Using Simulation as a Learning Strategy in Peri-Operative Nursing Education: Exploratory Descriptive Study

Bishoy Awadalla
Assistant Lecturer, Cairo University, Egypt
Liliane Narouz
Lecturer, Cairo University, Egypt
Dr. José Amendoeira
Coordinator Professor, Nursing at Polytechnic Institute of Santarém, Portugal
Dr. Marianne Pitkäjärvi
Senior Lecturer, Helsinki Metropolia University of Applied Sciences, Finland

Abstract:
Simulation has been shown to be an effective learning environment for students to learn and practice complex perioperative nursing as it provides experiential learning that can affects patient care, health, and safety. The aim of the study is to explore the effect of using simulation as a learning strategy in perioperative education on the nursing self-confidence, technical skills (TSs) and non-technical skills (NTSs). A descriptive, exploratory design was used to investigate self-confidence, Technical Skills and Non-Technical Skills levels using simulation training scenarios. Sample: A purposive sample (44/158) of undergraduate nursing students who were conducting their perioperative nursing education in autumn 2015. The study was conducted at Metropolia's simulation laboratory at Helsinki Metropolia University of Applied Sciences, Finland. PostOperative Simulation Sheet (POSS) was used. Results shows that Nursing students were confident with intra/postoperative simulation; For Intra and postoperative simulation Technical Skills and Non-Technical Skills they were occurred with a good level. Simulation as a learning strategy has been shown to be effective in providing students with a safe environment for learning perioperative patient care and has shown potential in improving student's learning outcomes such self-confidence, TSs and NTSs.

Keywords: Simulation, self-confidence, technical skills (TSs), non-technical skills (NTSs), perioperative nursing

1. Introduction

Simulation is an important tool that can be used in the nursing curriculum to increase experiences in nursing practice. (Durham, & Alden, 2008). It involves active student participation, and help to reinforces the development of assessment skills, psychomotor activity, critical thinking, problem solving, decision making, and collaboration with others (LaMartina & Ward-Smith 2014), it provides experiential learning that can affects patient care, health, and safety. (Rothgeb, 2008).

Human patient simulation is a relatively new teaching strategy that allows learners to develop, refine, and apply knowledge and skills in a realistic clinical situation as they participate in interactive learning experiences designed to meet their educational needs has revolutionized the way of teaching in healthcare settings. (Gaba, 2004; Maran & Glavin, 2003).

Perioperative contexts are interdisciplinary, multispecialty, and involve patients who are at risk of instability during this acute phase of care; it also involves the interaction of a multi-disciplinary team of healthcare professionals, (Petrovic et al., 2012).

Simulation environments reduce and eliminate anxieties produced with providing care for real patients. (Walsh, 2010). The skills requirements which can be enhanced with the use of simulation include (situation awareness, decision-making, communication, team working and leadership skills) all of these share a common thread in that they require active listening and collaboration besides possession of the basic knowledge and skills. (Gupta, Peckler, & Schoken, 2008).

2. Methodology

2.1. Aim of the Study

To explore the effect of using simulation as a learning strategy in perioperative education on the nursing self-confidence, technical skills (TSs) and non-technical skills (NTSs).

2.2. Objectives of the Study

- To explore nursing students' self-confidence.
- To explore nursing students' technical skills (TSs) and non-technical skills (NTSs)

2.3. Research Questions

How does the use of perioperative simulation training scenarios affect self-confidence, TSs and NTSs among nursing students who are conducting their perioperative education at Metropolia's simulation laboratory at Helsinki Metropolia University of Applied Sciences, Finland?

2.4. Significance of Study

Perioperative environment is considered one of the most sophisticated and challenging environment in acute care contexts where communication errors and mistakes could have serious and fatal implications. In fact, the most frequently reported cause of sentinel events within U.S. hospitals is poor NTSs (Street et al., 2011). Specifically, the risk for adverse events occurs more often for surgical patients than in any other clinical specialty (Amato-Vealey, Barba, & Vealey, 2008).

