Featured Article

Nursing Students' Perspectives on Telenursing in Patient Care After Simulation

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Abstract
Background: This article presents the perspectives of undergraduate nursing students on telenursing in patient care after simulating three telenursing scenarios using real-time video and audio technology.
Methods: An exploratory design using focus group interviews was performed; data were analyzed using qualitative content analysis.
Results: Five main categories arose: learning a different nursing role, influence on nursing assessment and decision making, reflections on the quality of remote comforting and care, empowering the patient, and ethical and economic reflections.
Conclusions: Delivering telenursing care was regarded as important yet complex activity. Telenursing simulation should be integrated into undergraduate nursing education.

Over the past several decades, information and communication technology (ICT) in health care has become a political priority worldwide (World Health Organization, 2015), also in Norway (Ministry of Health and Care Services, 2012). Because of a growing elderly population, increasing health care needs, and a shortage of skilled health care workers, it is a pressing issue to identify ways in which ICT can be used to meet the world's health care needs (Abbott & Coenen, 2008; Milligan, Roberts, & Mort,

2011). Telenursing is one such proposed means of improving health care globally (International Council of Nurses, 2015). Kumar and Snooks (2011) define telenursing as "the use of telecommunications and information technology to provide nursing practice at a distance" (p. 1).

There is a vast amount of research on the use of telenursing, especially in caring for homebound, chronically ill patients (Kamei, Yamamoto, Kajii, Nakayama, & Kawakami, 2013; Lindberg, Nilsson, Zotterman, Soderberg, & Skaer, 2013; McLean et al., 2011). There is less research, however, on telenursing training. Although the importance of integrating telenursing into nursing

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curricula has been repeatedly stressed (Gallaghar-Lepak, Scheibel, & Gibson, 2009; Glinkowski, Pawlowska, & Kozlowska, 2013; Grady, 2014; Husson, Zulkosky, Fetter, & Kamerer, 2014), few studies have examined telenursing training during undergraduate nursing education.

Key Points
- Nursing students viewed telenursing as a new and exciting nursing role.
- Simulated remote nursing care was complex, and simultaneously integrating communication skills, subject matter knowledge, and technological skill was challenging.
- More knowledge is needed on best practice telenursing simulation in undergraduate nursing education.

To our knowledge, there are only two articles on this topic. Benhuri (2010) designed telenursing simulations for several home care nursing scenarios, wherein students monitored and engaged in computerized text communication with simulated patients. The author found that simulating telenursing was important to make students comfortable with new technology, monitoring, and remote nursing care. Tschetter, Lubeck, and Fahrenwald (2013) reported on an ongoing telenursing study in undergraduate nursing education. They focused on using telehealth technologies to simulate nursing care in rural areas. High-fidelity simulations were integrated into each year of nursing education. Remote monitoring was evaluated and documented in electronic health records. Student evaluations from the first year of the intervention described the simulations as important to learning but that these simulations should be provided more frequently. So far, no studies have examined the simulation of telenursing scenarios executing remote care via real-time video and audio technology, which necessitates our study.

Simulation in nursing education has been a pedagogical approach for over a hundred years (Hyland & Hawkins, 2009). It is viewed as an opportunity to train simulated real-life scenarios in a safe environment and to practice situations that internships only offer to a limited degree (Jeffries & Battin, 2012; Ross, 2012; Tosterud, Hedelin, & Hall-Lord, 2013; Williams & West, 2012). At the university college affiliated with this study, telenursing simulation has been part of the nursing curriculum since 2005. This article presents the perspectives of undergraduate nursing students on the use of telenursing in patient care after they experienced three telenursing scenarios. The simulation session took place in the university college's simulation centre 2 weeks before the students' graduation. Remote care was simulated via real-time video and audio technology. We sought answers to two research questions using an exploratory design and focus group interviews: "How do nursing students describe their experiences with telenursing in a simulated setting?" and "What are nursing students' reflections on the use of telenursing in patient care?"

Methods

An exploratory, qualitative design was used (Polit & Beck, 2014) because little is known from former research studies about telenursing at the undergraduate nursing education level. Focus group interviews were used to collect data. We provide a brief description of the telenursing simulation scenarios.

