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Implementing Rapid Response and Medical Emergency Simulation Training for Medical-Surgical Nurses

Brandon Burnett
Gardner-Webb University, bburnett1@gardner-webb.edu

Implementing Rapid Response and Medical Emergency Simulation Training for

Medical-Surgical Nurses

by

Brandon Thomas Burnett

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Submitted by: Approved by:

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Brandon Burnett   Candice Rome, DNP, RN, CNE

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Abstract

This project is based on the problem of nursing competence and confidence within medical emergency and rapid response scenarios. This problem affects all patients, but specifically the medical-surgical patient population of which rapid assessment and intervention can lead to a change in patient mortality. The goal of the project is to use simulation, a common tool in undergraduate nursing education, to improve nursing competence and confidence after participation. The nurses will be cycled through three simulated scenarios, followed by a debriefing, and then moved to the next simulation. The nurses' performance will be evaluated using evaluator checklists for each of the three simulated scenarios by the implementation members. The nurses will also complete pre- and post-evaluation surveys to score personal competence and confidence on a Likert Scale. The surveys will be analyzed and compared to determine if scores on each question contain a significant difference.

Keywords: simulation, education, medical-surgical, nursing, education, healthcare

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CHAPTER I

Introduction

New graduate nurses face a variety of challenges when stepping out of academia and into the clinical setting. One of these challenges includes clinical readiness and confidence in identifying the need to call for a rapid response (Braaten, 2015). Common elements for the lack of confidence include inexperience with the rapid response process along with negative feedback from other participants in the rapid response system such as physicians and nurse peers (Braaten, 2015). These themes also challenge experienced nurses on the units, as many hospitals follow American Heart Association (AHA) guidelines for renewing Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS) every 2 years. This gap leads to feelings of anxiety in the bedside staff, experienced and new alike, which can lead to a decrease in effectiveness during a rapid response or code situation (Keys et al., 2009). This feeling of anxiety and unpreparedness was also bolstered by the infrequent nature of rapid responses and codes, which made nursing staff feel incompetent in their ability to deliver adequate care during emergency circumstances (Keys et al., 2009).

This anxiety and lack of preparation can lead to poorer outcomes for patients when the rapid response system is not utilized prompt enough to catch early signs of clinical distress and health deterioration such as confusion and hypoxia (Brice, 2014). When reviewing the literature, up to 48% of cardiopulmonary arrests were preceded by some form of mental status change while 21% were preceded by hypoxia or respiratory effort changes (Brice, 2014). The ability to catch these clinical manifestations is not as prevalent in novice nurses, as their lack of experience and variety of undergraduate

program coursework often does not prepare them adequately for these emergency situations. In comparison to their novice counterparts, experienced nurses put more emphasis on the deviation of their patients from their established baseline which allows them to determine emergency situations quicker (Brice, 2014).

Significance

In daily practice, it is uncommon for nurses to perform certain emergency skills that are part of the rapid response process. Over time, these skills begin to degrade and lose their effectiveness due to a lack of use and practice, which has been found to be true with cardiopulmonary resuscitation (CPR) (Oermann et al., 2010). With this in mind, hospitals and other healthcare organizations such as the American Heart Association (AHA) have moved away from the yearly model of practicing and reinforcing these skills to a more frequent model of quarterly review or evaluation. While the adaptation of more frequent practice of CPR skills facilitates reducing mortality in emergency situations, many emergency situations occur before the need for their implementation. This lack of competency can lead to incorrect performance within a rapid response or medical emergency situation or even the inability to identify the need to call a rapid response (Azimirad et al., 2020). The additional need for consistent training is evident. The act of reinforcing assessment techniques along with skills would allow nurses to identify the need for rapid response and perform adequately.

Purpose

It is the purpose of this project to address the concerns of inexperience or discomfort of nurses identifying and performing within the rapid response and medical emergency scenarios through simulated exercises. These exercises will be followed by

debriefing, and clinical knowledge and experience can be obtained through discussion and observation. Simulation has been found to provide an environment in which hospital staff can practice coordination and teamwork during scenarios to take back to real-world practice (Colman et al., 2019). One study had members of a local hospital perform three scenarios common to their hospital system during rapid response calls in a format called Rapid Cycle Deliberate Practice (RCDP) (Colman et al., 2019). This involved taking commonly used skills and assessment strategies and repeatedly using them during three assigned scenarios in order to develop their competency and teamwork-based practice. This project intends to take simulation in order to develop teamwork skills such as closed-loop communication, constructive feedback, and clear roles in conjunction with a nursing assessment to garner experience to take to real-world practice.

