Nursing Students' Experiences of Simulation-based Education on Hypoglycemia

In-hye Song[1] and Hyeon-cheol Jeong[1*]

[1]Department of Nursing, Sahmyook University, Korea.
*Corresponding Author: E-mail: love2hc@syu.ac.kr

Abstract

This phenomenological study examined nursing students' experiences of an educational emergency nursing-care simulation program on hypoglycemic patients. Participants comprised nine nursing students without prior simulation experience, selected from the present batch at the department of S university. One trained research assistant divided the students into three teams with three members each, and delivered two-hour theoretical lectures about diabetes and related nursing interventions. Subsequently, the assistant conducted two rounds of simulation tasks and debriefing. To understand the participants' experiences of the program, focus group interviews were conducted. Data were analyzed by applying the Colaizzi phenomenological method. The simulation participation experience tended to be clustered into four categories and eleven sub-themes. The four areas were "first encounter with actual clinical cases," "integrated application of individual nursing knowledge," "discovering one's identity as a future professional nurse," and "learning through repetition and mistakes." The participants showed a very positive attitude to the overall effectiveness of the practical session, although they were virtual situations. This suggests that simulation-based learning is an effective tool that should be employed in nursing education.

Keywords: Hypoglycemia, Emergency nursing, Simulation-based education,

1. Introduction

With recent developments in medical technology and the increasing number of severe cases, advanced intensive expertise and nursing intervention techniques are required in the clinical field. Therefore, nurses are required to have more sophisticated work capacities [1]. Through theoretical and practical educational programs, nursing education organizations focus on nurturing professional nurses' abilities to provide high-quality services [2]. However, hospitals are currently the primary organizations that offer nursing practicum in South Korea. They can only provide limited assistance and support for practicums, as their focus is on diagnosing and treating patients [3]. Thus, opportunities for first-hand practice in nursing services have been declining, since students are expected to only observe practical sessions. In order to improve clinical practicums in Korea, simulation-based nursing education has been recommended and introduced [4]. Such simulation-based education is safer as students do not perform procedures directly on patients and tasks can be repeated as often as required. Students can gain experience in attending to clinically difficult cases through simulation and have an opportunity to reflect on their performance during the post-simulation debriefing [5]. In addition, simulation-based education presents realistic situations for students to integrate their knowledge with practices while ensuring a safe environment for repeated learning, consequently helping them build confidence.

Education programs using simulation have been applied to diverse nursing fields and have yielded positive learning outcomes, proving to be effective in improving various kinds of clinical capacities [6]. However, most studies have concentrated on quantitative

results, suggesting the need for a qualitative study based on a deeper examination of nursing students' learning experiences.

Thus, the present study attempted to phenomenologically analyze nursing students' experiences of an emergency nursing-care simulation program on hypoglycemic patients to aid the establishment of effective simulation-based programs that reflect learners' covert needs and demands.

2. Methodology

2.1 Subjects

We targeted second-year students at the nursing department who had completed their introductory nursing science, basic nursing science and practice, and therapeutic communication courses. Research details were published online for recruitment; nine students were finally selected.

2.2 Procedure

Data were collected in September 1–26, 2014. The researcher delivered a two-hour theoretical lecture on diabetes and nursing care. Subsequently, participants were divided into three groups of threes for self-study, and were provided learning material for seven days following the day after the theory session. After this, two rounds of simulation education and debriefing were conducted. The first simulation program addressed the general scenario, physical patient assessment, and differential diagnosis. Thesecond program was on therapeutic communication, medicine administration, nursing intervention, and patient education.

For this study, a high-fidelity simulator (SimMan 3G, Laerdal Medical, Norway) was utilized. The students were divided into three teams comprising three members for simulation classes. Each team received a 10-minute orientation and 15-minute scenario operation task. The common debriefing session lasted 50 minutes. After the simulation class, participants were interviewed in a sub-group lecture room for the focus group members. Interviews were recorded with the participants' consent and were transcribed in shorthand for analysis.

2.4 Data Analysis

We applied the Colaizzi phenomenological method to determine the essential themes of participants' simulation-based education experiences[7].

① Transcription of the interview recording was performed on the same day, the transcribed data were repeatedly read to understand the overall meaning.

② The second step was identifying statements that significantly related to the simulation experience in participants' written and interview data.

③ The third step was to exclude overlapping expressions, re-state expressions more generally, and change idiosyncratic usage to scientific language, wherever possible.

④ The fourth step involved deriving the meaning of significant statements and re-statements. The validity thereof was supported by evaluation conducted by a professor with experience in content analysis.

⑤ The fifth step was defining the eleven sub-themes and four categories from the derived data.

⑥ The sixth step was to describe the participants' educational experiences in general, according to fundamental themes derived from the analyzed data, and describe its fundamental structure.

