Original Article

Lived Experiences of Nursing Students Concerning Education in Simulated Learning Environments: A Phenomenological Study

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Abstract

Background & Objective: Simulation is one of the new learning methods in medical and nursing education that can lead to useful learning outcomes. This study aims to explain the lived experiences of senior nursing students about education in simulated learning environments.

Materials & Methods: This qualitative research was based on the phenomenological approach. To collect data, senior nursing students of both genders were purposefully selected and surveyed using in-depth and semi-structured interviews lasting from 40 to 60 min. The interviews continued until theoretical saturation after 15 interviews with the participants. Data were analyzed using Colaizzi's seven-step method. Data reliability and validity were assessed using the reliability criteria proposed by Lincoln and Guba (1985).

Results: In this study, the main themes include learning, support and technical factors, human factors, and advantages. As a new learning method, simulation encounters support, technical, and human barriers that can be overcome to achieve goals such as learning clinical skills, clinical judgment skills, increasing critical thinking, and improving patient safety.

Conclusion: Simulation is one of the methods that can develop and improve students' basic skills and help in deepening their learning. Nursing schools can provide the necessary provisions and facilities to improve the quality of curricula by expanding and integrating simulations into nursing curricula.

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Introduction

Healthcare systems are becoming more sophisticated increasingly and significant changes are observed in this area worldwide. Meanwhile, the major challenge for nurses and healthcare professionals is to help provide safer care in this highly sophisticated and insecure environment (1). Nursing is a comprehensive discipline that requires knowledge and skills in the cognitive, emotional, and psychological areas of learning. The training systems of these professions should be updated regularly to ensure proper and effective functioning. Therefore, the current information age necessitates paying attention to the progress in the fields of education and vocational training (2). According to scientific evidence, nursing education aims to prepare qualified and skilled professionals who can provide effective responses to the different needs of patients and their families. Healthcare safety is an ongoing and related problem as well as a concern for global and national health organizations (3). Nursing students who care for patients without full education in appropriate and prerequisite clinical competencies can pose patient safety to various risks. Simulation has been shown to improve students' communication, decision-making, teamwork, critical thinking, and clinical practice skills and develop their self-confidence (4). In addition, the World Health Organization (WHO) recommends the use of simulation-based education (SBE) programs to improve and ensure patient safety (5). Simulation in nursing education is nowadays a regular component in preparing nurses' clinical practice and a part of the curricula of most undergraduate nursing programs (6). Simulation is implemented in nursing schools worldwide, and its popularity has grown rapidly as it has the potential to replace clinical practice hours, improve healthcare safety, provide accessibility at all times and spaces, and ensure the availability of safe, inclusive

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learning (7, 8). Foronda et al. surveyed nursing students' preferences and perceptions in the United States and found that they preferred the use of simulation to complete clinical practice or enhance the understanding of case-based lectures. Learners stated that important learning points in simulation included patient assessment skills, patient care prioritization, and emergency patient care (9). In a Chinese study, participants educated by simulation gained significantly higher learning levels in nursing knowledge than control groups who were only exposed to traditional formal education (10). SBE is considered a key component in learning and preparing nursing students for practice and professional life (11). During the past decades, the use of simulation as an educational method and teaching strategy has expanded significantly in nursing education, aiming at filling the theory-practice gap through new and interactive educational strategies (12). Simulation training is an experiential learning process through which problem-solving techniques through self-reflection and feedback are practiced in a learning environment similar to real-life situations (13). Simulation can provide students with consistent, reliable, and valuable practical experiences (14), which are necessary to fill the theory-practice gap and help students to move toward achieving the expectations from them as graduates (15). Simulation training also allows trainees to practice frequently in a safe environment without adverse consequences and provides an environment where no harm occurs to real patients and students, even if students make mistakes during practice (16). Simulation is a potentially potent educational approach that engages students in learning, obliges them to use critical thinking and clinical reasoning, and provides an opportunity for reflective learning and the integration of students' knowledge (17). The WHO (2011) reported that simulation could assist in education because students would respond and learn better in a safe, supportive, challenging, and engaging learning environment. Additionally, simulation was found to have a positive effect on various educational outcomes such as self-efficacy, knowledge acquisition, and clinical performance (18). Research has also shown that SBE is useful and effective for students during their learning process. Positive results, including such benefits as improved decision-making and critical thinking, improved performance in clinical skills, and improved ability to perform in the clinical setting, were often reported in previous studies on simulation (19, 20). Warren et al. reported that students' knowledge and trust increased after SBE, and students were more satisfied with simulation as an educational method than other teaching and learning strategies (20). To achieve the advantage of simulation, students need to understand the basic rules for simulation so as to maintain motivation and self-direction throughout the activity (21). Schiavenato re-evaluated simulation in nursing education and demonstrated that nurses limited their understanding of simulation as a concept to such an extent that simulation was sometimes understood merely as the function of human patient simulation. After that, examining the students' views on different scenarios and simulation methods was considered to be important (22). It is important to address students' perceptions and attitudes, including assessing their mental state, beliefs, feelings, values, and feelings about simulation, because this assessment helps measure their readiness to participate in simulation and prepare effective educational programs for nursing students in a clinical setting (23). In principle, experiences, values, attitudes, and beliefs should underpin successful simulation (18). The literature on simulation contains extensive research on the SBE effects on the quality of students' outcomes in terms of their clinical competencies. However, there are few studies on the effect of students' attitudes toward simulation on their clinical practice. Furthermore, the study of students' experiences, attitudes, and perceptions can provide insight into their readiness to perform simulations as attitudes and perceptions impact their responses directly and dynamically, define their observation of situations, and determine their behaviors toward simulation (24). Given the lack of research in this field and the need to understand students' experiences, this study seeks to examine the experiences of senior nursing students regarding education in simulated learning environments.

