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A SYSTEMATIC REVIEW OF SIMULATION-BASED LEARNING VERSUS TRADITIONAL LEARNING

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Abstract

Background: In rapidly changing society with changing demands of need, nursing education is grand changing furthermore. The student nurses identify their learning needs in terms of cognitive, affective, and psychomotor domains. Clinical instructors meet the student nurses learning needs by giving the appropriate methodologies and teaching strategies in enhancing the student nurse's knowledge, skills and attitude.
Methods: This study utilized a systematic review as a design to review the simulation-based learning versus traditional learning. The Science Direct database was used to search the studies comprehensively.
Result: An action plan was made to introduce the result of this research and the importance of evidence-based nursing practice. This is recommended to the PHINMA-University of Pangasinan to have clinical simulation-based learning like the use of simulation mannequins in performing return demonstrations or for the laboratory lectures of the student nurses.
Conclusion: Many students under MDL find the learning experience in such modality as non-helpful when it comes to developing their macro skills.

Keywords: Learning Modality, Macro Skills, Online Distance Learning, Modular Distance Learning.

Background

Simulation-based learning (SBL) is gaining its popularity in the healthcare education. Simulation as defined is the imitative representation of the functioning of one system or process by means of the functioning of another (Merriam-Webster's Dictionary). It is used for the sole purpose of training. The SBL proved to have a powerful positive effect on students' achievement outcomes. Nursing skills learning is one area that can benefit greatly from this kind of teaching and learning method (Lin, 2015). Simulations have been proven to be a viable approach to create and improve clinical skills, and are commonly applied *in* multiple areas in the healthcare arena (Lateef, 2010). However, de Jong (2012) stated that at least for novice learners, simulation-based learning is hard and that they have problems in establishing goals and their results in learning through simulation or that they have problems with verbalizing results and gaining knowledge. It seemed that richness of the information a student can extract from a simulation makes learning more difficult unless it is first simplified and well structured (de Jong, 2012). Poorly designed simulation can promote negative learning (Krishnan, Keloth & Ubedulla, 2017). Krishnan et. al (2017) emphasized that, if physical signs are missing in the simulation, students may neglect to check for these. SBL may also encourage shortcuts, such as omitting patient consent and safety procedures, and may foster artificial rather than genuine communication skills (Krishnan, Keloth & Ubedulla, 2017). Thus, to determine whether simulation-based learning improves the learning experiences of health care students more than TBL.

Simulation learning is widely used in education specifically in nursing education. This SBL has been in tune with the rapid technological advancements occurring in this day and age. Nonetheless, there is a limited study comparing the effectiveness of the two techniques. Hence, the researchers wanted to know if this new teaching and learning strategy changes the overall educational experiences of student nurses. Furthermore, if SBL makes learning easier, realistic and more interactive. Ultimately, if the outcomes are better than the traditional learning. Part of becoming a working professional always involves applying knowledge and practicing skills in

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carefully controlled and monitored settings to get constructive feedback. For many years, nurses have practiced taking BP readings on each other, learned to provide certain kinds of physical care on manikins, and rehearsed giving injections with oranges. With advances in technology, learning labs in nursing schools now include standardized patients (actors), various kinds of lifelike anatomical models, and full-scale simulators (manikins that manifest signs and respond to treatment decisions and other actions). The use of simulation in nursing education is now a common element in the preparation for practice (Clarke & Lavoie, 2017). It gives students a view of portrayed real events for them to learn how to act accordingly. The use of this teaching strategy in nursing emerged in 1874, and is now recognized as valuable teaching methods (Jeong & Lee, 2019).

Clinical education in nursing aims to integrate theoretical knowledge from books into practical knowledge in real-life situations and to help students develop their problem-solving skills. Due to rapid changes in clinical placements, patient safety issues, and ethical concerns, students' direct experience with patient care and opportunities to handle problem-based clinical situations have been diminished. Simulation learning is a useful pedagogical approach that offers nursing students with opportunities to enhance their clinical, critical thinking and decision-making skills through varied real-life situational experiences, all the while ensuring patient safety (Kim, Park & Shin, 2016).

Herzing University (2020) promotes that student nurses will practice responding to a wide array of clinical emergencies in the sim lab– from broken bones to more complex conditions like seizures or diabetic shock. Student nurses will learn to properly assess a patient, deal with complex circumstances and read subtle patient clues that can inform the type of care and treatment that is needed. Best of all, sim lab is a place where you can make mistakes without worrying about potentially negative outcomes for a patient.

On the other hand, traditional classroom learning offers its own array of benefits. Dedicated time in the classroom creates an environment optimal for learning. Online classes can be challenging because of distractions, competing priorities and the lure of multitasking (email, work, family, pets, etc.). The learning environment should be a place to be focused, engaged and ready to learn (Aubel, 2016).

