National Telephone Advice Nursing in Sweden

Patient Safety and Communication

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Dissertation presented at Uppsala University to be publicly examined in Sal IX, Universitetshuset, Biskopsgatan 3, Uppsala, Thursday, September 20, 2012 at 09:15 for the degree of Doctor of Philosophy (Faculty of Medicine). The examination will be conducted in Swedish.

Abstract

The overall aim of this thesis was to investigate patient safety and communication within national telephone advice nursing (SHD) in Sweden. Four empirical studies with different perspectives were conducted. The aim of Study I was to describe telenurses’ experiences of working with computerized decision support systems and how such systems could influence their work. The telenurses described a duality of perceptions: the CDSS both supported and inhibited their work. Study II aimed at describing medical errors that had led to an incident report within the context of SHD. Incident reports sent to and from the SHD during 2007 were collected. The results showed that telenurses have limited possibilities to refer callers to the appropriate level of care, and that other healthcare providers reported that telenurses had made an incorrect assessment regarding callers’ need for care. Study III aimed at describing the actual communication between telenurses and callers expecting a higher level of care than recommended by telenurses, and at investigating relationships within the communication between telenurses and callers. The results showed that telenurses were more prone to use closed-ended questions and did not follow up on callers’ understanding of the advice given. There was also a statistically significant positive relationship between callers’ expressions of Concern and telenurses’ expressions of Criticism, and also between utterances of Criticism between the parties. The aim of Study IV was to describe the characteristics of all malpractice claims following telephone calls to SHD, including the identified causes, the healthcare providers’ measures, and the actual communication between the telenurses and callers. The results showed that among the cases, 13 of 33 patients died and 12 were admitted to intensive care. The National Board of Health and Welfare’s (NBHW) investigations most commonly reported communication failure as the cause of the malpractice claims. The measures reported by SHD most commonly involved discussion in work groups and education of staff. Communication analysis showed a positive correlation between the callers’ expressions of Concern and the telenurses’ expressions of Reassurance. The results also showed communication patterns similar to those found in Study III. Hence, telenurses’ communicative strategies are not in line with the “dialogue process” they are educated in and could be regarded as a threat to patient safety.

In conclusion, the importance of high quality communication is undoubted within telephone advice nursing, and specific training and supervision in communication for telenurses might contribute to improving their communicative competence as well as patient safety. Adapting the CDSS into encourage telenurses to explore callers’ reasons for calling and to follow up on understanding might facilitate patient safety. Organizations also need to take a system-wide approach when addressing patient safety issues and ensure that telenurses are given the resources they need to fulfill their work.

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ISSN 1651-6206
ISBN 978-91-554-8404-0
urn:nbn:se:uu:diva-175262 (http://urn.kb.se/resolve?urn=nbn:se:uu:diva-175262)
To Robin and Maja
List of Papers

This thesis is based on the following papers, which are referred to in the text by their Roman numerals.


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Introduction

The three-year-old boy became ill, with stomach pain and vomiting. He whined and complained of pain. His mother called SHD since she perceived that her son’s stomach pain was more than just normal gastroenteritis. She received reassurance and self-care advice as she would in the case of gastroenteritis. A couple of hours later she called again. She told the telenurse how her son had stopped vomiting, that he was lying with his eyes open and “appeared unconscious” with pale, cold skin and blue lips. Yet again she was given reassurance and self-care advice. After the third call she was advised to go to the emergency department. The child was dead on arrival.

(From DN 2009)

As illustrated, making assessments via the telephone is one of the most difficult and complex work assignments for nurses.

My interest in this area arose when in my clinical work as a district nurse I worked at an on-call clinic in Gävle, and one of my duties was telephone advice nursing. During this work I sometimes had difficulty making decisions regarding the appropriate level of care for callers by simply estimating their need for care by communicating via telephone. I had the opportunity to deepen my knowledge concerning telephone advice nursing in 2007, when I was accepted as a doctoral student to the Health Services Research Group at Uppsala University. This thesis, with its overall aim to investigate patient safety and communication within national telephone advice nursing in Sweden, is the product of my search for knowledge and answers.

The context of the research has been Swedish Health care Direct (SHD), which started in 2003 with three pilot sites; today, all of Sweden’s county councils except one have joined SHD. During 2011 SHD answered approximately 5.5 million calls, making it one of Sweden’s largest healthcare providers (HCPs) today. A new HCP has hence been introduced and all citizens are advised to contact SHD when in need of care, yet knowledge regarding patient safety within this service is scarce. Within inpatient care, as much as 3% of all healthcare contacts are subject to medical errors, and studies have shown that communication is one of the most common causes of these errors (1-3). Based on this relationship, it is reasonable to assume that communication has an impact on patient safety within telenursing as well as other healthcare settings.
Telephone advice nursing

The definition of telephone advice nursing used in this thesis is:

…prioritizing clients’ health problems according to their urgency, and advising clients and making safe, effective and appropriate decisions, all by telephone. (Coleman (4) p. 227, 1997)

Telephone advice nursing is used in many Western countries, including the UK, the US, Canada, Australia, Denmark and the Netherlands. These healthcare call centers’ services have quite similar aims, with telenurses giving callers’ individualized advice on a wide range of problems, from minor disease to complex situations, with the assistance of a computerized decision support system (CDSS). The structure of telenurses’ work differs between countries. At NHS Direct in the UK, calls are first answered by call handler who decides whether the call should be forwarded to a telenurse. Another difference between the Swedish and UK contexts is the fact that in Sweden the individual telenurse is responsible for his/her decisions and can be held personally responsible for any wrong decision, whilst in the UK the organization is held responsible.

Since the introduction of the SHD in 2003, an increasing number of Swedish citizens have had access to SHD’s services. During 2011 about eight million of Sweden’s population of nine million had the possibility to call SHD for medical advice, and during this time SHD answered 5.5 million calls. The aim of this new HCP is to provide increased availability of qualified healthcare advice, increased safety for the public and increased efficiency of healthcare resources and, as mentioned, the service is quite similar to NHS Direct in the UK. SHD’s mission is to provide easily accessible, evidence-based healthcare advice day and night, year round, for the population regardless of geographic area (5). All county councils in Sweden have the opportunity to participate in the SHD network, and today 21 of 22 county councils have joined. Counties joining the network receive a total system solution: telephone equipment, electronic documentation and a CDSS (RGS 1177) (5). The telephone equipment can be connected to other councils in the network, allowing them to integrate during periods of high or low demand.

In Sweden, SHD is staffed with approximately 1,100 registered nurses (RNs), telenurses, who independently triage callers’ needs for further care (6,7). There is no formal education for telenurses in Sweden today; only shorter university courses are available. Many telenurses are experienced and have different specialist educations such as primary care nursing or intensive care nursing, whilst others are relatively newly educated as RNs. A telenurse in Sweden can handle up to eight calls per hour (5), and these calls include a broad variation of age groups and medical conditions. The
Telenurses can give a caller self-care advice or refer him/her to another care provider (8). This demands that telenurses be well versed in healthcare organization so that they can refer the care-seeker to an appropriate care provider (9). Greenberg (10) describes how the telephone advice nursing process involves interpreting in a two-way process. Telenurses are to interpret callers’ data into healthcare information and translate this healthcare information into a language the callers can understand. This process also involves interpreting the unsaid as well as using callers’ tone of voice to better interpret the situation.

Telenurses’ work environment can be described as a traditional call center environment in which telenurses sit in front of a computer, wearing a headset in order to handle calls. In the room telenurses have a widescreen TV monitor on the wall, making it possible to overview the number of calls waiting and displaying the mean waiting time, as well as providing an overview of the number of telenurses logged into the system. The system also provides statistics on each single telenurse’s individual performance, e.g. number of answered calls and mean call time. All calls to SHD are recorded and saved within a call database (5).

In short, telenurses have an exposed job in which they are subject to many challenges, including employers’ demands for efficiency as well as unequivocal and evidence-based advice. A telenurse’s ability to communicate with the caller is essential to the outcome of the call and to the double-sided question of trust/credibility. Communication is one of the most important instruments for the telenurses’ assessment, as they must ask the “right” questions and use non-verbal communication to verify or exclude symptoms of serious conditions. Through their communication, they also need to create trust and a caring relationship with the caller.

Computerized decision support systems and the use of CDSS in telephone advice nursing

To assist the clinical decision-making, telenurses working both internationally as well as in Sweden use CDSS. The main reason for introducing CDSS is to offer HCPs support for their clinical decision-making through access to evidence-based guidelines (11,12). A CDSS can be defined as a specialized information system developed to support users in their decision-making. These kinds of systems can be active or passive: whereas a passive system offers information, the active system offers suggestions when certain criteria are met (12). CDSSs have traditionally been regarded as potentially supporting and enhancing safety and quality within healthcare settings (13), and have been implemented in various healthcare settings such as acute care (11,13,14) nursing homes (15,16) and telenursing (8,9).

The CDSS used in SHD covers various symptoms and conditions common among children, adolescences, adults and older people. It is symptom-
based, with approximately 160 headings corresponding to common reasons for seeking advice. It is designed as a checklist, suggesting key questions based on the caller’s symptoms. Based on the caller’s responses, the CDSS suggests a measure, e.g. triage recommendation. Possible outcomes of a call include self-care advice, an appointment with a general practitioner (GP), a visit to the accident & emergency department, or a request for an ambulance (9). According to Greenes’ definition (12), the CDSS used at SHD is an active system because it suggests the appropriate measure based on the caller’s symptoms. The CDSS can also be searched for specific information by entering a tentative diagnosis (e.g. influenza) or main symptom, after which it offers facts and recommendations (7). In the triage recommendations, the CDSS does not take into consideration possible exacerbating factors such as previous medical conditions or high age. Swedish telenurses are allowed to make other recommendations to callers, hence deviating from the CDSS (5).

The consistency of outcome in nurse-led telephone triage in which telenurses use CDSS is not unanimous (9,17-19), and studies report consistency of triage outcome varying from 58% (19) to 97.6% (9). The problems of incorrect assessment and over-/under-triage may be due to the protocols on which the CDSS is based (20), and Richards et al. (21) found that a CDSS had a negative outcome, i.e. increased the number of unnecessary referrals. The use of CDSS might also extend the triage process, i.e. time needed for each consultation, which might be explained by the lengthy algorithms in the software (22).

Besides the CDSS’s effects on patient outcome it is also important to study the users’ (telenurses’) perceptions of the implemented CDSS. Telenurses working at NHS Direct (23) as well as SHD (7) have described how they use the CDSS for their assessments, and view it as a safety net and as a provider of consistency, especially when they are tired or confronted with queries outside their own clinical knowledge (23). Telenurses have also described (8) how the disposition in the software was far too often “doctor’s appointment”, and how the GP would soon be overbooked if they followed the software’s disposition. Another negative aspect of the CDSS was when a telenurse realized the symptoms presented by the caller were a sign of serious illness but could not find support for this in the software (24).