Description of Telenursing Education

Each student attended a 5-hour session completed in one day, which consisted of 2 hours of theoretical background and 3 hours of simulating telenursing scenarios in the university college's clinical simulation centre. The simulation comprised three scenarios and was delivered using real-time video and audio technology. The scenarios were: (a) assisting a patient at home in colostomy management, (b) increasing staff competence at a rural nursing home in the rehabilitation of a patient suffering from stroke sequelae, and (c) meeting family needs and assisting home care nurses in providing palliative care for a mother with terminal stage breast cancer. All scenarios had previously been reviewed and approved by clinical experts. The students took the roles of patients, next of kin, and nurses; each student experienced the role of executing telenursing. The scenarios were simulated from a variety of settings, including a home care nursing centre (Scenario A), a rehabilitation centre (Scenario B), and a palliative care unit centre (Scenario C). Internet Protocol (IP)-based video software enabled students via remote control to pan, tilt, and zoom an IP camera to obtain an optimal view of the patient's situation. They had access to a computerised decision support system on the performance of practical skills in nursing service (PPS, 2011). Speech communication took place via intercom thus ensuring synchronised audio and video. There was a 10-minute briefing before each scenario, during which the students prepared for their various roles and received information on software use. Each scenario was planned to run for 20 minutes. A debriefing session was included after all three scenarios were completed.

Ethical Considerations

The faculty dean at the university college gave institutional acceptance for the study. The Norwegian Social Science Data Services gave verbal approval; written approval was not necessary because we did not record personal information, and the study was judged as comparable to students giving feedback on educational issues.

Sample

Following Malterud (2012), we selected a purposive sample. One week before the simulation, students were informed via an e-learning platform that they would be asked to attend a focus group interview regarding their perspectives on the use of telenursing. On the two simulation days, all 59 bachelors of nursing students who had participated in the simulated telenursing scenarios were verbally requested to attend. Thirty-two students consented, including 30 women and 2 men. The mean age was 25.4 years (standard deviation, 5.2), and the range was 21 to 42 years. The students had followed the Norwegian internship norm, equating to 40% of their total 3-year undergraduate nursing education.

Data Collection

The students were divided into four focus groups consisting of six to nine students. Focus group interviews are carefully planned group interviews encouraging focused discussions on a specific topic. Group discussions stimulate a deeper understanding of the topic of interest and take advantage of group dynamics to elicit rich information (Krueger & Casey, 2009; Polit & Beck, 2014). A semistructured interview guide was developed by the researchers, all of whom were experienced lecturers in telenursing simulation. Three themes were covered: students' perceptions of telenursing simulation, reflections on appropriate nursing situations where telenursing could be offered, and reflections on opportunities and limitations of telenursing as a method of nursing practice. Examples of interview questions were "How did you experience the simulation situations? In what circumstances do you think telenursing can be used in the clinical field? What are your opinions on opportunities and constraints in using telenursing in the clinical field?" The focus group interviews were conducted immediately after students had finished the scenarios, replacing the usual debriefing session. They took place over a period of 2 days in May-June 2011, roughly 2 weeks before the students graduated. The four interviews were conducted by the same moderator and observer. Each interview lasted 45 minutes and was digitally recorded with the participants' consent.

Analysis

The interviews were transcribed verbatim by a transcriptionist unaffiliated with the university college. To correct any faulty transcriptions, the first author reread the transcripts while listening to the audio recordings. Analysis of the text was inspired by qualitative content analysis as described by Graneheim and Lundman (2004). The analysis focused on manifest content, described as the "visible and obvious components" of the text (Graneheim & Lundman,

2004, p. 106), as opposed to latent content, which "involves interpretation of the underlying meaning of the text" (p. 106). To acquire an overall understanding of the data, the interviews were repeatedly read, and comments, questions, and reflections were noted in the margins of the transcripts. After this, each interview was organised into meaning units and further condensed. The condensed meaning units were then abstracted into 19 subcategories, which in turn were combined into the five following main categories: "learning a different nursing role," "influence on nursing assessment and decision making," "reflections on the quality of remote comforting and care," "empowering the patient," and "ethical and economic reflections." An example of this process is presented in Table. To enhance the trustworthiness of the analysis, the authors discussed the meaning units, subcategories, and main categories with reference to the raw data. The subcategories and main categories were then refined according to this discussion.