Material & Methods

This methodical and qualitative research is based on a phenomenological approach. Phenomenology aims to understand the basic structures of experienced human phenomena through the analysis of verbal explanations of experiences from the participants' views. Phenomenology is the recognition of others or their experienced phenomena by hearing their own descriptions of their individual or mental viewpoints without the interpretation or intervention of the researcher's presumptions about that person or experienced phenomenon; accordingly, the researcher moves from objectivity to abstraction. In this study, the statistical population consisted of senior nursing students of both genders who experienced using simulated learning environments. For interviews, students were selected using the purposive sampling method. Senior nursing students who passed at least six credit units in simulation centers or clinical skill centers were included as participants in this study. Data were collected after obtaining permission and approval from

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the officials of the School of Nursing. Interviews were conducted through prior coordination with students and their agreement on this issue. Interviews were held in a place by maintaining privacy and silence to provide the greatest comfort and satisfaction to the participants. Open-ended questions were used in this study. The duration of interviews ranged from 40 to 60 min, and students were assured of confidentiality. The interviews continued until theoretical saturation after 15 interviews with the participants. The interviews lasted about a month. Research data were collected using in-depth and semi-structured interviews. In the end, each interview was listened to several times and transcribed verbatim on paper. The transcribed texts were coded after repeated reading. Data were analyzed based on Colaizzi's seven-step method (careful reading of all descriptions and important findings of participants, extraction of important phenomenon-related phrases and sentences, the conceptualization of important extracted sentences, grouping participants' descriptions and common concepts into specific categories, converting all inferred ideas into exhaustive and comprehensive descriptions, converting complete descriptions of the phenomenon into a real, concise description, and returning to participants to clarify the obtained ideas and validate the findings). Data reliability and validity were assessed using the reliability criteria of Lincoln and Guba (1985). For the validity index, the interviews were conducted by the researcher and confirmed by the interviewees after the interview. Specialists and experts not involved in interviews were used for the transferability index. Recording, documenting, and accurate step-by-step research were used for the confirmability index. Recording details during interviews and research was used for the credibility index. For ethical considerations in this study, the necessary explanations about the importance and objectives of the research were provided to the participants who presented their consent to participate in the research. After recording the interviews, they were explained their voluntary withdrawal from the research. The complete researcher's details were informed to the participants. The privacy and comfort of the participants were provided during the interview. Participants' personal details were kept confidential, and they were assured that the audio file would be deleted after completing the transcripts. Extracted contents from each interview were shared with participants, who were notified that they could be willingly informed of the research results.

