



SIMULATION IN NURSING EDUCATION: FACULTY AND PRELICENSURE BSN STUDENT PERSPECTIVES – AN INTEGRATED REVIEW

Mrs. Jansi Rani Natarajan¹ | Dr. Esra M. Al-Khasawneh² | Jennifer L. Bartlett

¹ MSC Nursing, Fundamentals and Administration Department, College of Nursing, Sultan Qaboos University, P.O. Box 66, Al-Khoud, Muscat 123, Sultanate of Oman.

² PhD in Nursing, Dean, College of Nursing, Sultan Qaboos University, P.O. Box 66, Al-Khoud, Muscat 123, Sultanate of Oman.

³ PhD, RN-BC, CNE, CHSE, Kennesaw State University, 1000 Chastain Road Kennesaw, GA 30144-5591.

ABSTRACT

Background: There is an increased focus on using simulation as a teaching method within Prelicensure BSC Nursing education. This integrated review was conducted to address ways in which clinical simulation impacts on student learning and the perceptions of nursing student and faculty about simulation experiences.

Method: A search was conducted for English articles published between 2010 and 2014, using the CINAHL and Google Scholar databases with the Mesh terms, nursing clinical outcomes in simulation, faculty perception, student perception, patient safety, and simulation.

Results: The major finding of the 14 articles reviewed were presented under themes: knowledge acquisition; competence and clinical performance skills; critical thinking skills and clinical judgment; student satisfaction; self-confidence; and student anxiety.

Conclusion: Students perceived higher levels of satisfaction, yet they expressed that simulation caused anxiety. The faculty were satisfied with the achievement of student learning outcomes, yet they acknowledged technical challenges with the implementation of novel methods and technology.

KEYWORDS: Simulation; Nursing Faculty; Nursing students; perception.

Introduction

Simulation is a training method that utilizes realistic situations and phenomena to replicate the actual clinical setting in order to familiarize trainees in a controlled environment. Early developments in this training method included the introduction of the first healthcare simulation manikins in the early 1960s [1]. The use of simulated clinical experiences in nursing education allows for the practice of complex skills and facilitates students to moving beyond the performance of basic tasks to integrating complex processes that involve “cognitive reasoning, clinical judgement and prioritization.” [2]. This has the potential to directly impact on patient outcomes [3,4]. Additionally, simulation is effective in facilitating students’ learning in the affective domain, including interpersonal, communication, and professional nursing skills [4,5,6].

Bastable (2008) posits that simulation also facilitates psychomotor skill development and enhances higher problem-solving through interactive activities, active learner involvement in a real-life situation, and a guaranteed safe, non-threatening learning environment. Simulated clinical experiences have been proven to bring about positive outcomes on skill and knowledge acquisition, remediation, educational experience, critical thinking, and competency levels of nursing students [7,8,9,10]. In fact, a recent National Council of State Boards of Nursing (NCSBN) study supports the inclusion of simulation in prelicensure nursing curricula and demonstrates that up to 50% of clinical time can be replaced with simulation without negatively impacting on the attainment of expected student outcomes [11].

Online surveys conducted in San Francisco on the perceptions of nursing students and faculty to describe simulation as an academically-safe learning environment (the sample included 101 students and 24 faculty members). They report that both faculty and students perceive nursing simulation as an academically safe and supportive methodology, and that, when done well, promotes the creation an environment where learning and professional growth can take place without fear of any harm [12]. This translates to the healthcare environment where patient safety is a primary concern. By situating students in the simulated environment, educators have the unique opportunity to allow for the safe practice of essential nursing skills. This emphasis on safety has the potential to directly and indirectly impact on the perceptions of students and force safety concerns to the forefront of their thinking. Therefore, as simulation continues to become an integral part of nursing education, both students and faculty are asked to work on creating and maintaining a culture of safety that will hopefully spill over into the clinical environment. The priorities within baccalaureate nursing education concentrate on safe patient- centered care, team work, collaboration, evidence-based practice, quality and safety improvement, and informatics [13]. Simulation addresses all of these tenets either directly or indirectly, depending on the simulation intention and design.

