Efficacy of Simulation Using NLN/Jeffries Nursing Education Simulation Framework on Satisfaction and Self-Confidence of Undergraduate Nursing Students in a Middle-Eastern Country

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Abstract

Introduction: Utilizing simulation in nursing education is increasingly becoming a popular teaching pedagogy. Simulation provides opportunity to the nursing students to practice the clinical skills through various real life like situational experiences. Simulation improves the clinical decision making skills of the nursing students.

Objective: A descriptive, cross sectional, correlational study was conducted to evaluate the efficacy of simulation using NLN/Jeffries Nursing Education Simulation Framework on satisfaction and self-confidence of Undergraduate nursing students.

Methods: 370 undergraduate nursing students participated in the study. Educational practices, Simulation design, Student satisfaction and Self-confidence questionnaires were used.

Results: Majority of the nursing students perceived agreement on various domains of student satisfaction, self-confidence, educational practices and simulation design used in the curriculum. The students were self-confident to care for similar patients in the clinical area and satisfied with this instructional method. Satisfaction and self-confidence were correlated with educational practices and simulation design.

Conclusion: Developing simulations using NLN/Jeffries Nursing Education Simulation framework will provide meaningful, engaging, and pedagogically sound experiences for the students. Pre-briefing and de-briefing are meaningful strategies to enhance the learning of students.

Nurse educators struggle to stimulate nursing students' critical thinking skills, learning, self-confidence, and satisfaction through student centered and interactive teaching pedagogy in this technology driven era. Preparing students for every situation in clinical practice is improbable; hence educators employ simulation (Howard et al., 2011). Utilizing simulation in nursing education is increasingly becoming a popular teaching pedagogy. Simulation provides opportunity to the nursing students to practice the clinical skills through various real life like

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situational experiences. Simulation improves the clinical decision making skills of the nursing students.

The use of simulation in nursing education has been endorsed by professional nursing bodies and guidelines have been developed by experts from International Nursing Association for Clinical Simulation and Learning (INACSL), American Association for Colleges of Nursing (AACN), National League for Nursing (NLN), Society for Simulation in Healthcare (SSH), Boards of Nursing and National Council of State Boards of Nursing (NCSBN) (Hayden et al., 2014).

In nursing education, simulation based clinical education includes various activities which uses patient simulators including trained standardized patients, devices, real life like virtual clinical environment, and role playing. The novice and experienced nurses are trained with realistic clinical scenarios with simulation based educational interventions that enhances the learning and prevents causing danger to the patients due to unsafe practice. Simulation helps the nurses and nursing students to learn effective non-technical skills and allow them to practice rare emergency situations. It also provides opportunities for them to practice a variety of life threatening situations. The simulation based curriculum aids in providing immediate feedback to the nursing students. The nursing students and nurses can practice repeatedly, learn independently, and adopt diverse type of learning strategies with the integration of simulation in nursing curriculum (Beuk, 2014).

Simulation improves the cognitive, technical, and behavioral skills of learners. It provides a structured clinical like environment for a safe and effective learning experience, and provides focused learning experiences (Jeffries & Jeffries, 2012). The students can practice nursing skills in a laboratory environment where they can integrate the theoretical knowledge that they have gained without posing any safety threat to the actual patients (Kim et al., 2016). High Fidelity Simulation (HFS) is considered to be an innovative teaching method for nursing students. HFS based learning activities improves clinical competency and knowledge of nursing students (Raman et al., 2019). Through simulation, nursing students gains clinical competency; able to compensate for missed clinical experience; and are able to overcome cultural or religious barriers (Raman et al., 2020).

Integration of simulation in the clinical courses like adult health, critical care, maternal health, child health, mental health, and community health nursing increases active-learning, confidence and satisfaction (Husson et al., 2014). Simulation-based training in nursing courses is effective in enhancing communication skills, self-efficacy and clinical competence (Mohamed & Fashafsheh, 2019). Repeated simulation practice gives more confidence in nursing students, thereby the students perform well in the clinical exams and it increases the competency of nursing students (Smallheer et al., 2018). Recent literature also supports the fact that repetitive simulation experience increases the competence, critical thinking, knowledge, and self-confidence of nursing students and nurses (Al Gharibi & Arulappan, 2020). In essence, simulation prepares more competent nurses (Smallheer et al., 2018).

