



Undergraduate Nursing Students' Perceptions of High-Fidelity Simulation-Based Learning

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Abstract

Because of the growing expectations for novice nurses to be adequately prepared to work in complex healthcare settings, pressure has dramatically increased for nursing schools to deliver better training. Nurse educators must explore innovative teaching methods to link the gap between knowledge and practice in order to enhance the students' ability to function as competent nurses. Researchers stated that simulation has the potential to help nurse educators better train students, especially when faculty members understand issues connected with students increased preparedness for actual clinical environments. The use of high-fidelity simulation has been increasing in the nursing curricula internationally; however, high-fidelity simulation in the nursing classroom is still new in Taiwan. It is important to understand students' simulation learning perceptions in order to formulate appropriate learning techniques.

This preliminary study used in-depth interviews to explore nursing students' perceptions regarding their learning associated with the use of simulation. 29 senior undergraduate nursing students had completed one semester of elective simulation course. 13 out of the 29 volunteer students were recruited to participate in formal interviews. The interview data analysis was retrospective; following a traditional framework for qualitative data analysis. Three themes were identified from the analysis: beginning to feel like a nurse; making more comfortable in real world; and feeling stressed during implementation the simulation scenarios.

Students generally have positive simulation learning experiences. In particular, they value the opportunity to apply theoretical principles of nursing care in a safe environment and develop skills in assessment, psychomotor activity, problem solving, decision making, and collaboration with others. Simulation can be used as an adjunct for clinical practice, not a replacement for everyday clinical practice. This study is significant because by exploring and filling the literature gap in relation to simulation education among pre-licensure nursing students in Taiwan.

Keywords

Learning perception, Novice nurses, Senior undergraduate nursing student, Simulation

number of intensive care units that specialize in cardiac vascular care, respiratory monitoring, and an overall high-risk health care environment. Because of the growing expectations for novice nurses to be adequately prepared to work in complex healthcare settings, pressure has dramatically increased for nursing schools to deliver better training. In Taiwan, newly graduated nursing students account for more than one third of nurses' turnover within 3 months [1]. High turnover rate brings low quality of patient care, jeopardizes patient safety and costs hospitals a fortune [2]. Berkow and colleagues [3] stated only 25% to 35% of newly graduate nurses meet expectations of employers for clinical judgment and have difficulties applying theoretical knowledge and nursing skill into practice. The major reason for novice nurses leaving their job is because a lack of competency including skill performance; responding appropriately to emergencies and communication with healthcare team members [4]. Present issues, such as awareness of patient safety, shortage of nurse staff, inadequate preparation for the complex health care setting, has encourage nurse educators to explore innovative teaching and learning methods to enhance students' clinical competency [5]. Numerous studies suggested nursing laboratory experiences could possibly be used as an alternative to the clinical experiences for students [6-8]. Therefore, simulation have the potential to help educator better prepare students for building nursing skill necessary for competent patient care.

High-fidelity simulation has frequently being used in nursing education and training programs since 1911 in the USA [9]. However, in Taiwan, simulation in nursing education started at the National Taipei University Nursing and Health Science in 2001 [10]. During the decades, nursing educators adopt simulation techniques to implement training for critical care, obstetric care, emergency area, physical assessment skills and communication course. The simulation scenarios occur in controlled learning laboratory settings which replicate the clinical practice environment and booster learner competence in knowledge and skills and the application of knowledge to patient care without jeopardizing patient safety [6,11,12]. Therefore, providing realistic situations for training nursing students in a risk free learning environment has potential for benefiting students' learning perceptions and quality of patients' care. Yet, there has been little research on undergraduate nursing students' perception of simulated clinical experience in Taiwan. The purpose of this study was to explore the perceptions of senior

Introduction

Hospitals are becoming more complex with an increase

undergraduate nursing students of high-fidelity simulation in order to formulate appropriate learning techniques.