There is an increased focus on using simulation as a teaching method within prelicensure nursing education. . While research and documented experience with using simulation in nursing education is increasing, there is limited research pertaining to the perspectives of faculty and students about simulation. Failure to investigate the effectiveness of simulation as a teaching learning experience from the perspectives of faculty and nursing students can create a wide gap in the knowledge of simulation and the attainment of clinical outcomes.

Therefore, this review will delve into the literature on simulation as a teaching and learning methodology in prelicensure Bachelors of Science in Nursing (BSN) programs. It will specifically address ways in which clinical simulation impacts on student learning and their perceptions regarding learning outcomes in the simulation experiences.

Methods

Search Strategy

Prior to conducting a database search for relevant literature, two research questions were determined. They were:

1. In what ways does clinical simulation impact student learning?
2. What are the perspectives of nursing faculty and students about clinical simulation?

Data Sources

A literature review of abstracts and articles published between 2010 and 2014 was conducted using Pub Med, MEDLINE, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Web of Science, and Google Scholar. Combinations of key terms relating to effectiveness of simulation in nursing education, student perspectives of simulation and faculty perspectives of simulation in nursing curriculum included clinical outcomes in simulation, faculty perception, student perception, patient safety, and simulation.

Selection of Articles

Inclusion criteria included:

- Original research articles
- Peer reviewed research articles in English
- Primary data with full text available online
- Studies including the perspectives of nursing faculty and student on simulation

Exclusion criteria included:

- Unpublished manuscripts or doctoral dissertations
- Review or opinion articles about simulation

Search Outcome

A total of 270 articles were identified in the initial search. 170 articles were reviewed for duplication and 70 articles were excluded. The final sample for this review included a total of 14 articles after having common consensus of 3 reviewers. The methodological pathway is depicted in **Figure 1**.

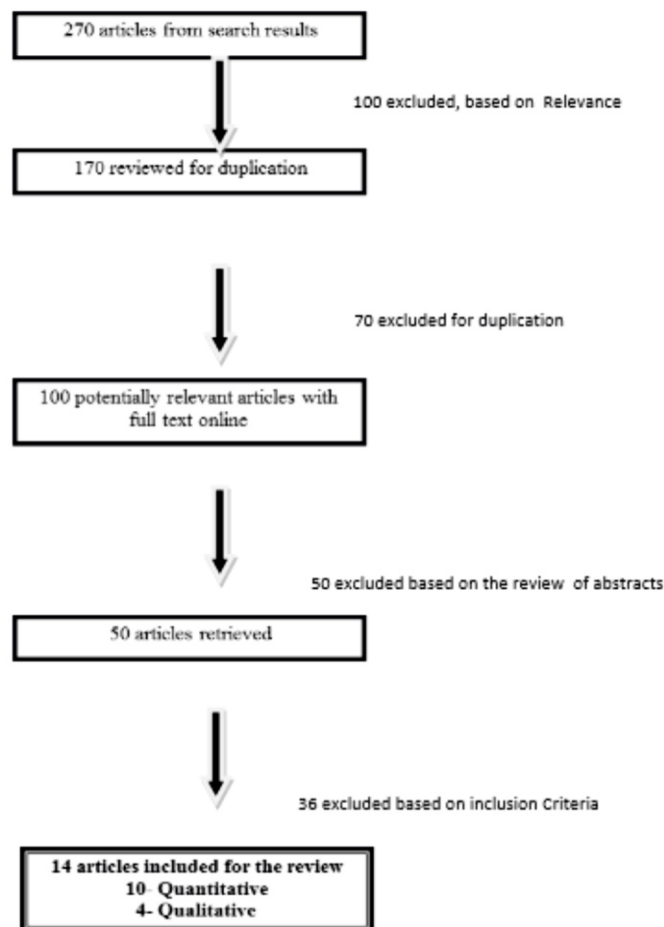


Figure 1: Methodological flow chart:

Data Extraction

Two authors reviewed the papers and independently selected the articles eligible for review based on the selection criteria. Data were extracted by 2 investigators and discrepancies were resolved by discussion with the third investigator. One author tabulated the data, and then all of the authors reviewed the tables (see **Table 1**) to ensure completeness and accuracy. Differences in data abstraction were resolved by consensus.