⑦ The seventh step involved requesting two participants to crosscheck the details

of the simulation experience descriptions to improve data validity.As the description was found to be identical to their experiences, the factual value of this research improved.

3. Results

Based on the interview data, the nursing students' simulation program experiences tended to cluster into four categories and eleven sub-themes [Table 1]. The four categories were "first encounter with actual clinical cases," "integrated application of individual nursing knowledge," "discovering one's identity as a future professional nurse," and "learning through repetition and mistakes."

3.1 First Encounter with Actual Clinical Cases

The three sub-themes in this category are "unfamiliarity of the experience", "field-based learning", and "vivid recall".

● **Unfamiliarity of the Experience**

Students were unacquainted with previous clinical work and expressed that the simulation session was unfamiliar. They were unaccustomed to the tasks, were unable to remember prior knowledge, and were too anxious to think of what to do.

"Well, first of all, it was very unfamiliar. The practice room was like a real hospital. A dummy was lying on the bed. It was awkward. And, you know, I've studied all the basic nursing practices so far, but I was about to deal with something like a real emergency. So I really didn't know what to do. I didn't know what to do first and didn't know the order."

● **Field-based Learning**

Students learned clinical techniques from the simulation program that cannot be taught theoretically. They gained first-hand experienced of assessing situations, making decisions informed by theory, and applying such internalized knowledge to clinical practice.

"When I first saw the patient, I tried to conduct a physical assessment. Until I actually performed it, I had no idea of what was important for him to get a proper treatment. And you know, we didn't know how to read monitor signs and what had to be reported to doctors. Such things are not taught in theoretical classes or basic nursing practice. When I actually saw it and watched what the other teams were doing, I think I almost understood about 90%. So it's very good."

● **Vivid Recall**

Students had vivid memories of what they had experienced and learned during the simulation program. According to them, simulation-based programs provided the liveliness of the clinical field and first-hand involvement, such that they were able to remember what they felt during the simulation even after a long time, more so than conventional lectures.

"It's very vivid and fresh even after the simulation. I think, for example, I did this [task] from this point of view; so next time, I could change it. I should have asked the patient first and then the others. Thinking during the situation helps. I can recall how embarrassed I was then. You know, the tension from the heart."

3.2 Integrated Application of Individual nursing Knowledge

The participants learned how to integrate individual units of knowledge that they had gained earlier into clinical practice. The two sub-themes in this category are "learning how to prioritize for decision making," and "appropriate integration of individual units of knowledge."

- **Learning How to Prioritize for Decision Making**

Students were able to identify important factors, thereby aiding decision makingin actual patient assessment and interventions.

"It was a real person, a real sick person lying there. Someone was actually lying on the bed, so I had to do something but I didn't know what to do. It's just very confusing … what should I do first … that was most difficult: deciding the first step and what is important."

- **Appropriate Integration of Individual Units of Knowledge**

Participants reported being able to appropriately integrate their nursing-care knowledge to the clinical setting. In their regular lectures or basic nursing-care classroom teaching, different topics were treated as independent, separate areas based on study themes. However, in their simulation sessions, participants were required to link relevant knowledge units and apply them in an integrated manner. This is why the simulation is a challenging experience for participants new to the experience.

3.3 Discovering One's Identity as a Future Professional Nurse

During the two rounds of simulation, participants began to better understand the nature of professional nursing care that was vaguely described prior to this study. All participants developed stronger occupational identities as future professional nurses through the experience of being entrusted to execute the nursing mission. This category includes three sub-themes: "understanding the duties of nursing profession and the sense of responsibility," "realizing the meaning of genuine care," and "wanting to engage in further self-study."

- **Understanding Nursing Profession Duties**

Through the simulation program participants clarified their previously ambiguous roles as nurses. Moreover, they realized the importance of developing professional abilities and felt more responsible toward patients' lives and providing care.

"Well, I came to gain the sense of responsibility that nurses imbue. I really have to study harder. It was virtual, so if I made a mistake, I just regretted it and that's all. But if it's real. Making even a small mistake, could endanger or be lethal for a patient. Now I feel burdened and understand my responsibility."

- **Realizing the Meaning of Genuine Caring**

Participants realized that nurses were not just working towards patients' physical health but were also caring for patients' and their families' emotional needs. As they took turns to play the role of family members in the simulation, they understood how it was important to provide mental support and holistic nursing care from the receiver's perspective.

- **Wanting to Engage in Self-study**

Students felt the need to continue practical nursing care sessions and acquire accurate nursing knowledge in order to gain nursing competencies for patient recovery.

"I played the leader and I felt a greater responsibility; I thought, how I should do this and I should know more about this, etc. If I read books, I read them and memorize them. So I don't have to feel burdened. But it's a real situation and similar to actual situations, so I was compelled to know more."

