ME performed the data analysis. AE, IH & ME were responsible for the drafting of the manuscript. AE, IH & ME made critical revisions to the paper for important intellectual content. IH obtained funding. IH provided administrative, technical or material support. IH & ME supervised the study.

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