Methods

Methodologically, this was a qualitative focused and case-based research to explore senior undergraduate nursing students' perceptions of high-fidelity simulation-based learning. As mentioned previously, simulation has been widely used in a variety of ways in the practice setting; however, there is not currently one universally accepted framework or theory in use [13]. Although there is not a common simulation framework, most simulations follow a similar design. The International Nursing Association for Clinical Simulation and Learning (INACSL) has developed a series of definitions for use in simulation as well as a set of 7 Best Practice Standards [14].

The clinical scenario provides the context for the simulation and the design of simulated scenario is incorporated INACSL standards to develop and build the course content and facilitate the simulations.

In this study, a simulation program was developed to target senior undergraduate nursing students. The elective simulation course was supported by capital funding. At the time of the study in 2013, the university had seven simulation programs, five of which were focused on new graduates and different types of work environments such as critical care, acute care and obstetric ward. Each program included several scenarios, lecture/practice, and debriefing. The scenarios included respiratory arrest, postpartum hemorrhage, and acute changes in mental status. Each scenario included a learner and faculty guide. The researcher and simulated faculty members as well as a full-time simulation assistant practiced actual simulation scenario.

The study was conducted at a nursing learning laboratory of the university in Taipei. The university of College of Nursing began a high-fidelity simulation elective course in 2013, 29 senior bachelor nursing students enrolled the course; they came to a laboratory setting (a hospital-like room with a computerized high-fidelity simulator) on 1 morning per week, in addition to required 4 days per week of clinical practices in a hospital.

In the class, students were divided into 4 teams and participated in a scenario. Each simulation session included two phases. Prior to the simulation each team received scenario objectives and had 15 minutes to complete scenarios. Students worked together to provide care for the simulator through the scenario. At the same time, the other students could observe the live action. During the second phase, or debriefing, verbal feedback on the performance of each student team was provided immediately following both scenarios and 15 minutes was offered to answer any questions and debrief.

Participants

Purposive sampling was used in this study [15]. The inclusion criteria were: (a) senior undergraduate nursing student who completed the simulation-based course in the university, (b) willingness to share their learning experiences. All participants were assured of confidentiality and given the option of withdrawing from the study at any time. A total of 13 volunteer students were recruited to participate in individual interviews, to satisfy the principle of saturation [15].

We recruited students after their class grades completed and sent to the administrative office to avoid the teacher-student power imbalance [16]. The author explained the purpose of this study, the interview questions and the duration of expected interviews. The participants received consent forms before interviews, and there was an opportunity for questions before the students signed it. All participants were allowed to withdraw from the study at any time and assured them that the data would be kept confidential. A digital recorder was used to record the interviews with the permission of the participants.

Data Collection

Individual in-depth interviews took place in a private and

Table 1: Questions to guide the in-depth interviews.

1	How do you think that working with the scenarios in the simulation laboratory helped develop your clinical ability?
2	What was most helpful in the simulation session as you reflected on your simulation experience?
3	Describe some of your thoughts during the simulation experience?
4	During what part of the high-fidelity simulation experience did you learn the most about the priority of patient care?
5	Is there anything else you would like to discuss that we have not covered or asked about regarding the simulation experience?

quiet room to ensure confidentiality and facilitate exploration of participant feelings and thoughts. The length of each interview ranged from 50 to 85 minutes. The students were asked to reflect broadly on their clinical practice experience in light of participating in the high-fidelity simulation-based learning scenario. Each interview was asked the same question to start: 'why undertake the elective course?' A second question was asked later in the process "what do you think simulation course achieve?' Further follow up questions were used as required for clarification. Field notes were recorded simultaneously with the procedure to record information about the perceptions of high-fidelity simulation.

An interview guide was prepared that aimed to encourage participants to describe their perception of learning (Table 1). Open-ended questions were used to occasionally clarify the intent or meaning of a student comment.

