

The Impact of Simulation-Based Learning on Undergraduate Nursing Students' Satisfaction and Self-Confidence at the Sultan Qaboos University in Oman

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Abstract

Simulation-based learning has been implemented in nursing education to help students experience the real world of nursing, increase their self-confidence, and allow them to practice safely. Through simulation practice, students can be exposed to different patient care situations without waiting for opportunities to arise at their clinical placement. This study aims to explore students' satisfaction and self-confidence as learning outcomes associated with the simulation experience through the lens of the Jeffries theoretical framework. A descriptive correlation study was conducted from October to December 2020 at the College of Nursing in Sultan Qaboos University in Oman. A convenience sample of 52 nursing students in their fourth and fifth academic year were recruited for the study. Student satisfaction and self-confidence in learning instrument was adopted from the National League for Nursing (NLN, 2006). The Statistical Package for the Social Sciences (SPSS) version 26 was used to analyze the data. Overall, the respondents from both academic years were satisfied with simulation practice as a learning method, and students' self-confidence was found to improve by learning through simulation practice. No significant relationship was found between students' satisfaction and demographic data, including age and gender. Students' self-confidence was found to have a significant relationship with students' age only. The results of this study indicate that simulation-based learning is an effective method in nursing education.

Keywords: simulation-based learning, undergraduate nursing students, simulation impact

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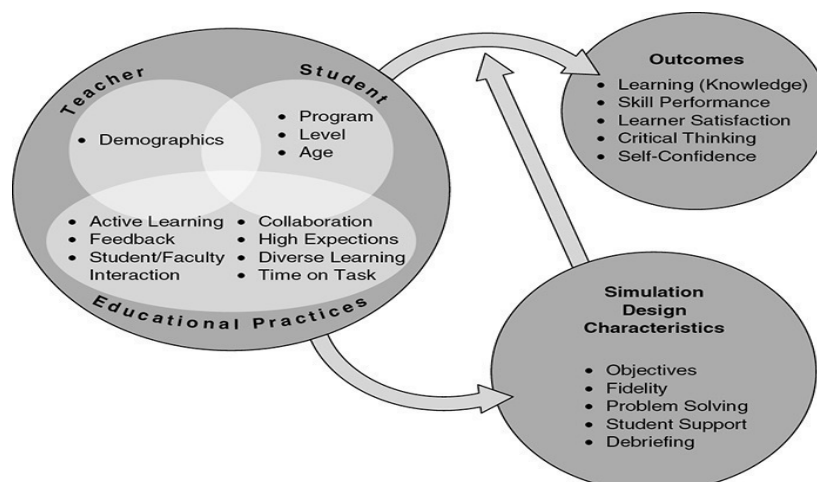
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1. Introduction

Globally, nursing education faces barriers that make it difficult to bridge theory and practice. As the main component in nursing education, clinical practice allows students to develop their skills and apply their knowledge in real-life situations (Lee et al., 2018). However, challenges exist, such as short patient stays at hospitals, patient safety issues, shortage of clinical preceptors, and some hospital policies that do not allow students to practice, limiting their role to observation only (Tawalbeh, 2017). Simulation-based learning has been implemented in nursing education to help students experience the real world of nursing, improving their self-confidence and allowing them to practice safely (Lee et al., 2018). Simulation also allows nurses to improve their competency and maintain patient safety (Gore & Thomson, 2016; Robinson & Dearmon, 2013; Terzioğlu et al., 2016).