Theoretical Framework

This project will be guided by Kolb's Experiential Learning Theory, of which the premise states that the learning cycle is based on a concrete experience in which abstract thought and new ideas can be formed (Lisko & O'Dell, 2010). It is through this initial concrete experience the learning cycle can be started, and new ideas can be formed and internalized. This learning cycle has four components: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Lisko & O'Dell, 2010). Figure 1 details the four components of Kolb's theory. In particular, this theory of learning is well-suited for simulated activity and nursing education as participants may experience a scenario in a controlled environment, reflect on what went well and what could be improved on, and discuss how this could be applied to similar situations in their real-world practice, and put this practice into use upon returning to their units. This

reflective observation, along with learning from the experience, will be completed in the post-simulation debriefing, a period in which the instructor walks through the scenario with the participants and provides constructive feedback along with allowing students to unpack the situation and evaluate their own performance as an individual.

Figure 1

The Learning Cycle of Kolb's Experiential Learning Theory
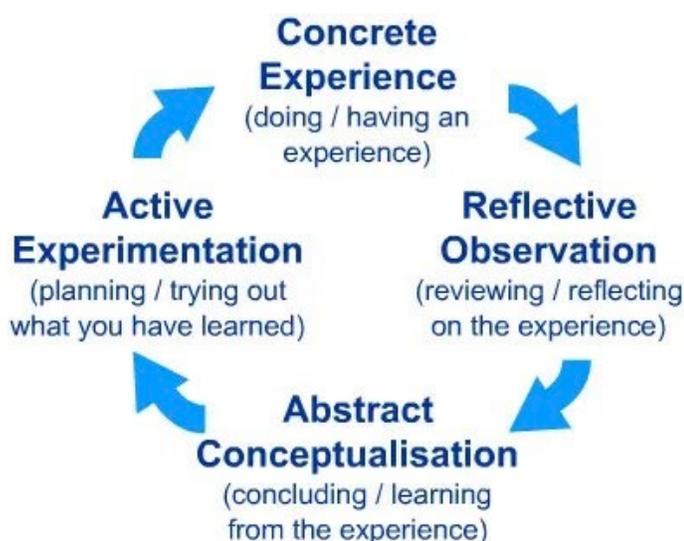
Definition of Terms

Terms known to have multiple meanings or be used in various situations will be defined by the project author to ensure clarity. The terms defined are scenario and debriefing. A scenario is defined as a detailed clinical experience based upon possible real-life occurrences. Debriefing is the period after the simulated scenario is completed with both instructor and participants. The act of debriefing is where the instructor and participants discuss the scenario components along with the participants' actions in order to provide constructive criticism and allows participants to critically evaluate their performance to garner insight that will improve their real-world practice.

Summary

It is the goal of this project to address the concerns of inexperience or discomfort of nurses identifying and performing within the rapid response and medical emergency scenarios through simulated exercises. These exercises will be followed by debriefing and clinical knowledge and experience can be obtained through discussion and observation. It is through this implementation that learners develop their own experiences and self-reflection, along with guidance by instructors of the simulation using Kolb's theory, that learners may become better prepared for rapid response and emergency situations. The learners may therefore be able to provide better care in these stressful situations for their patients, leading to better outcomes overall.

CHAPTER II

Literature Review

Emergency scenarios are a common theme of weakness among new graduate and experienced registered nurses. Whether this stems from inexperience with procedures, operating under pressure, or a lack of practice with team dynamics in the rapid response or medical emergency, this puts stress on the registered nurse as well as can place patients at a higher risk for harm. As such, the purpose of this project is to review the literature and develop a plan to improve performance in rapid response and medical emergency scenarios through simulated exercises for the registered nurse. By reviewing relevant literature on rapid response simulation through various avenues of nursing such as critical care, emergency, and even within the nursing curriculum, it is hoped that patterns of successful education can instill competence in new graduate and experienced registered nurses in the inpatient hospital setting will be discovered.

