DEVELOPING A HOLISTIC COMPETENCY MODEL FOR TELENURSING PRACTICE: PERSPECTIVES FROM TELENURSES AND MANAGERS OF TELEMEDICINE SERVICE CENTRES

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Abstract

Telenurse's work performance determines the quality and the efficiency of the service and strongly influences the acceptance of patients and healthcare professionals. Considering this important role, qualification and training of telenurses is of utmost importance for the success of telemedicine providers and the future of telemedicine. However, in Germany the profession "telenurse" is not yet established, nor is there a standardised education programme for telenurses. Purpose: In our study, we seek to identify and describe needed competencies from the perspectives of employees and employers in telemedicine service centres. We develop a systematic competencies concept fundamental for a specific telenurse education curriculum. Methods: We designed an exploratory study as a series of semi-standardised interviews with telenurses and the management of telemedicine service centres, focusing on knowledge, skills and attitudes needed in telenursing practice. Results: By including the perspectives of employers and employees, we provide a broad view on the skills and competencies needed. We show that telenursing requires a great variety of competencies that can be structured into four categories: professional, methodological, personal and social competencies. Conclusion: Our study provides a comprehensive approach to key competencies of telenurses. The results set out a framework for the development of skills and competencies considering the perception of the telenurse-workplace not only from employers but also from employee's perspective.

Keywords: Telenursing; competencies; curriculum; management perspective

Introduction

New telemedicine applications are increasingly being developed and telemedicine is becoming a part of healthcare in most countries. However, many barriers remain to making it an integral part of healthcare delivery.[1] Among the barriers is the lack of standardised training programs for telenurses which hampers adoption and broader diffusion of telemedicine applications.

According to the International Council of Nurses (ICN),[2] telenursing is "the use of telecommunications technology in nursing to enhance patient care. It involves the use of electromagnetic channels (e.g. wire, radio and optical) to transmit voice, data and video communications signals."[2]

Because of the growing number of telemedicine service centres around the globe (Sweden, UK, Finland, Canada, Brazil, Japan) and their intensified service activities, telenursing is gaining relevance and is involving multiple tasks and aims. Now, telenurses not only advise patients, they know from the practitioner's office, but also patients unknown to them. Often, those telenurses are the primary contact person for patients or family members. Therefore, they bear a special responsibility and have a great impact on the quality and efficiency of the telemedicine services.[3-5] Moreover, telenurses' work affects the satisfaction of the clients with telemedicine services.[6-9] Hence, the success of telemedicine strongly depends on the competence of the telemedicine staff.[10,11]

Competency is defined as: "a measurable human capability that is required for effective performance. A competency may be comprised of knowledge, a single skill or ability, a personal characteristic, or a cluster of two or more of these attributes."[12]

Some skills used in face-to-face consultations cannot be directly transferred into telenursing settings, requiring specific training for telenursing.[13] The need for standardised education and for integration of telemedicine in the nursing curriculum has been discussed.[14-17] While in some countries competency requirements for telenurses exist, in other countries like Germany the profession of telenurse is not yet well established and standardised training curricula for telenurses do not exist.[18] Closest to a curriculum for telenurses in Germany is continuing professional education on GP practice communication and Telematik, which does not address specific skills and competencies for telenursing in a telemedicine service centre.[19] This study aims to narrow the current knowledge gap on the necessary knowledge, skills and attitudes needed in telenursing practice. It explores the perspective of telenurses and their employers in Germany and Switzerland and identifies core topics for a future curriculum for telenurses working in a telemedicine service centre.

Telenurses in Germany and Switzerland work in a call centre like setting. Calls can be distinguished between inbound patient calls and outbound patient calls. Some institutions differentiate between tasks of call centre agents and telenurses. In this case the call centre agent is the first contact for the patient. The call centre agent checks the client (patient) ID, and assesses the urgency. Afterwards a telenurse deals with the concerns of the patient, or, in case of emergency, the call is immediately directed to a doctor or an emergency organisation. In other organisations, telenurses take responsibility for coordination and consultation of both tasks.[20]

Inbound calls typically occur, when patients have questions concerning their medication, suffer from medical conditions or need medical advice. These patients do not necessarily have frequent contact with telenurses. Telenurses listen attentively and actively to the patient's description of his/her health problem. Following specific question algorithms, the telenurse narrows down the problem and identifies possible solutions. The process of telephone triage for inbound calls follows six steps.[21, 22]

Outbound calls constitute a typical element of telemonitoring programmes for chronic patients (e.g., heart insufficiency patients). Telemonitoring comprises the analysis of incoming patient data, for example weight and blood pressure combined with information the patient provides about their condition. Chronic patients are in regular contact with telenurses.