While the traditional model implies direct supervision by a qualified CI, literature has shown that due to high student-to-instructor ratio, the model does not guarantee the level of supervision, support, and attention that most junior students need to succeed and provide safe patient care (Luhanga, 2018 [1]).

Methods

Research Design

This study utilized a systematic review as a design to review the simulation-based learning versus traditional learning. The Science Direct database was used to search the studies comprehensively. The terms "traditional learning in nursing practice", resulted in 24,201 articles. Adding the terms "versus traditional learning in nursing practice", resulted in 7,418 articles. After specifying the term to "Simulation Based Learning vs Traditional Learning", procured 1,202 articles. Limiting the search to full text and English language sorting from 2016-2020 and then manually reading the titles of each article led to 517 files, **but only one passed the inclusion criteria set.**

A second search was performed using Cochrane using the term "Simulation Based Learning in Nursing Practice" resulted in 95 articles. Adding the terms "vs Traditional Learning" resulted in 15 articles. After using the term "Simulation Based Learning vs Traditional Learning", resulted in 7 articles. **Basing on the titles of the studies there was 1 article which passed the criteria.**

Another search was conducted using Scholarly Works the term "Simulation Based Learning" last December 8, 2020. The Scholarly Works website yielded 10400 articles. Adding descriptors like "vs traditional learning" resulted in 2,610. After sorting through articles that were published from 2016-2020 and utilizing articles that contained full text in the English language 15900 articles remain. **Considering the inclusion criteria, only 3 articles were read and qualified based on the inclusion criteria set.**

The last search was made in Semantic Scholar same day as the previous search which was on December 8, 2020. There were 290,000 articles that contained the term "Simulation Based Learning". After adding the term "vs Simulation Based Learning, the articles were reduced to 18,600 articles. An additional term which was "Simulation Based Learning vs Traditional Learning", resulted into 3,560 articles.

After scanning the articles titles only 1 article was used for the study.

Search History

The search process needed to be documented in sufficient detail throughout the process to ensure that it can be reported correctly in the research and to allow others to assess the thoroughness of the search. Hence, the researchers needed to keep track of: (1) Each database searched, together with the platform searched. (2) The date each search was conducted. (3) Subject headings and keywords used. (4) Search history, which included the combination of terms. (5) Number of results retrieved for each search. In addition, all searches conducted via hand searching must identify the source (name of journal, date of publication, etc).

The inclusion and exclusion criteria were formulated to select and assess studies properly; furthermore, the criteria limit the studies included in this research.

Quality Appraisal Tool

This study used an Audit Guide that will reveal various strengths and limitations of the studies that will be reviewed. The researchers will review three to five studies that are related to simulation, traditional method, and academic performance. It will be assessed using the PEDro scale.

PEDro scale contains 11 items. Points are only awarded when a criterion is clearly satisfied. A point should not be awarded if on a literal reading of the trial report was not satisfied. However, criterion 1 which relates to applicability or generalizability is not being calculated in the PEDro scale as reported on the PEDro website. Criterion 2-9 determines the internal validity of the Randomized Controlled Trial (RCT) while criterion 10-11 examines the sufficiency of statistical information, thus, making the results interpretable. Hence, the highest potential score is 10.

Nonetheless, PEDro scale should not be used as a measure of the "validity" of a study's conclusions. Those studies that show significant treatment effects and scores highly on the PEDro scale do not necessarily provide evidence that the treatment is clinically useful. Also, another consideration is if the treatment effect was big enough to be clinically worthwhile, whether the positive effects of the treatment outweigh its adverse effects, and the cost-effectiveness of the treatment.

Data Gathering Procedure

The PEDro scale will be used to measure or examine the validity and relevance of studies if it fits the inclusion or exclusion criteria. Once approved, the researchers will proceed to collect past research studies. Among the studies included were 3 RCTs (Tamaki et al., 2018; Reinhardt, Mullins, De Blieck, & Schultz, 2011; Padilha et al., 2019). These 3 studies concerned undergraduate nursing students.

All of these studies measured the learners' performance outcome. Two of the studies assessed the learners' knowledge, skill performance and self-confidence (Tamaki et al., 2018; Reinhardt, Mullins, De Blieck, & Schultz, 2010) and 1 study assessed the clinical reasoning, self-efficacy and satisfaction of the learners (Padilha et al., 2019).

Result

In the study of Tamaki et. al. (2019) results suggest that the EOL care simulation was effective in increasing nursing students' knowledge, skill performance, and self-confidence related to EOL care, although the improvement was only measured once, and after a short follow-up time. However, nursing students generally cannot experience EOL care through clinical practice, so simulations may provide an alternative way to acquire competency in caring for patients at the EOL as part of basic nursing education. The findings suggest that using SPs in an EOL care simulation enhanced not only knowledge and skill performance but also the broad scale of nursing students' competencies.