With rising influence of nursing and student intake in the Middle East, use of simulation as a teaching-learning nexus increases opportunities to develop and master core competencies and reduces the theory-clinical gap. In the Arab world, inadequate hands-on skills, insufficient clinical training hours, risk of unsafe practice, lack of exposure to high-risk clinical units, low availability of specialized clinical settings, and gender and cultural sensitivity have been cited to hinder actual learning experiences (Durham & Alden, 2008). The advent of simulation in the Sultanate of Oman, a Middle Eastern country has led to a significant need for empirical testing of its outcomes on student learning, satisfaction and self-confidence. The NLN/Jeffries Nursing Education Simulation Framework (NLN-JSF) was used to guide this study. This is a comprehensive framework developed to provide theoretical direction for the nurse educators to plan, conduct and evaluate the simulation activities (Jeffreys, 2015).

Since simulation is relatively novice in the Arab world, the empirical scope in this domain is vast and is much needed. Empirical evidence on the outcomes of simulation in terms of student satisfaction, confidence, critical thinking, knowledge and performance will establish the effectiveness of this teaching-learning pedagogy. The statistical influence between selected characteristics of the students and their simulation based outcomes will help to refine and customize the implementation standards of simulation to the Arab world. Based on these empirical drives, the current study aimed to assess the efficacy of simulation using NLN-JSF on satisfaction and self-confidence of Undergraduate nursing students.

Methods

A descriptive, cross sectional, correlational research design was used in this study. A pioneer college of nursing established within a renowned public university in Oman was selected for this study. The population for the study was narrowed to those students who had registered for clinical courses in Undergraduate nursing program. Research and Ethics Committee, College of Nursing, Sultan Qaboos University approved the study. Informed written and verbal consent was obtained from the students after providing study information. Research ethics and human rights were ensured during the study. Participation was voluntary and

freedom to withdraw at any time was encouraged without affecting the student learning, performance and evaluation. There were no potential risks or threats imposed while participating in the study.

The clinical simulation laboratory in which the study was conducted is equipped with high fidelity simulators. The lab structure encompasses the simulation room with facilities to record the proceedings. The operator room with control panels is located within the simulation unit. The infrastructure of the lab closely resembles a fully operational simulation hospital unit to enhance the fidelity of the simulated experience. This effect was facilitated with the recreated nursing station, medication retrieval equipment, monitors, resuscitation carts, and the supplies necessary for patient care.

Eight clinical courses have inbuilt simulation as a teaching-learning strategy (20% of the total clinical hours), which is delivered by the clinical course team members in the clinical simulation laboratory. A total of 415 students registered in eight clinical courses and were eligible for the study. 370 students who volunteered to participate in the research study were conveniently sampled for the study. The students enrolled for the study had satisfied the inclusion criteria of being placed in level 2, level 3 or level 4 clinical courses. The students secured registration in any one or two of the selected eight clinical courses (Level 2 - Adult Health Nursing I, Level 3 - Adult Health Nursing II, Child Health Nursing, Maternal Health Nursing, Psychiatric Mental Health Nursing, and Level 4 - Critical Care

Nursing, Community Health Nursing, and Nursing Administration) were included in the study.

The NLN-JSF was used to plan, conduct and evaluate the simulation activities in our institution. In our institution, simulation was initially introduced only in Maternity nursing clinical course. Later, it was decided to introduce simulation into all eight clinical courses as it is identified as the international best practice. As we introduced simulation into all eight clinical courses, we have decided to follow a standard framework to guide us in planning the simulation activities and we found NLN-JSF as a most suitable framework that fit into our curriculum.

The framework encompasses the teacher, student and educational practices along with the simulation design and characteristics and outcomes. The program, level and age were identified as student characteristics. The teacher acted as a facilitator. The educational practices included active learning, student and faculty interaction, collaboration, diverse learning, time on task, high expectations and feedback. The simulation design and characteristics included objectives, problem solving, fidelity, student support and debriefing. Finally, the outcomes are measured in terms of knowledge, skill performance, learner satisfaction, critical thinking ability and self- confidence (Figure 1).