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Table 1. Characteristics of participants in the research

Row	Major and degree	University	Interview type
1	Graduate Student in Nursing	Tabriz University of Medical Sciences, School of Nursing	In person
2	Graduate Student in Nursing	Tabriz University of Medical Sciences, School of Nursing	In person
3	Graduate Student in Nursing	Tabriz University of Medical Sciences, School of Nursing	In person
4	Graduate Student in Nursing	Tabriz University of Medical Sciences, School of Nursing	By phone
5	Graduate Student in Nursing	Tabriz University of Medical Sciences, School of Nursing	In person
6	Graduate Student in Nursing	Tabriz University of Medical Sciences, School of Nursing	In person
7	Graduate Student in Nursing	Tabriz University of Medical Sciences, School of Nursing	In person
8	Graduate Student in Nursing	Tabriz University of Medical Sciences, School of Nursing	In person
9	Graduate Student in Nursing	Tabriz University of Medical Sciences, School of Nursing	By phone
10	Graduate Student in Nursing	Maragheh University of Medical Sciences, School of Nursing	In person
11	Graduate Student in Nursing	Maragheh University of Medical Sciences, School of Nursing	In person
12	Graduate Student in Nursing	Maragheh University of Medical Sciences, School of Nursing	By phone
13	Graduate Student in Nursing	Sarab University of Medical Sciences, School of Nursing	In person
14	Graduate Student in Nursing	Sarab University of Medical Sciences, School of Nursing	By phone
15	Graduate Student in Nursing	Sarab University of Medical Sciences, School of Nursing	In person

Table 2. An example of the coding and extraction procedure of the classes

Main class	Subclasses	Open codes
Manpower	• Lack of simulation specialists • Unfamiliarity of faculty members • Lack of faculty support • Lack of interest and eagerness	Many professors do not believe in simulation at all, and students use only traditional methods for teaching because they are not familiar with the benefits and capabilities of these environments. Professors are not interested in using simulation environments in education, and due to lack of education and up-to-date conditions, they rely on traditional classrooms and resist changes in technology and new teaching-learning methods. In the case of using simulation centers, we sometimes did practices and activities without training or guidance, without anyone guiding us. The faculty should provide the necessary support and pressure for faculty members to use simulated learning environments in student education.

Results

The study and analysis of qualitative interviews using Colaizzi's method resulted in 16 sub-themes, which were included in four main themes, namely learning, technical and support factors, manpower, and advantages.

Learning

1. Deep and sustainable learning: In simulation-based learning, students are active and involved in learning, and this involvement is the presumption of deep and sustainable learning.

"In simulated learning environments, we can practice what we have learned in classrooms, and this practice enhances and consolidates our skills. Our learning in these environments is much higher than the theory lessons we read in classrooms."

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2. The gap between theory, clinical setting, and learning transfer: Simulation is one of the ways to engage students with learning experiences, allowing them to live with what they have learned and become one step closer to bridging the theory-practice gap.

"By education in simulated environments, we get rid of the dull and theoretical lessons taught in classrooms. "Simulation can be a bridge between these lessons and the work done in the clinical setting. We first do many times the work that we have to do in the real clinical setting in the simulation environment so that we do not have problems in the clinical setting."

3. Attractive learning: Simulation also makes learning attractive by creating an interactive environment and reducing anxiety and stress.

"In normal classrooms, the dull environment and limited communication make the classroom environment without the necessary attractiveness, but a simulated environment is more attractive than a real clinical setting and a classroom due to the absence of the serious clinical setting and the dullness of the classroom environment."

4. Satisfaction with learning: Learners' satisfaction is one of the critical and effective variables in motivation, academic achievement, and attachment to the educational environment. Satisfaction is a purely subjective concept that expresses the pervasive emotional response in relation to the experiences obtained in dealing with a service or product.

"I feel satisfied that there is a place where I can fearlessly practice and master what I have learned in the classroom before entering the clinical setting. It is very pleasant that I learn well and have less stress when I make a mistake."

Technical and support factors

1. Unsuitable physical space

"We expected the simulation learning environment to be exactly the same as or, at last, similar to the clinical setting so that we could practice the skills needed in the clinical setting. Unfortunately, the tools and equipment were old and the space was very different from what we see in the clinical setting."

2. Low and insufficient equipment

"In the simulation center, only basic equipment is at hand, and the needed equipment that is frequently used in the clinical setting is not available. Even when the equipment breaks down, it takes a long time to replace it, and this replacement is not applied for expensive equipment."

"In the area of simulation, fully tactile and smart models are now used in the world, while we use old mannequins in our simulation environments."

3. Improper technical support

"A mannequin, which was expensive as denoted by the professors, has remained unused due to the unfamiliarity of the simulation instructors and the lack of support, and they cannot even repair damaged mannequins."

Manpower

1. Lack of simulation specialists: The training will not have a good quality level when simulation specialists are absent in simulated learning environments and clinical skill centers.

"Sometimes we did exercises and activities in the simulation center without training or guidance, without anyone guiding us."