Results

Learning a Different Nursing Role

Simulating nursing care via ICT was experienced as a new way of providing nursing care that the students had not been previously trained for. During their internships, no students had experienced telenursing. They described the simulation as interesting and exciting. Telenursing was judged as a suitable approach, especially for patients in remote areas. One student stated, "This is what we have to learn, this is the future," whereas another commented, "It might be less hospital and more screen," indicating that telenursing could prevent some hospitalizations. They reported that their communication skills, knowledge of the subject matter, and technological skills were challenged because these competencies had to be integrated simultaneously. One student explained "When you can't use hands on guidance, you have to be very precise in the way you guide." Referring to the complexity of executing remote care, the students suggested that telenursing simulation should be introduced at an early stage during their nursing education, as this would encourage the development of competence. The students described telenursing as changing their perspectives on nursing roles and suggested that if this was the role in the future, telenursing should be integrated into every undergraduate nursing curriculum.

Influence on Nursing Assessment and Decision Making

Technological quality was valued as crucial for valid nursing assessment and decision making. During the simulation, the sound quality varied. The students explicitly expressed the significance of good sound quality to ensure

Table An Example of the Analysis Process

Extract of Interview, Raw Data	Meaning Unit	Subcategories	Main Category
So I suppose I'm afraid, yes, I think that's what I feel. I'm afraid—that I fear, is wrong to say—but I can see that the patient is not completely seen. As was mentioned earlier, the big important things you can see, but many times it is the little signs that are actually important, the tiny signs. Those that you actually may not catch, anyway, but I think it is more difficult via a screen and a phone call.	Afraid that the patient might be neglected, that key data are not identified, data which often can be difficult to detect, but which will be even more difficult to capture via screen and telephone	Influence on the quality of nursing assessment	Influence on nursing assessment and decision making
I feel that perhaps it also will be a benefit to me later as a nurse. Maybe I can confer with a cardiac nurse who is somewhere else, about a diagnosis that the patient has that I do not know. Or I can confer with a polyclinic, like a wound polyclinic. I think the home care nurses could greatly benefit from this. I absolutely think so. Maybe one should start this? I think so. I have seen so many wounds, and we do not know where to call. Who should we contact? Who can help us? And they do not see what the wound looks like. How shall we explain things? And it is like I think this definitely would reduce communication problems. "Yes, look at this wound. That's what it looks like. What do you think? Should we use this? Should we continue with what you sent? Should we change after a while?" I definitely think it helps to use video support. Definitely.	Feel that it might be useful as a nurse, for example in the home care setting, where one can consult experts via video conferencing, for example, consult a cardiac nurse or a wound care nurse	Assurance in consulting experts when one is alone as a nurse	
Another thing I'm a little worried about is, what if the technology fails? In the midst of a conversation? Would you, maybe, cause further suffering for Mrs. Hansen than you initially might have thought? Because she now also is worried, since she now has no one? And what do I do now? Who do I call now? Where can I contact? So I think quality assurance is very important.	Worried about what happens when technology fails, what happens to the patient, and who can be called for technological help, quality assurance is important.	Technical use and support	

fluent communication and prevent misunderstandings. Adequate video quality was also highlighted. One student exemplified this by describing how light quality could influence wound assessment and therefore affect adequate nursing judgement. Compared to using the telephone alone, video was judged to offer better nursing care. The students could observe whether actions were correctly performed during and after supervision. The students also saw the benefit of being able to observe expressions of emotion. One student said, "I don't think that it is difficult to observe happiness or sadness via a camera. I definitely think that would be easy, because you also assess [the patient] via his or her voice."