After analysing recent patient data, telenurses call them and ask them about changes in their condition. Typically, telenurses document their calls in an electronic patient file while talking to the patient. Time per patient is often pre-defined in a tight schedule. Based on the given information the telenurse determines the next steps. Options include advising on self-care, re-assuring or motivating the patient, educating them about their disease, symptoms, medication, and adjusting lifestyle or referring the call to a doctor (for example for adjustments in medication). If paramedics or an emergency physician are called, the telenurse stays on the line with the patient or their relatives.

Methods

The following questions guided our research: What knowledge, skills, and attitudes are needed for telemedicine practice from the perspective of the employer? How do telenurses describe their work and what qualifications do they presume necessary? The study draws on exploratory inductive methodological approaches and analysis techniques to examine perceptions and expectations of those major stakeholders.

Telemedicine service centres in Germany and Switzerland, which provide telenursing services were explored. Following the definition of telenursing, centres providing solely teleconsultations between physicians (doctor-to-doctor or second opinion services), and centres offering administrative health consultations (for example management of doctors' appointments) were not included. It was assumed that understanding what is needed in the telenurse profession can be best made by nurses working with their patients from a distance only. Consequently, telemedicine services provided by a physician or clinic and limited to patients already personally known to the staff were excluded.

Within Germany 12 providers of telemedicine services were identified and asked to participate in the study. Of those, eleven centres agreed to participate in interviews at management level. Telenurses of three centres agreed to participate in our interviews. In Switzerland one out of three identified centres agreed to interviews at management as well as at employee level. A total of 12 institutions gave their consent to participate and were included in the sample. Fifteen executives or managing directors and nine employees were asked in semi-structured interviews about their

perspective on competencies needed in the telenursing setting. (Appendix A) The development of interview questions was guided by existing research on tele-phone nursing experience and work processes.[21,23-25]

To ensure the quality of the interviews, pilot interviews were conducted to make the interviewers comfortable and to test the interview guidelines. The questions were broad and open-ended. Formal and informal prompts were used during the interviews.[26]

Interview participants were managers (employers) and telenurses (employees) of telemedicine service centres. They were recruited as research participants by virtue of their professional role. Interviewees were asked for their perspective on knowledge, skills and attitudes needed in tele-nursing practice. In our research no health related data were collected, participation was voluntary. Interviewees received written and oral information about the study purpose and its design, as well as about voluntariness and confidentiality. No information reported in this paper can be linked to any interviewee. All employee interview partners that were included were female; their association with telemedicine practice varied from 10 months (1 interviewee) to 11 (2 interviewees) years, with most of the interviewees having more than 4 years of practical experience in telemedicine. The background of each employee ranged from doctors' receptionist to qualified intensive care nurse. Two of the 15 employer interviewees were female. Managers, experience in telemedicine ranged from 1 to 11 years.

The interview setting was always the workplace of the interviewee, e.g., the meeting room. For phone based interviews, all interviewees stated that they were in a private surrounding at their workplace, where they felt comfortable talking about their perspectives on telenursing and where no disturbance was expected during the interview. The interviews lasted between 30 and 45 minutes and were tape-recorded with prior consent of the interviewees. Interviewees were encouraged to speak freely about their own experiences. They were repeatedly asked to give examples in order to avoid general descriptions of ideal situations but rather depict reality. Interviewers used verbal and non-verbal probes to encourage participants to provide information that is more detailed.

Interviews were transcribed verbatim with prior consent of the interviewees.

We analysed our data to support two aims: First, to describe the work processes in a telemedicine service centre, the existing job training and the skill adaptation

possibilities and, second, to identify and analyse the range of skills needed in telemedicine consultations. The data of the Swiss company was initially analysed separately but no remarkable differences were found between the Swiss and German data. Thereafter the Swiss data set was no longer treated separately. All interview data were analysed thematically using content analysis.[27] The research team read and re-read transcripts in order to become familiar with what the data entailed. After creating and refining codes, themes were identified in an iterative process and reviewed on the material in order to conceptualise the set of required competencies and to derive the curriculum framework. Three researchers were involved in the analysis process and came to a consensus leading to the themes and categories.

Quotations are used to illustrate ideas and to support the researchers' claims. Credibility in research is increased by including participants with different experiences and from various backgrounds.[26,27] In this study, credibility was strengthened by including telenurses and managers, women and men with differing length of experience in telemedicine. Gender differences were not analysed; as all telenurses were women, this might reduce credibility.