Thus, post-simulation, students recognized professional nurses' responsibilities. They also felt the need to study further and motivate themselves to enhance their nursing capacities.

3.4 Learning Through Repetition and Mistakes

The post-simulation debriefing was conducted to review participants' general practices, during which they developed their nursing skills further by practicing clinical techniques and engaging in trial and error. The three sub-themes in this category are "developing confidence through repeated experiences," "clearer demarcations between knowing and not-knowing," and "reflecting on mistakes."

- **Developing Confidence Through Repeated Experiences**

With repeated simulation sessions, participants showed attitudinal change, from being passive due to unfamiliarity and lack of experience to being more confident.

"At first, we really messed up. I left after my team's performance and watched all the other teams. And I think the more I saw, the more I could act and build my confidence. I watched our second performance with my friends and while it was not excellent, it was better than earlier."

- **Clearer Demarcations between Knowing and Not-knowing**

During the simulation practice, participants were able to separate their precise knowledge and skills from what they vaguely knew, but thought they knew from lectures. Participants were able to identify what they clearly knew and what they didn't know by practicing and applying theoretical nursing knowledge, which highlighted areas for improvement.

"In the lectures, I thought I understood everything. But when I did it for real, I could tell what I knew for sure from what I knew vaguely and from what I didn't know. It's like filtering the knowledge. I hope we can have more practical sessions."

- **Reflecting on Mistakes**

Students clarified their knowledge and studied more diligently when they made mistakes because of nervousness or lack of skill during the simulation.

"I study for an exam before taking it. And if there is something I don't know then I just miss the question. And the next time, I still don't know it. But the simulation practice provides debriefing to see what I did in the practice. So I can deal precisely with the parts that were mistakes. "

Thus, students checked and reviewed their simulation sessions to identify mistakes or aspects that needed improvement during debriefing, thereby advancing their experience and skills.

On analyzing the interviews with nursing students, it was found that they were deeply satisfied with the nursing care program and their performance, even at the practice level. This process improved their confidence levels for practicums and their interest in learning. The participants showed a proactive attitude by expressing their intention to participate again in such a simulation program if provided in the future.

Table 1. Participants' Experiences of a Simulation-based Emergency Nursing Care Education Program on Hypoglycemic Patients

Category	Sub-theme
A. First encounter with actual clinical cases	- Unfamiliarity of the experience - Field-based learning - Vivid recall
B. Integrated application of individual nursing knowledge	- Learning to prioritize for decision making - Appropriate integration of individual units of knowledge
C. Discovering one's identity as a future professional nurse	- Understanding nursing duties and developing a sense of responsibility - Realizing the meaning of genuine caring - Wanting to engage in self-study
D. Learning through repetition and mistakes	- Developing confidence through repeated experiences - Clearer demarcations between knowing and not-knowing - Reflecting on mistakes

4. Discussion

For the second-year nursing students, the simulation-based education program was their first experience of using textbook-based knowledge in a realistic clinical situation. They found the tasks unfamiliar and very challenging. However, it was an opportunity for them to understand how clinical nursing care should be provided. Although the high-fidelity simulation-based training was new to them, they were exposed to various aspects of real clinical situations that allowed them to apply their knowledge to complex situations. In the first encounter with actual clinical cases, the students had some negative responses, such as confusion and embarrassment in the unfamiliar environment. This is consistent with Kim and Suh's study [8] wherein the participants behaved as though the situation was real; they were surprised and amazed by the simulation and were too embarrassed to act logically. However, through the simulation experience participants learned standard procedures based on features of the actual situations that are also presented in textbooks, such as effective communication and interaction with patients. Due to its experiential nature, they better remembered relevant knowledge and skills acquired during simulation than those learned using typical teaching methods. Consistent with Lasater's observations [9], the present study found that by reenacting complicated clinical situations, simulation-based educational programs enable participants to have realistic experiences and vivid memories of task execution.

Since participants had no previous simulation training experience, they initially made several mistakes, as they were unfamiliar with the situation and embarrassed; however, through repeated practice and by attempting to resolve patients' nursing problems with their team members, they were able to build their confidence, which was reinforced through the session reviews and feedback. They maintained that they were able to respond more accurately and with more confidence when they faced a similar clinical situation after graduating. This finding is consistent with Shin and Shim's [10] and Yoo's [6] studies wherein nursing students' confidence improved after a simulation training on child nursing care and on emergency nursing care for newborn infants, respectively.

Consequently, the simulation-based education offered intensive integrated clinical situations to inexperienced clinical students. Through repeated and safe practices, students motivated themselves for further study while developing their confidence and sense of responsibility as future professional nurses. Instead of ordinary observation, which comprises the majority of typical clinical practice sessions, the students actively participated in and initiated situational assessments while integrating and applying the

separately acquired theories and knowledge. It was deemed that such a dynamic and effective program had a positive effect on the nursing students.

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