A review of simulation instruments was done and the standardized questionnaires of the National League of Nursing Laerdal Group (NLNLG) was ascertained by the research team to fulfill the requirements of the study.
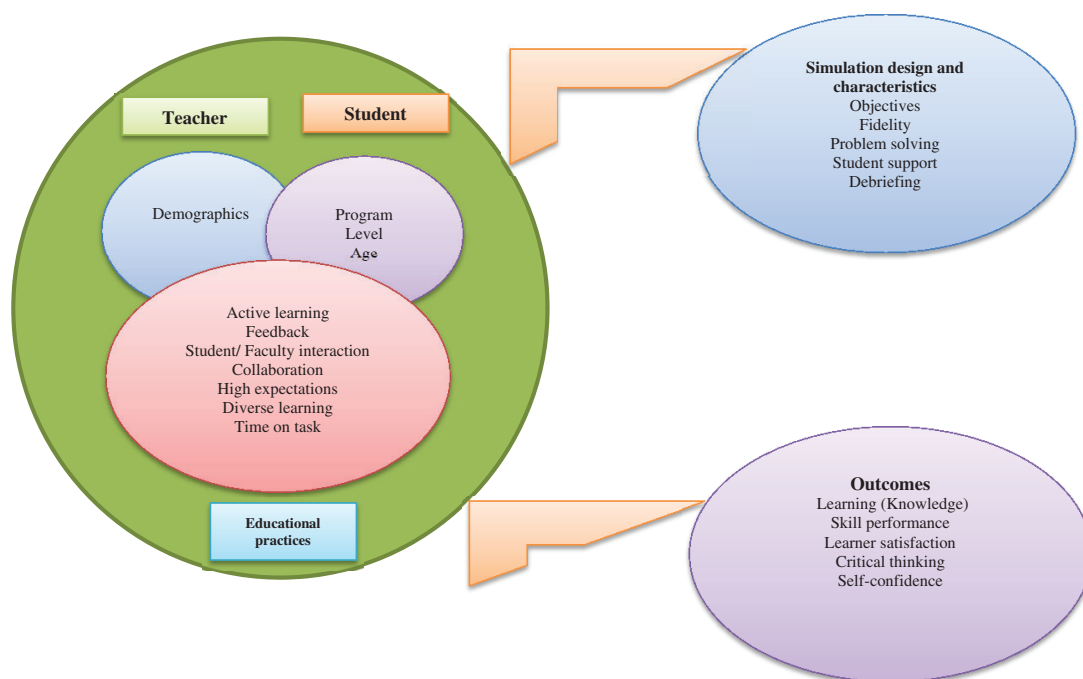

Figure 1. NLN/Jeffries Nursing Education Simulation Framework.

A copyright permission for using these instruments was obtained from the NLNLG.

Demographic characteristics included age, gender, courses, and previous lab experience.

Education Practices Questionnaire (EPQ) (student version), is a 16-item tool with a five-point Likert scale that measures four educational practices including active learning, collaboration, high expectations, and diverse ways of learning. Content validity was established by a team of expert nurse educators experienced in simulation. Cronbach's alpha for design presence is 0.92 and the importance subscale is 0.91 (Jeffries & Jeffries, 2012).

Simulation Design Scale (SDS) is a 20-item tool with a five-point Likert scale designed to evaluate five design features of instructor-developed simulations. It solicits feedback concerning the presence and importance of scenario design features such as objectives and information, student support, problem solving, and guided reflection/debriefing. The instrument has two parts: presence of specific features in the simulation and importance of those features to the learner. Content validity was established by an expert panel. Cronbach's alpha for the overall scale is 0.94 (Jeffries & Jeffries, 2012).

Student Satisfaction and Self Confidence in Learning (SSSCL) is a 13-item questionnaire that uses a five point Likert scale to measure each item. The instrument measures satisfaction with simulation and self-confidence in simulation. Cronbach's alpha for satisfaction is 0.94 and self-confidence is 0.87 (Jeffries & Jeffries, 2012).