Telenurses have reported that they do not always use the CDSS as intended (8,23,25,26). As their own knowledge of the guidelines within the CDSS has increased, they have been able to select the “proper” guidelines to enter. They choose a route through the software to ensure that the recommendation it proposes will match their own; that is, they use the CDSS to confirm their own decisions (23). Similar results have been presented by Dowding et al. (25), who describe how experienced telenurses manipulated the CDSS in order to obtain desired answers and confirm their own decisions. This might be explained by the fact that telenurses perceive rigidity in the software (6,8,23,25).
During each call, telenurses are to make a decision regarding the callers’ need for care. They base their clinical decisions on the caller’s description and interpretation of current symptoms, the content of the CDSS and their own professional know-how. Human decision-making is a complicated process (27), and many different factors contribute when telenurses make decisions. We are sometimes not aware of all the factors impacting our decision.

Clinical decision-making

There are two main theoretical approaches within nurses’ clinical decision-making: the systematic-positivistic theory and the intuitive-humanistic approach. The systematic-positivistic theory of clinical decision-making assumes that the process of clinical decision-making follows rational logic, a linear process that can be studied (28). The structure (e.g. tree algorithms) of many CDSS follows this model of decision-making (29).

Within the intuitive-humanistic approach, based on a number of clinical studies Benner (30,31) has shown how clinical decision-making is a relationship between nursing experience, knowledge and intuition. Intuition is defined as “understanding without a rationale” (p.23) (32). According to Benner (30), novice nurses need guidelines and structure to guide their clinical decision-making, but with increased clinical experience a nurse gains know-how and recognition of situations, and decision-making come to be more influenced by intuition.

Dowie (33) argues that nurses predict the future in their decision-making, and when making choices draw on a variety of sources of information such as experience, stored knowledge, intuition and research evidence. These decisions are not always based on complete and true objectivity; they are sometimes biased by uncertainty and stress (34). Dowding and Thompson (35) also state that clinical decision-making in face-to-face encounters is complex and characterized by a great degree of uncertainty. That is to say, the telenurse’s lack of visibility enhances the uncertainty factor in telephone advice nursing (36).

According to Brännmark and Sahlin (27), over fifty years of psychological research has shown that humans are often quite poor decision-makers. Within decision situations, we humans tend to generate too few and narrow hypotheses that are skewed in favor of our own beliefs; hence we prefer confirmation before falsification.

Since communication has been shown to be telenurses’ main source for their clinical decision-making, it is important to study the actual, actual communication between telenurse and caller. As illustrated, the decision a telenurse makes has great importance for patient safety.
Patient safety and patient safety work

Patient safety problems are common both internationally and in Sweden (37). Studies have shown that in Sweden almost 3,000 patients died during 2007 due to medical harm (1). This is the equivalent to five and a half crowded, crashed Boeing 747s. It is important to keep in mind that patient safety work is far more than medical errors; however, in this thesis the focus is on medical errors.

The concept of patient safety can be defined as:

The avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the process of healthcare (Vincent (38) p.31, 2010)

In international literature, medical error is defined as “the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim” (39). An error can also be defined as an act, assertion or belief that unintentionally deviates from what is correct, right or true (40), which is in line with the definition by the Institute of Medicine (39). Medical error can be classified as slips or mistakes/lapses. A slip occurs as part of the daily routine and is mainly caused by distractions or heavy workload, whereas a mistake/lapse is the result of an incorrect choice and is often due to lack of knowledge or experience, or to applying the wrong decision tree (41,42). Many times these medical errors pass without causing any kind of adverse event, but sometimes they result in an adverse event. The National Board of Health and Welfare (NBHW) (43) defines adverse event as “an unexpected unwanted event” (43), i.e. an occurrence or event that interrupts normal procedure and should be reported as an incident. Adverse events can be either preventable or non-preventable (44). A preventable adverse event is defined as something that would not have occurred if the patient had received the standard care appropriate at the time. A non-preventable adverse event is defined as resulting from a complication that could not be expected (44).

In Sweden, an adverse event not including patient harm is filed as an incident report and handled by the head of management within the involved organization. Incident reporting is mandatory and non-confidential, and responsibility for it is placed on the director of operations (45). Incident reporting is crucial in work involving quality improvement and patient safety. The NBHW’s term bank (43) defines patient safety as “protection from care injury” and patient safety work as “work aiming at enhancing patient safety by analyzing, determining and obviating causes of risks, adverse events and negative events”. Improved incident reporting is essential to the development of safer healthcare, as it provides an understanding of an organization’s medical errors and their causes (46). Therefore, the primary purpose of inci-
dent reporting should be to use encountered medical errors to promote a learning process.

When an error involves a patient being hurt or exposed to the risk of being hurt, a malpractice claim (Lex Maria) should be filed with the NBHW by either the HCP itself or the HCP discovering the event. Patients who perceive that they have been harmed or exposed to risk of becoming harmed by a HCP can also file a malpractice claim with the NBHW.

The patient safety literature describes two approaches to medical errors: the traditional, human approach, which focuses on human error; and the systematic approach, which focuses on the chain of events that led to an incident or error (41). Within healthcare there has been a focus on the traditional, individual approach, while other high-risk industries such as aviation and nuclear industries have focused on the systems. With a system approach, medical errors are regarded as consequences rather than causes; when an error occurs it is not of primary interest who blundered but how and why the defense failed (41). When using a person approach the focus is on those performing the unsafe act, nurses and physicians. The approach regards medical errors as caused by aberrant mental processes, e.g. forgetfulness, inattention, carelessness and negligence (41). Two different kinds of medical errors are identified by Reason: active failure (unsafe acts committed by those in direct contact with the patient) and latent conditions (inevitable “resistant pathogens” found in the organization). Ineffective communication, stressful work environment, understaffing and inexperience are typical examples of latent conditions (41). These latent conditions may lie dormant for many years until they combine with active failure and create an opportunity for the error to occur (41).

Nolan (47) offers a similar description of causes of medical errors, stating that there are two proximal causes: “sharp end” and “blunt end” causes. Whereas the sharp end is usually associated with the caregiver in contact with the patient, the blunt end is found within the organization and work environment. These latent conditions (41) and blunt ends (47) have the commonality that they describe and identify causes of medical errors not on an individual level but a systematic one. Currie and Waterson (48) argue that the use of both Reason’s (41) and Nolan’s (47) models enables a more holistic approach when addressing patient safety failures.

Using a traditional approach focusing on the individual’s unsafe action would probably identify causes on the sharp end and not take into account the impact of the blunt end such as work environment. With this approach, there is a risk that decisions made at the blunt end and that hence affect what happens on the sharp end are not identified and that the medical errors may appear again since not all causes are identified (48).

From a clinical point of view, patient safety should be a high priority for healthcare organizations. One way to address patient safety issues is to report medical errors and systematically analyze them. One US study (49) of
medical errors in primary healthcare showed that the most commonly report-  
ed error was communication problems (70.8%). Similar results are presented  
by Beckman et al. (50), who describe that claims related to communication  
failure are common; as much as 70% of the claims in their study were relat-  
ed to communication failure. Other studies have also shown that communica-  
tion failure is the most common reason for patient safety risks, and that the  
most common cause of adverse events within healthcare is problems with  
communication (51-54).

Despite the obvious advantages of reporting medical errors and using  
them to enhance learning, the problem with under-reporting is well known  
(55). In a publication from 1983, McIntyre and Popper highlighted the impor-  
tance of clinicians actively seeking out medical errors and using them to  
advance personal as well as medical knowledge in general. They stressed the  
advantages of sharing experiences with others and also of learning from  
others’ mistakes. According to McIntyre and Popper, this requires the will-  
ingness to admit one’s mistakes and the ability to discuss the factors that  
may have been responsible (56). Still, almost 30 years later, the major prob-  
lem with this wise recommendation is the healthcare culture and barriers to  
reporting medical errors (38). Reasons for not reporting medical errors have  
previously been described based on individual factors such as fear of embar-  
rassment, punishing oneself, or fear of malpractice claims (46,57,58). Other  
reasons for not reporting medical errors are lack of feedback and the belief  
that there will be no response from organizations as a result of the report  
(59). Within the context of Swedish primary healthcare, staff has described  
reasons for not reporting medical errors due to lack of time (44%) and the  
experience of complicated reporting procedure (27%) (60). Within the con-  
text of nursing, nurses have described reluctance to report medical errors  
because of fear of reprisal (61) as well as fear of being ridiculed or blamed if  
admitting having made mistakes (48). Whitehead and Baker (61) suggest  
that one way to overcome this problem and improve patient safety is to im-  
plement confidential reporting systems, aiming at creating an environment  
where nurses feel safe to report problems. Thus, despite the well recognized  
strength of reporting medical errors, the problem of under-reporting is signif-  
icant (55,62).

To summarize, although telephone advice nursing is regarded as a pa-  
tient’s first contact with the healthcare system, it is an unexplored field re-  
garding patient safety. When introducing a new kind of healthcare service,  
such as SHD, it should be considered important to rigorously investigate  
issues of patient safety to ensure the provision of safe care and learning from  
medical errors.
Communication

The word *communication* comes from the Latin “communis”, meaning to share, and “communicatio” meaning mutual exchange. In this thesis, communication is defined as the process of the exchange of information and meaning from one individual to another through the use of verbal and non-verbal strategies (63). The process involves sending messages and encoding received messages, while simultaneously synthesizing their meaning and actual information. As senders and receivers we have an intention with what is said and done, and each party has a filter to interpret the other’s message (63). Within relationships, communication is mainly of two types: verbal and non-verbal. Verbal communication is the spoken word, and non-verbal communication is the exchange of signals using other strategies such as body language, movements, facial expressions and tone of voice (64). It is clear that communication over the telephone is different from face-to-face communication. There are many factors that can obstruct and aggravate communication: hearing problems, dialects, foreign language, cultural differences, stress and use of medical jargon (64).

The spoken word contains information, and the message can be divided into two different levels: what is said and how it is said. The what aspect is most often the verbal content – the meaning of the word – and is presented under conscious control. The how aspect is the non-verbal part of communication, and is more often unconscious and unintentional. These two levels often complement each other, but sometimes the messages on the different levels contradict each other and when what and how do not correspond the communication will become incoherent and inconsistent (63). The how aspect is equally important as the what aspect, and studying recordings of actual communication allows both aspects to be addressed. Culture, personality, attitudes and language habits are also reflected in communication and contribute to interpreting the message. When two people communicate, they enter a relationship with each other. In order to enhance effective communication is important to decide on the relations – on what privileges and obligations the partners have. These roles are often predetermined by the social and cultural context in which the communication takes place (63). Hence, collisions between different traditions and cultural contexts can be reasons for communication breakdown.