Some concerns were raised regarding remote observation. The camera range would limit observation of the context. Not being able to use senses such as touch and smell was regarded as a challenge and a factor to be aware of when attempting to make reliable nursing decisions. Technical support was regarded as crucial—the students worried about whether patients' safety would be

compromised if the electronic contact broke down in the middle of remote nursing care.

Despite the potential problems of telenursing, students clearly envisioned how it could be a support in professional development, particularly by easily allowing a second opinion on nursing assessments. Through internships, the students had experienced how home care nurses in particular worked alone and had few opportunities to discuss here-and-now situations with other colleagues. Particularly in this arena, telenursing could be a valuable tool.

Reflections on the Quality of Remote Comforting and Care

To provide comfort and care without being physically present was perceived as a challenge. Observing the simulated patients' and next of kin's distress and not being able to physically comfort or guide them was disturbing for students. As one student stated:

> When using telephone calls it is natural not to be physically present. But when you see the person on a screen, you get a feeling that something is missing, when you see the people and you can't physically comfort them.

Concerns were raised about whether telenursing could lead to more impersonal nursing care. In answer to this, some students voiced that for inexperienced nurses, telenursing could also be an asset in keeping a professional distance and not getting too emotionally overwhelmed by a situation. The students suggested that knowing the patient in advance might ease the process of giving comfort at a distance. It might also be used only after preliminary face-to-face nursing encounters. However, some students thought that the future elderly population would be skilled in ICT and that a telenursing approach might suit this generation.

Empowering the Patient

Students experienced telenursing as a way to empower the patient. The distance provided patients with a sense of self-confidence and authority. Having simulated the patient role, one student expressed: "They [the telenurses] couldn't see how vulnerable I was. This made it easier for me to express what I really wanted to say. And this situation was not real. It must be even better in real life." In the scenarios, the home care nurse and patients/next of kin received the same information from the telenurses, as all were online simultaneously. The students advocated this structure to enhance patient involvement in their own health related issues. The telenurse also instilled a sense of security, as students in patient and next-of-kin roles felt as if the expertise was "in the same room." Feeling informed and safe was strongly linked to perceiving the telenurse as competent. Although suggesting telenursing as a means to

empower the patient, the students underlined individualised practice; the patient's own needs and wishes should decide whether telenursing would be an optimal nursing approach in the actual situation.

Ethical and Economic Reflections

The students reflected on the economic aspects of telenursing, particularly in relation to technological quality. To make telenursing a sustainable approach, efficient and optimal technological quality would be essential. As one student said, "At times it was difficult to hear what the telenurse said. The volume was too low. It can easily become like: We won't bother with this telenursing, let's use our energy on something else." Economical reflections also included students' unease, reflected by questions such as "Who will ensure funding? Who will finance staff education? Who will finance ICT support whenever needed? Will this be too heavy a burden for a tight municipal economy?" The students saw telenursing as a favourable economic approach in that it would make it possible to organise more patient encounters compared to face-to-face meetings; however, they also raised concerns on whether this might threaten existing nursing positions. An appropriate balance "between the new and the old" was desirable.

In discussing economics, ethical awareness was underlined. One student noted:

> I think, when there is suitable technology available, there will always be someone who uses it for purposes it is not meant to be used for. They might choose such a consultation instead of being with the patient even though the nurse knows the patient needs a face-to-face visit.

Ethical reflections on which situations a telenursing approach was preferable were regarded as crucial. Telenursing should ideally be a supplement, and not a substitute for face-to-face encounters, and should as far as possible be initiated subsequent to the establishment of a face-to-face nurse—patient relationship. Furthermore, the students maintained that patients should consent to this approach.