All the eight clinical course teams individually developed the simulation scenario module, algorithm and events for teaching-learning based on the course objectives and outcomes. The simulation scenarios were different in each clinical course based on the course objectives. However, all the simulation activities were planned, implemented and evaluated following NLN-JSF framework. Therefore, uniformity was maintained in all the eight clinical courses in terms of planning, method of delivery and evaluation in simulation. To enhance the confidence of teachers and make them feel comfortable, the scenario scripts and roles were rehearsed by the simulation team before the implementation of the simulation learning experience to students.

Students were exposed to the structured and didactic learning in the theory courses before their clinical simulation. Structured teaching-learning through various pedagogy like videos, MOODLE forums, case studies and flipped class rooms were used as pre-simulation learning experiences. The pre-learning resources and activities were posted on the on-line teaching channels and were informed to the students during the lecture a week before the simulation experience. On the day of the simulation, pre-briefing of the knowledge assimilated through learning resources was done. Various methods like quiz, puzzles or recap sessions were employed for the pre-briefing session.

The actual simulation experience was implemented with high fidelity patient simulator, a standardized patient, or a hybrid simulation based on the nature of the course objective, content and outcomes. Small groups of students involving three to five students were involved in the controlled simulation environment and the rest of the students observed the simulation in the control room. Observers were provided with an observer guide to document their views on the proceedings of the simulated environment.

Debriefing session was conducted at the end of the simulation experience. The participants and observers shared their interpretations of their experiences. Both participants and observers had participated in the study. The facilitator channelized, summarized, and flavored the proceedings with evidence based facts. Evaluation of simulation learning was done with quiz, online and written exams.

A Research Assistant was assigned to collect the data from undergraduate nursing students immediately after the simulation sessions. In order to maintain anonymity, pseudonyms were assigned to all eight clinical courses. The investigators obtained the list of all the nursing students undergoing simulation in their clinical courses. The study was publicized to all nursing students through emails. Students were made to sit in a private comfortable room to complete the data collection questionnaire. On completion of data collection, the completed questionnaires were stored in a locked cabinet to maintain confidentiality and privacy. Research assistants were trained to maintain reliability and consistency in the data collection and entry. Double blind method was used during data collection and entry. Data was stored on a password-protected computer and secured in a locked cabinet.

Data analyses were conducted using SPSS for Windows (SPSS-21). Descriptive statistics (percentage, mean, standard deviation, and p-values) were used to summarize the demographic variables, Nursing Students' Satisfaction and Self-confidence in simulation, and Educational practices and Simulation design in simulation learning. Pearson's correlation was used to investigate the relationship between the simulation variables (simulation design and educational practices) and the student experience variables (self-confidence and satisfaction). The level of statistical significance for all statistical analyses was set at 0.05. ANOVA was conducted to compare the mean scores of satisfaction, self-confidence, simulation design and educational practices, and between the various course registration and cohorts. Pearson's correlation was used to investigate the relationship between the simulation variables (simulation

design and educational practices) and the student experience variables (self-confidence and satisfaction).

Results

Demographic Characteristics

Most of the students were females (74.1). Majority of them had previous simulation lab experience (72.7%). The participants were distributed across the clinical courses such as Adult Health Nursing I, Adult Health Nursing II, Mental Health Nursing, Child Health Nursing, Maternal Health Nursing, Critical Care Nursing, Nursing Administration and Community Health Nursing (Table 1).

Satisfaction and Self-Confidence in Simulation

Majority of the students agreed that they were satisfied with the simulation and had good self-confidence in handling similar cases in the clinical setting (Table 2). Most of the students had an overall satisfaction (3.97 ± 0.74) with

Table 1. Demographic Characteristics of Undergraduate Nursing Students (N = 370).

Student characteristics	No	Percentage
Gender		
Male	96	25.9
Female	274	74.1
Clinical course registration		
Level 2		
Adult health nursing I	95	26.2
Adult health nursing II	58	16.0
Mental health nursing	44	12.2
Level 3		
Child health nursing	68	18.8
Maternal health nursing	15	4.1
Level 4		
Critical care nursing	31	8.6
Nursing administration	22	6.1
Community health nursing	29	8.0
Previous simulation lab experience		
Yes	237	72.7
No	89	27.3

Table 2. Satisfaction and Self-Confidence Among Undergraduate Nursing Students (N = 370).