Communication within healthcare

In the literature on healthcare communication, two main types of communication styles are described: the biomedical and the bio-psychosocial, e.g. *patient-centered communication* (65,66). The concept of patient-centeredness is widely used but is surrounded by considerable ambiguity, lacking a clear definition. Stewart (67) suggests that it is probably most commonly
understood for what is not: technology-, doctor- or disease-centered. The biomedical communication style is often described as traditional healthcare communication, in which the professional is the expert and takes a leading position in the conversation. In bio-medical communication, there might be a risk that the professional takes an authoritarian roll and only focuses on signs and symptoms presented by the patient. The professional uses closed-ended questions and may give directives without following up the patient’s understanding of the advice given (68). Patient-centered communication (65,67) presupposes patients’ experiences and understanding, and hence ideally engages the patient in a discussion. The professional’s role is to guide and structure the communication (65,69). Studies on general healthcare have shown that patient-centered communication may facilitate patient concordance (65,70), satisfaction (71-73), fewer complaints (74) and increased patient safety (72,75,76). Within telephone mediated care, a study of calls to a poison control center showed that an increase in the percentage of partnership statements was associated with an increased likelihood of concordance (70). Studies on actual communication within telephone advice nursing are scarce; only one Dutch study using standardized incognito callers has been found (77). However, this study showed that telenurses gave advice regarding the outcome of triage as well as self-care advice without following up on callers’ understanding and acceptance of the advice. Derx et al. (77) also state that telenurses should be trained in a more patient-centered communication, using strategies like active listening, active advising and call structuring. Effective communication is suggested to be one of the most powerful tools in risk management (51).

Nursing theorist Travelbee (78) describes how communication between patients and HCPs is essential and central to the nursing process. Travelbee (78) states that a major belief of the theory is that communication is a process – a dynamic process – and an instrument for nurses when providing care. According to Travelbee, professional healthcare communication is characterized by empathy, professional know-how and goal orientation. To be empathetic implies that the healthcare professional communicates sympathy and understanding to the care-seeker. Good communication also demands professional know-how in order to analyze the situation and take needed measures (64,78). In order for the patient to want to share anything meaningful, it is important that they be certain that what they communicate will be accepted and not ignored or discounted; otherwise, communication breakdown will occur (78). Healthcare communication has a purpose and a goal, but the different actors (patients and nurses) may have different goals with this communication. Travelbee stresses that it is important that nurses be aware that every human is different and will respond to stress in his/her own unique way (78), and that it is important to keep in mind that individual patients can respond differently to the same symptom. Problems may arise if nurses, instead of being “activity-oriented”, are “sign-and-symptom-
centered”, i.e. focus on the presence or absence of symptoms rather than exploring how these symptoms affect the patient.

Fossum (79) describes that in an ideal communication the participants are equal partners who mutually listen to each other and the different arguments. In healthcare communication, there is almost always an asymmetric power balance between the professional and the care-seeker. The basis for this power asymmetry can be found within the different roles of the parties: the nurse’s role as caregiver and possessor of something desirable, and the caller being in need of help (80,81). In (79), Vinthagen states that the aspect of power influences healthcare communication. Vinthagen mentions that one problem with power is the fact that it is regarded differently by the actors involved. For the possessor of power the act can be regarded as obvious and well-intended, but it can be perceived as insulting by the receiver. The telenurse has the resources callers might request at his/her disposal, such as knowledge and access to healthcare, making their role more of a gate-keeper. This might affect the communication. On the other hand, the patient is not less important. He/she has information and knowledge regarding the problem, and the nurse cannot perform his/her work without this information. The parties are mutually dependent (64). From the caller’s perspective the problem is of a private nature, and for the telenurse it is a part of his/her professional role (80,82). The caller’s experience of the problem could be described as “the voice of the life-world”, consisting of more than the obvious medical problems identified by the nurse (81). This asymmetry can consist of different aspects such as resources, knowledge, responsibility and perspectives (82). In (79), Vinthagen describes several similar power aspects within healthcare, such as diagnostic power, information power, agenda power, authority and resource power. Healthcare communication is always performed within a complex context with many different actors, and is steered not only by personal ideals but also by the structures and available resources within the context. Hence, the execution of power is not always driven by personal ideals but often by the limited resources available to the HCP (24,83,84). There is also an asymmetry regarding responsibility: telenurses have both a professional responsibility for how they perform their work (85) as well as a responsibility to control and lead the dialogue forward (82).

Communication within telephone advice nursing

Communication is a process of great importance for both the telenurses’ triage process of the callers’ need for care and the callers’ understanding of the advice given. Verbal as well as non-verbal communication is of importance as a basis for telenurses’ decisions in their work (86), and the communicative strategies used by telenurses are of greatest importance for their clinical decisions (10).
According to Leppänen (80), in telephone advice nursing there are at least six possible problems to consider: the caller may present a second-hand interpretation of the situation, the caller might want something out of the call (e.g., a referral to a doctor), the telenurse often has no previous knowledge regarding the caller/patient, telenurse triage is based on second- or third-hand information, time pressure, and the parties cannot see one another. Telenurses’ main tool for solving/addressing these problems is their communication.

The communication process in telenursing has not been investigated to any great degree. It is described as dynamic and goal-oriented, aiming to identify and meet callers’ needs (10). According to Greenberg’s model (10), the process consists of three phases: gathering information, cognitive processing and output. According to Runius in (87), the communication process in telenursing consists of five phases: open, listen, analyze, motivate and close. All telenurses working at SHD are educated in-house in Runius’ model. The content of these two processes is quite similar; see Figure 1.

According to the quality goals of SHD, all calls should be answered within three minutes and the desirable call duration is six to seven minutes (5). This implies that a single telenurse can handle 50-60 calls per work shift. We do not know how this communication appears or how the ideal telephone communication should be performed, since there are currently no studies describing or analyzing the actual communication between telenurses and callers.

One can reflect on how the process of communication in telephone advice nursing, previously described, fits with the algorithms of the CDSS. The
structure of the CDSS focuses on closed-ended questions based on the caller’s main symptom, which might lead to the first part of the communication process receiving too little attention. Another possible downside of the CDSS’s influence on communication is that it might lead the telenurse into a biomedical communication style, e.g. only focusing on signs and symptoms presented by the caller, with the risk of missing important information not found without asking open-ended questions. The structure of the CDSS might hence negatively affect the communication and outcome of the call (13).

Analyzing healthcare communication

There are a number of instruments available (89) for estimating and evaluating healthcare communication. One of the most commonly used instruments in analyzing provider-patient communication is the Roter Interaction Analysis System manual (RIAS) (90), developed as a tool for viewing the communicative exchange between HCP’s and patients. The RIAS is a method for coding medical communication and has been used in more than 90 studies in healthcare settings in e.g. the US, Europe, Asia, Africa and Latin America (90). The coding is done from audio recordings in order to enable investigation of both the what and the how aspects (63,90); hence not only what is said but also how it is said. According to its developer, Debra Roter, the RIAS is loosely derived from Bales’ social exchange theory related to interpersonal influence, problem-solving and reciprocity (personal communication, RIAS training course Utrecht April 2011). In Bales’ (91) theory he presents four main categories to describe group interactions, based on the assumption that a group’s success depends on how well it can solve tasks (task function) and how satisfied it can keep its members (socio-emotional function). The four categories in Bales’ theory are: socio-emotional positive, socio-emotional negative, task-related attempted solutions (e.g. gives suggestions, opinions, orientation) and task-related questions (asks for suggestions, opinions, orientation). Roter (90) states that the social exchange theory used by Bales (91) is consistent with the empowerment perspective that views the medical encounter as a meeting between experts. The communication categories in the RIAS created by Roter are meant to identify the socio-emotional and task-focused elements of medical communication. Task-focused exchanges are described by Roter (90) as technically based skills used in problem-solving, and include those related to data gathering, the physical exam and patient education and counseling. According to Roter the socio-emotional element of the RIAS contains activities of building social and emotional rapport, and includes use of social amenities such as empathy, concern and reassurance. Patients’ communication is viewed in a parallel fashion, and task-focused communication is reflected in patients’ asking questions and providing the healthcare personnel with information regarding
their health. The socio-emotional domain includes communication showing expression of concern, optimism, empathy and laughter (90). Bales’ (91) original observation scheme, the Bales Interaction Process Analysis, consists of 12 categories for socio-emotional and instrumental behavior, and Roter (90) has added categories in order to make the scheme suitable for medical dialogues. The RIAS thus now consists of a total of 41 categories.

According to Roter, the RIAS differs substantially from Bales’ original Interaction Process Analysis in four ways: the coding is performed based on the dyadic exchange between patient and provider, the categories are tailored to directly describe the content of the dialogue between patient and provider during medical encounters, the coding is performed directly from audio or video tapes, and tonal qualities are included in the coding procedure (RIAS manual).

One possible disadvantage with the Bales (91) model as a basis for developing the RIAS is that it was developed for studying interaction within groups rather than between two individuals. Bales’ model has been criticized for not enable sequential analysis, and the same criticism has been raised regarding the RIAS (92). For a further description of coding medical dialogues using the RIAS, see the Data analysis section.

Rationale for this study

Today SHD is one of Sweden’s largest HCPs, and over eight million of Sweden’s citizens are advised to contact SHD when in need of care. Much research has been performed internationally as well as in Sweden to investigate the effects of telephone advice nursing and also different aspects regarding callers’ and telenurses’ experiences of the service. However, the knowledge regarding medical errors within this context is scarce. To date, there are no studies describing what kinds of medical errors occur in telephone advice nursing or the causes of these medical errors. Since communication is essential in telephone advice nursing, it is reasonable to assume that communication shortcomings might exist when telenurses misjudge callers’ needs for care. The reason for implementing CDSS in telephone advice nursing is to enhance patient safety, but knowledge of how it affects the communication is scarce. The lack of studies regarding communication and patient safety within this large HCP highlights the importance of further research in this context.
Overall and specific aims

The overall aim of this thesis is to investigate patient safety and communication within national telephone advice nursing in Sweden.

Study I
The aim was to describe telenurses’ experiences of working with computerized decision support systems and how such systems could influence their work.

Study II
The aim was to investigate medical errors that led to an incident report in the context of SHD telenursing.

Study III
The aim was to describe the communication activities between telenurses and callers who expected a higher level of care than that advised by the telenurses, and to investigate relationships between telenurses’ and callers’ communication.