Data Analysis

The findings of each study were first considered in order to develop codes for individual studies. Subsequent qualitative comparisons across the 14 studies enabled identification of themes within the data, resulting in an integrative review. It should be noted that the resulting themes are descriptive rather than explanatory, due to the level of data collected in the studies. With a view to ensuring rigor in the interpretation, the research team members read the literature review findings with the purpose of clarifying and/or challenging the interpretations and themes as needed.

Summary of the Findings

Out of the 14 studies, 7 are quantitative studies, 3 are mixed-method studies and the remaining 4 are qualitative studies. The participants included prelicensure Bachelors of Science in Nursing (BSN) program students. Only two studies have used standardized tools. Following themes were derived from the 14 studies reviewed: knowledge acquisition; competence and clinical performance skills; critical thinking skills and clinical judgment; student satisfaction; self-confidence; and student anxiety.

Discussion

Critical Thinking and Clinical Judgment

Nurse educators are challenged to teach students to think critically when it comes to nursing process application for their patients. Critical thinking is the disciplined, intellectual process of applying skilful reasoning as a guide to belief or action [14]. Martin describes critical thinking as the thought process used by nurses for clinical decision-making, and states that critical thinking increases with higher levels of clinical experience [15]. Studies by Mariani et al [16], Partin et al [17] and Guhde [18] have assessed the effects of simulation on critical

thinking and clinical judgment of BSN students. Students in these studies have reported significantly higher levels of clinical judgment scores along with enhancement in critical thinking, while also reporting that the use of high fidelity simulation is an excellent way to enhance their critical thinking and critical judgment. The perception of students about the effect of simulation on critical thinking are very subjective [19,20] and data are derived from the common critical thinking tests [21,22]. In a systematic review, Carter, Creedy, and Sidebotham concluded that, nursing specific instruments to measure critical thinking is required [23]. It is imperative to design nursing specific standardized critical thinking skills to test the effectiveness of simulation.

Knowledge Acquisition

Cant and Cooper reported in their systematic review that, "simulation enables nurses to develop, synthesize and apply their knowledge on the representation of real experience" (p.13) [24]. An experimental study conducted by Mohamed et al. demonstrated that simulation education facilitated the students in the experimental group to enhance their knowledge to a larger extent when compared to the control group [25]. In a study conducted by Mariani et al, students perceived that debriefing is the cornerstone of simulation and is often where much of the learning occurs [16]. This supports the findings of Levett-Jones and Hapkin emphasizing the role of feedback in simulation and the opportunity it affords students to learn [26]. There was improvement in self-rated knowledge of students who had experiential learning using simulation [27]. The faculty ratings of students with patient simulation experience were higher than those who did not attend simulation [28].

Learning Outcomes

Five studies [28-32] have evaluated the skill performance of BSN students. The responses ranged from higher perception of competence to acquisition of technical skills and improvement of their skills. The participants in one study overwhelmingly agreed that the learning outcomes were met through the simulation experiences. Students even identified that both simple and complex scenarios had helped them learn different aspects of the nursing role. Faculty agreed that the use of simulation was beneficial to the accomplishment of learning objectives. In the faculty ratings, therapeutic skills were positively impacted by simulation and the scores obtained. In a phenomenological study, where Cordeu explored the lived experience of graded clinical simulation for novice nursing students, 'perception of preparing for nursing practice' (p 90) was identified as a theme from the student descriptions [33]. The teaching faculty perceived simulation as a means of developing confidence in their students, which would facilitate the students' transition to becoming confident nurses. It is significant that despite mention of learning outcomes and the use of simulation to replace clinical hours, there is scarcity of studies directly comparing student performance in the clinical area and simulation in the lab settings [34].