Data Analysis

The interview data were transcribed to produce verbatim transcripts by author. The study used Creswell's steps to organize the data [17]. All interview transcripts and field notes were read repeatedly. Throughout this process, any words or phrases that stood out as being meaningful were highlighted and returned to these many times as author moved between the parts and the whole. The coding was to enter the abbreviated code names with the text and file name. These codes were grouped into categories and themes to facilitate abstraction. After many viewings and readings of the notes, three main themes were generated including beginning to feel like a nurse, making more comfortable in real world and feeling stressed during implementation the simulation scenarios.

Rigor

To enhance the trustworthiness of the findings, credibility, dependability and confirmability were established [18]. To ensure credibility, the author is a nursing educator for more than 10 years. The researcher's background and experience enabled her to build trust with students when discussing their learning experience. The whole process of this study was conducted in Chinese. Member checking was achieved during the interview process, at the conclusion of interview, and during the second interview with students. During the interviews, I restated and summarized information to determine accuracy [18]. Furthermore, verbatim quotations are used during presentation of findings to allow readers to judge the veracity of the work [19].

Results

All of the participants responded positively the simulation experiences. It showed that students became more self-confident in the clinical area as a result of their simulation experiences. This finding is supported by numerous other research studies and is considered one of the great benefits of simulation. Three themes were identified from the analysis: beginning to feel like a nurse; making more comfortable in real world; and feeling stressed during implementation the simulation scenarios.

Beginning to feel like a nurse

These students participated in various roles for simulation scenarios. The roles were alternated to give them the opportunity to be an observer and a care giver. Students viewed the experiences as forcing them to think about the priority of nursing care and potential

interventions available. Simulation offers nursing students the opportunity not only to practice clinical nursing skills, but also the chance to begin to learn how to be a nurse. For example, student A stated:

The simulation sort of speeded up the [learning] process by bringing into focus on patients' scenario, there are certain things that I can do it and know how to do.. I found that during my clinical practice made me think about what I am doing... from that day I am really thinking about what I am doing.. I feel like I am a real nurse.

The simulation course may help students imprint clinical practices or procedural skills from the class. Student stated (Student E):

I learned to care for a COPD patient from the [simulation session] class. How coincide, I went back to the clinical practice next day, the patient with the same condition and I found I could perform the nursing skill without asking senior [nurse staff]... I felt so much confidence to care for the patient independently.

Students were to use the same approach they learned in the simulation when caring for a patient whose condition was similar to simulation scenario. Again, one student noted: *When teachers gave me very clear about errors made in the debriefing, that makes me feel better because I feel like I am getting clear [information] about what is correct that I can bring with me into future real-life situations.*

All of the students reported that the use of high fidelity simulators to train them once a week, might improve their clinical performance while going back to clinical practicum in hospital. They indicated that simulation-based learning session enabled them to learn essential nursing care skills and practice safely at the bedside.

Making more comfortable in real world

Most of students reported that unlike conventional teaching methods, the simulation-based class made learning more enjoyable, useful, and practical while in some way tense. Analysis of the data also showed that participants felt that the course made students easy to learn nursing principles and concepts relevant to patient care. Students B expressed:

I think these (simulations) are nice...they are like ...little sort.. bits of really intensive learning from clinical setting...so real...I recalled the scenario I have seen from the class...if things happened again I would know how to deal with it ... I knew I have prepared myself better than before...I feel comfortable when dealing patient well...

Supportive responses from both head nurse and patients enhanced nursing student self-confidence as well as learning motivation. Student G stated:

Head nurse said to me that I am a smart student...she asked me to apply this unit when I am graduated....

One student felt confidence because she was able to repeatedly practice many basic skills and more prepare for the health care setting.

I was so happy when a family member of the patient ask me to teach her how to do chest percussion for her mum, she was thankful for what I have done to her mum...I think I learn the physical assessment skills from the [simulation] course.

She added:

While during the simulated class I make some misjudge... miscommunication with physicians...[I] didn't know how to talk to physician via phone. I feel so nervous to talk to physician, especially through telephone conversation..., however, I was surprised when I return to clinical practicum I was not that afraid to answer question via telephone...most significantly, I found I am getting used to hand over to senior [nurses]; I think this is a big step toward...the real...I know what is going on And get used to the surrounding of the hospital and routine.