Study IV
The aim was to describe all malpractice claims regarding SHD during 2003-2010 (what went wrong and why as well as the HCPs’ measures), to analyze the communication between telenurses and callers, and to investigate whether there are any differences between male and female callers.
Methods

Design
Study I had a qualitative approach, and Studies II and IV used both a qualitative and quantitative approach. Study III used a quantitative approach; see Table 1.

Table 1. Description of Studies I-IV.

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Participants/Material</th>
<th>Data analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Descriptive</td>
<td>Eight telenurses using CDSS</td>
<td>Qualitative content analysis (93)</td>
</tr>
<tr>
<td>II</td>
<td>Descriptive and comparative</td>
<td>426 incident reports within SHD</td>
<td>Manifest summative content analysis (94), and descriptive and comparative statistics</td>
</tr>
<tr>
<td>III</td>
<td>Descriptive and correla-</td>
<td>Callers (n=25) stating having expected a higher level of care than recommended by telenurses</td>
<td>The Roter Interaction Analysis System (RIAS) (90), and descriptive and correlational statistics</td>
</tr>
<tr>
<td></td>
<td>tive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Descriptive and comparative</td>
<td>All telephone calls (n=45) to SHD leading to a malpractice claim during 2003-2010</td>
<td>The Roter Interaction Analysis System (RIAS) (90), manifest qualitative content analysis (94), and descriptive, correlational and comparative statistics</td>
</tr>
</tbody>
</table>

Setting
The setting for the studies is call center sites connected to the national telephone advice service SHD.
Sample and Material

Study I
Eight telenurses working with CDSS participated in the study. Purposive sampling (95) based on experience and workplace was used. The telenurses worked at three different call centers, located in small and large towns. An inclusion criterion of one year’s clinical experience was set. The participating telenurses were female and their ages varied from 35 to 61 years of age, with a mean age of 55 years. Their work experience as a telenurse varied from 1 to 37 years, with a mean of 8 years.

Study II
The material consisted of a total of 426 incident reports. During the time of the data collection, six county councils were connected to SHD; all incident reports during 2007 were collected from five of these six sites. As the sixth site had a higher rate of reported incidents we asked the manager in charge to select slightly more than 20% of their incident reports, stored in manual files. Based on these 426 incident reports, a total of 452 medical errors were identified (one incident report could describe more than one error).

Study III
The sample for Study III was chosen based on another study (96). During one week in October 2008, one call center connected to SHD located in central Sweden within approximately 148,000 citizens answered 4,080 calls. Within these calls a patient chart had been made, e.g. the telenurse had given the caller individualized advice, in 3,808 calls. These 3,808 calls were made by 3,272 individuals (mean 1.16 calls/individual). Of these 3,272 callers, 20.2% (n=660) were randomly selected with SPSS. Postal questionnaires (n=660) were sent to these randomly selected callers of adult age (over 18 years) and to parents when the patient was a child (under 18 years). Exclusion criteria were: the call regarded a child below the age of one year, suicide thoughts, or complications regarding miscarriage/abortion. Two reminders were sent. The total response rate was 49% (n= 316), but when the number was restricted to complete answers to key questions (expected level of care) the response rate was reduced to 44% (n=273). The results of this study have been reported elsewhere (96). A group of callers (n=40) receiving a less urgent level of care than they had expected and/or were not in agreement with the telenurses regarding the recommended level were chosen for the present study, i.e. criterion sampling (95). Thirty of these callers’ actual calls were able to be retrieved from the call database. Five of the callers had made two calls, and these second calls were excluded from the study since in the second call they had a patient chart rather than a new symptom for the telenurse to assess. The data in Study III consist of these 25 first calls made to SHD.
Study IV
The material consisted of all investigations (n=33) of malpractice claims in connection to telephone advice nursing filed by the NBHW regarding cause of the event and organizations’ reported measures concerning the event. Also used in the study were the sound files from telephone calls (n=45) made to SHD that had resulted in a malpractice claim since its start in 2003 until 2010. To the best of our knowledge, this is the first study of the actual, actual encounter between HCP and care-seeker in which a consultation resulted in a malpractice claim. This has been possible because all calls to SHD are recorded and saved along with the patient’s healthcare record.

Data collection

Study I
Data were collected through semi-structured interviews using an interview guide. The interviews started with open questions regarding respondents’ experiences working with a CDSS e.g.: “What is your experience of working with CDSS?” “What advantages do you experience when working with CDSS?” and “Can you please describe a recent call?”. Probes such as “Can you give an example please?” were used in order to obtain a richer description. The interview guide had been tested in a pilot interview (not included in the study). The interviews were performed by AE during 2006, lasted 45-60 minutes, and took place in a spare room at the telenurses’ workplace.

Study II
All sites (n=6) connected to SHD in 2007 were contacted, and it was from five of these sites that all incident reports registered during 2007 were collected. As the sixth site had a high frequency of reported incidents, the Head of Department was instructed to randomly select slightly more than 20% of all incident reports, stored in manual files.

Study III
The 40 respondents who stated that they had received a less urgent level of care than they had expected and/or were not in agreement with the telenurses regarding the recommended level were included in the study. Among these 40 calls, 30 were able to be technically retrieved from the system’s call database and, thus, were eligible for communication analysis. The 30 calls had been made by 25 different callers, and the second call made by the same caller was excluded from the study because it concerned the same problem as the first call and hence did not involve a new symptom for the telenurse to assess.
Study IV
The NBHW provided the research team with a list of all malpractice claims to SHD regarding telephone consultations and their investigation regarding the event. According to the NBHW registrar, 33 malpractice claims involving SHD were registered. After NBHW’s initial identification of the cases, all actual sound files from the cases regarding the malpractice claims were retrieved from the manager in charge at the respective call center site.

Data analysis

Study I
Qualitative content analysis according to Graneheim and Lundman (93) was used for data analysis. In nursing research, qualitative content analysis has been used in a broad variety of data and includes various depths of interpretation (93). The interviews were listened to and read through several times to obtain a sense of the whole, and all interviews were transcribed verbatim. Text related to the aim of the study was identified as meaning units. These units were then condensed (shortened without changing their meaning), abstracted and labeled with a code. The whole interview was taken into consideration during condensation and labeling. The codes were then sorted into sub-categories and later into categories based on differences and similarities. The data analysis of sorting data into categories is regarded as manifest analysis, answering the question “What?”. In the latter part of the data analysis, an underlying meaning of two of the categories was identified and this is presented as a theme. A theme is the researcher’s interpretation of data, and should answer the question “How?”. A theme is found as a thread of underlying meaning, running through codes, sub-categories and categories (93).

Since the data in the third category were descriptive, only manifest data analysis was possible. The last author read four whole interviews, and during the process of condensation, coding and categorization the first and last authors discussed the process until agreement was reached.

Study II
Data were first qualitatively analyzed using inductive manifest content analysis (94). In the first step, all incident reports were read through several times and text describing the reported medical error was transcribed into a text document. Text in the incident reports describing reported medical errors was identified as meaning units and condensed. Condensed meaning units were then sorted into sub-categories and categories based on similarities in content. To enhance trustworthiness, two of the authors (AE and ME) then independently audited the categorized reports. When there was contention about the categorization, this was discussed until consensus was reached. After the initial qualitative analysis, data were analyzed using the
Statistical Package for the Social Sciences (SPSS). The five main categories were compared for possible differences regarding incoming and outgoing incident reports using the Chi² test. Observed and estimated expected frequencies and standardized adjusted residuals were used to test independence (97). A standardized adjusted residual that exceeds about 2 or 3 in absolute value indicates a lack of fit of the null hypothesis in that cell.

**Studies III and IV**

All calls in Studies III and IV were analyzed using the Roter Interaction Analysis System (RIAS) manual (90). The manual has been used to analyze face-to-face encounters between patients and professionals in numerous settings, and has also shown to be applicable to the context of telemedicine (98,99). When healthcare communication is coded using the RIAS, the conversation is divided into “utterances”; an utterance is defined as the smallest discernible segment of speech to which a classification can be assigned. Utterances can vary in length from a single word to a full sentence. A sentence is regarded as one utterance if it only contains one thought or relates to one item of interest. Lengthy sentences are often divided into two or more utterances since they are often composed of more than one thought or item of interest. The major reason for coding directly from audio records is that this allows for an expansion of the verbal interpretation through addressing intonation and emotional signals. Expressions reflecting concern, disagreement, optimism or approval conveyed through tone of voice, e.g. empathetic nuances, are difficult to define and describe but are registered and interpreted uniformly by most people (RIAS coding manual 2011). When an utterance is identified, it is placed in one of the 41 exclusive and exhaustive categories describing the communicative behavior. Specific categories can also be combined into different structures, e.g. composite categories describing specific activities, such as: *Data gathering biomedical* (7 categories), *Data gathering lifestyle/psychosocial* (4 categories) and *Patient education and counseling-biomedical* (4 categories) (RIAS manual; (73,90). In their manual, Roter and Larson suggest 20 different composite categories. Another suggested measure is to calculate the verbal dominance ratio, i.e. the total number of telenurse utterances/total number of caller utterances. A verbal dominance ratio of 1.0 indicates equal participation by caller and telenurse (73,90).

The developer of the RIAS (RIAS manual) recommends that about 10% of all conversations be double-coded in order to calculate inter-rater reliability. Inter-rater reliability for the RIAS has shown a mean agreement of 0.85 (Pearson’s correlation) for all patient and physician categories (90). The RIAS has also been adapted for telemedicine, i.e. video-transmitted consultations, by adding technology-specific categories. Inter-rater reliability calculations using intra-class correlation (ICC) showed a variation from 0.53 (socio emotional exchange total patient) to 0.98 (task-focused exchange pro-
vider) (98). In telephone consultations (calls to poison control centers), inter-rater reliability based on communication categories for both provider and caller showed an average of > 0.70 (range 0.70-0.99) (70) and > 0.80 (99) using Pearson correlation.

The content validity of the RIAS has been tested in oncology settings (100), showing that all utterances in the study could be classified into one of the RIAS categories; hence, the categories covered all the content in the conversations. However, the authors state that the classification of some of the categories was questionable and that coding conflicts occurred because different utterances, such as “Am I going to die?”, could be coded as either “Patient asks medical question” or “Patient shows concern”. The study also reported how some categories were seldom or never used.

In Study III all calls were listened to by the author and the main supervisor, and five were analyzed jointly to ensure consistency during the coding process. After the communication analysis, data were imported into PAWS and analyzed using descriptive and correlational statistics using Spearman’s rho. In Study IV, 18 of the 45 calls (40%) were double-coded by the main supervisor (IKH) in order to estimate inter-rater reliability. ICC ranged from 0.76 to 0.91 within the categories used, except in the Reassures category, where ICC was 0.45. This result in Study IV involving lower values regarding psychosocial exchange is concurrent with Eide et al. (101).