Dependability was protected in part by having a semi-structured interview guide, but shifts in perspective during the interview period may have influenced the degree to which certain topics were pursued through follow-up questions. Dependability in the analysis process was increased through the final discussions among the researchers.

Transferability of the findings depends on similarity of telemedicine service centres to German and Swiss telemedicine service centres.

Research team members had experience in qualitative research, telenursing settings and processes, and the telemedicine market in Germany. This was advantageous and helped authenticate statements and themes. Member checking minimises the possibility of this familiarity leading to overlooking details or nuances.[26] Participants were invited to comment on their interview transcript and on derived themes to increase trustworthiness of the results. Two participants agreed and confirmed that created themes, categories and competencies adequately reflected their perspectives on telenursing.

Results

The following descriptions characterise the specific

perspectives of employers and employees in telemedicine service centres on telenursing activities.

Employers' expectation

Respondents identified certain expertise that forms the basis for high-quality telenursing. This expertise includes broad clinical knowledge and experience, as well as specialised expertise and in-depth knowledge dependent on the specific setting and indication.

> "The most important is to know the diseases, mainly CHF. The rest is learning by doing. I expect the telemedicine nurse to have an idea about the disease and to know how to deal with the patient." (TM4)

> "The complete medication, the way each drug works…this is what you must definitely know. You must understand why a hypertension gets an ace-inhibitor and not a beta-blocker or another drug." (TM11)

Knowledge about legal and ethical issues (including privacy and data management) provides the legal framework and security for the employer and the employee. Knowledge of the healthcare market helps to identify partners and to initiate adequate actions. Experience in psychological motivational techniques supports the development of social and personal competencies, which are essential in patient communication.

The special circumstances in telenursing i.e. communication via telephone, makes it more difficult to build a mutual trust with the patient and requires a high degree of social and personal competencies.

> "It is very important for nurses to "see" when the patient is not doing well. Patients can hide it quite well and the nurses need to develop a good feeling for this, they must realise if an intervention is needed. It is essential to understand the signals sent by the patient and to ask the right questions." (TM15)

> "It's something completely different to talk to the patient on the phone than to interact with him face-to-face" (TM10).

Telenurses should be able to motivate their patients. In addition, they must be assertive. Respondents emphasised the importance of stress resistance and mental resilience. Identified social competencies included skills to deal with challenging clients, such as those who are suicidal or abusive.

> "They must hold their nerve, also in case of emergency. It's definitely stress resistance that you need." (TM1)

> "Sometimes it's pretty hard, you must be stress resistant. You get 100-160 calls per day…" (TM11)

More specific attitudes and skills were noted: Being able to empower yourself and others, teaching skills, excellent communication skills, empathy, and being comfortable with the use of technology and the skills associated with computer applications and databases.

> "A certain amount of technical understanding is just part of the job. This means for example that you must handle the computer - that you must be able to deal with technical problems also intuitively. And if this happens during a phone call with a patient it's important to stay calm so that the patient does not notice anything." (TM11)

> "They should be computer savvy. Somebody who has never before used a pc, who doesn't know how to deal with Internet or Outlook, he won't get on with this job." (TM8)

Since most aspects of telenursing are team based, it requires working collaboratively with physicians. Telenursing requires critical thinking as well. Besides diagnostic skills and analytical skills, a capacity for abstraction is important to ask precise questions, interpret given information and deduce adequate decisions.

> "You also have to react on the data that you get and that includes talking with the patient. And the better you understand the patient and his feelings and reactions to the illness, the better you can be responsive to him, helping him to manage his illness." (TM4)

Employees' perceptions

When a patient calls (inbound call), the telenurses' task is to actively listen and to ask the "right" questions in order to determine the patients' needs. All telemedicine centres have a certain implemented algorithm to help telenurses determine urgent cases. Once the telenurse has a clear picture of the patients' situation, he/she would inform, reassure or advise the patient or, if needed, transfer the call to a doctor.

> "I know of course what to ask to find out, how the child is" (TN7)

> "By providing specific questions, one can assess (the patient's situation) very good. I always ask the patients and tell them: I want to have a holistic picture. (…) It depends on how a question is asked, whom do I ask (…)" (TN5)

Like their employers telenurses state that a medical foundation is presumed necessary for the tasks.