Component/statement	Overall agreement (%)		
	Disagree	Undecided	Agree
Satisfaction	6.1	14.2%	79.5
Self confidence	7.0	18.0%	75.0

simulation learning experiences (Table 3). The students' greatest satisfaction was towards the teaching methods employed in simulation experiences (4.05 ± 0.88). The lowest score in this domain was attributed to the ability of the instructor to customize learning experiences to the requirement of each student (3.91 ± 0.90).

Majority of the students had perceived an escalation of their self-confidence through simulation experiences (3.86 ± 0.63). Though most of the scores in this section were within similar mean ranges, the students' awareness that self-preparation is the cardinal factor to maximize their learning experiences (3.98 ± 0.87) topped this category. The mastery of the content presented through simulation was not strongly agreed by most of the participants, which had dragged this statement to the lowest mean score (3.80 ± 0.83) in this category.

Correlation of Student's Satisfaction and Self Confidence in Learning

Table 4 revealed that the students were overall satisfied with simulation (Mean and SD = 3.97& ±0.73). Overall, the students were confident in caring for similar patients in clinical setting (Mean and SD = 3.86 & ±0.63). It is reported that the correlation of student's satisfaction and self confidence in learning was about 75% which was highly significant ($p < 0.001$).

Educational Practices in Simulation Learning

Most of the students expressed agreement with the educational practices used in simulation. Simulation learning empowered students on the four dimensions of the education practices measured by the EPQ. Students had accounted agreement of acquiring all four competencies; in particular, in their ability to reach a goal directed higher standard of learning (84.8%). The diverse learning strategies threaded from pre-learning expectations (review of associated cognitive contexts) through the simulation experiences (implementing the appropriate psychomotor skill eg., assessment, medication administration, etc) and debriefing sessions (utilizes affective strategies of internalizing values, and organizing the learning experiences) was also perceived to enhancing the learning and confidence of students. Active learning was fostered during simulation by providing opportunities to internalize the situation, make a clinical judgment, implement intervention based on the decision, and witness the consequences of their actions.

The need to initiate collaboration was infused into the learning experiences through using incomplete records, awaited reports, sudden deterioration in client's conditions, and need for prescribed orders. About 77.5% of nursing students believed that simulation enhanced their collaborative work. 80.9% expressed that simulation

Table 3. Item Wise Satisfaction and Self-Confidence Scores Among Undergraduate Nursing Students (N = 370).

Items	Mean (SD)
Satisfaction with current learning	
1. The teaching methods used in this simulation were helpful and effective.	4.05 (0.88)
2. The simulation provided me with a variety of learning materials and activities to promote my learning the medical surgical curriculum.	3.98 (0.80)
3. I enjoyed how my instructor taught the simulation.	4.01 (0.92)
4. The teaching materials used in this simulation were motivating and helped me to learn	3.96 (0.90)
5. The way my instructor(s) taught the simulation was suitable to the way I learn.	3.91 (0.90)
Overall satisfaction	**3.97 (0.74)**
Self-confidence in learning	
6. I am confident that I am mastering the content of the simulation activity that my instructors presented to me	3.80 (0.83)
7. I am confident that this simulation covered critical content necessary for the mastery of medical surgical curriculum.	3.82 (0.86)
8. I am confident that I am developing the skills and obtaining the required knowledge from this simulation to perform necessary tasks in a clinical setting.	3.92 (0.90)
9. My instructors used helpful resources to teach the simulation.	3.92 (0.85)
10. It is my responsibility as the student to learn what I need to know from this simulation activity.	3.98 (0.87)
11. I know how to get help when I do not understand the concepts covered in the simulation	3.92 (0.81)
12. I know how to use simulation activities to learn critical aspects of these skills	3.81 (0.89)
13. It is the instructor's responsibility to tell me what I need to learn of the simulation activity content during class time	3.86 (0.86)
Overall self-confidence	**3.86 (0.63)**

1 = STRONGLY DISAGREE with the statement.
2 = DISAGREE with the statement.
3 = UNDECIDED – you neither agree or disagree with the statement.
4 = AGREE with the statement.
5 = STRONGLY agree with the statement.

Table 4. Correlation Between Student Satisfaction and Self-Confidence Scores.

