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Undergraduate Nursing Students' Experiences When Examining Nursing Skills in Clinical Simulation Laboratories with High-Fidelity Patient Simulators: A Phenomenological Research Study

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Contributions

Study design: AS, AP, MB; acquisition of data: AS, MB; analysis: AP, AS; drafting of the article: AS, AP, MB. AS and MB are well experienced in performing qualitative interviews and using the phenomenological approach, and AP is well experienced in teaching with patient simulators.

Conflict of interest

The authors have no conflict of interest.

Abstract

Simulation has become a widely used and established pedagogy for teaching clinical nursing skills. Nevertheless, the evidence in favour of this pedagogical approach is weak, and more knowledge is needed in support of its use. The aim of this study was (a) to explore the experiences of undergraduate nursing students when examining knowledge, skills and competences in clinical simulation laboratories with high-fidelity patient simulators and (b) to analyse these students' learning experiences during the examination. A phenomenological approach was used, and qualitative interviews were conducted among 23 second-year undergraduate nursing students—17 women and 6 men. The findings revealed that, irrespective of whether they passed or failed the examination, it was experienced as a valuable assessment of the students' knowledge and skills. Even if the students felt that the examination was challenging, they described it as a learning opportunity. In the examination, the students were able to integrate theory with practice, and earlier established knowledge was scrutinised when reflecting on the scenarios. The examination added aspects to the students' learning that prepared them for the real world of nursing in a safe environment without risking patient safety. The study findings suggest that examinations in clinical simulation laboratories can be a useful teaching strategy in nursing education. The use of high-fidelity patient simulators made the examination authentic. The reflections and feedback on the scenario were described as significant for the students' learning. Undergraduate nursing students can improve their knowledge, understanding, competence and skills when such examinations are performed in the manner used in this study.

Keywords: Simulation, learning, nursing, education

Introduction

The complexity of healthcare today is increasing with the explosion of knowledge in different specialties, the increase in technological advances and the growing attention to the issues of patient-centred care and patient participation. Nursing education must enable students to hone their nursing skills, solve problems and develop their reflective and critical thinking approaches to nursing. Consequently, teaching and learning strategies are needed to improve the knowledge, understanding, competence and skills required by nursing care students.

In this study, we focus on the use of simulation in an examination taken by undergraduate nursing students. It has been pointed out that simulation is an innovative pedagogical approach that can provide opportunities for students to develop their clinical nursing skills (Berragan, 2011; Moule, 2011). Today, simulation is widely used and has become an established pedagogy for teaching clinical nursing skills. Simulation comprises a range of types and methods, from case studies to high-fidelity patient simulators and virtual environments. High-fidelity patient simulators, which is the use of a computer-based mannequin that are commonly used in nursing education, offer learners exposure to real-life scenarios in a safe environment and enable them to develop their confidence and competence. Nevertheless, the evidence in favour of this pedagogical approach is weak, and more knowledge is needed on simulation and its impact on learning.

Background

Simulation has been described as a pedagogy that enhances opportunities for undergraduate nursing students to learn nursing skills (Arthur, Levett-Jones, & Kable, 2013; Berragan, 2014). Mills et al. (2014) support the view that simulation has the potential to enhance learning in different and unpredictable care situations that require the use of critical thinking and advanced skills. The use of simulation in the education of undergraduate nursing

students offers a process that can facilitate learning that involves active participation, integration, repetition, evaluation and reflections (Bland, Topping, & Wood, 2011). Through simulation, students can be encouraged and motivated, and it can offer them an active way to learn (Bland et al., 2011; Jeffries, 2005; Robinson & Dearmon, 2013). Simulation enables feedback to be given, tacit knowledge to be expressed and understanding to be explored (Eraut, 2000). Furthermore, students have reported that simulation gives them confidence in their future clinical practice and their ability to integrate theory with practice (Traynor, Gallagher, Martin, & Smyth, 2010). The role of feedback in simulation has been emphasised (Arthur et al., 2013), and it can promote the development of skills that are important for becoming a reflective practitioner (Murray, Grant, Howarth, & Leigh, 2008). Reflection-in-practice has been pointed out as central in the work of professionals (Ekebergh, 2007; Schön 1983). In contrast to simulated situations, reflections on learning in real-life situations in clinical practice can be more complicated. However, experiences from practice may be difficult to identify and make explicit. In addition it may not be possible to reflect in or closely related to the actual situation in the clinical setting with respect to patient care and the workload. Reflective processes may demand structured reflections with the time and space needed to make experiences and emotions explicit.