(For outbound calls) "One reads the patient file, prepares it, before one starts the phone call, in order to have a good base with the patient. One has to check diagnosis, medication, (...) was there any threshold crossing?" (TN9)

"(Upset mother calling) 'my baby has swallowed a token'. One still has to ask for name, family name and insurance - but before that, one has to ask: 'Does it have difficulties in breathing right now?' One needs to know that immediately." (TN6)

The assessment of emergencies, the structured questioning of symptoms, advising and the pre-interpretation of vital data require a medical qualification. However, in the case of first contact with call centre agents, special medical training to detect emergencies is considered sufficient and a certified training qualification is not always needed. Employees thought that practical experience in a hospital makes the tasks much easier since one has a clear picture in mind of what a person with a particular problem looks like. The questioning of symptoms and their well-being are thus more focused. Some employees stated, that in their recruitment interview, they felt, their experience in a hospital/physician's office was a necessary prerequisite to be considered for the position as telenurse.

Employees also put a strong focus on the necessity of communication skills. As they communicate all day on the phone with very different types of patients/clients, they need to know how to address problems and challenges.

"My ear and my voice are my main tools every day." (...) "There are younger clients, who are still working and have an extremely full schedule – there we are dealing with facts, they want help, immediately and not a big talk about it." (TN1)

"Well on the phone it is always favourable, if someone is communicative. There are those (patients), who only answer yes and no, this is not pleasant, because we actually ask questions…" (TN10)

All interviewees stated that the prerequisite for providing telemedicine services is to build basic confidence with patients and to empathise. To be empathetic was the most mentioned skill that employees named for telenursing. Moreover, to motivate and to talk were additional important skills.

Telenurses are very aware of their limited time to communicate with patients about topics other than medical issues. Nevertheless, they thought social interactions are very helpful in building a personal relationship with their patients and took the time for it. With older patients, talking about family is a bigger part of the conversation.

"The patient knows, 'well, I won't meet (name of the telenurse)' and often patients tell me more than their family. I'm then kind of confidant.... "(TN1)

"To (those) Patients, (who were called more frequently due to the specific programme design) we had a very personal relationship, almost as family." (TN9)

Asked about challenges, the telenurses described communication with emotionally stressed patients or patients with mental disorders as their most difficult task. Furthermore, counselling and guiding patients was described as a difficult task, if the patients are not aware of or not willing to accept the medical competence of the telenurse. Telenurses perceive trust conflicts, as some patients do not believe in the telenurse's advice, and keep asking for a call with the doctor. This puts telenurses in a difficult situation, since telenurses are instructed to handle as many patients as possible within their medical competence, and to transfer as few calls as possible to a doctor.

"How can I persuade somebody, who is upset, to listen? There is definitely so much about communication, that I find interesting." (TN1)

"The doctor is deemed sacred. They (the patients) see me as 'Miss at the desk' and not as qualified healthcare worker." (TN5)

"I have too much knowledge and energy to simply ask (...) I want to advise. I want to share my expertise (...)." (TN5)

Asked about an area, where they felt more training was needed, telenurses described communication as well as multi-tasking as challenging:

"The biggest challenge (...) is to coordinate listening, thinking (...), working with the data base,

writing, using all tools and information (...)."(TN7)

Three key points emerged in the interviews with managers and telenurses: First, to qualify as a telenurse, candidates should have at least an associate's degree in nursing, three to five years of recent nursing experience, and a strong set of clinical documentation

and assessment skills. Recent graduates do not qualify.

Second, telenurses must have strong communication skills as well as skills related to creating effective relationships in a virtual environment. Respondents also identified their need for strong empathy and sensitivity as well as listening skills. This seems crucial due to the advanced age of many patients and their social isolation. Telenurses must have a positive, respectful, caring, compassionate and understanding attitude. The majority of the study respondents emphasised the need for nurses to have strong decision-making and critical-thinking skills in order to be able to understand patient´s needs even if it is unexpressed.

Third, a role conflict seems to be challenging for telenurses: Working as a telenurse after years of hospital work, telenurses have a lot of experience and can handle certain situations. In addition, the telenurse has a gatekeeper role to the doctors working in a telemedicine service centre. Still patients keep asking for a doctor's advice, which creates a dilemma for the telenurses.

Results of the study show that the executives' perceptions and expectations almost fully match the skills and competencies that employees considered to be essential. Only legal knowledge and knowledge of healthcare market was not mentioned as relevant by telenurses. Both, nurses and employers, report that many of the social and professional skills and attributes – especially communication and use of technology - are currently not being developed sufficiently in general nursing curricula.