Variables	n	Mean (SD)	Pearson correlation 'r' value	p value
Student satisfaction	370	3.97 (0.73)	0.75	<0.001
Self-confidence	370	3.86 (0.63)		

enhanced active learning. 81.6% of students reported that simulation provided opportunity for diverse learning and 84.8% said that simulation created high expectations in delivering patient care.

Simulation Design in Simulation Learning

With regard to Simulation Design, most participants (84.5%) acknowledged the close resemblance of the simulated scenario to a real life situation, in which they could observe the changes in the client's conditions, implement therapeutics, and re-evaluate the effectiveness of the care provided. Majority of students agreed that simulation design is significant in enhancing their learning. About (83.4%) agreed that the debriefing session engraved strong learning in the

participants and enhanced their confidence. Lesser but high percentage of students (77.8%) agreed that objectives and pre-briefing sessions enhanced their learning. 78.6% of students mentioned that simulation provided support in their learning. 79.2% of the students agreed that simulation enabled the problem solving ability of the students. This data is presented in Table 5.

Correlation Between Simulation Design and Educational Practices With Satisfaction and Self-Confidence

Active learning, collaboration, diverse ways of learning, objectives and information, support, problem solving, feedback/guided reflection and fidelity were positively correlated with student satisfaction and self-confidence in simulation learning (p < 0.001) (Table 6). This demonstrates significant relationship between simulation design and educational practices with satisfaction and self-confidence.

Thus, the NLN-JSF guided the investigators to evaluate the efficacy of simulation upon the levels of satisfaction and self-confidence of Undergraduate nursing students.

Table 5. Agreement on Educational Practices and Simulation Design Among Nursing Students (N = 370).

Component/statement	Agreement %			Importance	
	Disagree	Undecided	Agree	Mean	±SD
Educational practices					
Active learning	5.6%	13.5%	80.9%	4.09	0.79
Collaboration	10.4%	12.1%	77.5%	4.03	0.96
Diverse ways of learning	6.2%	12.2%	81.6%	4.14	0.9
High expectations	4.0%	11.3%	84.8%	4.15	0.91
Simulation design					
Objectives and information	7.8%	14.4%	77.8%	4.11	0.83
Support	6.2%	15.2%	78.6%	4.06	0.8
Problem solving	5.3%	15.5%	79.2%	4.09	0.83
Feedback/guided reflection	5.7%	10.9%	83.4%	4.17	0.86
Fidelity (realism)	4.5%	11.0%	84.5%	4.09	0.92

Table 6. Correlation Between Satisfaction and Self-Confidence With Educational Practices and Simulation Design (N = 370).

Educational practices and simulation design	Satisfaction	Self-confidence
Active learning	0.292**	0.428**
Collaboration	0.242**	0.337**
Diverse ways of learning	0.269**	0.323**
High expectations	0.316**	0.352**
Objectives and information	0.254**	0.350**
Support	0.342**	0.391**
Problem solving	0.298**	0.407**
Feedback/guided reflection	0.294**	0.347**
Fidelity (realism)	0.279**	0.417**

**p < 0.001.

Discussion

The study showed that nursing students across the clinical courses had perceived higher levels of satisfaction and self-confidence after simulation experience. Students pursuing Adult health nursing I, and Critical care nursing had higher satisfaction, and self-confidence with the educational practices, and simulation design used, which also supported the use of simulation in preparing undergraduate nursing students to face real world situations in medical and surgical management areas and practice in an anxiety free, safe environment. The results of our study were consistent with the previous study findings where the researchers reported that satisfaction and self-confidence were perceived as internal outcomes of simulation experience by nursing students (Costa et al., 2020; Lubbers & Rossman, 2017; Tosterud et al., 2013).

In our study, higher satisfaction and self-confidence were observed in assessments based on the clinical scenarios, readiness to get involved properly and understanding the situation comprehensively to act upon.