Moving on to the study of Reinhardt, Mullins, De Blieck, & Schultz (2011) the results suggest that standard simulation techniques used to teach students the IV insertion skills require that the instructor be present to demonstrate the procedure and the use of the required equipment. Student confidence may be derived from the students' success at being able to perform the skill and achieve a successful check-off process. The interaction that takes place with a return demonstration that uses the latex arm task trainer and meets with faculty approval can work to boost students' confidence in their ability to perform the skill with a real patient. Although an instructor may be present when a student uses the high fidelity computer-assisted device, the device does not afford an opportunity to manipulate the IV insertion equipment.

Does instruction using the high-fidelity computer assisted simulation IV insertion device increase

proficiency of IV insertion in an actual patient scenario? Although the students like the simulation experiences (Alinier, 2003), programs of nursing must juggle both cost of the equipment and efficacy of its use (Jarzemsky & McGrath, 2008). In this study, no difference was found in the skill acquisition of IV insertion and the method of instruction used. Despite the students' interest in the high-fidelity computer-assisted IV insertion device, neither the skill level nor the confidence expressed correlated with the type of training equipment used. Students thought the use of the high-fidelity equipment added to their skill, but the data did not support this assertion. The majority of students who had the opportunity to insert an IV in the clinical setting were successful on either their first or second insertion attempt, regardless of the instruction method used. Using high-fidelity computer-assisted simulation for IV insertion instruction in this study did not increase or decrease skill acquisition, confidence, or performance in the patient care setting. Current methods of instruction use the latex arm task trainer and offer sufficient support and practice technique for successful IV insertion in the clinical setting (Henneman & Cunningham, 2005). Henneman and Cunningham (2005) also found little support of the use of the high-fidelity computer-assisted IV insertion device as a training method of choice. Finally, current task-trainer instruction methods cost less than the high-fidelity computer assisted device. Therefore, we support the use of standard simulation using the latex arm task trainer for IV insertion instruction as the training aid of choice when IV insertion into a patient is the final measure of skill success.

Nursing programs are all experiencing the challenge of finding suitable sites for their students' clinical experiences. Although high-fidelity computer-assisted simulation has been shown to support in many areas of student practice and education, it does not appear to assist students significantly in the acquisition of the IV insertion skill ability or confidence. As an adjunctive practice device to reinforce skill training, the high-fidelity computer-assisted IV equipment may add to student satisfaction. When reviewing resources available to schools of nursing, the use of high-fidelity computer-assisted simulation may be more effective when assessing critical thinking-patient preparation and organization of needed supplies--rather than teaching a basic procedural skill such as IV insertion.

Lastly, in the study of Padilha et al. (2019) the paper indicates that clinical virtual simulation improves knowledge retention and initial clinical reasoning over time (2 months) and improves student satisfaction with learning, without influencing the perception of general efficiency. Clinical virtual simulation enabled a 20.4% improvement in students' knowledge retention and clinical reasoning in the context of the study. This study showed that clinical virtual simulation is a pedagogical strategy that, combined with other strategies such as briefing, simulation, and debriefing, improves both initial knowledge retention and knowledge retention over time. Clinical virtual simulation also raises the level of satisfaction with the learning experience among nursing students. These results reveal the fit of clinical virtual simulation with the new generation's expectations and ways of learning. The effect of the use of clinical virtual simulation as a pedagogical strategy in improving knowledge retention and clinical reasoning and students' satisfaction levels showed a match with the features of twenty-first century nursing students

Conclusion

Based on the three studies included in this systematic review, it can be concluded that SBL, generally tends to give participants advantages as compared to traditional learning. The results of this systematic review indicates that SBL can be used to effectively complement and enhance the clinical education of nursing students.

Moreover, SBL is effective in increasing nursing students' knowledge retention, self-efficacy, self-confidence, clinical reasoning and satisfaction related to clinical procedures. However, instructor's capability to explain the uses of simulation instruments is essential to prevent mistakes in doing the clinical procedures and practices.

There were only 174 participants that were in included in this review, but the findings are successful in determining the efficacy of simulation-based learning in nursing practice. SBL can be utilized as a new style of teaching clinical skills to nursing students to be able to hone and sharpen student nurses' clinical performances.

Recommendations

As part of the Evidence-Based Practice Process, the researchers strongly recommend the meta-analysis of this research for the deeper and comprehensive evaluation of the clinical trials used in this research,

thus, strengthening the level of evidence of the study making it more concrete in presenting analytical and statistical reports with regards to the objective of this research, furthermore, the continuity of the progress and the utilization of findings this study has presented sees the innovation in the process of learning of the students in many certain ways and it is improving with our technology.

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Conflicts of Interest

The authors declare there are no significant competing financial, professional, or personal interests that might have influenced the performance or presentation of the work described in this manuscript.

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