The significance of simulation practice in nursing education has been studied widely. Several studies have been conducted to evaluate the effectiveness of teaching nursing students using a low-, medium-, or high-fidelity simulations (Gore and Thomson, 2016). Durham and Alden (2012) emphasize the importance of simulation in exposing students to various clinical scenarios and improving their knowledge, skills, and attitude. Likewise, Gore and Thomson (2016) emphasize the importance of the educator's role in creating various simulation training scenarios for nurses not only during their undergraduate education but also after they have obtained licensure. They also assert that this will help expose students to different situations of patient care; they do not have to wait for the opportunities to arise at their clinical placement. High-fidelity simulations expose students to more practice and result in better performance at the clinical placement, which means better care for the patient and safer practice (O'Connor, 2014). For instance, evidence shows that simulation-based education can be used as an effective method to teach nursing students medication calculations, so students can repeatedly practice before going to their clinical placement, thus minimizing medication errors (Kelly et al., 2016; Lee et al., 2018; Terzioğlu et al., 2016; Zahara-Such, 2013). Robinson and Dearmon (2013) assert that most clinical errors occur because of a failure to transfer knowledge into practice. Having nurses who are equipped with the knowledge and skills to provide safe and competent care is the ultimate goal of nurse educators to improve the quality of health services.

This study utilized the NLN Jeffries simulation theoretical framework, which was introduced by Dr. Pamela Jeffries. This theoretical framework illustrates the interaction of nursing educators, students, and educational practice with the simulation design characteristics and how this interaction affects learning outcomes. Based on the NLN Jeffries theory, there are five common learning outcomes associated with simulation practice in nursing education: knowledge, skills performance, student satisfaction, critical thinking, and self-confidence (NLN, 2006).



Source: Jeffries, P.R. (2007) *Simulation in Nursing Education: From Conceptualization to Evaluation*.
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Figure 1. the NLN Jeffries simulation theoretical framework

2. Aim and Questions

The aim of the study is to explore students' satisfaction and self-confidence as learning outcomes associated with the simulation experience through the lens of the Jeffries theoretical framework by answering the following research questions:

- Is simulation-based learning improve clinical self-confidence of nursing students?
- Is nursing students satisfied with the simulation learning experience?
- Is there any relationship between satisfaction, self-confidence, and demographic data (age, gender) and course taken?

Although this descriptive study explored how satisfied and confident nursing students in Oman are with respect to simulation learning and experience, generalizability beyond the College of Nursing at Sultan Qaboos University in Oman may be limited.

3. Methodology

3.1 Study Setting

The current study was carried out at the College of Nursing in Sultan Qaboos University, Oman from October to December 2020. In 2011, the College of Nursing established a virtual laboratory simulation center, where advanced audio-visual technology is used to provide a learning environment similar to hospitals to enable safe student practice. Three simulation teaching approaches are implemented in the center; the use of human patient simulators, simulation that features standardized patients, and hybrid simulation (College of Nursing, 2021).

3.2 Sample

Convenience sampling was carried out to recruit undergraduate nursing students (N=52), specifically, senior students in their fourth and fifth academic years and students enrolled in courses that include simulation practice in any specialization in Fall 2020. These inclusion criteria were applied to ensure that participants had acquired simulation experience in their first three academic years and had cultivated good knowledge and learning skills through simulation practice. The independent variable is simulation-based learning, and the dependent variable is the learning outcomes of simulation practice in nursing education including student satisfaction and self-confidence.

3.3 Data Collection

A self-report questionnaire was obtained from the National League for Nursing (NLN, 2006) to measure student satisfaction and self-confidence. This instrument consists of five items intended to determine student satisfaction and eight items designed to measure student self-confidence. As indicated by the NLN (2006), values of 0.94 and 0.96 are the instrument reliability for satisfaction and self-confidence, respectively. The validity and reliability of the instrument was tested in a study that was conducted at the College of Nursing- Jeddah of King Saud bin Abdul Aziz University (Omer, 2016). The Cronbach's alpha for satisfaction was 0.897, whereas that for self-confidence was 0.871. Since there is a uniformity in demographic characteristics between participants from Oman and Saudi Arabia, the same instrument was used. In the present work, the reliability test on satisfaction and self-confidence yielded a value of 0.829 for satisfaction and 0.885 for self-confidence.