For this literature review, the Cumulative Index for Nursing and Allied Health Literature (CINAHL Complete) and the Nursing & Allied Health Database (Proquest) were used to search for articles. Full-text articles and peer-reviewed search criteria were used to determine whether articles were used for this literature review. Keywords used in this search were "simulation", "rapid response", "nursing" and "medical emergency". These words were chosen due to their relevance to the question at hand, as well as their ability to distinguish simulation training for other healthcare professions from those of nursing.

Rapid Response and Medical Emergency Readiness

Azimirad et al. (2020) asked the question, do nurses activate the rapid response system timely enough for resuscitation or intervention, and was there a difference in performance and criteria between British and Finnish nurses? The question was formulated in response to reviewing the literature on delays in care due to nurses not identifying or utilizing the rapid response system in a timely manner to avoid potential harm to the patient. The study took place at two acute care hospitals: A 671-bed acute care hospital in Finland and a 750-bed acute care hospital in the United Kingdom chosen for their comparable size and acute care statuses. The Finnish hospital used the Medical Emergency Team (MET) criteria while the hospital in the United Kingdom used the National Early Warning Score (NEWS) criteria in order to determine if a rapid response should be called. The sample were nurses that fell into categories of new graduate registered nurse, a registered nurse with greater than 1 year of experience, and a registered nurse with significant experience that fell under bands five, six, and seven respectively. Exclusion criteria included nurses that worked in specialty areas such as the emergency department, intensive care unit, neurology, pediatric, neonatal, and maternity units due to their rapid response criteria did not follow the standardized adult Medical Emergency Team criteria or National Early Warning Score criteria respectively. Data was collected over a 3-month period in Finland and the United Kingdom using a rapid response team survey which comprised six multiple-choice scenarios, four from the primary questionnaire and two added that were adapted from simulation scenarios. For the hospital in Finland, the questionnaire was translated into Finnish using an official native translator which was back-translated in order to ensure accuracy and validity. A

total of 180 nurses were included in the study, with 86 from the United Kingdom and 94
from Finland. The number of nurses correctly answering and identifying the need to call
a rapid response scenario was 11.6% in the United Kingdom sample and 6.4% in the
Finnish sample. There was no significant difference noted between years of work
experience and the number of correct answers, and no significant difference in correct
rapid response identification between both sample groups. From the questionnaire, nurses
within both sample groups were able to correctly identify the need to activate a rapid
response in less than 50% of scenarios. Work experience and ethnicity were not identified
as statistically significant in the ability of nurses to identify a rapid response scenario
with the case studies provided. The study did identify potential confounding factors and
eliminated them such as populations that do not use the same adult MET and NEWS
criteria but did not have a large sample size and could have improved by having more
than one hospital per country participate to increase participant diversity.

Gordon and Buckley (2009) asked the question, could the use of simulation in
graduate nurse education improve medical-surgical nurses' perceived abilities to respond
to rapid response and medical emergency scenarios. This study occurred in an Australian
university in which 50 students participated. All students were enrolled in a graduate
course that covered live lectures related to clinical emergencies and practiced
resuscitation skills prior to participating in simulation workshops managing an acutely ill
medical-surgical patient. Approximately 75% were practicing as clinical nurses, with
70% in a medical-surgical setting. And the mean years of experience for participants was
9 years as a registered nurse. Participants completed a questionnaire consisting of 14
questions to rate perceived ability regarding aspects of emergency response with

recognition of the need for rapid response, technical skills, and leadership. These questions were rated from not at all confidence (1) to great confidence (4). The questionnaire was administered before participating in the simulation and after the simulation. Following the conclusion of the simulated training, scores from the pre-simulation questionnaire were compared to the post-simulation questionnaire within the three categories: recognizing an unstable patient, identifying priorities, and calling for help. While original scores were high in confidence, when comparing pre-and post-simulation scores, data was found to show an increase in confidence in all three domains. Limitations included the assessment of performance in the clinical environment to ascertain the application of simulation training to clinical performance, as well as the number of simulation participants. The study also did not evaluate theoretical knowledge of simulation and skills learned during the course and simulation experience post-simulation which could be addressed to determine improvement.