2. Unfamiliarity of faculty members: Unfamiliarity of faculty members of universities with simulators and their use, the need for training, and resistance to changing the conventional teaching method into simulation are some other challenges facing the use of simulation in nursing education.

"Many professors do not believe in simulation at all, and students use only traditional methods for teaching because they are not familiar with the benefits and capabilities of these environments."

3. Lack of faculty support: The support of the university and the faculty in terms of education and equipment is a major reason for the success of simulated environments in the education of nursing students.

"The faculty should provide the necessary support and pressure for faculty members to use simulated learning environments in student education."

4. Lack of interest and eagerness: Faculty members are not interested in using these environments for various reasons such as unfamiliarity, improper education, etc.

"Our teachers are not interested in using simulation environments in education at all, and due to lack of education and up-to-date conditions, they rely on traditional classrooms and resist changes in technology and new teaching-learning methods."

Advantages

1. Reduction of anxiety and stress: The implementation of simulated scenarios by students in special situations makes them gain experience, develop their skills, and achieve the necessary competence without fear and anxiety (due to injury to patients).

"We did not fear for the patient to be harmed or we would make a mistake in simulated environments, and this allows us to practice and acquire skills without anxiety and stress."

2. Learning clinical skills: Practice and repetition in a simulated environment can make students acquire proper skills and provide appropriate practices in caring for real patients in the clinical setting.

"We practice frequently in a simulated learning environment, and because there are no limits on practice and repetition relative to the clinical setting, we do the necessary exercises to gain skills and mastery."

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3. Clinical judgment skills: Clinical judgment is one of the key features of professional clinical practice and one of the essential competencies needed for safe and effective care, decisions, and diagnoses in the nursing profession. Clinical judgment in nursing includes complex words in relation to such words as clinical decision-making, critical thinking, clinical reasoning, intuition, nursing diagnoses, nursing process, and problem-solving. Applying a simulation method in nursing results in the development of students' knowledge, skills, and functioning. Students achieve high levels of critical thinking through practice and attain new professional skills without harming real patients.

"Simulation is a clear example of 'practice makes perfect'. When I practice and repeat a skill over and over again, I get more ability in that skill, and that ability at last builds in me a sense of self-confidence and decision-making power in critical situations."

4. Increased critical thinking: Students attain high levels of critical thinking through practice and obtain new professional skills with no damage to real patients.

"We have mastered by facing lots of stress-free exercise in simulated environments, and then we can fully analyze activities and even comment and evaluate our friends' practices."

5. Improving patient safety: Simulation is characterized by providing a safe and controlled environment that is appropriate for learner-oriented approaches. Besides, it can lessen the traditional ethical problems of medical and nursing education by reducing patients' exposure to inexperienced trainees.

"A problem we face in the internship is the real clinical setting in which we sometimes attend after theory classes, and dealing with patients is too tough for us; this difficulty and stress increases our mistakes."

Table 3. The main themes and sub-themes of students' experiences

Main class	Subclass
Learning	Deep and sustainable learning
	The theory courses-clinical setting gap and transfer of learning
	Attractive learning
	Satisfaction with learning
Support and technical	Inappropriate physical space
	Insufficient equipment
	Improper technical support
Manpower	Lack of simulation specialists
	Unfamiliarity of faculty members
	Lack of faculty support
	Lack of interest and eagerness
Advantages	Reduced anxiety and stress
	Clinical skills
	Clinical judgment skills
	Increased critical thinking
	Improved patient safety

Discussion

The findings of this study were obtained from the experiences of senior nursing students about education in simulated environments, which were classified into four main themes. The first theme was learning, including deep and sustainable learning, the theory-practice gap, the transfer of learning, attractive learning, and satisfaction with learning, which is consistent with those of Bisholt & Abelsson (25) and Berragan (26). With simulation, nurses, students, and other health care professionals are provided with the opportunity to learn in a controlled learning environment where they are able to deal with a real patient (4); it transfers students' knowledge and skills from the classroom and laboratory to realistic interactions with the patient. A reason for the theory-practice gap is the distance of knowledge from a real-like environment. Simulation allows students to link their ideas to practice and research and help them connect what they receive in the classroom to what they experience in the clinical setting or in-patient care. In addition, simulation helps prepare students for the nursing profession and provides effective learning methods in numerous areas, including cognitive

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knowledge acquisition, self-confidence, self-sufficiency, clinical decision-making, clinical skills and practices, leadership skills, communication skills, and teamwork skills (27).