Summarising the employers' expectations and employees' perspective, necessary competencies may be divided into four categories: Social competencies, personal competencies, methodological competencies and professional competencies. Figure 1 depicts needed competencies in a holistic model. The model visualisation is adapted from different competency models.[28-30]

Social competencies comprise soft skills such as friendliness and empathy – a very dominant factor from an employee's perspective. Under personal competencies we summarised a certain attitude towards the tasks – such as reliability and willingness to learn. Methodological competencies are skills most employers already focus on in their "in-house-trainings", i.e. anamnesis skills, analytical thinking and the ability to cope with certain levels of abstraction. Finally, professional competency, i. e.
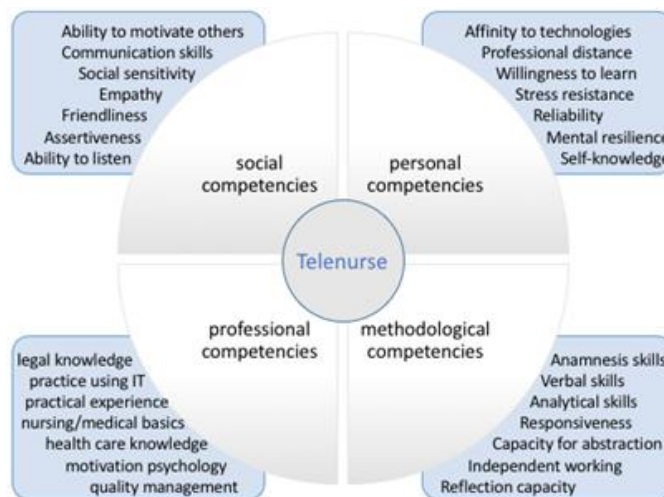

Figure 1. Holistic model of required telenurse competencies.

medical knowledge and experience was described as very valuable and necessary for fulfilling sophisticated tasks. Tables 1 and 2 present selected quotes of managers and telenurses corresponding to the depicted competencies.

Discussion

We compared the employees´ expectations of the work of telenurses with the perception of employers within the telemedicine environment. The perception of necessary competencies by employers and employees do not differ greatly. However, minor differences emerge regarding the necessary knowledge of legal aspects – a competence that is clearly necessary from the employer's perspective, but that does not play an important role for the employees. To the best of our knowledge, the employers' perspective on the needed skill set of telenurses has not yet been analysed in the literature, although the employer's perspective on goals of telenursing was investigated and compared to the telenurses view for Swedish Healthcare Direct (SHD).[31]

Our findings correlate well with existing research on telenurses' understanding of work.[23,32-34] Interviewees confirmed the described need for knowledge about health system regulations and modern information and communication technologies.[35,36] Studies focusing on patient experience show similar expectations of telenurses.[37]

Furthermore, the identified dilemma of gatekeeping versus care giving complies with the findings of

Holmström[38] and Hakiminia[39] in Swedish telemedicine service centres.

Good and effective communication skills are considered a key competency for healthcare professionals, especially for physicians.[40-42] Despite the long existing demand for communication training and phone training for nurses in different settings,[25,43-45] communication training for telenurses is not yet established in Germany.

Additional challenges, such as communication with distressed persons or motivation of chronic patients, emphasise the need for verbal training and demand a particular empathic attitude of telenurses.[46-48]

The study draws on this need and provides a holistic framework for essential competencies and skills, which can be addressed in focused trainings for telenurses. The improved competence set will help to increase the relationship quality between the telemedicine service centre and its patients as well as the relationship quality between the service centre and the patient's physicians.[42] This will result in greater client satisfaction and most importantly may increase quality and efficiency of the telenursing service.[49]

Conclusion

The study findings give an overview of needed soft and hard skills in telenursing practice, by combining employers' perspective on needed competencies with the perceptions of telenurses regarding their workplace. The study was conducted in Germany and Switzerland. Not all telemedicine centres in both countries agreed to interviews. Further studies with larger samples, are needed to reach generalisable results. Despite the limited number of participants, the findings in this study offer perspectives on telenursing from employers and telenurses. The resulting holistic model emphasises key knowledge, skills and attitudes needed for telenursing and forms the basis for the development of a curriculum and for a structured needs analysis of on-the-job-trainings. Advanced verbal communication skills are particularly important in calls, as the unspoken visual feedback from patients or nurses must be communicated and understood.

Due to the important role of telenurses and the given lack of standardised education for telenursing, this study provides an evidence informed and systematic model for design of a telenursing curriculum design, and raises awareness of the importance of telenursing work and inherent responsibilities for patients and positive outcomes.

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Table 1. Selected quotes of Telemedicine Centre Managers (TM).