The contribution of simulation has primarily been positive. Simulation may have the potential to offer a learning environment in which students begin to practise nursing and develop nursing skills and competences (Berragan, 2013). To be effective, simulation must reflect reality (Bland et al., 2011), and context, therefore, seems crucial. Students have reported positive responses to simulation as a learning strategy that has allowed them to apply theory in a safe and controlled environment (Hope, Garside, & Prescott, 2011). In addition, simulation can offer students a safe environment for learning that enhances clinical competence without the risk of harming patients (Murray et al., 2008). However, simulation

has its limitations with regard to authenticity, and it cannot fully replace the context of human healthcare because patients' concerns and responses are complex (Dunnington, 2014).

Educational providers need to be aware of that simulation cannot automatically be assumed to be authentic because high-fidelity simulators are being used (Bland, Topping, & Tobbell, 2014). However, even if there are complex differences between the real world and that of patient simulation, the latter may still offer students opportunities to explore how it feels to be a nurse and to begin to understand the complexities of nursing (Scholes, 2008). A mixture of simulation and training in practice may be preferred and vital for undergraduate nursing students' learning.

Limited research has been undertaken on the use of simulation in examinations to uncover its potential as a learning and teaching strategy. Even if studies have been conducted on simulation, there has been a lack of studies specifically illuminating the impact of using simulation to examine undergraduate nursing students' clinical skills and the meaning of such examinations to students learning. The need for further research has been highlighted (Moule, 2011; Wellard, Solvoll, & Heggen, 2009), and more evidence-based support is necessary for the development of this pedagogical approach. Therefore, the aim of this study is (a) to explore the experiences of undergraduate nursing students when examining knowledge, skills and competences in clinical simulation laboratories with high-fidelity patient simulators and (b) to analyse their learning experiences during the examination.

Method

The phenomenological approach, developed by Dahlberg, Dahlberg and Nyström (2008) as a method of reflective lifeworld research (RLR), was used in this study. This approach, which builds on phenomenological epistemology and Husserl's theory of human intentionality and the lifeworld, was used to explore the nursing students' experiences of an

examination in clinical skills laboratories with high-fidelity patient simulators and its impact on their learning.

Participants and Educational Settings

Qualitative interviews were conducted among second-year undergraduate nursing students selected from a university in western Sweden in 2010. The local university commences simulation from the start of the nursing programme. The simulation is used to integrate theory with practice and to prepare the students for clinical practice. Through the nursing programme, the simulation progresses with an emphasis on developing nursing students' clinical knowledge and reasoning as well as their decision-making abilities. In the examination that is the focus of this study, a high-fidelity patient simulator was used. During the examination, the students were required to demonstrate their knowledge, competence and skills in nursing. In the assessment, the teachers used an objective structured clinical examination protocol.

The examination was undertaken in a "practical room"—a so-called clinical simulation laboratory—in which teaching simulations were usually held. The students were examined in groups of four. The examination started with a report of a patient case that simulated a real-life scenario. The students were then given specific tasks they were expected to undertake during the examination. The students then had to care for the "patient"—that is, the high-fidelity patient simulator—for about half an hour and were observed by teachers. The scenario was also videotaped. Thereafter, the students were gathered outside the practical room, where they reflected on and analysed the scenario with their teachers. They were also able to watch the videotaped episodes. Finally, each student received an assessment of whether he or she had passed or failed the examination. If failing, which some of them did, the students had to do the examination again.

Data Collection

Qualitative interviews were used to gather the data (Dahlberg et al., 2008). A total of 23 undergraduate nursing students, comprising 17 women and 6 men, were interviewed in groups. Three of the students had failed the examination once. The interviews were conducted in 2010 and were carried out in five gender-mixed groups of three to six students each. The interviews were preceded by a five-week period of clinical placement at the local hospital.

The interviews aimed to explore the students' experiences in the examination. The researchers endeavoured to meet the students with an openness to obtain rich descriptions of their lived experiences of the studied phenomenon. The interview questions related to their experiences in terms of how they felt, their learning and what the examination meant to them. The interviews lasted about 60 minutes each, after which all were tape-recorded and transcribed verbatim.

