Summer 2021

The Impact of an Escape Room Simulation on Confidence and Competence in Nursing Student's Identification of Critical Changes in Patients: A Mixed-Method Approach

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A project submitted to the faculty of

Gardner-Webb University Hunt School of Nursing

in partial fulfillment of the requirements for the degree of

Doctor of Nursing Practice

2021

Submitted by:	Approved by:
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June 19, 2021 Date	June 19, 2021 Date

Acknowledgements

First and foremost, I would like to thank my husband and daughter for all of the love, support, and understanding during this time. I promise this is the last time I will go to school. I would also like to thank my chair, Kathy Williams, for all of her encouragement and her advice. In addition, I would like to thank Caitlin Lofton and Susan Furr, committee members, for all of your expertise and support with my project. I could not have done it without any of you!

Abstract

Background
The novice nurse takes time to show competency and confidence when implementing the new skills learned throughout their time in nursing school. With the increasing complexities of the healthcare system in the United States, it is necessary to ensure graduates are adequately prepared to handle critical situations. However, the ability of novice nurses to recognize critical changes in patients continues to be a hurdle that nursing faculty are attempting to address.
Objectives
The objectives of this project were to explore the impact of an escape room simulation on student's confidence and competence in recognizing critical changes in patients.
Design
A mixed-method quasi-experimental was used with a one group pretest and posttest design.
Settings
The setting was a private university in rural southeastern United States which offers a four-year Bachelor of Science Nursing Program.
Participants
The participants were Baccalaureate junior nursing students (N=13) were recruited from a convenience sample.
Methods
The project consisted of a pretest, an escape room simulation, and a posttest. The Nursing Anxiety and Self-Confidence with Clinical Decision Making (NASC-CDM©) scale was used with permission, Krista A. White PhD, RN, CCRN-K, CNE, to measure participants' perception of their levels of self-confidence. An Escape Room Questionnaire was designed by the researcher to evaluate a number of variables, including student perceptions of competence with critical changes in patients, feelings during the escape room simulation, and student views about the most helpful aspects during the experience.
Results
A descriptive statistics analysis indicated there was no statistically significant difference in participant's mean confidence scores. However, there was a reported increase (77%) in competence scores after the implementation of the escape room simulation.
Conclusion
The use of an escape room simulation to increase confidence was not statistically supported. However, there was an increase in self-reported competence.

Keywords: escape room simulation, confidence in nursing students, competence in nursing students, nursing education, critical changes in patients

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1. Introduction

New graduate nurses are expected to be prepared to apply clinical reasoning and clinical practice skills to competent nursing problem solving actions. Clinical practice assignments allow students a great opportunity to apply the skills learned in the classroom and laboratory settings. However, due to the competition for and limited availability of clinical sites, there is an increased need for alternative methods that ensure implementation of necessary skills needed in identifying critical changes in patients. According to the Carnegie National Study of Nursing Education, there are new methods that should guide educators; one of which is a more contextualized and productive way of thinking (Benner, 2015). This can increase the students understanding of prioritization within certain situations. A need to fill the void of clinical-practice gaps and increase new ways of looking at patient issues can be addressed with an escape room simulation. This game-based learning scenario allows students to utilize theoretical and clinical knowledge while using puzzles and clues to "escape" the simulation.

2. Background/literature

The novice nursing student takes time to show competency and confidence when implementing the new skills learned throughout their first year in nursing school. Decreased confidence and competence in new nurses have been shown to decrease successful transition into practice (Kaihlanen et al., 2019). The transition into practice can be a demanding and overwhelming experience, leading to higher nurse turnover rates

and lower satisfaction of new graduate nurses (Eckerson, 2018). During nursing education, a student is exposed to a combination of classroom educational experiences along with the opportunity to apply this knowledge in a clinical setting. Due to the inability to control the clinical practicum experience and the variety of clients during clinical rotations, a theory-practice gap exists. Simulation scenarios have been shown to be an effective pedagogy to fill this void (Karkada et.al, 2019). One quasi-experimental study showed significant statistical findings that using simulation with novice nursing students not only improved their practical skills, but also had a significant impact on their competence (Karkada et al., 2019). In addition, the commercial escape room can be adapted to the healthcare setting. Utilizing this game-based approach to a patient scenario has proven to show positive results related to knowledge and teamwork with undergraduate nursing students (Adams et al., 2018). Although many studies have shown a positive outcome in the healthcare settings with the utilization of an escape room, limited research is available related to nursing education.