The study offers the opportunity for nursing students to practice skills, techniques, communication, problem solving and critical thinking in a safe environment; it offers innovative ways of teaching students about real situation in a controlled environment (Jeffries, 2009; Webster, 2009).

2.5. Sampling

A purposive sample (44/158) divided into 4 groups (11, 11, 14, and 8) undergraduate nursing students who were conducting their perioperative nursing education in autumn 2015, voluntarily accepting to participate in this research after a written consent, being familiar with the simulation lab at Helsinki Metropolia University of Applied Sciences, Finland.

2.6. Research Design

A descriptive, exploratory design was used to investigate self-confidence, TSs and NTSs levels using simulation training scenarios among nursing students at Helsinki Metropolia University of Applied Sciences, Finland.

2.6. Instruments

The POSS (See Appendix A) was developed by the researcher after extensive literature review with a collaboration with facilitators and then submitted to a panel of three reviewers and experts in critical care and perioperative nursing. Revision of the tool was made based on the feedback from the reviewers and before conducting the study. The POSS consisted of two main sections; the first section was used to collect self-reported data on socio-demographic variables related to the observed subjects as age, gender, educational background, enrolled program, attendance time in the simulation laboratory, hours spent in the simulation laboratory, healthcare working experience, student's role played during simulation in both intraoperative and postoperative simulation training scenarios.

The second section in POSS is divided into three parts; the first part is students' self-confidence tool in perioperative simulation with eight items adapted from (NLN, 2004) (See Appendix A & Appendix D for NLN permission letter), The second part was a perioperative TSs checklists consisted of two checklists the first one for intraoperative TSs using four main objectives the first was to achieve a successful negotiation regarding the roles (one item), the second objective was to explain the process and progress of spinal anesthesia (six items), the third objective was to know how to instruct the patient to a correct position (eight items), the fourth objective was to perform the skin disinfection to the spinal anesthesia (seven items) the second checklist for postoperative TSs using ABCDE assessment model: A for Airway with (two items), B for Breathing with (two items), C for circulation with (five items), D for disability with (four items), and E for exposure with (four items). The third part was a perioperative NTSs checklist (was used for intraoperative and postoperative simulation training scenarios) consisted of two categories: first category assessed two cognitive skills (situation awareness and decision-making), the second category assessed two social skills (communication/ team-working and leadership) each sub category contains three sub items were evaluated by the researcher using correct mark for correct done action (equal one) and incorrect mark for incorrect or not done action (equal zero) (Briggs et al., 2015; Mullen & Byrd, 2013; Gillon et al., 2012; Carne, Kennedy, & Gray, 2011; St. Pierre, Hofinger, Buerschaper, & Simon, 2011; Reader, Flin, Lauche, & Cuthbertson, 2006; Fletcher et al., 2003).

2.7. Procedure

The researcher used simulation training scenarios at simulation lab at Helsinki Metropolia University of Applied Sciences, Finland. which involved 44 nursing students who were conducting their perioperative curriculum. Students were

divided into four groups for two days (two groups per day) going through perioperative simulation practice (one for intraoperative simulation skills occurred in the 3rd floor simulation lab and the second for postoperative simulation skills occurred in the 5th floor simulation lab).

In the intraoperative simulation practice; three students from each group shared to play the role of a nurse, anesthesiologist and a standardized patient. The standardized patient was asked in the briefing session to act as a 55 years old cardiac patient who was planned to undergo spinal anaesthesia for open inguinal hernia repair. Observing students were asked by the perioperative educator to take during the simulation training scenario event to be used later on in the debriefing session.

In the postoperative simulation practice: three students shared to play the role of a nurse, a doctor and a standardized patient who act as semiconscious patient in PACU on a simple mask oxygen with 99% O2 saturation, the patient was connected to haemodynamic monitor and pulse oximetry, the patient was also connected to one drain for blood drainage. The pain scale was 7 over 10.