Data Analysis

The analysis followed the principles of the RLR approach (Dahlberg et al., 2008) and focused on the patterns and nuances of qualitative meanings. The aim was to be sensitive both to the parts and the whole of the text as well as to the emerging meanings. Through the analysis, differences and similarities were discussed in the search for meanings. When various meanings of the phenomenon emerged, it was finally possible to describe its general structure—that is, its essence. In the Results section, this essence is illustrated in the constituents.

Ethical Considerations

Institutional ethical approval as well as approval from the student union at the local university were obtained for this study, which was carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki). Written and verbal information discussing the nature, purpose and methods of the study was given to the students. Informed consent was obtained from the participants, who were made aware of their right to withdraw at any time without consequences. All three researchers teach at the local

university where the study was carried out. Those of us who conducted the interviews (MB & AS) were not involved in the examination.

Results

Irrespective of whether the students passed or failed the examination, in their experience, it was a valuable assessment of their knowledge and skills. Ongoing learning was experienced in the examination, and, at the same time as the students were evaluated, they learned and developed their knowledge. Undergoing the examination was challenging. The use of a scenario involving the high-fidelity simulator made the examination feel real and serious. The course of events taking place absorbed the students' attention and stimulated them to demonstrate the skills needed. In the examination, the students were able to integrate theory with practice, and their established knowledge was scrutinised as they reflected on the scenario. The dialogue that followed enabled the students to contemplate the course of events, and they were able to reflect on and discuss it with each other from different viewpoints. Altogether, the examination added aspects to the students' learning, preparing them for the real world of nursing in a safe environment without risking patient safety.

The students' experiences and the significance of the examination are clarified in the following constituents: To involve in the scenario and the environment; To confront and challenge one's own knowledge and skills; To contemplate and reflect on the course of events; To engage in pleasurable learning; and To improve the students' self-confidence.

To Involve in the Scenario and the Environment

A realistic scenario was deemed important for taking the examination seriously: "When I was in there, I was very focused". When the environment or those who were acting in the scenario failed in terms of their credibility, the experience was frustrating. For example, according to one student, "The technical things, when they didn't work, it was disappointing".

The examination conditions and how the scenario was performed influenced the students' learning. For instance, the information students received and how facilitating teachers or other students behaved were important: "It was a bit ... depending on which teachers [were] with us in the room". The students were sensitive to approaches and attitudes, and the teachers had a responsibility to set the scene for the scenario. How the teachers acted and responded to what took place was described as important. They needed to be flexible regarding whether the scenario needed to be more realistic or the opposite, and to calm the students down when they were too nervous. The examination was like a game in which everyone had a role in the interplay with one another: "You had to pretend a little", "We pretended so much that I finally did not know what I was pretending". The more the students participated in the illusion of the simulation, the more they enjoyed and learned from it. Things that broke the illusion effected their learning negatively.

To Confront and Challenge One's Own Knowledge and Skills

In the examination, the students' knowledge was tested. They were challenged to manage new situations which they experienced, and this was a real opportunity to test their knowledge. When confronted with different problems, they needed to understand what they entailed and to search for ways to manage the situation. Ongoing learning was thereby experienced.

The situation was described as different from common training, during the examination the students were both observed and videotaped. Initially, some students were uncomfortable knowing that they were being videotaped, even if they could later see it as an opportunity to learn. When receiving both verbal and visual feedback on how they had acted in the scenario, they became aware of aspects they would not otherwise have known: "The feedback gets very clear when you can see yourself on the TV screen". The feedback made them attentive to what they had demonstrated in the scenario, and they became aware of what they did and did

not know. The feedback was experienced as significant for their learning: "You see all the small mistakes you make. Yes. I probably wouldn't have listened to them if they'd told me all these things and mistakes . . . if they had just told me."

The examination involved learning that required the students to put their knowledge into practice, thereby enabling them to learn more about how to be good nurses and how to interact with patients: "Practising how to meet the patient. Yes, especially the encounter. Yes, I think in nursing, that is the most important aspect." The examination not only tested their knowledge but also their skills and competences: "It was good to be examined, because you became sure of what you knew and how you did".

To Contemplate and Reflect on the Course of Events

After the scenario, the students described how they had to reflect on and rethink the scenario. They stayed in the practical room after completion of the scenario to discuss and reflect on the course of event. When discussing sequences of the practical examination with other students and the teachers, they indicated that the experience had deepened their knowledge. For example, they became aware of aspects that were not previously known, and they were able to expand on their views and understanding.