2.1 Theoretical Foundation

The main theoretical undertone that relates to this project is Patricia Benner's Philosophy of Caring and Expert Nursing Practice (George, 2011). Patricia Benner's Philosophy of Caring and Expert Nursing Practice reflects five different levels as a theoretical basis to identify the development of nurses on a professional level (George, 2011). These stages include: Novice, Advanced Beginner, Competent, Proficient, and Expert. An escape room simulation scenario allows for the student nurse to practice new skills and clinical reasoning in a safe environment while eliminating the risk of practicing on live patients (Mahoney et al., 2013). During the Advanced Beginner stage, the nurse

would recognize changes in the clinical state but is unable to identify how to act upon those changes (George, 2011). A recent study demonstrated the use of simulation to have a positive outcome in improving the confidence, competence, and ability of student nurses to recognize deteriorating patients (Goldsworthy, 2019). Another theoretical underpinning of this project was David Kolb's Experiential Learning Theory. Applying Kolb's Experiential Learning Style to simulation scenarios such as an escape room simulation can benefit multiple types of learners. Benefit of the Kolb's Theory of Experiential Learning is how it allows for the application in four different types of learners. Simulation also allows for many different types of learners to be reached (Chapman, 2020).

3. Methods

3.1 Project Design

This project used a mixed-method approach. The intent of the quantitative component was to determine if and escape room simulation was effective in increasing student confidence in identifying critical changes in patients, hypothesizing a positive result. A quasi-experimental methodology was chosen using a pretest and posttest design. The qualitative element was used to examine the student's perceptions of competence following the intervention along with their opinion of the educational strategy.

3.2 Participants

Participants of this project was composed of second semester Bachelor of Science degree nursing students from a rural university in North Carolina. Participation in the evaluation of this project was voluntary, and written consent was obtained. All students enrolled in the course agreed to participate. The students consisted of both men and

women; 8% were men (n=1) and 92% were women (n=12). Approval from the university's institutional review board was obtained prior to starting.

3.3 Instruments

Confidence Tool

The Nursing Anxiety and Self-Confidence with Clinical Decision Making (NASC-CDM©) scale was used with permission, Krista A. White PhD, RN, CCRN-K, CNE. The purpose of this self-report quantitative instrument was to measure participants' perceptions of their levels of self-confidence and anxiety during the process of clinical decision making (CDM). The confidence tool was self-reported with 27 questions measuring confidence with various aspects of confidence. It is a 6-point Likert-type scale (6 = totally confident and 1= not confident). Possible confidence scores could range from 27 (not at all confident) to 162 (totally confident). Internal consistency reliability of the scale was assessed for each subscale (self-confidence, = .97; anxiety, = .96) (White, 2014). There are two subscales of the NASC-CDM© scale: self-confidence and anxiety. The anxiety data was not included in the evaluation process of this project.

Escape Room Questionnaire

The evaluation plan for the qualitative element, an Escape Room Questionnaire, was designed by the project leader to evaluate a number of variables, including student perceptions of competence with critical changes in patients feelings during the escape room simulation, and students' views regarding the most helpful strategy during the experience. The questionnaire was given to participants following the conclusion of the escape room experience. Trustworthiness was established by the project leader, exploring influences, and confirming subsequent actions through regular meetings with the team.

3.4 Ethical Considerations

Institutional Review Board (IRB) approval was obtained prior to the project implementation. The Escape Room Simulation was a required class activity, but participation in completing the evaluations of the project was voluntary and participants had the right to withdraw before submitting surveys or not participate at any time without penalty. They also had the right to refuse to answer any question(s) for any reason. Because this project involves anonymous surveys, the only time the participant could not withdraw is after the surveys had been collected. There was no way to identify the participants data at that time.

3.5 Administration of the pretest

Immediately after informed consent was obtained and prior to the prebriefing session of the escape room, participants were given time to complete the NASC-CDM© pretest scale. Once all the students had been given time to complete the surveys, the faculty member then entered the room. All pretests were placed in a locked box at the back of the room prior to scoring.