In both intra/postoperative simulation scenarios with the all four groups; POSS, the second and the third parts in the second section, was used by the investigator assisted by video-taping and with the help of the co-supervisor to investigate students' TSs and NTSs levels. After the debriefing session, all nursing students were asked to fill in the self-confidence tool; POSS, first part in the second section.

The rating scale for self-confidence, TSs and NTSs levels were as the following: adapted from (NLN, 2004; Fletcher, 2004)

- 1-Less than (33.3%) was considered poor level: (Not confident)
- (TSs and NTs Simulation performance endangered or potentially endangered patient safety,   serious remediation was required).
- 2-From (33.3%) to (66.6%) was considered acceptable level: (Neutral)
- (TSs and NTs, simulation   performance was of a satisfactory standard but some improvements were needed).
- 3-More than 66.6% was considered good level: (Confident)
- (TSs and NTs Simulation performance was for a consistently high standard, enhancing patient   safety; it could be used as a positive example for others).

2.8. Data Analysis

The data was scored, tabulated and analyzed by using Statistical Package for the Social Sciences (SPSS–version 21) descriptive statistics were utilized as standard deviation, frequency, mean and percentage (Woolf, Keating, Burge, & Michael 2004).

2.9. Ethical Consideration

A written formal research permit and a Formal permission letter from NLN (2004) was obtained in November, 2015; the tool was modified to collect data related to students' self-confidence. Subjects' names were not written for the purpose of anonymity and confidentiality. Subjects were free to withdraw from the study at any time. They were assured that the results of the study would not be used for any performance evaluation.

3. Results

Table (1) shows that nursing students' mean age was 25.73±6.92 years old;   (95%)   were   females.   high   school educational background had the highest frequency (64%); Student nurses who enrolled nursing program were (52%) followed by public health (36%) while those who are enrolled in midwifery and paramedics programs (7%) and (5%) respectively. The students play different roles in the simulation scenarios (18%) played the role of the nurse; (9%), patients and (73%) observers while during postoperative simulation training scenario (20%) played the role of the, nurses; (14%), patients and (66%).

Demographic Variables	n=44	(%)	Mean± SD
Age			
Less than 25 years old	27	61	
From 25 to 30 years old	9	21	25.73±6.92
More than 30 years old	8	18	
Gender			
Male	2	5	
Female	42	95	
Educational background			
Vocational	8	18	
High school	28	64	
University degree	8	18	
Enrolled program			
Nursing	23	52	
Paramedics	2	5	
Midwifery	3	7	
Public health	16	36	
Attendance time in the simulation laboratory			
Less than 4 times	29	66	3.61±2.67
4 times and more	15	34	
Hours spent in the simulation laboratory			
Less than 6 hours	14	32	
From 6-10 hours	19	43	8.95±6.83
More than 10 hours	11	25	
Health care working experience			
Less than one year	33	75	1.00±2.13
One year and more	11	25	
Student's role in intraoperative simulation training scenario			
Nurse	8	18	
Patient	4	9	
Observer	32	73	
Student's role in postoperative simulation training scenario			
Nurse	9	20	
Patient	6	14	
Observer	29	66	

Table 1: Frequency, and Percentage Distribution of Socio-Demographic Variables
Related to Nursing Students or Observed Subjects (N=44)

Regarding the level of self-confidence, Table (2), shows that the majority (95.5%) of nursing students' answers were (confident) ranging from (not confident, neutral, or confident) in intra and postoperative simulation training scenarios.