Self-confidence behaviors and satisfaction were reported in a study conducted among BSN students on assessing the impact of simulation on the learning outcomes of nursing students (Winum, 2017). Satisfaction and self-confidence perceived by nursing students has been classified as internal outcomes of simulation experience (Sørensen et al., 2017). Participants in a study indicated that they have high level of self-confidence in their abilities to conduct appropriate health assessments, perform effective intervention, participate as an effective team member and recognize patient deterioration events (Omer, 2016). It has been reported from colleges of nursing nationwide on the difficulty in securing clinical placements for nursing students. As we look for alternative experiences like simulation, the results of our study persuaded the use of 20% of simulation across the clinical courses as recommended by international standards which improves the satisfaction and self-confidence of nursing students.

Alshammari et al. (2018) announced that the BSN students profoundly recognized the importance of simulation as a learning strategy in clinical nursing education. The nursing students also produced the desired learning outcomes on completion of simulation session which included competence in the clinical skills, competitiveness in clinical setting, collaborative skills, positive way of accepting feedback, and increased level of self-confidence. Also, the students perceived clarity in the communication of goals, objectives and expectations. The study concluded saying that the characteristics of the participants significantly influenced their simulation practice. In our study, the simulation scenarios were prepared considering various characteristics of the nursing students which was reflected in increased self-confidence and satisfaction among nursing students.

The positive outlook perceived by the students to the conduct of simulation encompassed pre-learning activities, pre-briefing, simulation activity and debriefing.

The expression of agreement in all domains provides a validation for NLN-JSF in providing proper description and sequencing of the learning experiences. Our findings were consistent with findings of a study which was conducted among junior-level BSN students which revealed that the students' perception of the structured debriefing sessions provided a holistic approach to their learning experiences and the positivity (Tosterud et al., 2013).

Our study revealed a significant positive correlation between multifaceted educational practices and student satisfaction and self-confidence. In line with the current study findings, a study reported similar findings that the simulation-based training promoted self-confidence; improved clinical skills and judgements in clinical practice; and emphasized the importance of communication and team collaboration (Hustad et al., 2019). It was again reported in another study that the nursing students were satisfied with the experience, felt confident in their performance, and felt that the simulations were based on sound educational practices and were important for learning (Zapko et al. (2018). In our study, active participation was facilitated by exposing the students to clinical scenarios which demanded them to react and respond to sudden or progressive changes in a patient's health condition. During debriefing sessions, critiquing on the videotaped performance of students formed a platform to enhance the active learning process. Another study also indicated that deliberate practice and video debriefing were effective modalities in simulation technology for nursing skills acquisition and self-assessment (Kiernan & Olsen, 2020).

In the current study, it was found that the ability to practice collaborative skills during simulation experiences is related to higher satisfaction scores. The simulation scenarios implemented enhanced the execution of strong themes like collaborative practice, emergence of a team leader, who actively delegated tasks and assimilated prompt feedback from team members. An opportunity to communicate with other team members helped the students to introspect their shortcomings. These findings are consistent in another study, where the participants reported an increased understanding of the scope of practice of other team members through their reflections following simulation. In addition, participants reported increased comprehension of team dynamics and their relationship to improved patient care which supports our study findings (Kuehn et al., 2017).

In our study, diverse learning opportunities were provided through pre-briefing like videos, MOODLE forums, case studies and flipped lessons. The exposure to high fidelity and standardized patients contributed to the diversity in learning experiences. Simulation lends itself to diverse means of learning a concept (Norman, 2012). The provision of objectives at the beginning of the learning experience and the steadfast commitment to

stay on the same track during the implementation phase could be attributed to the students' ability to achieve the expected higher standards. Simulation environment prompts the nurses to expand their competency levels and empower them to achieve greater learning (Christian & Krumwiede, 2013).

In our study, a focused and consistent connectivity in planning, implementing and evaluating the simulation scenarios was manifested through a positive correlation between the satisfaction scores, simulation design and educational practices. Innovative teaching strategies like simulation are vital in attracting the attention of students in active learning and ultimately it can help in bridging the gap between theory and practice (Beuk, 2014). A systematic review which analyzed the efficacy of High Fidelity patient simulation (HFPS) on the learning outcomes of nursing students also reported that HFPS improved the knowledge and competence of the nursing students. The authors recommended that HFPS can be considered as an effective teaching method which will build the competence of nursing students and asserted that engaging the nursing students in simulation could improve their ability to deliver safe nursing care even in patients with unstable and rapidly changing clinical conditions, thereby increasing the self-confidence (La Cerra et al., 2019). Our study also claims that simulation enhances the self-confidence of nursing students.