Self-confidence and Satisfaction

Leigh, stated that adoption of simulation in nursing education helps students to feel more confident in their clinical performance [35]. Learner satisfaction was a commonly identified theme in the articles related to simulation. The studies reviewed used the simulation survey tools developed by NLN [32], or other valid and reliable instruments [16,18] to measure learner satisfaction and confidence. All four articles reviewed demonstrated a positive association between simulation, self-confidence, and overall satisfaction of students. Students also perceived that increased practice with simulated patients improved their confidence in cultural awareness [32]. Students strongly supported simulation as they found it to be very realistic, helped them to communicate better, and facilitated working as a team. Even though the teachers were supportive, they faced many challenges while handling the technology. Grossman et al reported that students at a senior level felt more confident than novice students [32]. However, Yuan, Williams and Fang's systematic review concluded that there is insufficient evidence to support the effect of simulation in student's achievement of confidence [37]. It is unknown whether the amounts of teaching experience of faculty members and/or style of facilitation are potentially influential variables. This important facet is not analyzed or explored in any research.

Anxiety

Studies conducted by Cordeau; Walton, Chulte and Ball, reported the perceived anxiety and fear of the participants during simulation [33,37]. Mariani et al suggested that, debriefing sessions could help students review their reactions and emotions about the learning experiences from simulation [16]. More quantitative research using standardized scales to assess the anxiety/stress levels of nursing students is needed in this area.

Nursing Implications

The use of simulated learning in prelicensure BSN programs is continuing to grow faster. Although the literature supports the inclusion of simulation in nursing curricula, there is limited rigorous research regarding its effectiveness and the specific facets of simulation highlighted in this review like students perception of anxiety. Substantial commitment of human and financial resources is required to implement well-structured simulations and develop viable simulation centres. There is still much work to be done in simulation. Nurse educators need to undergo extensive training for effective teaching and learning through simulation [38], and this was actually just mentioned in a brief from the NLN – one of the key things it calls for is better training of faculty. Interdisciplinary simu-

lation experiences need to be shared and inculcated between medical and nursing students to promote teamwork, collaboration, and communication.

Limitations

Some limitations apply to this review. The studies reviewed were based on descriptive, quantitative analysis. Experimental studies with large sample sizes are needed in order to measure student satisfaction and faculty with regards to simulation learning. Most of the studies reviewed have small samples with researcher-developed questionnaires.

Conclusion

The preponderance of the literature in this review concluded that simulation is an effective method of teaching and learning for selected clinical experiences, although future research is warranted to strengthen the evidence related to each skill, critical thinking, and the anxiety level of students. Students perceived higher levels of satisfaction, yet they expressed that simulation caused anxiety. The faculty were satisfied with the achievement of student learning outcomes, yet they acknowledged technical challenges with the implementation of novel methods and technology.