Competencies (knowledge, skills and attitudes)	Quote
Analytical skills	"You have to interpret the things the right way and then to react properly. It´s a clear analytical competence that you need." [TM6]
Reflection capacity Ability to listen	"It is very important for nurses to see when the patient is not doing well. Patients can hide it quite well and the nurses need to develop a good feeling for this, they must realise if an intervention is needed. It is essential to understand the signals sent by the patient and to ask the right questions." [TM15]
Independent work	"You must be able to assess how the patient is doing and if a doctor is needed – this is very important." [TM15] "They must also be able to take decisions on their own." [TM13]
Verbal skills	"You cannot hire somebody with a Bavarian or Saxonian accent." [TM11] "The verbal expression, the ability to speak freely and to respond to someone – this is what you need." [TM12]
Anamnesis skills	"It´s not only about being able to deal with the data that come in – it´s also about being able to asses that data and to be aware of the correlations." [TM4] "You must be familiar with the topic you´re talking about with the patient, you must understand the patient´s questions as well as his symptoms." [TM9]
Capacity for abstraction	"It´s something completely different to talk to the patient by phone than to interact with him face-to-face" [TM10]. "Capacity for abstraction is also crucial – you must be able to draw conclusions about the personality of the patient and his health status from the abstract data." [TM4]
Responsiveness	"They must be aware that obesity in combination with dyspnoea can really be a critical acute situation." [TM5]
Social sensibility	"you also have to react on the data that you get and that includes talking with the patient. And the better you understand the patient and his feelings and reactions to illness, the better you can be responsive to him helping him to manage his illness" [TM4].
Empathy	"Our customers are mainly older patients and you definitely need empathy." [TM3]
Communication skills	"They must be skilled in telecommunication and know how to build up good relations with the patient." [TM11] "Communication skills are very important since they are always in contact with different groups – the patient, the GP, the clinicians." [TM4] "You definitely need communication skills to establish a relation with the patient." [TM13]
Assertiveness	"Older people sometimes behave like children, so you need to be rigorous and assertive, too." [TM11]
Ability to motivate others	"Well, you talk to a patient on the phone whom you have never seen before - and you must convince him to change his behaviour." [TM13]
Politeness, friendliness	"And they must also be friendly and polite to the people, of course." [TM9]
Self-knowledge	"And they must be able to know their limits – this is the bottom line." [TM6] "So you need to know how far you can accompany the patient and you must realise when it´s time to let him go." [TM13]

Mental resilience	"You always have to be aware that the patient you are talking with, may not be there anymore tomorrow. That´s the way it is." [TM11] "And there are certainly also cases, which touch you maybe on a more personal level when you have to say, sorry, I cannot handle this." [TM14]
Sense of responsibility	"And then of course, the sense of responsibility…they often have to learn it first. At the beginning, when they get asked about their job, they say, I am a call centre agent." [TM5]
Stress resistance	"They must hold their nerve, also in case of emergency. It´s definitely stress resistance that you need." [TM1] "Sometimes it´s pretty hard, you must be stress resistant. You get 100-160 calls per day…" [TM11]
Willingness to learn	"Definitely the willingness to learn." [TM11]
Professional distance	"It´s necessary to keep professional distance, because you get confronted with many human tragedies." [TM13] "You must find it out for yourself how much you want to engage in this." [TM14]
Medical basics	"Anatomy, physiology, the human body, cardiac functions and of course the disease management program that deals with these issues." [TM11] "The most important is to know the diseases, mainly CHF. The rest is learning by doing. I expect the telemedicine nurse to have an idea about the disease and to know how to deal with the patient." [TM4] "The complete medication, the way each drug works…this is what you must definitely know. You must understand why a hypertonic gets an ace-inhibitor and not a beta-blocker or another drug." [TM11]
Practice using IT systems, Affinity to technology	"In any case, basic knowledge in technology, you must know how to install IT systems, how to configure it and how to deal with complex technical issues." [TM15] "They have to be able to handle the telemedicine work station." [TM1] "A certain amount of technical understanding is just part of the job. This means for example that you must handle the computer that you must be able to deal with technical problems also intuitively. And if this happens during a phone call with a patient it´s important to stay calm so that the patient does not notice anything." [TM11] "They should be computer savvy. Somebody who has never before used a pc, who doesn´t know how to deal with internet or outlook, he won´t get on with this job." [TM8]
Practical medical experience	"If you analyse the data, you must know the disease and its clinical picture and you must have already seen patients with CHF or heart rhythm disorders, otherwise it´s too abstract" [TM4]. "We expect the nurse to have already a certain level of professional experience...3 years or even better 5 years…" [TM10] "It´s also important that the person has already gained experience in the clinical context and that he or she does not come directly from school." [TM14]
Basic legal knowledge	"A basic understanding of data protection law is necessary." [TM3] "You must know what you are allowed to do and what you are not allowed to." [TM15]
Healthcare knowledge	"They need a basic knowledge about the German healthcare system and about its challenges and problems." [TM12]
Motivation psychology	"How do I motivate a person to change the lifestyle, to take his drugs regularly?" [TM10]

Table 2. Selected citations of telenurses (TN).