Other students reflected on the benefits of simulation learning, such as *work with the patterns of nursing routine...help with knowing how to work fast...*

Gaining comfort in the real clinical setting was addressed by some students whose confidence was increased by practicing the simulation scenarios. The simulation experience allowed students to reflect on how they would respond to similar situations when they provide patient care. One student noted: *the more simulation experience I gain, the more confident I feel while going into clinical setting.* Students appreciated the opportunity to practice nursing intervention repeatedly in a less threatening environment. Patient safety may improve as students learn from the mistakes they make. They mentioned the best part of the simulation learning was to *make mistake without hurting anyone.*

Overall, students believed simulation was an innovative strategy that has potential for developing clinical competency and increasing self confidence.

Feeling stressed during implementation the simulation scenarios

Most students reported that because high fidelity simulators were capable of producing life-like physiological responses, the simulators could prepare them to respond better to emergencies and other life-threatening situations. Specifically, students felt that using high fidelity simulator increased their auscultation skills and that they were more focused and aware during the learning process, although the process was stressful. For example, Student C reported:

The simulation... was kind of challengingso many classmates watched what I was doing. I was so stupid... and I was feeling stressed especially during resuscitation training.....

While students felt stressful, they mentioned the experiences learned from the course were valuable and realistic. Moderate stress levels may facilitate performance of technical procedures. Although most of students felt stressed out during simulation, they will be less nervous in the clinical setting when caring for similar patients, because of the replicate practice.

I used to feel I am a "hindrance", I didn't know where I should be standing and reminding myself not to obstruct the way of nurse or physicians, especially during emergency episodenow...[while I went back to the clinical practices], I knew what the physician and nurses to do during the CPR. Sometime I can help senior [nurse] to pass some stuff....

All the students knew that they must learn resuscitation skills otherwise they would feel unprepared in the real environment. Students in this study also reported that because simulator was able to replicate normal as well as abnormal respiratory breath sounds, heart sounds, and bowel sounds, this technology could very well serve as an excellent training tool to enhance their assessment skills.

Besides, some students felt awkward to work with classmates from the commencement of the course. The ambiguous nature of simulation, that is, the frustration of anxious and stupid feelings, yet over time increased learning and awareness. One student stated learning from other classmates facilitated the process of learning.

Student F expressed: *During the simulation session I could learn from classmates...I was thinking if I were doing the scenario if I would be doing the same way...watching classmates doing the assigned scenario...I think I was not the only one who did not know how to deal with patients' condition. I would feel more relax...haha... I am not 'lonely'...*

Student F expressed further: *All the time, we [students] thought over the scenario... sort of brainstorming.... We discussed how to take care for the patients. It's quite fun and helpful...this is what we called team-building spirit...*

Most students valued the skills practice in team-based simulations. Learning by doing and learning from others is an advantage particular applicable to simulation learning. Interestingly, students felt stressed out during simulation session; on the other hand they felt support and connected with their team members. This would reinforce the

simulation learning and have the best opportunity to strengthen the communication among team workers.

Discussions

This preliminary study offered valuable insight into the use of high fidelity simulation-based model as part of their preparation for clinical practice. Learning method used in a smaller simulation-based class provided greater opportunities for hand-on learning, less attention on spending time reading class materials, and more time to building interactive communication skills. Students value the opportunity to apply nursing knowledge and skills to patient care. These findings are similar to those of other studies noted that simulation is an innovative strategy that promotes active learning and has great potential for developing clinical competence and increasing confidence prior to clinical practice [10,11].

Over time, the patient care model shifted from doctor-centered to a multidisciplinary. Most nursing students are not well prepared to work with team-centered approach. Findings from these studies suggest that nursing students lack experience in communicating with multidisciplinary and patients [20,21]. Students in current study described how engaging in simulation course increasing their confidence with team work communication and therefore, developing clinical competence. These finding are supported by Watters et al. who found an increased confidence in health care setting after attending simulation course [22]. Similar finding were reported by researchers who discovered that novice nurses were significant improvement in knowledge, confidence and performance on actual patient care [23].