The online survey consists of three sections:

- Section 1 contains questions regarding demographic data on the participants, including age, gender, academic year, and courses taken.
- Section 2 consists of five questions on student satisfaction, and
- Section 3 comprises eight questions on self-confidence.

The data were analyzed by running descriptive analysis in the Statistical Package for the Social Sciences (Windows, version 26). The mean, standard deviation, and correlation values were determined to describe and test the relationship between the variables.

3.4 Ethical Approval

Ethical approval was obtained from the Institutional Review Board (IRB) and the Research and Ethics Committee of Sultan Qaboos University. The online survey starts with a consent form that indicated the purpose of the study and the participants' right to withdraw from the research at any time. The participants were assured that the information obtained from them will be kept confidential and that there will be no penalty or loss of benefits associated with a refusal to take the survey.

4. Results

The total number of undergraduate nursing students who participated in the study was ($N = 52$), among whom 17 were males and 32 were females studying in their fourth and fifth academic years. Their ages ranged from 21 to 25 ($M = 22.78$, $SD = 0.823$). The mean and standard deviation were used to reflect differences in participant composition by gender (Table 1). The majority of the students were enrolled in the Advance Health Nursing course ($n = 29$), whereas the rest were enrolled in Administration of Nursing ($n = 12$) and other classes ($n = 8$), including those on psychiatry, child health, and maternity.

Table 1: Mean, Standard Deviations of Participants Gender

Gender	Male		95% CI		Female		95% CI	
	<i>M</i>	<i>SD</i>	<i>LL</i>	<i>UL</i>	<i>M</i>	<i>SD</i>	<i>LL</i>	<i>UL</i>
Satisfaction	4.07	0.44	3.84	4.29	4.18	0.43	4.02	4.33
Self-confidence	3.99	0.55	3.70	4.27	4.11	0.39	3.97	4.25

Prior to data analysis, data were assessed for statistical assumptions. The normality assumption met where skewness and kurtosis values range between +1 -1, Shapiro-Wilk test is non-significant, and Q-Q plots matching ideal quantiles line. Also, the Matrix scatter indicate meeting the assumption of linearity.

The reliability analysis of the student satisfaction and self-confidence survey showed that a high Cronbach's alpha was generated for the dependent and independent variables, consistent with Omer's (2016) study in Saudi Arabia (Table 2). Based on the results running by SPSS at $\alpha = 0.05$, the following averages with respect to student satisfaction with simulation experience: $M = 4.14$, $SD = 0.43$, and $CI = 4.01, 4.26$. These findings indicated that the students agreed and strongly agreed with most of the statements on satisfaction and that they were satisfied with simulation practice as a learning strategy. The averages related to student self-confidence were as follows: $M = 4.07$, $SD = 0.45$, and $CI = 3.94, 4.20$.

Table 2: The reliability test of the student satisfaction and self-confidence survey

Scale	No of items	Cronbach's α
Satisfaction	5	0.829
Self-confidence	8	0.885

The Pearson's correlation analysis indicated no significant relationship between the satisfaction of the nursing students and their demographic characteristics, including age, and gender, and courses taken (Table 3). As regards self-confidence, the Pearson's correlation analysis revealed a significant relationship with student age but no statistically significant association with student gender and courses taken (Table 3).

Table 3: Correlation for Student's Satisfaction and Age, Gender, and Course taken

Gender	Age	Gender	Course taken
Pearson correlation	-0.037	0.123	0.072
<i>p</i>	0.803	0.401	0.625

Table 4: Correlation for Student's Self-confidence and Age, Gender, and Course taken

Gender	Age	Gender	Course taken
Pearson correlation	-0.395**	0.128	0.048
<i>p</i>	0.005	0.382	0.746

**Correlation is significant at the 0.01 level (2- tailed)

5. Discussion

Exploring the effectiveness of low-, medium-, or high-fidelity simulation in nursing education is highly important

in assessing its impact on student performance and examining educational outcomes. On the basis of the results on the satisfaction items, the average student satisfaction with simulation-based learning was high, as indicated by the responses to the following statements:

- “The simulation provided me with a variety of learning materials and activity to promote my learning.” (Item 2) ($M = 4.05$, $SD = 1.03$)
- “I enjoyed how my instructor taught the simulation.” (item 3) ($M = 4.05$, $SD = 0.872$)
- “The teaching materials used in this simulation were motivating and helped me to learn.” (Item 4) ($M = 4.01$, $SD = 0.7.27$).