Demographic Variables	Self-Confidence Frequency Self-Confidence					
	Intraoperative simulation			Postoperative simulation		
	Not Confident	Neutral	Confident	Not Confident	Neutral	Confident
Age						
Less than 25 years old	0	1	26	0	1	26
From 25-30 years old	0	0	9	0	1	8
More than 30 years old	0	0	8	0	0	8
Gender						
Male	0	0	2	0	1	1
Female	0	1	41	0	1	41
Educational background						
Vocational	0	0	8	0	0	8
High school	0	1	27	0	1	27
University degree	0	0	8	0	1	7
Enrolled program						
Nursing	0	0	23	0	2	21
Paramedics	0	0	2	0	0	2
Midwifery	0	1	2	0	0	3
Public health	0	0	16	0	0	16
Attendance time in the simulation laboratory						
Less than 4 times	0	0	29	0	2	27
4 times and more	0	1	14	0	0	15
Hours spent in the simulation laboratory						
Less than 6 hours	0	0	14	0	0	14
From 6-10 hours	0	1	18	0	2	17
More than 10 hours	0	0	11	0	0	11
Health care working experience						
Less than one year	0	0	33	0	1	32
One year and more	0	1	10	0	1	10
Student's role in intraoperative simulation training scenario						
Nurse	0	0	8	0	1	7
Patient	0	0	4	0	0	4
Observer	0	1	31	0	1	31
Student's role in postoperative simulation training scenario						
Nurse	0	0	9	0	0	9
Patient	0	0	6	0	0	6
Observer	0	1	28	0	2	27

Table 2: Frequency Distribution of Students' Self-Confidence in Relation to Socio-Demographic Variables in Perioperative Simulation (N=44)

Table (3) illustrates that the about two third (67%) of the nursing students had an overall satisfactory level of performance in the intra-operative TSs.

Objectives	Total
1 Negotiation	1/4 (25%)
2. Process explanation	18/24 (75%)
3 Instruct patient. for proper position	19/32 (59%)
4. Skin disinfection	21/28 (75%)
Total	59/88 (67%)

Table 3: Frequency and Percentage Distribution of TSS Data Related to Intraoperative Simulation (N=88)
* Indicates the Total Number of Intraoperative TSS

Table (4) shows that, the total overall performance of postoperative TSs is (79%) which is considered satisfactory performance level. The highest scores were in both airway and breathing management (100%).

ABCDE Approach	Total
1.Airway	8/8 (100%)
2.Breathing	8/8 (100%)
3.Circulation	19/20 (95%)
4.Disability	13/16 (81%)
5.Exposure	13/16 (81%)
Total	54/68 (79%)

*Table 4: Frequency and Percentage Distribution of TSS Data Related to
Postoperative Simulation (N=68)*
* Indicates the Total Number of Postoperative TSS*

Table (5) indicates that the total overall performance of both intra and post-operative NTSs is (92%) which is considered a good performance level.

	NTSS	Intraoperative Simulation	Postoperative Simulation	Total
Cognitive Category	1.Situation Awareness	12/12	11/12	23/24 (96%)
	2.Decision Making	11/12	9/12	20/24 (83%)
	Total	23/24 (96%)	20/24 (83%)	43/48 (90%)
Social Category	3.Communication/Team-Work	11/12	12/12	23/24 (96%)
	4.Leadership	10/12	12/12	22/24 (92%)
	Total	21/24 (87.5%)	24/24 (100%)	45/48 (94%)
	Total Of Total	44/48 (92%)	44/48 (92%)	88/96 (92%)

*Table 5: Frequency and Percentage Distribution of NTSS Related to Intra and
Postoperative Simulation (N=96)*
* Indicates the Total Number of Intra and Postoperative NTSS*

4. Discussion

A systematic review based on current available literature on simulation and nursing education indicated that simulation is useful in creating a learning environment that contributes to self-confidence, TSs and NTSs (Norman, 2012). In one study conducted by Foot (2007) supporting the current study result in a manner that nursing students can develop new TSs and NTSs through repeated experience with simulation, allowing repeated exposure to both common and rare clinical scenarios' in addition that Conducting simulation in a team context allows the opportunity for team building and development of interpersonal skills.

Another study conducted by Gillon, et al. (2012) supporting the current study in recognizing the importance of NTSs in education and training in acute environments as simulation has been shown to improve trainee self-confidence and performance when faced with a similar situation again and is found to be both beneficial and enjoyable by participants. Conducting simulation in a team context allows the opportunity for team building and development of interpersonal skills

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