Data in Study IV also consisted of the NBHW’s investigations concerning the malpractice claims. The content of the documents could vary depending on when in time and where in the country (the NBHW consists of six different regional boards) an investigation had been conducted. The reports were analyzed using manifest content analysis (94). In the first step, all reports were read through several times, and text describing the medical error, the causes identified by the NBHW and HCPs reported measures were transcribed. This text in the reports describing causes and organizations’ measures as a response to the event was identified as meaning units and condensed. Condensed meaning units were then inductively sorted into sub-categories and, based on similarities in content, into categories. To enhance trustworthiness, the first author and the main supervisor then independently audited the categorized reports. When there was contention about the categorization, this was discussed until consensus was reached. After the initial qualitative analysis and for the communication analysis of actual calls, data were imported into PAWS and analyzed using descriptive, correlational and comparative statistics (Spearman’s rho and Mann-Whitney U Test).
Ethical considerations

Study I
All participants gave their informed consent to participate after receiving written and oral information about the study. Since Study I included voluntary telenurses, ethical approval was not needed at the time of the study. Ethical regulations described in Swedish Law 2003:460 (Codex) were followed.

Study II
Permission to perform Study II was obtained from the Regional Ethical Review Boards in Uppsala, no. 2008/05.

Study III
The study was approved by the Regional Ethical Review Board in Linköping, no. 2008-172-31.

Study IV
Since the data for Study IV consist of highly sensitive material (actual calls around which the caller or patient has been exposed to a malpractice claim and is often seriously injured or dead), permission to perform the study was requested from both the Regional Ethical Review Boards in Uppsala and the Swedish National Board of Health and Welfare (NBHW). We requested permission to collect and analyze the data (actual calls) without asking those affected by the malpractice claims for informed consent to participate. The reason for this decision, based on long discussions within the research team as well with professional ethicists, is that a request could arouse unpleasant memories among those affected and their relatives. The study was approved by the Regional Ethical Review Boards in Uppsala (no. 2010/008) and by the NBHW (act number 3.1 35689/2010).
Results

Study I
Telenurses described their experiences of the CDSS as supporting, inhibiting and quality-improving, including nine sub-categories; see Table 2. The latent analysis of the data showed that two of the categories, supporting and inhibiting, formed a theme interpreted as being strengthened, but simultaneously controlled and inhibited. The results showed that telenurses experienced that the decision support system facilitated their work, complemented them, gave them security and increased their trustworthiness. Telenurses simultaneously experienced the decision support as incomplete, not in agreement with their own opinions, and controlling. The decision support system contributed to securing the quality of telephone advice nursing. The data in the first two categories were close to the individual telenurses’ experiences, and the data in the third category dealt with quality-improving issues on an organizational level. These different perspectives, the individual and the organizational, might explain the differences of depth in data.

Table 2. Description of theme, categories and sub-categories in Study I

<table>
<thead>
<tr>
<th>Theme</th>
<th>Categories</th>
<th>Sub-categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being strengthened but simultaneously controlled and inhibited</td>
<td>Supporting</td>
<td>-Simplifying work</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Complementary support</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Professional security</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Enhancing telenurses’ credibility</td>
</tr>
<tr>
<td></td>
<td>Inhibiting</td>
<td>-Disagreement between telenurses and CDSS</td>
</tr>
<tr>
<td></td>
<td>Quality-improving</td>
<td>-Uniform advice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Increasing accessibility</td>
</tr>
</tbody>
</table>

Study II
The analysis of incident reports within SHD showed five categories of medical errors: accessibility problems (41%), incorrect assessment (25%), routines/guidelines (15%), technical problems (13%) and information/communication (6%). The incident reports were divided into two groups, incoming and outgoing incident reports. Incoming incident reports were
those sent to SHD from other HCPs to whom telenurses working at SHD were able to refer callers. Outgoing incident reports were those sent from SHD to other HCPs. None of the incidents reports regarded medical errors within the organization itself.

Overall, the most commonly reported category was accessibility problems (41%), e.g. issues of accessibility problems at other healthcare providers. Among the outgoing reports, this category constituted 61% of the incident reports. The most common error reported to SHD described Incorrect Assessment (58%). In this category 36 reports stated that a too-high level of care had been recommended and 20 that a too-low level of care had been recommended, while ten reports did not specify this; see Table 3.

Table 3. Description of categories, sub-categories, frequency and incoming or outgoing incident report

<table>
<thead>
<tr>
<th>Categories and sub-categories</th>
<th>Total n/percent</th>
<th>Incoming n/percent</th>
<th>Outgoing n/percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility problems</td>
<td>183/41</td>
<td>18/10</td>
<td>165/61</td>
</tr>
<tr>
<td>Insufficient accessibility – other HCP</td>
<td>165/37</td>
<td>0/0</td>
<td>165/61</td>
</tr>
<tr>
<td>Insufficient accessibility – SHD</td>
<td>18/4</td>
<td>18/10</td>
<td>0/0</td>
</tr>
<tr>
<td>Incorrect Assessment</td>
<td>114/25</td>
<td>106/58</td>
<td>8/3</td>
</tr>
<tr>
<td>Incorrect advice</td>
<td>26/6</td>
<td>26/14</td>
<td>0/0</td>
</tr>
<tr>
<td>Incorrect referral – level of care</td>
<td>73/16</td>
<td>66/36</td>
<td>7/3</td>
</tr>
<tr>
<td>Incorrect referral – geographic location</td>
<td>15/3</td>
<td>14/8</td>
<td>1/0.4</td>
</tr>
<tr>
<td>Technical Problems</td>
<td>60/13</td>
<td>4/2</td>
<td>56/21</td>
</tr>
<tr>
<td>Software</td>
<td>19/4</td>
<td>0/0</td>
<td>19/7</td>
</tr>
<tr>
<td>Telephone</td>
<td>41/9</td>
<td>4/2</td>
<td>37/14</td>
</tr>
<tr>
<td>Routines/Guidelines</td>
<td>67/15</td>
<td>38/21</td>
<td>29/11</td>
</tr>
<tr>
<td>Does not follow formal guidelines</td>
<td>48/11</td>
<td>31/17</td>
<td>17/6</td>
</tr>
<tr>
<td>Lack of or inadequate routines</td>
<td>19/4</td>
<td>7/4</td>
<td>12/5</td>
</tr>
<tr>
<td>Information and Communication</td>
<td>28/6</td>
<td>17/9</td>
<td>11/4</td>
</tr>
<tr>
<td>Nurse experienced unpleasant encounter with patient</td>
<td>2/0.4</td>
<td>0/0</td>
<td>2/0.7</td>
</tr>
<tr>
<td>SHD nurse complains about encounter with other collaborator</td>
<td>9/2</td>
<td>0/0</td>
<td>9/3</td>
</tr>
<tr>
<td>Collaborator complains about encounter with SHD</td>
<td>4/0.9</td>
<td>4/2</td>
<td>0/0</td>
</tr>
<tr>
<td>Patient experienced unpleasant encounter with SHD</td>
<td>13/3</td>
<td>13/7</td>
<td>0/0</td>
</tr>
<tr>
<td>Total</td>
<td>452/100</td>
<td>183/100</td>
<td>269/100</td>
</tr>
</tbody>
</table>

Study III

The analysis of the calls with callers who had received a recommendation of a lower level of care than expected showed that 14 of the calls had been made by female callers and 11 by male callers. The calls were quite short, with a mean call time of 4 minutes and 18 seconds (SD 1 min 53 sec).

The communication analysis results showed that telenurses mainly asked Closed-ended medical questions, used in 23 of calls (mean 4.6/call).
Telenurses asked *Open-ended medical questions* in 9 calls (mean 0.9/call). Analysis of callers’ communication showed that *Concern* was expressed in 16 calls. *Reassurance* was expressed by telenurses in 16 calls, and *Empathy statements* were found in 1 call; see Table 4.

Telenurses *Checked for understanding* (made sure they had understood what the callers had communicated) in 19 calls and *Asked for understanding* (followed up on callers’ understanding) in 7 calls. For further description of communication between telenurses and callers, see Table 4. Communication analysis showed that callers’ most common communication activity was *Gives information-medical*, found in all 25 calls. Callers requested a doctor’s appointment in 12 of the calls, see Table 4.

The communication analysis also showed that there was a statistically significant positive relationship between callers’ expressions of *Concern* and telenurses’ expressions of *Disapproval*, e.g. “No, I don’t think so”, using Spearman’s rho (rho=0.52) (p=0.008). There was also a statistically significant relationship between telenurses’ *Facilitate and Patient Activation* and callers’ providing telenurses with medical information (*Gives information-medical*) (rho =0.64) (p=0.001) and utterances of *Criticism* between telenurses and callers (rho =0.53) (p=0.007). Telenurses’ expression of

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Table 4. *Description of telenurses’ and callers’ communication (n=25)*

<table>
<thead>
<tr>
<th>Category of telenurses’ communication</th>
<th>Used in total of calls/total number of utterances</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed-ended medical question</td>
<td>23/116</td>
<td>4.6</td>
<td>3.6</td>
<td>5.0</td>
<td>0</td>
<td>13.0</td>
</tr>
<tr>
<td>Open-ended medical question</td>
<td>9/23</td>
<td>0.9</td>
<td>1.4</td>
<td>0</td>
<td>0</td>
<td>5.0</td>
</tr>
<tr>
<td>Counsels medical/therapeutic</td>
<td>25/296</td>
<td>11.8</td>
<td>8.9</td>
<td>11</td>
<td>2.0</td>
<td>44.0</td>
</tr>
<tr>
<td>Asks for opinion</td>
<td>5/11</td>
<td>0.4</td>
<td>1.2</td>
<td>0</td>
<td>0</td>
<td>6.0</td>
</tr>
<tr>
<td>Asks for understanding</td>
<td>7/11</td>
<td>0.4</td>
<td>0.8</td>
<td>0</td>
<td>0</td>
<td>3.0</td>
</tr>
<tr>
<td>Paraphrases, checks for understanding</td>
<td>19/78</td>
<td>3.1</td>
<td>2.7</td>
<td>2.0</td>
<td>0</td>
<td>10.0</td>
</tr>
<tr>
<td>Empathy statements</td>
<td>1/2</td>
<td>0.1</td>
<td>0.4</td>
<td>0</td>
<td>0</td>
<td>2.0</td>
</tr>
<tr>
<td>Reassures</td>
<td>16/35</td>
<td>1.4</td>
<td>1.5</td>
<td>1.0</td>
<td>0</td>
<td>5.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category of callers’ communication</th>
<th>Used in total of calls/total number of utterances</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gives information-medical</td>
<td>25/377</td>
<td>15.1</td>
<td>7.8</td>
<td>14.0</td>
<td>4.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Concern</td>
<td>16/50</td>
<td>2.0</td>
<td>2.2</td>
<td>2.0</td>
<td>0</td>
<td>7.0</td>
</tr>
<tr>
<td>Asks for service</td>
<td>12/28</td>
<td>1.1</td>
<td>1.6</td>
<td>0</td>
<td>0</td>
<td>5.0</td>
</tr>
</tbody>
</table>
Open-ended medical questions had a statistically significant negative relationship with callers’ checking that they had understood the telenurse correctly (rho = -0.158) (p=0.013). There was also a positive relationship between telenurses’ use of Closed-ended medical questions and callers’ providing telenurses with medical information (rho =0.72) (p=<0.001).