Table 1

Evidence of reviewed articles - Quantitative studies

SL. NO	AUTHOR AND YEAR	PURPOSE	DESIGN, SAMPLE, SETTING	DATA COLLECTION METHOD	DATA ANALYSIS	RESULTS
1.	Lewis, B. & Ravert, P. (2014)	To evaluate the effectiveness of simulation experience in meeting the learning outcomes of nursing students.	Mixed method survey design, (N =61), UK.	Researcher developed Survey questionnaire and open ended questions.	Mean scores, Thematic analysis.	The participants overwhelmingly agreed that the learning outcomes were met through the simulation experiences.
2.	Hanan, Mohamed, Amany, M. S. Sheble, M., & Shrief, W. I. (2014)	The aim of the present study is to evaluate the effect of low-fidelity simulation training with role play scenarios on nursing student's clinical skills and competence.	Pre-test and post-test randomized control design, N=260, Egypt.	Researcher developed confidence questionnaire	Paired t-tests and Mann-Whitney U test.	The study revealed that, students in the study group generally obtained higher scores than those in control group with mean score. This support the conclusion that, simulation training has enabled them to improve their skills and knowledge to a greater extent.
3.	Oldenberg, N.L, Maney, C, & Plonczynski, D.J. (2013)	To compare the results of a survey of perceived clinical competence after simulation.	Comparative survey design, N=168, USA.	Researcher developed Likert scale questionnaire on perceived clinical competence.	Descriptive statistics and paired t tests	Students with first semester HFS experiences had initial higher perceptions of competence.
4.	Mariani, B., Cantrell, M. A., Meakim, C. Prieto, P., & Dreifuers, K. T. (2013)	To empirically test and compare the clinical judgment of students who participated in structured debriefing sessions using DML and of students who received unstructured debriefing.	This mixed-method study used a quasi-experimental design for the quantitative component of the study and focus group discussions for the qualitative portion of the study. 42 students in the intervention group and 44 students in the control group, for a total sample size of 86. Faculty -6+6, USA.	Lasater Clinical Judgment Rubric	ANOVA and Thematic analysis.	The mean clinical judgment scores of the intervention group were higher and improved more over time compared with the mean scores of those in the control group. Students perceived the structured debriefing sessions as being learner-focused discussions that provided a holistic approach that included a review of knowledge, technical skills, and their reactions and emotions about the learning experiences.
5.	Liaw, S. Y., Scherpier, A., Rethans, J.-J., & Klainin-Yobas, P. (2012).	To determine whether self-reported confidence and knowledge measures are indicators of clinical performance observed in a simulation Based assessment.	A prospective randomized controlled trial Thirty-one final year nursing students in intervention (N = 15) and control group (N = 16). National University of Singapore.	A 53-item multiple choice questionnaire to test the participants' knowledge & a 5-item confidence scale for the measurement of confidence.	Mean scores, Paired t-test, ANCOVA, and correlation analysis.	After the simulation, the intervention group significantly improved their knowledge, performances and self-confidence.
6.	Grossman, S, Mager, D, Opheim, H.M, & Torbjornsen, A. (2012)	To compare the effects of simulation on perceived cultural awareness between Norwegian and American students.	A Bi-national comparative study, American senior class (N=48) and Norwegian seniors (N=25), North America and Norway.	NLN tools was used to measure students' self-efficacy perceptions for performing cognitive, practical, and affective trans-cultural nursing skills.	Descriptive statistics and paired t tests.	Students perceived increased practice with simulated patients improved confidence in cultural awareness.
7.	Swanson, E. A, Nicholson, A. C, Boese, T. A, Cram, E, & Stineman, A.M, Tew, K. (2011)	To compare the effects of three active learning teaching strategies on the outcomes, student self-confidence, and educational practice preferences.	Experimental post-test only design, N=144, USA.	Educational practices questionnaire, student satisfaction and self-confidence in learning instrument.	Descriptive statistics, Chi-square analysis and one-way ANOVA test.	Students' scores were significantly higher in retention performance than in first performance.
8.	Guhde, J. (2011)	To compare the Nursing Students' Perceptions of the Effect on Critical Thinking, Assessment, and Learner Satisfaction in Simple Versus Complex High-Fidelity Simulation Scenarios	Survey 134 Junior Nursing Students, USA	Evaluation of assignments for Critical Thinking, Assessment, and Learner Satisfaction.	Mean scores.	Both scenarios improved student awareness of assessment skills, critical thinking. In the qualitative comments, students identified that both simple and complex scenarios can be used to help them learn different aspects of the nursing role.
1. 9.	Howard, V. M., Englert, N., Kameg, K., & Perozzi, K. (2011)	To implement high-fidelity human simulation as a teaching strategy and to evaluate the student and faculty perceptions related to this instructional technology.	Mixed-methods (survey and focus group) research design, Students (N= 151) and faculty (N= 6), USA.	Simulation evaluation survey questionnaire and focus group interviews.	Mean and ANOVA	Student responses related to the experience were overwhelmingly positive, and while faculty agreed that the use of simulation was beneficial to the achievement of learning objectives, many challenges related to the use of the technology were experienced.
2. 10.	Meyer, M. N., Connors, H., Hou, Q., & Gajewski, B. (2011)	To evaluate the effects of a theory-driven paediatric simulation curriculum on nursing students' clinical performance.	Prospective study, N=120 Midwest United States.	The evaluation tool was adapted from a Likert-style tool developed by Massey and Warblow.	Repeated measure analysis with the mixed model and the compound symmetry covariance model with SAS Mixed procedure 19 were used.	Faculty rated students with patient simulation experience higher than those who had not yet attended simulation on item analysis; therapeutic skills were positively impacted by simulation.