Competencies (knowledge, skills and attitudes)	Quote
Empathy	(one needs...:) Empathy. Quite a lot of empathy. A lot of. (TN1) "To (those) Patients, (who were called more frequently due to the specific programme design) we had a very personal relationship, almost as family. (TN9)
Politeness, Friendliness	"A communicative basic skills should be there and just this flexibility, how I react on the phone and then of course this concept of service : Always remain friendly." (TN1) (a professional telenurse is:) : "someone who can articulate who is also polite, who can apply a certain social skills and empathy" (TN7)
social sensibility	"The patient knows, 'well, I won't meet (name of the telenurse)' and often patients tell me more than their family. I'm then kind of confidant.... "(TN1) "when you have contact with patients over a certain time, then we also know their concerns." (TN9)
Ability to motivate	"Well on the phone it is always favourable, if someone is communicative. There are those (patients), who only answer yes and no, this is not pleasant, because we actually ask questions…" (TN10)
Assertiveness	"We discuss which assignment he [the patient] handled well and how to approach others." (TN7)
Communication skills	"My ear and my voice are my main tools every day." (…) "There are younger clients, who are still working and have an extremely full schedule – there we are dealing with facts, they want help, immediately and not a big talk about it." (TN1) "How can I persuade somebody, who is upset, to listen? There is definitely so much about communication, that I find interesting." (TN1)
Reliability	"There are scheduled calls, if we [the patient and me] have an appointment I call, if I can't make it on time, it is important to let the patient know." (TN9)
Willingness to learn	"I think if I had been her – she had called about her son – I would have hated me. By the time I had finally found her [data] in the system – it is simply learning by doing […] But the first 100 patients are badly off. (TN5) And then you need (...) sensitivity and diplomacy, (you) need to exercise psychology in order to do this correctly. But I think it's great, I've learned a lot this year." (TN6)
Practice in using IT-Systems	"The biggest challenge (…) is to coordinate listening, thinking (…), working with the data base, writing, using all tools and information (…)."(TN7)
Affinity to technology	"So, if you only have the medical background and education whereas you have almost no idea of telecommunications and technology, then there are certainly deficits. (TN5)
Analytical skills Anamnesis skills	"{Upset mother calling} 'my baby has swallowed a token'. One still has to ask for name, family name and insurance- but before that one has to ask: 'Does it have difficulties in breathing right now?' One needs to know

Capacity for abstraction Responsiveness	that immediately." (TN6) "One reads the patient file, prepares it, before one starts the phone call, in order to have a good base with the patient. One has to check diagnosis, medication, (…) was there any threshold crossing?" (TN9)
Stress resistance	"{Upset mother calling} 'my baby has swallowed a token'. One still has to ask for name, family name and insurance- but before that one has to ask: 'Does it have difficulties in breathing right now?' One needs to know that immediately." (TN6) "The doctor is deemed sacred. They (the patients) see me as 'Miss at the desk' and not as qualified healthcare worker." (TN5)
Verbal skills	"...it depends on how I'm talking to the patient, so that he understands well what I mean." (TN1)
basic legal knowledge	"Still one has to know the line between a doctor's decision and mine" (TN3)
Ability to listen	"One needs the ability to identify and understand the problem."
Medical basics	"I have too much knowledge and energy to simply ask (…) I want to advise. I want to share my expertise (…)." (TN5) "a basic (medical) knowledge is required. (TN9)
Practical medical experience	"To have some life experience wouldn't be false, accordingly I would not go for too young people […]." (TN9)
Motivation psychology	"And then you need (...) sensitivity and diplomacy, (you) need to exercise psychology in order to do this correctly. But I think it's great, I've learned a lot this year." (TN6)

Appendix A

Interviews with telenurses

Personal Background
- How long have you been employed in the telemedicine centre?
- What was your previous job?
- Why did you choose to work in a telemedicine centre?