Study IV
The 45 calls resulting in malpractice claims in the study were made by 19 male and 24 female callers, and had a mean call time of 5 minutes and 50 seconds. The calls were made by the patient him/herself in 25 calls, 9 were made by a relative, 1 by a friend, 8 were made by the mother of a child and 2 were made by the father. The most common reasons for calling were abdominal pain (n=11) and chest pain (n=6).

Among the patients (n=33) affected by the malpractice claim, 13 had died and 12 had been admitted to an intensive care unit. Seven had been admitted to “standard care” for more than 24 hours, and one was able to leave the hospital after medical treatment.

The NBHW’s investigation of the telephone calls to SHD involved in the malpractice claims showed that Failure to listen to caller (n=12), Communication failure (n=11) and Inadequate anamnesis (n=10) were the most common reasons for error. Each case could include several causes; see Table 5.

Table 5. Description of NBHW’s identified causes for malpractice claims

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-category</th>
<th>N=</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication (n=35)</td>
<td>Failure to listen to caller</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Communication failure</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Inadequate anamnesis (too few questions)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Talked through third person</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Did not follow up on caller’s understanding</td>
<td>1</td>
</tr>
<tr>
<td>Decision process (n=29)</td>
<td>Lack of overall picture of caller</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Probability diagnosis</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Did not reconsider previous diagnosis</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Did not follow/use CDSS</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Did not follow guidelines</td>
<td>6</td>
</tr>
<tr>
<td>Organization deficits (n=24)</td>
<td>Work task not defined</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Lack of healthcare resources</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Deficit CDSS</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>High workload</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Lack of personal competence/inadequate introduction</td>
<td>9</td>
</tr>
<tr>
<td>No error within SHD’s responsibility</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>
The most common measures reported were *Discussion in work group* (n=13) and *Education of staff* (n=10). *Revision of guidelines* (n=8) and *Revisions of CDSS* (n=6) were also described. Sometimes, several measures were taken for each call. In four cases no measures were reported, and in three cases SHD reported that measures were planned but did not specify what. Two reported measures included *Discharge of telenurse*.

In analyses of the actual communication between caller and telenurse, the results showed that telenurses mainly asked *Closed-ended medical questions* in 41 of 45 calls. They used *open-ended questions* in 30 of the 45 calls. Analysis of caller’s communication showed that *Concern* was commonly raised among callers (found in 36 of the 45 calls). Telenurses expressed *Reassurance* in 31 calls. The results also showed a significant relationship (rho=0.39 p=0.032) between Concern and Reassurance. In 15 of the calls, the caller made a *Request for service*, e.g. asked the telenurse for a referral to a doctor. Telenurses expressed *Empathy statements* in 15 calls. No statistically significant differences were found between genders when using the Mann-Whitney U Test. Telenurses checked for their own understanding regarding information from callers in 38 calls, and followed up on callers’ understanding in six calls. In six of the calls, callers *Reassured*, e.g. told the telenurse “This is probably nothing to worry about” or “I feel much better now, I’m probably just anxious”.
Discussion

The aim of this thesis was to investigate patient safety and communication within national telephone advice nursing in Sweden. Studies I, II and IV aimed at studying patient safety issues within SHD from different perspectives, and the results of these studies all showed how communication was of importance for providing safe telephone advice nursing. Telenurses using the CDSS, aiming at enhancing patient safety, described a duality in their perceptions of using the system. Descriptions of how the CDSS contributed to uniformity and increased their credibility were mixed with descriptions of how it could impair their communication with the caller, making them forget to ask questions and give advice not found within the CDSS. Communication analysis of actual calls in Study III and Study IV showed how they seldom asked open-ended questions, followed up on callers’ understanding or asked for callers’ opinion. Based on previous research, these communicative strategies could be regarded as a threat to patient safety. The communication analysis in Studies III and IV also showed that telenurses did not follow the structure of the communication process, in which they are trained in-house. The NBHW’s investigations regarding the causes of the malpractice claims in Study IV showed that communication failure was the most commonly described cause (n= 35) of the medical error. They also showed that patients were seriously affected by the medical error, often due to communication failure. Another problem regarding patient safety was found in Study II, where the most common outgoing incident reports (41%) described how telenurses had limited possibilities to refer callers to the appropriate level of care and how SHD received complaints from other HCP concerning referring callers to an incorrect level of care (36%). The following discussion section is structured based on the main areas of this thesis: patient safety and communication in telephone advice nursing.
Patient safety issues were examined in Studies I, II and IV. The results of Study I indicated that the safety level of the CDSS could lead to problems in cooperation with other HCPs, and the results of Study II showed that the most common incident report sent to SHD regarded telenurses making an Incorrect Assessment (58%). We do not know if this was a recommendation by the CDSS in use. Among these reports, 66 described how telenurses made an incorrect referral – level of care, 36 stated that a too-high level of care had been recommended, and 20 stated that a too-low level of care had been recommended. None of the 20 reports stating that a too-low level of care had been recommended were found in the data of Study IV. Are some of these incorrect assessments a result of the previously described deficits of the CDSS, e.g. unnecessary referrals and controlling and obstructing telenurses’ work?

The main reason for implementing CDSS in nursing care as well as telenursing is to enhance patient safety and uniformity. The CDSS used in SHD contains evidence-based information and recommends measures based on the caller’s symptoms. As previously described, the CDSS can be either active or passive (12), and in the context of SHD and NHS Direct the CDSSs are active systems because they suggest the appropriate measure based on the caller’s symptoms. One mentioned disadvantage of using CDSS in clinical decision-making is if the hypothesis (main symptom) is incorrect (27,28), i.e. if the telenurse chooses the incorrect main symptom in a CDSS, the system will recommend an incorrect measure (cf. (35)). If users in a decision situation enter the wrong main symptom (e.g., indigestion instead of cardiac problems) the CDSS might suggest appropriate questions regarding the main symptom “indigestion” and not encourage the user to search for alternative causes of the symptoms using open-ended questions.

In Study I, telenurses expressed that they did not always agree with the recommendations in the CDSS. In previous studies (8,23,25,26), telenurses have reported not using the CDSS as intended, privileging their own expertise and overriding the CDSS in order to be able to offer callers individualized care that is consistent with a holistic view of the caller (102). The effects on patient safety of these overrides could be positive (e.g., providing individualized care to callers), but could also be seen as a threat to patient safety. The NBHW’s investigations regarding the causes of the malpractice claims in Study IV highlighted that the CDSS had not been followed or used by the telenurses in 7 cases. The investigations also showed that deficiencies within the current CDSS contributed to causing five of the malpractice claims.

An active CDSS can be seen as an example of artificial intelligence. The introduction of these kinds of systems into healthcare as an aid in the decision process is not without problems. It raises several questions, for exam-
Does the CDSS influence telenurses’ feelings of responsibility for making their own judgments? And how does it influence the communication? According to Dreyfus and Dreyfus (103), there might be a risk that the use of these kinds of systems within healthcare professions will result in expert nurses regressing and becoming less competent in their profession. If this assumption is true, patient safety might be at stake.

Accessibility problems at the correct level of care as described in Study II and feelings of responsibility might make telenurses over-triage callers to a higher level of care in order to help them. Telenurses have previously described ethical dilemmas (24) in their work due to problems with limited resources in healthcare. From a patient safety perspective, over-triage (n=36) is not a problem for the individual caller because he/she will be “unnecessarily” taken care of by a physician. On the other hand, it will become a problem from an organizational and a societal perspective, and is hence not financially defensible. It is the other group of callers, referred to a too-low level of care (n=20), that is of more interest. The incident reports seldom stated the degree to which the caller/patient had been affected, but the descriptions in the incident reports portrayed several cases of personal injury (e.g., not being referred to an oral surgeon when permanent teeth had been traumatically removed). In Study II we found that other HCPs reported that telenurses had under-tribged callers’ need for care in 20 cases but that no malpractice claims had been filed despite callers’ facing a risk of being injured due to the under-triage. Despite the existence of a mandatory reporting system, HCPs have been found to be reluctant to report colleagues, and research indicates that the actual reports, adverse events and malpractice claims are just the tip of the iceberg as only the most severe cases are reported (55). These arguments are clearly supported by the results of Study IV and the fact that none of the incident reports in Study II reported medical errors within the organization. Despite the large number of calls made each year to SHD (5.5 million calls during 2011), we found only 33 registered malpractice claims regarding SHD at the NBHW. Research regarding patient safety in general states that about 1 of 8 patient encounters within healthcare results in patient injury, and based on these figures the rate of injury within telephone advice nursing would be of a great magnitude.

The reported malpractice claims in Study IV are very serious: in 13 cases the patient died, and in 12 cases the patient was admitted to an intensive care unit. Despite the severity of the cases and the fact that the NBHW’s investigations pointed out organizational deficits (n=24), e.g. blunt end (47) and latent failures (41,42) as conduciveness causes, organizations’ responses to the malpractice claims were often directed at an individual approach (41,42) like discussion in work group (13) and education of staff (10) at the sharp end (47) of care. In the literature on patient safety, these kinds of measures are considered “weak” as they focus on the individual rather than the system. Reason (42) describes that human error problems can be viewed in two dif-
ferent ways: the person approach and the system approach. In patient safety work, the person approach includes countermeasures directed at reducing unwanted variability in human behavior by simply using campaigns that appeal to people’s sense of fear: writing another procedure, using disciplinary measures and threats of litigation (41). In a system approach, countermeasures are based on the assumption that since we cannot change the human condition we should instead change the conditions humans work under (41). The response to an adverse event should not be to ask “who” blundered but instead “why” the defense failed.