Discussion

The students reported that telenursing represented a new nursing role. They were clearly engaged and enthusiastic, claiming this as a valuable nursing method for the future. However, they perceived simulated telenursing to be a challenge because they had not been previously trained for such nursing care. By requiring that students integrate adequate communication skills, subject-matter knowledge, and ICT performance, telenursing was considered as a complex activity. To enhance sequenced learning, the students suggested introducing telenursing to the

simulation centre at an earlier stage of their undergraduate studies and to gradually incorporate more complex nurse—patient situations. Adequate knowledge of the nursing situation in question was perceived as fundamental to guide and meet the respective needs of patients/next of kin and also to support the home care nurses. The students reported that inadequate knowledge made communication with patients and next of kin a challenge. Arwood and Kaakinen (2009) argued that more attention should be given to conceptual development and language in simulation situations as language "is a representation of conceptual learning" (p. 3). Thus, they developed the model for SIMulation based on language and learning (Arwood & Kaakinen, 2009). This model is based on neuroscientific findings relating to the acquisition of concepts (Doolen, 2014). The model describes how to design simulations to assist students in developing high-order conceptual understanding and how to specifically work with language in designing simulations. A higher order understanding of concepts is vital in complex nursing situations (Arwood & Kaakinen, 2009). Because telenursing situations are complex and because the main means of delivering nursing care is via language, the SIMulation based on language and learning model is an important contribution to traditional communication theory. Thus, we advocate this model to be tested in creating simulations in undergraduate nursing education.

Another pivotal finding was the feeling of unease in performing nursing assessments, decision making, and nursing care without being in the patients' physical presence. Not being able to use senses such as smell and touch in nursing assessment was challenging and unfamiliar. Nagel, Pomerleau, and Penner (2013) stated that telehealth technology modifies what the nurse can observe and changes the way nurses perceive and interact with others. In other words, the manner in which nurses display key aspects of nursing care, such as empathy and compassion, is changed (Nagel et al., 2013; Simpson, 2005). Human touch is an important part of nursing care; thus, telenursing challenges a central aspect of nursing care (Milligan et al., 2011). There is currently insufficient knowledge in nursing regarding the extent to which nurses can establish adequate knowing and caring in a nonphysical, "virtual" meeting with patients (Nagel et al., 2013). Pols (2010) said that telenurses designed "new strategies to compensate for absent senses" (p. 385) by combining remote monitoring data with telephone calls and Webcam use. If deemed necessary, additional face-to-face encounters were implemented to further assess the patient's situation. In some cases, telenursing therefore became more intensive (Pols, 2010). Because ICT is rapidly emerging as an important asset in health care, nursing students must develop virtual competence to be prepared for modern nursing care (Davis, Drey, & Gould, 2009). One means is to integrate telenursing simulation into the undergraduate nursing curriculum (Blake, 2013; Thompson & Skiba, 2008).

The students discussed how telenursing could influence the recipients of telenursing, with due consideration of both the opportunities and the concerns which might arise. Home care nurses' possibilities of developing competence and using telenursing as a decision support were acknowledged. As for the patient and their next of kin, telenursing was valued as means of patient empowerment. These findings coincide with those of other studies (Milligan et al., 2011; Pearce, 2012). The students also emphasised the need to individualise telenursing technology to meet patient's and next of-kin's requirements. Technological solutions that maximise the benefit for individuals should be developed (Peeters, Wiegers, & Friele, 2013). Indeed, technological developments have reached a stage where tailoring to individual needs should be the aim. Involved in patients' daily care needs, nurses should be part of the drive to develop appropriate solutions. Undergraduate nursing education has a responsibility to prepare students for this reality. Therefore, we advocate the importance of integrating telenurse knowledge, experience, and reflections throughout undergraduate nursing education. Simulating telenursing scenarios is a contribution in this respect.

Methodological Considerations

It is plausible that the results of the study are biased, as both moderator and the assistant lectured on telenursing simulation, and this might have influenced the students' discussions in the focus group. To prevent this, the participants were informed that we genuinely wanted their perceptions on the subject matter and that their meanings and discussion would have no consequences for their final grades. Both researchers were cognisant of these aspects, seeking also to promote critical reflections and objections to simulating telenursing scenarios and to telenursing in general.

Conclusion

ICT in health care is developing rapidly, thereby changing traditional ways of delivering nursing care. Our study shows that undergraduate nursing students were enthusiastic about simulating telenursing via real-time audio and video technology. They viewed telenursing as future oriented and argued that nursing education must prepare students for this reality. Telenursing was viewed as a complex way of delivering care and should be taught over time throughout undergraduate nursing education. More research is needed to obtain a broader insight into best practice telenursing education.

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