Why do I have my butt against the patient when I'm bending down to pick up something from the floor? That's not very nice. That is not the best thing to do. It's obvious when you see it. Oh, but why am I doing it like that? But, are you sure I did it like that? Yes, I must have, because that's what can be seen on the video. So, it's not tampered with, somehow, and then you get more of an eye-opener.

The students stated that it was important for them to not get the correct answers too quickly. If they were given questions and not the answers, this supported their reflection and encouraged them to learn from their experiences: "You had a chance to think about it. They did not just say that I was wrong. No, no, think about what you did now. And you get a chance to . . . Oh,

yeah, I did forget that.” To contemplate and reflect on the scenario enabled the students to approach things differently, and it gave them opportunities to scrutinise themselves as well as the competences and skills of other students.

It has to do with the reflections. It's amazingly important. Yes, you learn a lot of from it . . . To actually think about what you . . . what you do and what you say, and not just rush on. And that is good for one's development . . . It makes me think very much about what I have done and what I could have done.

The reflections on the learning process was perceived as a meaningful experience. How the students performed in the scenario was not always in line with their knowledge. The knowledge they had was not always transformed into practice in the examination. When they were able to reflect on the course of events, they were confronted with this disparity. When the students were aware of the discrepancy, their experience was that they learned from the examination. They were able to develop their learning and nursing skills even further after the feedback and discussions.

To Engage in Pleasurable Learning

The examination was experienced as meaningful and stimulated the students to learn: “I have really seen it as a learning opportunity”. They were able to mature in terms of their knowledge when they were trained to evaluate the scenario and compare the information they were given with what they could see. The examination gave new dimensions to their learning; even though they were being examined, it was still seen as an opportunity to train and learn in a safe way in real-life situations: “You learn more in a different way”. They could have trust in the situation, knowing that even if they were nervous about being examined, they did not need to fear that anyone would be harmed.

Differences were experienced from earlier training in the clinical simulation laboratories. The examination was difficult, and some students failed. However, even though

they failed, they perceived that they had learned from the experience. They described being spurred to learn more and to show their knowledge.

It's good to come back and show them that I . . . I can actually do this now. And to show them, both the teachers and myself, that I have actually learned something and that I have actually listened to their feedback.

In the examination, they were put to the test. There were high demands by the teachers and by the students themselves: "You get something to fight with". The demands made the students take the examination seriously, which motivated them to learn: "The nervousness is a sign that you want to do well". They were motivated to demonstrate their knowledge in what they conceived as real and serious scenarios, and the students felt that they had a responsibility for their learning.

So I hope everyone felt that this is for their own interest. The tests are not made to please my teachers and show that I am good, but rather because of me . . . that I must be able to have that knowledge.

In the examination, they also learned from each other: "We have learned from each other". Altogether, it was experienced as pleasurable learning.

To Improve the Students' Self-Confidence

In the students' view, the experience enabled them to develop their professional knowledge, and their self-confidence improved. The examination was meaningful and helped to prepare the students for the real world of nursing: "Then I felt that I did it the right way. I knew . . . I didn't need to ask. I could do this. That I felt was really good". The experience of doing well made the students feel that their knowledge was confirmed: "It is good to be examined. Then you can be sure that you know what to do". The course of events could add aspects to their learning and improved their self-confidence in nursing.

When applying theory to practice, their self-confidence improved: "That you can manage practical stuff. Reading course in the theory, and do it in practice. Then you can feel that you have a little more behind it when you come out in clinical practice". When the students' competences and skills were confirmed in the examination, this supported and prepared them for clinical practice. Their uncertainty and worry decreased: "I felt more self-confident after practising these skills so that it wasn't the first time being in clinical practice".

Discussion

This study offers insights into undergraduate nursing students' experiences when examining nursing skills in clinical simulation laboratories with high-fidelity patient simulators.

The findings reveal that examinations in clinical simulation laboratories can motivate students' learning; and the visual and verbal reflections and feedback given was experienced to be significant and meaningful for the students' learning. In addition, it was described it as important that the examination and the scenario was authentic and the high-fidelity patient simulators made the simulations authentic. Practical experiences and embodied understanding are involved in students learning process (Ekebergh, 2007). In everyday life we usually have a natural attitude, which basically is unreflective. Our experiences can be made aware and available for analysis through reflections. Our study revealed that the students could work with their actions and experiences during reflections, which gave them opportunities to reconsider their experiences and discover new insights and knowledge during the examination.