REFERENCES

- Jeffries PR. Simulation in nursing education: From conceptualization to evaluation. National League for Nursing; 2012.
- Patel VL, Yoskowitz NA, Arocha JF, Shortliffe EH. Cognitive and learning sciences in biomedical and health instructional design: A review with lessons for biomedical informatics education. *Journal of biomedical informatics*. 2009 Feb 28;42(1):176-97.
- Murray C, Grant MJ, Howarth ML, Leigh J. The use of simulation as a teaching and learning approach to support practice learning. *Nurse education in practice*. 2008 Jan 31;8(1):5-8.
- Valler-Jones T, Meechan R, Jones H. Simulated practice--a panacea for health education?. *British Journal of Nursing*. 2011 May 26;20(10).
- Medley, C. F., & Claydell Home PhD, R. N. Using simulation technology for undergraduate nursing education. *Journal of Nursing Education*. 2005 44(1), 31.
- Shepherd, C. K., McCunnis, M., Brown, L., & Hair, M. Investigating the use of simulation as a teaching strategy. *Nursing Standard*. 2010 24(35), 42-48.
- Gaba DM. The future vision of simulation in health care. *Quality and safety in Health care*. 2004 Oct 1;13(suppl 1):i2-10.
- Pacsi AL. Human simulators in nursing education. *The Journal of the New York State Nurses' Association*. 2007 Dec;39(2):8-11.
- Decker S, Sportsman S, Puetz L, Billings L. The evolution of simulation and its contribution to competency. *The Journal of Continuing Education in Nursing*. 2008 Feb 1;39(2):74-80.
- Ricketts B. The role of simulation for learning within pre-registration nursing education—A literature review. *Nurse Education Today*. 2011 Oct 31;31(7):650-4.
- Hayden J, Jeffries P, Kardong-Edgren S. The NCSBN national simulation study. *Clinical Simulation in Nursing*. 2012 Jan 10;8(8):e407.
- Ganley BJ, Linnard-Palmer L. Academic safety during nursing simulation: Perceptions of nursing students and faculty. *Clinical Simulation in Nursing*. 2012 Feb 29;8(2):e49-57.
- Brown R, Feller L, Benedict L. Reframing nursing education: the Quality and Safety Education for Nurses initiative. *Teaching and Learning in Nursing*. 2010 Jul 31;5(3):115-8.
- Phan HP. Critical thinking as a self-regulatory process component in teaching and learning. *Psicothema*. 2010 Dec 31;22(2):284-92.
- Martin C. The theory of critical thinking of nursing. *Nursing education perspectives*. 2002 Sep;23(5):243-7.
- Mariani B, Cantrell MA, Meakim C, Prieto P, Dreifuert KT. Structured debriefing and students' clinical judgment abilities in simulation. *Clinical Simulation in Nursing*. 2013 May 31;9(5):e147-55.
- Partin JL, Payne TA, Slemmons MF. Students' perceptions of their learning experiences using high-fidelity simulation to teach concepts relative to obstetrics. *Nursing Education Perspectives*. 2011 May;32(3):186-8.
- Guhde J. Nursing students' perceptions of the effect on critical thinking, assessment, and learner satisfaction in simple versus complex high-fidelity simulation scenarios. *Journal of Nursing Education*. 2011 Feb 1;50(2):73-8.
- Farrar FC, Suggs L. Empowering critical thinking skills with computerized patient simulators. *Journal of College Teaching and Learning*. 2010 May 1;7(5):1.
- Horan KM. Using the human patient simulator to foster critical thinking in critical situations. *Nursing Education Perspectives*. 2009 Jan;30(1):28-30.
- Massias LA. Influencing critical thinking in nursing education: Comparing high-fidelity simulations and traditional clinical training (Doctoral dissertation, UNIVERSITY OF PHOENIX).
- Ravert P. Patient simulator sessions and critical thinking. *Journal of Nursing Education*. 2008 Dec 1;47(12):557-62.
- Carter AG, Creedy DK, Sidebotham M. Evaluation of tools used to measure critical thinking development in nursing and midwifery undergraduate students: A systematic review. *Nurse education today*. 2015 Jul 31;35(7):864-74.