3.6 Escape Room Simulation Procedure

A prebriefing session included information about the data collection and informed consent was obtained immediately prior to beginning the simulation scenario. The pre-simulation assignment was then reviewed to help the students focus on the topics that were included in the scenario; chronic renal failure and suicidal ideations. The simulation escape room instructions were read to the students by the faculty member that completed the prebriefing session which included the goal of having to escape the morbidity and mortality meeting that would be required if they do not escape. Following the reading of the scenario, the simulation began with the students completing a crossword puzzle. The

answer revealed a word code to lock #1, which was highlighted on the puzzle by the faculty member. This lock allowed students access to the patients record. The students were then prompted to complete a head-to-toe assessment and begin to gather data, thus leading to the fact that the patient is disoriented and confused. Utilizing the situation, background, assessment and recommendation method, the students has to notify the provider of their findings. As a result, the provider ordered lab work, which allowed access to the next clue. The instructions included the need to treat the given blood sugar. In order to do that, the students needed to assemble a Tarsia puzzle with terms that needed to be matched up related to chronic renal disease. On the back of the puzzle a black light revealed the amount of insulin to be administered. This unlocked the next hemodialysis clue. Once solved, the students were informed of the final clue which prompted them to identify that the patient was having suicidal ideations due to their chronic medical diagnosis. The students needed to take immediate actions to set up suicide precautions to protect the patient. Completing this task allowed the students to successfully “escape” the simulation. This exercise required the students to recognize the critical assessment data, notify the provider, and ensure the patient receives treatment in a timely manner to prevent a decline in the patient. A debriefing session then took place where a discussion was held that included how the students felt about the scenario and any comments or concerns were discussed with the project leader during the session. A debriefing tool was completed. The post-simulation surveys were then given to the students for completion and collected by the students inserting the completed survey into a locked box outside the debriefing room. The surveys were color coded for differentiation of pre- and post-simulation surveys.

4. Data/results

Data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 21. A paired sample t-test was conducted to examine the difference in the pretest and posttest of the data. The result reveals that there is no statistically significant difference in the pretest and posttest (t (12) = -0.769, $p > 0.05$). Due to the p-values being greater than 0.05 level of significance, and can conclude that the mean for pretest (M = 113.00, SD = 21.837, N = 13) is not significantly different from the mean of posttest (M = 114.46, SD = 21.919, N =13).

The NASC-CDM© was validated to identify different dimension for specific focus areas of confidence. One dimension analyzed was dimension 3; Knowing and Acting. This dimension looked at the mean score of specific questions to distinguish a high level of knowing and acting. The sample test was conducted to examine the difference in the dimension 3 pretest and posttest. The result reveals that there is no statistically significant difference in the dimension 3 pretest and posttest (t (12) = -0.606, $p > 0.05$). This means that the p-values is greater than 0.05 level of significance and can conclude that the mean for pretest (M = 27.92, SD = 5.604, N = 13) is not significantly different from the mean of posttest (M = 29.31, SD = 5.907, N =13).

The Escape Room Questionnaire was analyzed and did not result in any negative comments. Some statements given by the students to describe their experience following the escape room simulation included *exciting*, *challenging*, and *enlightening.* Of the 13 students that completed the escape room simulation, 77% (n=10) reported feeling competent in detecting critical changes in patients, 15% (n=2) felt this somewhat improved their confidence, and 8% (n=1) reported the simulation did not improve their

confidence. Students' statements about what benefited them most about the experience included "forced me to think outside of the box to detect critical changes," and "working with my team members to interpret critical data".

5. Discussion

It is necessary that nurse educators today utilize experiential learning to help students prepare to learn and use knowledge in particular situations (Benner, 2007). The purpose of this project evaluation was to determine if there was a statistical difference with confidence and competence in identification of critical changes in patients through the use of an escape room simulation. Statistical analysis did not support using an escape room simulation to help with confidence in identifying critical changes. Although this survey data did not yield statistical significance related to confidence, many positive outcomes were voiced by the students related to competence. According to Morrell and Eukel (2020), using an escape room simulation has shown positive outcomes with the application of critical skills and knowledge.

The limitations to this study included the small convenience sample(n=13), so it is unclear if the perceptions by the students would be duplicated. Also, since the study was at a single educational institution carrying its own specific population, further studies would be needed to investigate if other nursing schools would yield similar results. In addition, implementation of the project was limited to baccalaureate nursing students at a private university and examined increased confidence only related to an escape room simulation. It is unclear if other simulation methods might lead to increased confidence.

6. Conclusions

The purpose of the escape room simulation was to examine the impact on undergraduate nursing student's confidence and competence in identifying critical changes in patients. There was no statistical significance between the mean competence scores of the pre and post test groups, as measured by the NASC-CDM©. The use of an escape room simulation related to confidence was not supported. However, positive results were reported in relation to competence. Current literature supports the use of escape room simulation for knowledge; however, research supporting other skills is lacking.

Recommendations for continued use of an escape room simulation include multiple teaching modalities to determine their effects on confidence in identifying critical changes in patients. The project leader intends to continue to examine different methods in improving confidence in prelicensure nursing students with the use of simulation. In addition, different aspects of the application of an escape room simulation will continue to be assessed.

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