In the scenarios, the students developed their skills and competences by working with other students as well as through the feedback and reflections given after the scenario. The importance of feedback or debriefing on the scenarios similar to the reflections and feedback used in this study, has been pointed out as central (Arthur et al., 2013; Eraut, 2000; Murray et al., 2008, Neill, & Wotton, 2011). Reflections and discussions with other students has been

reported as aspects meaningful for nursing students learning (Westin et al. 2015). Guided reflections can improve knowledge and skills, and we argue that using visual feed-back may be important as well, and can improve the students' development of knowledge and skills even more. In the examination, the students' were challenged to manage new situations and their knowledge was tested. Still, they experienced that they learned from the examination. The examinations in clinical simulation laboratories used in this study was can be a meaningful teaching strategy to test knowledge, but also to enhances students' learning. However, simulation and individual feedback places demands on educational providers, and it can be challenging to provide the resources needed to make simulation beneficial. It is important that simulation not be dominated solely by fascinating technological advances; the students also need to be acknowledged in their learning contexts, which involves actions as well as cognitive and emotional aspects (Ekebergh, 2007). The careful planning of simulation may be important to meet individual learning needs (Ricketts, 2011). In line with this, we found that reflections and feedback could slow down the students' learning process in a way that enriched their knowledge, also facilitating their integration of theory with practice.

Based on the study findings, the simulation and examination were reported as preparing the students for clinical placements and improving their self-confidence, which is also suggested by Ricketts (2011). Even if the benefits of simulation are remarkable, clinical practice should not be completely replaced by simulation. The clinical learning environment is in general reported to be positive by nursing students (Sundler et al., 2014). However, the learning environment differ between clinical settings (Bisholt et al., 2014) and clinical placements can be stressful to students (Blomberg et al., 2014). Real patients and practice are needed in nursing education; simulation needs to be a supplement to clinical placement. Nevertheless, the benefits of simulation need to be underscored. One of its advantages is the possibility of structured reflections and of contemplating on the scenario by reflecting on the

course of events; this may seldom be possible in clinical practice. To enhance learning, such reflections and feedback demand that lecturers be sensitive and adopt an open and flexible approach. Another advantage is the safe environment that training in simulated laboratories can offer as patients are never at risk of harm.

Study Limitations

Even though the interviews were relatively rich in their descriptions, a few negative experiences were described by the students. The interviews were conducted approximately five weeks after the examination; this was at the end of the course following the examination which contained a period of clinical placement. This time was chosen to enable an interval that was likely to be sufficiently short to exclude memory bias but still long enough to allow the students to reflect on the examination from a distance. Bland et al. (2011) maintain that simulated learning needs to be evaluated. The qualitative approach used in this study is limited in its capacity to reveal the effectiveness of simulation; rather, this approach was used to uncover and explore the potential of this learning strategy from the perspective of undergraduate nursing students' experiences. Even though this study offers insights into students' experiences of this teaching strategy and its meaning for their learning, more evaluative research is needed to further explore the pro and cons of the use of simulation in nursing education. Several studies have pointed out the need for further research in this area (Moule, 2011; Wellard et al., 2008).

Conclusions

The findings of this study suggest the following:

- Examinations in clinical simulation laboratories can be a useful teaching strategy in nursing education to improve the skills and competences of undergraduate nursing students.
- High-fidelity patient simulators can make the simulations authentic.

- Both visual and verbal reflections and feedback can be significant and meaningful for undergraduate nursing students' learning.
- Examinations in clinical simulation laboratories can motivate students' learning in a safe environment.
- Examinations in clinical simulation laboratories with high-fidelity patient simulators can improve students' knowledge, understanding, competence and skills when performed in the manner used in this study.

This study has provided insight and information concerning the meaning of examinations in clinical simulation laboratories with high-fidelity patient simulators as experienced by undergraduate nursing students in Sweden. These findings are of interest to nursing educators and students. However, there are challenges, and we argue that these examinations must be carefully organised. Simulated examinations similar to the one in this study have the potential to motivate nursing students to learn, support their learning in a safe environment, and can provide some insights into the complexity of patients' concerns and responses in the real world of nursing.

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