Another systematic review which appraised the evidence of the impact of simulation based education on the learning outcomes in undergraduate/pre licensing nursing students also supported that simulation aids in the development of psychomotor skills among nursing students. Simulation also improved the self-efficacy, resulted in higher levels of satisfaction, improved the confidence, and critical thinking ability among nursing students. The study concluded with the assertion that simulation based education contributes to nursing students learning in different ways and the authors recommended to integrate simulation in the pre-licensure nursing curriculum (Cant & Cooper, 2017). As reported in the aforementioned study, our study also identified that the Educational practices and simulation design used in the nursing curriculum improved the confidence and satisfaction of nursing students. We as author's of this study strongly recommend integrating simulation in nursing curriculum. Also, we support the use of NLN-JSF as a guide to plan, implement and evaluate simulation experiences.

The six competencies of Quality and safety education for nurses (QSEN) to improve the quality of patient care among the nursing students are patient-centered care, team work and collaboration, evidence-based practice, quality improvement, patient safety and informatics (Cronenwett et al., 2007). The knowledge, skills and attitudes of these QSEN competencies are easily achievable

through well-developed simulated scenarios in the laboratory than the hospital settings (Khalaila, 2014) which is evident in our study findings. As we were guided by NLN-JSF, the focused and consistent connectivity in planning, implementing and evaluating the simulation scenarios, was manifested through the statistical correlation between the satisfaction scores of the participants and their rating of the simulation design and educational practices. Hence the researchers of the current study, strongly recommends the need for a standardized template specifically NLN-JSF which comprehensively encompasses all facets of the simulation design.

Limitations

This study used a non-probability convenient sample technique, which limited the generalizability of the study findings. It is also important to admit that the study used a self-reported method of data collection and the NLN tools used in this study has not been previously used in Oman. In the current study, the tools were pretested and found to have a satisfactory level of internal consistency. Also, we could not evaluate the satisfaction and confidence levels of Undergraduate nursing students prior to the integration of NLN-JSF framework in our institution. Despite its limitations, the study provided significant intuitions into the aspect of introducing simulation across all the clinical courses and to use NLN-JSF to direct the simulation experience in undergraduate nursing education.

Implications for Nursing Education and Research

The educational practices enhanced through these simulation experiences clearly demarcates the potentials of these experiences in helping the nursing students to transfer the acquired competencies to the real world. The need to thread these experiences through the curriculum in increasing intensities was also magnified. The satisfaction scores obtained in the current study were attributed to the process of implementing these experiences. Hence sequencing simulation experiences in this empirically tested format (NLN-JSF) will enhance the role specific graduate competencies required by a graduate nurse. As this study was guided by NLN-JSF and evaluated by NLN rubrics, which provided a valuable, empirically supported approach to conduct simulation research, the authors strongly recommend others in this middle-eastern region to incorporate simulation in the curriculum of Undergraduate nursing program using this structured framework. Further studies to assess the impact of simulation on anxiety level of students and their caring ability as outcomes could be conducted to strengthen the outcomes of the study.

Conclusion

Developing simulations using best practices (NLN-JSF) will provide meaningful, engaging, pedagogically sound experiences for the students. In our study, the nursing students perceived the simulation experience as positive, and reported high levels of satisfaction and self-confidence with the simulation experiences. The results of this study supported the use of 20% of clinical learning in the form of simulation. The simulation framework used for this study supported the components of the teaching-learning process and their relationships to guide the implementation and evaluation of these activities. Hence, there is a need for standardized and structured simulation scenarios that comprehensively encompass all the facets of simulation design.

Recommendations

The authors recommend the use of repeated simulation experience in all nursing clinical courses to increase the satisfaction and self-confidence of the students. Pre-briefing and de-briefing which are meaningful strategies that enhances the learning of students should be a part of simulation. Each clinical course should provide the blue print for intended simulation for the students. Routine need assessment is required for developing the appropriate learner centered simulation scenario. Domains of educational taxonomies should be considered in accordance with the course objectives while developing the simulation scenarios. Evaluation of each simulation should be done to ensure process improvements.

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