The second theme was technical and supportive factors, including the themes of unsuitable physical space, low and inadequate equipment, and lack of appropriate technical support, which agree with the results of Campbell et al. (28) and & Kunst et al. (29). Simulators are expensive mechanical tools driven by computer equipment. Since the best educational outcomes from the simulation method are obtained when about 5-10 students participate in each simultaneous experiment, it is not possible to allocate one or more rooms to achieve educational purposes. Therefore, sufficient physical space to create a simulation center in universities is a priority, and the shortage of physical space in universities can be considered a challenging issue. Other citable problems include limited access to simulation for all members and resistance of group members to changing the current teaching method toward using simulation. On the other hand, education members need to be taught the use, control, and repair of mannequins and computer programs. Besides, mechanical tools must be controlled and repaired by the manufacturer's support team. These services, alongside the need for people with technical skills and computer literacy, can intensify the challenges of using simulation in student education (30).

The third theme was manpower, including a lack of simulation experts, faculty members' unfamiliarity, lack of faculty support, and a lack of interest, which corresponds to research by Sawaya & et al. (31), Campbell & et al. (28), and Morgan & et al. (32). As with other methods, the use of simulation in nursing education is accompanied by challenges. A major challenge is to educate instructors in the area of simulation equipment, including computers, related software programs, and making mannequins. Instructors should have a pleasant feeling about using all simulation technologies and finding appropriate methods to integrate the simulation into their curricula (33). The students' learning extent in simulation depends on the effectiveness of the instructors and the design. Learning outcomes should be defined beforehand so that simulation can be used to achieve these outcomes. Evidence indicates that students with more involvement in the simulation process more probably achieve learning outcomes. This is because students have the opportunity to make meaningful links to the content, and this connection leads to the achievement of learning objectives and course capabilities (34).

The fourth theme was advantages, including reduction of anxiety and stress, learning clinical skills, learning clinical judgment skills, increasing critical thinking, and improving patient safety, which is in agreement with those of Curtis (35), Berragan (27), and Jani Ghorban et al. (36). Applying the simulation method in nursing can result in the development of knowledge, skills, and performance of students in this discipline. Students achieve high levels of thinking through practice and attain new professional skills without compromising patient safety and health (21). Hammer (2014) believe that simulation in nursing education can lead to more control over students' learning environment. Simulation is also a method to engage students with learning experiences, allowing them to live with what they have learned and take a step closer to bridging the theory-practice gap (37). The use of simulators varies in nursing programs and includes guiding a novice student in practicing basic skills to manage complex scenarios. Through simulation, students can perform simple methods, such as disease diagnosis and their introduction, to very complex methods, including catheter placement or wound care. They can accomplish advanced scenarios that require critical thinking and risk in the learning environment through simulation both in groups and individually. Simulation scenarios can be presented after a lecture or class. The content can be repeated to master skills and increase self-confidence. In these simulation scenarios, students have no fear of harming a real patient (38). Applying the simulation method in nursing results in the development of students' knowledge, skills, and performance. Students achieve high levels of critical thinking through practice and acquire new professional skills without harming real patients (39). Implementation of simulated scenarios by students in special conditions makes them gain experience, develop their skills, and achieve the necessary competence without fear and anxiety (because of injury to patients). As a result, using this method in nursing provides safe care and favorable outcomes for the patient (40).

Conclusion

Nurses are nowadays facing complex health care settings and require problem-solving skills, good clinical judgment, clinical reasoning, and decision-making. Accordingly, simulation is a technique that can develop, improve the needed basic skills, and help deepen their learning. Students generally expressed their satisfaction with simulation as an educational method as it improves their competence and prepares them for professional practice. They mostly criticized the lack of facilities and no interest and familiarity of professors with simulation. Finally, nursing schools are recommended to provide the necessary arrangements and facilities to improve the quality of curricula by the

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expansion and integration of simulation into nursing curricula.

Limitations

Lack of sufficient Iranian studies on simulation in nursing education, nursing students' insufficient familiarity with the simulation method, coincidence of the research with the COVID-19 pandemic, and caution in the generalization of the findings due to the use of qualitative methods are the main limitations of this study. Finally, colleges are recommended to develop equipped simulation centers and laboratories to complete clinical education. Besides, the government and the ministry should provide the necessary financial support to develop simulation centers. Students should be provided with incentives to use simulation centers, and changes should be made in nursing courses to integrate nursing curricula into the simulation.

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Conflict of interest

There is no conflict of interest for the authors in the present study.

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