The next highly satisfactory items were the teaching methods used during simulation sessions ($M = 3.98$, $SD = 1.11$) and the suitability of teaching methods for students’ learning styles ($M = 3.92$, $SD = 0.788$). The results are congruent with those of several studies that were conducted in many countries under the same objectives (Omer, 2016; Smith & Roehrs, 2009). Simulation affords students exposure to various clinical scenarios and helps them improve their knowledge, skills, and attitudes. The role of simulation educators in creating various training scenarios and the teaching strategies used to deliver information are also essential in exposing students to different situations of patient care and helping them think critically and reflect on their experiences.

The students’ self-confidence was improved by learning through simulation practice. The average values with respect to student agreement with the notion that learning by simulation helps them develop skills and obtain the knowledge required in a clinical setting were $M = 3.90$ and $SD = 0.975$. Students who are trained through simulation practice are expected to exercise their skills to improve patient care and thereby enhance output. Additionally, the role of simulation instructors in using helpful resources for teaching simulation was a significant factor for improving the students’ self-confidence ($M = 4.01$, $SD = 0.91$) and clarifying concepts for the students whenever they needed help ($M = 4.03$, $SD = 0.88$). Simulation practice can enhance student confidence by strengthening their understanding of nursing theory and motivating them to practice repeatedly in a safe environment.

On the basis of the Nursing Education Simulation Framework developed by Jefferies (2007), there are three participant-related variables that contribute to learning outcomes resulting from simulation practice: program, level of anxiety, and age. However, the results of the present study indicated no significant relationship between the students’ satisfaction and their demographic characteristics. A significant relationship was found between self-confidence and age, but such association was not identified between gender and courses taken.

6. Conclusion

In this study, students were found to gain more confidence and self-efficacy that have been related to being exposed to various clinical experience through simulation practice, to imitate real clinical situation. Students have the opportunities to bridge knowledge into practice by practicing several situations, ultimately, it contributes to improve students’ confidence and reduce their anxiety.

This study can provide a foundation for future empirical research since there is a scarcity of studies on the impact of simulation as a learning tool in Oman. Nurses’ instructors can consider the results of the study to develop a consistent curriculum and fill the gap between nursing theory and practice to enhance simulation curriculums. Also, instructors should pay more attention on improving the simulation practice guidelines and evaluation criteria based on evidence-based practice. Deans, directors, and chairs of nursing programs in other nursing colleges in Oman can consider incorporating simulation practice in nursing education and train expertise in designing pedagogy of simulation to achieve the learning outcomes.

7. Limitation

This study was conducted in fall 2020, during the COVID-19 pandemic, when in-person classes were replaced with remote learning, resulting in a low response rate and a small sample size. Hence, generalizability beyond the College of Nursing at Sultan Qaboos University in Oman may be limited. The study also explored only two of the learning outcomes from the Nursing Education Simulation Framework, and further studies should consider examining the other three learning outcomes (knowledge, skills performance, and critical thinking) with a larger sample size.