Preparation
- How did you prepare for the job?
- Were you offered training at the beginning of your employment?
    - If so, which ones? Did you participate in any of the offered trainings?
    - How long did the training take?
    - Which trainings did you like in particular? Why?
    - What did you personally learn from these trainings?
- What special skills / qualifications from your previous employment can be used for your current job?
- What do you remember from the first few weeks in the telemedicine service centre?
    - Was a personal tutor / supervisor available?
    - How do you remember the first weeks? (if not too long ago)

Tasks
- Please describe your typical workflow!
- Are there routine activities?
    - How much time is spent on routine tasks?
    - How often do you use additional expertise,(a doctor/an experienced colleague?)
- What creative freedom do you have?
- Describe a typical telephone conversation with a patient.
    - Do you use structured questionnaires?
    - How much free communication with the patient is useful in your opinion?
    - Can you describe typical communication patterns?
- How well do you know the patients in your care?
    - How well can you gauge your patients?
- Are there any particularly pleasant patients?
    - What makes working with these patients so pleasant?
- Are there in general difficult patients / cases?
- Describe a particularly difficult case that you have experienced
    - What was the challenge?
    - How did you handle the situation? How did you cope with it?
    - What helped you?
    - Where would you have liked to have more support?
- Are there any surprises in the conversations with patients?
- What devices do you use?
    - Which devices do you like to use most? Why?
    - Are there situations in which you particularly noticed the possibilities or limitations of the device? Which ones?

- For whom would you recommend this profession? What skills and competencies would the person have to have?
  - o What are the key skills? Which ones are essential?
  - o Are there specific experiences that are beneficial to your work?
  - o Are there certain methods that you apply again and again? Which ones?
  - o Are there tools that you use over and over again? Which ones?
  - o What personal characteristics do you consider to be especially important in your daily work?
  - o What general conditions must be met for you to fulfil your job well?

Environment and Satisfaction
- How does your environment respond to your profession?
- How would you describe your scope of duties to a relative / acquaintance?
- Do you receive feedback to your work? In what form?
- Did you attend training courses alongside your work? Which ones?
- Can you imagine continuing in your current position for five years?
- What changes would you like to see by then?

Teaching method and implementation
- How can these skills you described before best be taught?
- What form of education is best suited?
- How much practical training should there be in comparison to theory?
- How can one make the profession of Telenurse more attractive?

Closing
- Is there any topic concerning telenurses qualifications and work environment, that you would like to add?
  - o Questions, you expected, I did not ask?
  - o Remarks on the interview itself?

Thank you.

Interviews with managers

Existing structures
- Which services does the TELEMEDICINE SERVICE CENTRE offer?
- How many persons are employed in the TELEMEDICINE SERVICE CENTER?
    - How is the distribution between the sexes?
    - Age?
- Who is employed in the TELEMEDICINE SERVICE CENTER?
    - Who is recruiting?
    - Which qualification levels do exist?
    - Which working time model(s) does the TELEMEDICINE SERVICE CENTRE offer?
- Which tasks have to be done by a physician, and which tasks can be done by a telenurse?

Requirements
- Please describe the most common tasks in the TELEMEDICINE SERVICE CENTER?
    - What does an employee have to be able to do?
    - To which extent are these abilities required?
- Please describe from your point of view, what professional background and experience should a telenurse have?
    - What are you looking for in applications?
    - Practical experience?
    - Level of education?
- To what extent should the employee have? medical / technical / legal / economical / telemedical knowledge
- What are the most important skills?
    - Which of them are indispensable?
    - On which qualification level are those skills needed?
    - To which extent does the employee have to have those skills?
- Do you see any difficulties in transferring and applying the skills into daily practice?
    - What deficits exist in your opinion in the qualification of the employees?
    - Where do you see a need for improvement?
    - Which tasks cause the biggest difficulties?
- What kind of methodological skills are needed? Which of these are the most important?
    - To which extent does the employee have to command those skills?
- What personal skills are especially important?
- What do you look for most when hiring a new employee?

Requirements
- How do you train new employees?
    - What is the content?
    - Please describe the training process
    - How did you develop the training?

Implementation of a curriculum
- In your opinion, how should training for telenurses be implemented?
    - stand-alone course of studies or an additional qualification?
    - What would be the entry requirement?
- What content do you think is important?
- How long should the training take?
- What should be the theory-practice-ratio?

- Should telemedicine be already trained at the medical school?
- Should a qualification as a specialist in telemedicine be offered?
- Do you think that cooperation among the existing telemedical centres is realistic?
  - What supports collaboration?
  - What hampers collaboration?
- How do you assess the demand for nurses trained in telemedicine?
- How could the telemedical profession get more attractive? What kind of working time models is possible? What kind of incentives could be offered?

Closing
- Is there any topic concerning telenurses qualifications and work environment, that you would like to add?
  - Questions, you expected, I did not ask?
  - Remarks on the interview itself?

Thank you.