Telenurses working at SHD are given a mission to triage callers’ need for care, but Studies II and IV show that they have limited possibilities to refer callers to the appropriate level of care. This situation could aggravate the cooperation between SHD and other HCPs. Could it be the case that SHD has been given the assignment to triage and refer callers to the correct level of care but has not been given the resources to execute this assignment? Coalitions are not an ingenious solution to all problems. In the implementation of a coalition, different frustrations may arise. These frustrations can be based on promised resources, e.g. primary HCPs’ capacity to accept appointments not being made available (104).

This limited possibility to perform their work might put strain on telenurses and contribute to both feelings of not being able to perform their work task as expected as well as vulnerability and stress in their work. The limitations can also encourage telenurses to act like gate-keepers for the limited resources in healthcare, e.g. under-triage callers and give self-care advice, or advise callers to wait a period of time due to lack of healthcare resources. This argument is supported by the results of Study IV, where the NBHW’s investigations identified lack of healthcare resources and high workload as the causes of some of the malpractice claims (n=7). These job situations can lead to employees’ experience of low well-being, and clinicians’ exposure to job stress has a negative impact on quality of care (105).

In Study I, telenurses described that they referred to the content of the CDSS when addressing reluctant callers. This communicative behavior was also found in analyses of actual calls in Studies III and IV. This use of the CDSS offers a possible explanation for the threats to patient safety, such as both the lack of follow-up on callers’ understanding and the telenurses’ own opinions as well as the frequent use of closed-ended questions. There are no studies that investigate telenurses’ work environment or structural empowerment, thus further studies in this area are clearly needed.

Communication in telephone advice nursing

In Study IV the most common reason for the malpractice claims, as described by NBHW, was communication failure (n=35). The importance of
communication in telephone nursing is not doubted – the only way telenurses can gain information regarding the caller is through communication, verbal as well as non-verbal. They need to ask the appropriate questions as well as listen to what has and has not been said and background sounds like breathing patterns. Nine out of 35 calls regarding adults in Study IV had been made by a relative or a friend; this result could have clinical importance, as it is a reminder that third party communication might be a risk and that telenurses should try to talk to the patient him/herself. When taking through a third part, telenurse do not have the possibility to evaluate or estimate the non-verbal communication and information. The results of Study I revealed that the CDSS sometimes hindered communication and drew the telenurse’s attention away from the caller. The telenurses described that there was a risk that they did not fully listen to the caller, since they were working with the CDSS. It is well known that external factors such as age, time pressure and organizational factors can contribute to users’ perceptions of systems’ usefulness and useworthiness. Useworthiness is defined as the individual user’s experience of how the current system meets their individual needs (106). In Study I, the telenurses described using the system as a checklist to avoid missing asking appropriate questions. This result is contradictory to Benner (32), who states that the need for such checklists was common among novice nurses while experienced nurses based their clinical decisions on intuition and clinical competence.

Since telenurses tend to rely on their practical rationality (107), situations of tension between telenurse and technology might arise. According to Barnard (108), there is a risk that the technology will affect nurses’ ability to provide individual measures for patients/callers. This result is supported by results presented in Study I. Telenurses also described how a CDSS cannot serve as a substitute for personal knowledge and competence. Technology can be perceived as a barrier between nurses and patients, complicating the communication and leading to decreased patient safety, demanding the telenurses’ attention (109,110).

Telenurses face many communicative challenges. Previous studies have shown that they not only experience difficulties trying to make callers realize they do not need medical attention (84), but are also faced with callers who do not understand why they need medical attention (24). The telenurses participating in Study I described that in these kinds of situations they usually referred to the content of the CDSS to make the caller listen to them and accept their advice. There is a duality in how the CDSS might affect their communication: on the one hand it enhances it, but on the other they perceive that it controls and obstructs it.

Another communicative challenge mentioned is when the caller has a preconception regarding the outcome/measure. This kind of caller has been described as demanding (24,83,84), putting extra strain on telenurses’ com-
municative skills. In two of the studies (III and IV) included in this thesis, the actual communication between telenurses and callers has been studied.

The participant callers in Study III are a special group, as they received a recommendation for a lower level of care by telenurses than they had expected. Hence, they are not average callers who openly address telenurses for advice regarding their healthcare problems; before making the call they have identified a need for care. It is important to note that we do not know whether the caller received correct advice from the telenurse, i.e. that their expectation regarding preferred level of care was inadequate. In Study IV, all of the calls included had been subject to a malpractice claim; hence they are not normal calls but rather call in which something has gone wrong.

In both Studies III and IV, telenurses were more prone to use closed-ended questions. The telenurses only followed up on callers’ opinions regarding the suggested outcome in 5 of 25 calls in Study III, and in 21 of 45 calls in Study IV. Callers’ understanding regarding advice given was often not checked by the telenurses; in only 7 of 25 calls in Study III and 6 of 45 calls in Study IV was callers’ understanding checked. This communicative style could entail poor patient concordance and also influence patient safety negatively. Studies have shown that high quality communication, e.g. the use of open-ended questions and following up on callers’ understanding, enhances patient safety (75,76), and Price et al. (51) state that effective communication is probably the most powerful risk management tool in out-of-hours care. Travelbee (78) states that nurses should focus on how the symptoms affect the patient rather than on the presence or absence of symptoms. As every patient experiences symptoms in his/her own unique way the how aspect is important, and the use of open-ended questions facilitates a more comprehensive understanding of the caller. The CDSS currently in use is designed as a symptom-based checklist (focusing on symptoms), an adaption to encourage telenurses to use open-ended questions; identifying the reason for calling would improve both communication and patient safety. Another way telenurses could gain more information from callers is through trying to activate the caller; this had a positive correlation with callers’ providing telenurses with medical information in Study III. These kind of communication strategies are common in patient-centered communication and the results of Study III are in line with those from other contexts (65,72,75,76).

There was also a statistically significant positive relationship between callers’ expressions of concern and telenurses’ expressions of disapproval in Study III and use of reassurance in Study IV. This could be regarded as a hindrance/threat to providing safe care via the telephone, since the more correct response (78) to issues of concern would be to use open-ended questions in order to explore why the caller is concerned.

Heavy workload, limited resources in healthcare and stress can be other possible explanations for the communicative behavior of not using open-ended questions. When one simply addresses the main symptom presented
by the caller and does not investigate it more thoroughly the calls will be shorter, as will the waiting time. In Study I, telenurses described that the CDSS facilitated them and allowed them to handle more calls. Telenurses have previously reported (84) that long waiting times make callers more aggressive; thus, keeping calls short could be a strategy for maintaining an acceptable work environment and avoiding unnecessary aggression toward the telenurse.

Telenurses’ rare use of open-ended questions and their efforts to estimate callers’ need for care using closed-ended questions could possibly entail the risk that they do not identify the cause of the caller’s symptoms, a clear threat to providing safe advice. By simply investigating the symptom presented by the caller, the telenurses may risk missing serious underlying causes, e.g. simply trying to provide an explanation rather than to understanding the problem. A possible explanation for the rare use of open-ended questions is found in psychological research (27), which states that humans are quite poor decision-makers. Telenurses base their decisions on information received through communication alone. In our nature as humans, Brännmark and Sahlin (27) describe, we tend to seek for likely explanations, seeing what is presented to us and not searching for alternative causes. In decision situations, we humans tend to seek evidence that is narrow, skewed and visible, and once we have formed a hypothesis we tend to hold on tight to it, searching for evidence that supports our existing beliefs rather than trying to shift our incorrect convictions (27). Hence we prefer confirmation before falsification. In decision-making we tend to collect information that supports our hypothesis (tentative idea) rather than trying to collect information that could make us reconsider our first hypothesis/idea (27).

As mentioned, the structure of the CDSS is active and based on clearly defined main symptoms of illness, leading to recommended advice based on the caller’s symptom. One of its weaknesses is that it does not take into account aggravating factors in its recommended assessment. This structure might stimulate rather than avoid the problem of the cyclopic perspective (27) and hence threaten patient safety in decision-making, since the CDSS focuses on main symptoms presented by the caller and does not encourage the user to search for alternative explanations. This argument is supported by the results of Study I, in which telenurses described that they perceived that the use of a CDSS could lead to their not using their own knowledge and competence and cause them to only focus on the content of the CDSS, hence decreasing patient safety.

Communication analysis also showed that the callers in the studies made Requests for service (12/25 in Study III and 15/45 in Study IV). If the caller expresses that he/she is in need of medical attendance, it must be considered important for telenurses to further explore why the caller has this perception. One explanation for not further exploring callers’ reasons for this request can be found in a study by Leppänen (80), who showed that when callers express
requests for medical attention and/or give their own diagnosis, telenurses tend to question them and thereby take on the role of gate-keeper rather than caregiver. Another sign of possible risk to patient safety in communication between telenurses and callers is the positive correlation between telenurses’ and callers’ expressions of Criticism. It is important for telenurses to maintain a professional role (78) and not becoming defensive, despite being subject to criticism. Hence, the CDSS might promote telenurses’ use of power and assumption of the role of gate-keepers if they, as described in Study I, refer to the content of the CDSS as, e.g., enhancing their credibility when encountering difficult and demanding callers. Another answer to this can perhaps be found in the telenurses’ perception of their work, as argued by Travelbee (78). If the telenurse regards his/her job as that of a gate-keeper (83) to the limited resources of the healthcare system, there is an inherent risk that patients will not be given the opportunity to express their point of view. Could it be that when callers make demands for something this triggers gate-keeping behavior in telenurses, perhaps compromising patient safety?
Methodological considerations

Study I
Several measures were taken to enhance the trustworthiness of Study I. According to Graneheim and Lundman (93), the concept of trustworthiness involves credibility, dependability and transferability. Credibility was achieved through collecting data in different locations and using quotations within the results. According to Patton (111), credibility can be enhanced by including participants with varying experiences of the topic, as was done in the study. By seeking agreement among fellow researchers, i.e. researcher triangulation, dependability as well as credibility can be strengthened (93). During analysis the last author read four of the interviews, and during the whole data analysis process a discussion was held between the first and the last authors until agreement was reached. The first and second authors have previously worked as telenurses and their pre-understanding, along with the results of the entire study, was discussed at research seminars. The concept of transferability, i.e. the extent to which the results can be transferred to other settings, is best judged by the reader. To facilitate this, a clear description of the sample and setting has been presented.

The methodological weakness of this interview study was the small sample as well as the fact that interviews provide consciously generated data; hence, there is a risk that respondents’ descriptions are “politically correct” according to beliefs within their work group. The findings in the study are presented in terms of both latent and manifest content. This is explained by the differences in depth of the data: when telenurses described how the CDSS affected them as individuals more comprehensive descriptions were presented during the interview, compared to descriptions of how the CDSS affected the organization. Graneheim and Lundman (93) state that interpretive approaches of qualitative content analysis imply working at different levels of abstraction, and that difficulty may arise in creating sustainable and consistent categories and themes.