Again, this study support the issue in term of the transition from students to nurse staff has been recognized as a challenge issue for many nursing students [24]. Novice nurses at this level often feel they are insufficient prepared as lack of confidence, discomfortable with interdisciplinary and patients communication strategies, and identity priority for patient care [4,25,26].

Berragan stated that participants found that using high-fidelity simulation based learning instead of traditional learning methods, made learning more realistic and gave them more of an opportunity to link learning to what they experience in the clinical setting [6]. This is similar to the “*replicate practice from the simulation laboratory is able to apply to the clinical practice settings*” coding in this study. The difference between the traditional lecture learning methods and simulation based learning course is that traditional training programs relied heavily on memorization and not on the transfer of knowledge and skills derived from conceptual learning and critical thinking [25].

Key division of simulation design for educator is a need to coordinate the simulation to clinical reality and the relevant curriculum [23]. Findings suggest that it is important for nurse educators to be clear and precise about the perceptions of the simulation based learning pedagogy. The use of simulation in educating enable student to practice necessary skills in a controlled environment that allows for unthinkable errors and applicable learning experiences from simulation to clinical practice. The result of study is consistency with Taplay et al. [11], when individuals perceived a particular teaching strategy to be useful and personally relevant; there was greater likelihood that the individual would successfully integrate the acquired clinical skills and theoretical principle into their job performance. This study supports the use of simulated scenario as teaching and learning strategies in an undergraduate nursing curriculum [11,22]. Simulation-based learning course offers nursing student the opportunity not only to practice clinical nursing skills, but also the chance to begin to learn and explore how it feels to be a qualified nurse.

While many students described their experiences of the simulation design as support, problem solving and broad horizon, some students viewed the simulated experience as stressful. This can play an essential part in making the transition to the real setting as smooth as possible, to reduce the reality shock of actual health care environment. In this study, the students work with their classmates who have different

learning skills, cultural background, problem-solving strategies, and personalities. The diverse groups promote student learning to each other. These differences force them to deal with conflicts and interact with others while they are only nursing students. It is obviously enough for nursing student to fully experience the clinical environment or develop role identity as a nurse. This development of professional identity is important enabling the student to begin to understand the complexities of nursing [25]. The result is consistent with previous studies, for example, Everett-Thomas and Lucas et al. highlighted that theoretical basis of simulation as an effective pedagogical approach for nurse education and enable students to learn to be well prepared nurses [8,23].

Everett-Thomas et al. described simulation as a strategy bridges the theory and practice gap enabling students to link theory to practice during practicum in clinical care setting [8]. Results of this study found some of the students had positive simulation learning experiences in terms of promoting collaborative learning, fostering self-confidence and better prepared them while going back to clinical practicum in hospital. The result is consistent with previous studies which evaluate the outcomes of simulated clinical course [12,22]. Information from this study may be useful to develop learning interventions and educational curricula. More research is needed to evaluate whether the skills learned through a simulation experience transfer into real-world settings.

Conclusions

Students felt more confident during their clinical practices. They valued the opportunity to be trained in a safe environment to improve their clinical performance while going back to clinical practicum in hospital. The simulation course has opened up a new application in nursing curriculum. This study would motivate nurse educators to increase the use of simulation in their nursing education setting. However, the teaching methods could be used as an adjunct for clinical practicum, never replace time spent with patients. This study is significant because by exploring and filling the literature gap in relation to simulation education among pre-licensure nursing students in Taiwan.

Limitations of the Study

The sample size in this study was appropriate for the nature of qualitative study. However, the limitation of all students at the same university is recognized. In addition, the researcher is a faculty member may also have had an effect on how students answered the questions in the interview. This is a possible limitation of this study.

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Ethics Approval

This study sought ethical approval from the Taipei Medical University Ethics Committee and all participants gave informed consent before taking part.

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