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References

- Boling, B., & Hardin-Pierce, M. (2016). The effect of high-fidelity simulation on knowledge and confidence in critical care training: An integrative review. *Nurse Education in Practice*, 16(1), 287-293. <http://dx.doi.org/10.1016/j.nepr.2015.10.004>
- College of Nursing. (2021, February). *Nursing education and clinical simulation unit*. <https://www.squ.edu.om/nursing/Departments-and-Units/Units/NECSU>
- Durham, C. F., & Alden, K. R. (2008). Enhancing patient safety in nursing education through patient simulation. In *Patient safety and quality: An evidence-based handbook for nurses*. Agency for Healthcare Research and Quality (US).
- Gore, T., & Thomson, W. (2016). Use of simulation in undergraduate and graduate education. *Advanced Critical Care*, 27(1), 86-95. <https://doi.org/doi:10.4037/aacnacc2016329>
- Jeffries P R. (Ed.) (2007). *Simulation in nursing education*. New York: National League for Nursing.
- Jeffries, P. R., & National League for Nursing. (2016). *The NLN Jeffries Simulation Theory*. Philadelphia: Wolters Kluwer.
- Kelly, M. A., Berragan, E., & Husebø, S. E. (2016). Simulation in nursing education—International perspectives and contemporary scope of practice. *Journal of Nursing Scholarship*, 48(3), 312-321. <https://doi.org/10.1111/jnu.12208>
- Khalaila, R. (2014). Simulation in nursing education: An evaluation of students' outcomes at their first clinical practice combined with simulations. *Nurse Education Today*.34(2), 252-258. <http://dx.doi.org/10.1016/j.nedt.2013.08.015>
- Labrague, L. J., McEnroe-Petitte, D. M., Bowling, A. M., Nwafor, C. E., & Tsaras, K. (2019). High-fidelity simulation and nursing students' anxiety and self-confidence: A systematic review. *Nursing Forum*. 54, 358-368. <https://doi.org/10.1111/nuf.12337>
- Lee, J. Y., Lee, S. H., & Jung-Hee, K. (2018). A review of the curriculum development process of simulation-based educational intervention studies in Korea. *Nurse Education Today*, 64, 42-48. <https://doi.org/10.1016/j.nedt.2018.01.029>
- National League for Nursing (NLN). (2006). Simulation Innovation Resource Center. www.sirc.nln.org/mod/page/view.php?id=347 Accessed: Jun 2014.
- O'Connor, T. (2014). The role of simulation in nursing education. *Kai Tiaki Nursing New Zealand*, 20(1). 11-12. <http://ezaccess.libraries.psu.edu/login?url=https://www.proquest.com/docview/1510299460?accountid=13158>
- Omer, T. (2016). Nursing students' perceptions of satisfaction and self-confidence with clinical simulation experience. *Journal of Education and Practice*, 7(5). 131.
- Robinson, B. K., & Dearmon, V. (2013). Evidence- based nursing education: Effective use of instructional design and simulated learning environments to enhance knowledge transfer in undergraduate nursing students. *Journal of Professional Nursing*, 29(4), 203-209. <https://doi.org/10.1016/j.profnurs.2012.04.022>
- Smith, S. J., & Roehrs, C. J. (2009). HIGH-FIDELITY SIMULATION: Factors correlated with nursing student satisfaction and SELF-CONFIDENCE. *Nursing Education Perspectives*, 30(2), 74-8. Retrieved from <http://ezaccess.libraries.psu.edu/login?url=https://www.proquest.com/scholarly-journals/high-fidelity-simulation-factors-correlated-with/docview/236663356/se-2?accountid=13158>
- Tawalbeh, L. (2017). Effect of simulation on the confidence of university nursing students in applying cardiopulmonary assessment skills: A randomized controlled trial. *The Journal of Nursing Research*, 25(4), 289-295. doi: 10.1097/JNR.0000000000000170
- Terzioğlu, F., Yücel, Ç., Koç, G., & Şimşek, Ş. (2016). A new strategy in nursing education: From hybrid simulation to clinical practice. *Nurse Education Today*, 39, 104-108. <http://dx.doi.org/10.1016/j.nedt.2016.01.009>
- Zahara-Such, R. M. (2013). Improving medication calculations of nursing students through simulation: An integrative review. *Clinical Simulation in Nursing*, 9(9), e379-e383. <https://doi.org/10.1016/j.ecns.2012.08.003>

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