Study II
The strength of Study II is the quite large sample (n=426 incident reports); we collected all incident reports from five of six sites. Since the sixth site had a higher number of reported incidents we decided to include 20% of
their reports; otherwise, these reports would have had too much an impact on the results. To ensure consistency in categorization, the categorized incident reports were read independently by one of the co-supervisors (M E). The categorization was then discussed, and if opinions varied they were discussed until consensus was reached. One weakness of the study is that since the incident reports were anonymized we could not follow up on the measures taken by the HCPs or the extent to which the caller had been injured. Retrospectively analyzing incident reports is no more than a window to the system (112); it is not a search for the cause. However, it provides a description of the medical errors that exist within the organization.

Studies III and IV

The methodological strength of both Studies III and IV is the use of actual calls to SHD. Analyzing naturally generated data, e.g. the actual call, can be a way to reach beyond the subjective descriptions found in interviews. The sample in Study III was derived from a larger randomized sample, and the calls included in the study fulfilled the criterion of callers being recommended a lower level of care than expected. The calls in Studies III and IV were analyzed using the RIAS. In Study III, the first author and main supervisor listened to all the calls and jointly analyzed five of them to ensure consistency during the coding process. The reason for this qualitative approach to the material is the small sample. In Study IV, 18 of the 45 calls were analyzed by both the author of this thesis and the main supervisor. Inter-rater reliability analysis using intra-class correlation (ICC) revealed an average of 0.81 (range 0.76 to 0.91) within the categories used, except in the Reassures category, where the ICC was 0.45. Previous studies have reported an average inter-rater reliability of the RIAS to be 0.85 (Pearson’s correlation) for both patient and physician categories (90). Based on category coding, mean reliability coefficients of 0.80 (range 0.42-0.96) for physician communication and 0.87 (range 0.60-0.94) for patient communication have been reported (74).

Sandvik et al. (2002) have raised some criticism against the RIAS, stating that it lacks strict definitions within the coding categories. They also mention the problem of several coding categories sometimes being contradictory for coding. Epstein (113) argues that developers of measurement instruments provide limited or no theoretical justification for operationalization, and that few instruments measure the contribution of relations. For example, the value of shared information may depend on the context: critically ill patients may tend to respond more positively to directive communication styles than “normally” ill patients. Despite this criticism, however, the RIAS has been extensively used for analyzing provider-patient communication in more than 90 peer-reviewed studies (90).
Another problem with the RIAS instrument is the fact that the interactions between the parties are not analyzed. Further studies regarding the interaction between telenurses and callers are needed.

A methodological weakness of Study III is the small sample; however, this special group of callers is interesting to study for several reasons. Telenurses have previously described problems encountering this kind of caller (24,83,84); they are regarded as a communicative challenge. By studying the actual communication within this special group, the problem can be viewed from a different perspective. The fact that the caller have receive a recommendation for a lower level of care than expected is also interesting from a patient safety point of view; we cannot take for granted that callers are incorrect in this expectation. Instead, they might have been incorrectly triaged to a lower level of care by the telenurses. Another interesting aspect of this special group is the fact that this group of demanding callers is growing (114); thus, information about communication with this special group is important to study and learn from. To the best of our knowledge, the present study is the first to analyze communication in actual calls to a nurse-led telephone triage service.

A methodological strength of Study IV is its use of a total sample; all malpractice claims registered are included. This is the first time malpractice claims have been subjected to this kind of analysis. The fact that the data consist of actual malpractice claims regarding calls to SHD provides a unique opportunity to study the communication in detail. By studying this naturally generated data (95), communication analysis allows us to learn from these unwanted events, and possible biases such as recall bias can be avoided. In the study, six of the calls were analyzed for literal print and this may have influenced the interpretation of the calls. Since the sample – albeit a total sample – was small, we regarded these call transcripts as too important to be excluded from the study. Unfortunately, three calls were impossible to retrieve due to technical problems, but all other data regarding the cases were included in the analysis.
Conclusions

- The CDSS is perceived as both supporting, inhibiting and quality-improving telenurses’ work; hence there is a duality in perceptions.
- Telenurses have limited possibilities to refer callers to the appropriate level of care, which might make them over or under-triage callers’ need of care. This over/under-triage may in turn make other HCPs to report incorrect assessment to SHD. More resources on the level of primary healthcare are needed to give telenurses possibilities to refer callers to the appropriate level of care. Limited healthcare resources might cause telenurse to not refer callers to the appropriate level of care, compromising patient safety.
- The analysis of actual calls showed that telenurses do not follow the structure of the “dialogue process” as they are educated in-house to do. Analysis showed that callers’ understanding of the advice given was seldom followed up by telenurses, which might be seen as a threat to patient safety.
- Communicative deficiencies led to severe medical errors; thus, further education in communication for telenurses should be regarded as important. Many of the calls figuring in malpractice claims were made on behalf of someone other than the patient; thus, third-party communication could be regarded as a threat to patient safety.
- The calls to SHD were quite short and, strikingly, on some occasions the telenurses counseled the callers and gave them advice without posing a single open-ended medical question. Companies that develop decision support systems could consider adapting them to encourage telenurses to explore callers’ reasons for calling and to verify callers’ understanding of advice given before ending the call.
Clinical implications

It is of clinical importance that telenurses do not rely too heavily on the structure of the CDSS, and that they allow callers to freely describe their reasons for calling and not only ask the preset questions found in the CDSS. It is also important that telenurses explore how the current problems affect the individual caller. Using open-ended questions to explore callers’ reasons for calling and following up on callers’ understanding of advice given might facilitate patient safety and reduce medical error in telephone advice nursing. Although they work within a call center context, it is important that telenurses prioritize their own nursing competence, providing individualized care to each caller. A possible way to facilitate patient safety in telephone advice nursing would be for the current CDSS to be adjusted to encourage telenurses to explore callers’ reasons for calling and follow up on callers’ understanding.

Since communication has been shown to have an impact on patient safety in telephone advice nursing, education in communication and following up on their own calls might improve telenurses’ communicative skills and, hence, improve patient safety. Telenurses have a quite isolated work environment, seldom having the opportunity to follow up on their assessments. Listening to their own calls and discussing them with other telenurses during supervision/coaching sessions might improve their communicative skills and, hence, improve patient safety.

Many of the calls involved in malpractice claims had been made by someone other than the patient. Thus, third-party communication should be regarded as a potential threat to patient safety and be avoided. Another finding of clinical relevance is that 14 out of 33 cases described in the malpractice claims had made more than one call to SHD. It should be considered important that telenurses explore callers’ reasons for renewed contact and do not inherit their colleagues’ assessments, as pointed out by the NBHW.

Despite the severity of the calls involved in malpractice claims, organizations mainly addressed active, obvious failures. The NBHW’s investigations showed that communication failure was the most commonly identified cause of medical error, but did not answer the question of why the telenurses’ communication failed or why they asked too few questions. This is an area that needs further exploration.

Telenurses working within SHD are given a mission to assess and refer callers to the appropriate level of care but, as shown in Study II, are not al-
ways given the resources to fulfil this mission. Poor accessibility is a threat to patient safety and needs to be addressed. The reasons for incorrect assessments need to be explored further.
Sammanfattning (Summary in Swedish)

vanligaste åtgärden var diskussion i arbetsgrupp samt utbildning av personal. Kommunikationsanalys visade att det fanns ett statistisk signifikant samband mellan uppringarens uttryck av oro och telefonjuksköterskans uttryck av förtröstan. Resultatet för delstudien visade även liknande kommunikationsmönster som beskrivits i delstudie 3. Telefonjuksköterskors kommunikativa strategier är inte samstämmiga med Samtalsprocessen som de utbildas i inom 1177 och detta kan ses som ett potentiellt hot mot patientsäkerheten.

Acknowledgements

This work was carried out at the Department of Public Health and Caring Sciences at Uppsala University, and was financed by the Swedish Research Council; AFA; the Faculty of Medicine at Uppsala University; and the University of Gävle.

Writing a thesis is not a one man’s (or woman’s) work but rather constitutes a journey of several years with the help of many people. I am deeply grateful to everyone who has helped me during these years. I particularly want to express my gratitude to the following people:

To all participants and managers in charge who participated and contributed material to the study: thank you for your support and co-operation.

Professor Inger Holmström, my main supervisor, for giving me the opportunity to make this academic journey, and for believing in me and guiding me through these years. Your outstanding scientific knowledge and constructive criticism have kept me on track and moved my thinking forward. Your supervision has not only encouraged my independence but also taught me a lot, about scientific research as well as about myself, and I am truly grateful for this.

Associate Professor Ulrika Winblad, my co-supervisor, for your excellent scientific guidance and for always being full of energy and creative ideas. Thank you for all our discussions and for contributing by casting new eyes on the material, seeing things in other ways and encouraging me to do so as well.

Associate Professor Maria Engström, my co-supervisor, always thoughtful and thorough. You have an unbeatable eye for clear structures as well as details. I have learned so much from you, and would like to express my deepest thanks to you for all your questions and for helping me see things in other ways. Your approach to supervision has improved my self-esteem and encouraged my independence.

To all former and present members of the Health Services Research Group (Mio Fredriksson, Roya Hakimnia, Elenor Kaminsky, Ragnar Stolt, David
Isaksson, Marta Roing, Jan Larsson, Finn Hjemblink, Urban Rosenqvist, Caroline Andersson, Linda Moberg, Madeleine Boll and Margareta Sanner). Thank you for contributing to my work and for creating a friendly and creative research atmosphere. Not to be forgotten is Helène Eriksson, for keeping everything together.

To “Maria’s” doctoral group at the University of Gävle (Annakarin Olsson, Heidi Hagerman, Ann-Sofi Östlund, Kerstin Stake-Nilsson and Eva Dahlqvist): thank you for the creative discussions, ideas and friendship.

Annakarin Olsson, fellow PhD student and workmate, thank you for always being there for me, supporting and encouraging me when I needed it. You are a true friend.

Thanks to all my colleagues at the Faculty of Health and Occupational Studies at the University of Gävle, senior researchers and fellow doctoral students, for all your support during these years.

To Karen Williams and Judith Rinker Öhman, for excellent proof-reading of my articles and thesis.

To my parents, my father Tommy, mother Gunbritt and stepfather Christer, thank you for your encouragement and support, for always believing in me.

To my wonderful family, Mikael, Robin and Maja, thanks for always being there and reminding me of the world outside research. I love you so much.
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