- Cant RP, Cooper SJ. Simulation-based learning in nurse education: systematic review. *Journal of advanced nursing*. 2010 Jan 1;66(1):3-15.
- Ahmad MO, Liukkunen K, Markkula J. Student perceptions and attitudes towards the software factory as a learning environment. In *Global Engineering Education Conference (EDUCON)*, 2014 IEEE 2014 Apr 3 (pp. 422-428). IEEE.
- Levett-Jones T, McCoy M, Lapkin S, Noble D, Hoffman K, Dempsey J, Arthur C, Roche J. The development and psychometric testing of the Satisfaction with Simulation Experience Scale. *Nurse education today*. 2011 Oct 31;31(7):705-10.
- Buykx P, Kinsman L, Cooper S, McConnell-Henry T, Cant R, Endacott R, Scholes J. FIRST 2 ACT: educating nurses to identify patient deterioration—a theory-based model for best practice simulation education. *Nurse education today*. 2011 Oct 31;31(7):687-93.
- Meyer MN, Connors H, Hou Q, Gajewski B. The effect of simulation on clinical performance: A junior nursing student clinical comparison study. *Simulation in Healthcare*. 2011 Oct 1;6(5):269-77.
- Hunter C, Ravert PK. Nursing students' perceptions of learning outcomes throughout simulation experiences. *Undergraduate Research Journal for the Human Sciences*. 2010;9(1).
- Oldenburg NL, Maney C, Plonczynski DJ. Traditional clinical versus simulation in 1st semester clinical students: students perceptions after a 2nd semester clinical rotation. *Clinical Simulation in Nursing*. 2013 Jul 31;9(7):e235-41.
- Liaw SY, Rethans JJ, Scherpier A, Piyanee KY. Rescuing A Patient In Deteriorating Situations (RAPIDS): A simulation-based educational program on recognizing, responding and reporting of physiological signs of deterioration. *Resuscitation*. 2011 Sep 30;82(9):1224-30.
- Grossman S, Mager D, Opheim HM, Torbjornsen A. A bi-national simulation study to improve cultural awareness in nursing students. *Clinical Simulation in Nursing*. 2012 Oct 31;8(8):e341-6.
- Ann Cordeau M. SPECIAL TOPIC: SIMULATION AND HUMAN CARING The Lived Experience of Clinical Simulation of Novice Nursing Students. *International Journal for Human Caring*. 2010;14(2):8.
- Norman J. A Systematic Review of the Literature on Simulation in Nursing Education. *ABNF Journal*. 2012 Apr 1;23(2):24.
- Leigh GT. High-fidelity patient simulation and nursing students' self-efficacy: A review of the literature. *International Journal of Nursing Education Scholarship*. 2008 Sep 26;5(1):1-7.
- Yuan HB, Williams BA, Fang JB. The contribution of high-fidelity simulation to nursing students' confidence and competence: a systematic review. *International Nursing Review*. 2012 Mar 1;59(1):26-33.
- Walton J, Chute E, Ball L. Negotiating the role of the professional nurse: The pedagogy of simulation: A grounded theory study. *Journal of Professional Nursing*. 2011 Oct 31;27(5):299-310.
- Benner, P., Sutphen, M., Leonard, V., & Day, L. (2009). *Educating nurses: A call for radical transformation* (Vol. 15). John Wiley & Sons.
- Hanan, M. Soliman, Amany, M. Sheble, & Waffa. I. Shrief. Effectiveness of Simulation training on clinical Nursing Education and competence :Randomized Controlled Trial. *International Journal of Advanced Research*. 2014 2(4), 387-393.
- Swanson EA, Nicholson AC, Boese TA, Cram E, Stineman AM, Tew K. Comparison of selected teaching strategies incorporating simulation and student outcomes. *Clinical Simulation in Nursing*. 2011 May 31;7(3):e81-90.
- Howard VM, Ross C, Mitchell AM, Nelson GM. Human patient simulators and interactive case studies: A comparative analysis of learning outcomes and student perceptions. *Computers Informatics Nursing*. 2010 Jan 1;28(1):42-8.
- Berragan L. Learning nursing through simulation: A case study approach towards an expansive model of learning. *Nurse education today*. 2014 Aug 31;34(8):1143-8.