Scaramuzzo et al. (2014) performed a study based on the question, could simulated and mock medical emergencies in the outpatient setting help improve response times and confidence to medical emergencies? The setting was an outpatient infusion center with 23 participating staff including registered nurses and technicians. The medical emergency simulation training sessions were led by a nurse educator. Seven training sessions using simulation and medical emergency scenarios were conducted. These sessions integrated hypersensitivity reactions to infusion products as well as basic life support care. A survey on comfort pre- and post-simulation training was conducted and compared, along with post-simulation analysis using the Strengths, Weaknesses, Opportunities, and Threats (SWOT) method. In comparing the pre-simulation training

and post-simulation training, participants reported a 99% improvement in comfort with recognizing and performance within an emergency scenario. Participants also completed three hypersensitivity reactions after simulation training which was noted by researchers to have improved response time in comparison to initial simulation times. The study targeted and assessed their ideal population but had a small sample size. The study also primarily assessed subjective data with comfort levels pre- and post-simulation training and could be improved by adding an objective metric such as measuring successful identification of the cause of the emergency scenario, or time from identification to basic life support initiation.

Eda et al (2021) developed a study around the question of, would introducing a rapid cycle deliberate practice cardiac arrest simulation into professional development for registered nursing staff improve confidence in the medical emergency setting as well as competence with cardiac arrest care? This study was performed using a sample of 89 staff registered nurses in a hospital in the northeastern United States. Participants were derived from various specialties including medical-surgical, intensive care, labor and delivery, emergency room, and post-anesthesia care. A total of 89 registered nursing staff were given a five-question pre-and post-test to evaluate knowledge which was created by hospital education staff. Scores were on a 10-point scale ranging from not at all (1) to a great extent (10). This coincided with a Simulation Effectiveness Tool-Modified which was a 19-item index to evaluate if the simulation activity met student learning needs. The study noted significant improvement in reported knowledge from pre-test to post-test among participants after participating in the rapid cycle deliberate practice simulation for cardiac arrest. Limitations in the study included a small sample size, the inability to

compare traditional debriefing with using the Rapid Cycle Deliberate Practice (RCDP) debriefing model for cardiac arrest care, as well as the inability to follow up on the clinical application of simulation learned experiences. Rapid cycle deliberate practice is defined as a practice in which simulation participants perform simulations in succession with small debriefings in between. By performing simulations in quick succession with smaller debriefings to understand and correct learning, learners are able to reinforce skills and learn concepts in a more condensed timeframe

       Kutzin and Janicke (2015) asked the question, could incorporating rapid cycle deliberate practice into professional development for staff registered nurses compensate for decreased teaching time and increased competency? This was performed at Winthrop University Hospital in Mineola, New York. This was integrated into competencies and continuing education simulation for staff registered nurses using three simulation modules. There is no defined number for the sample size noted in the article for the study. The integrated practice was divided into three modules for registered nurses: (1) tracheostomy care, (2) sepsis care and SBAR report, and (3) rapid cycle deliberate practice simulation for the registered nurse to enter the room, assess, and call for help to begin basic life support. Registered nurses after exposure to the rapid cycle deliberate practice simulations reported greater confidence in caring for patients with the taught skills. Nurses also reported in the post-simulation interview that they felt greater satisfaction and retention of the educational material. This study did not report quantifiable data on sample size and skill performance pre-and post-intervention. This study could be improved by incorporating performance in simulation prior to

intervention, as well as post-intervention immediately and after a set time interval for registered nurses.

Liaw et al. (2016) asked the question, would implementing an online simulation to assist registered nurses in recognizing and responding to rapid response scenarios with deteriorating patients? The study was performed at a 991-bed hospital in Singapore affiliated with a university. Two medical-surgical units with high rapid response rates were chosen from the university hospital. A total of 99 registered nurses from these units were brought to a location where a registered nurse program called e-RAPIDS was loaded on computers. The e-RAPIDS program was integrated into the registered nurses continuing education requirements for the hospital. Each registered nurse was brought into the computer room with the e-RAPIDS program and asked to complete simulated scenarios during a set time period. At the end of the simulated training were five scenarios to help evaluate learning, of which feedback was provided through the program. Students then received a multiple-choice questionnaire after completion of all modules and a final simulation to evaluate subject knowledge from training. Upon comparing knowledge scores on the pre-test and post-test knowledge scores the average score did increase after the implementation of the e-RAPIDS program. However, upon comparing 6-month rapid response calls pre-and post-intervention on the medical unit and surgical units studied—only the medical unit showed an increased number of rapid response scenarios called. Limitations and weaknesses of the study include a lack of diversity of hospital units studied, as well as a short timeframe for the follow-up post-e-RAPIDS implementation to determine if training and simulation were truly effective.

Crowe et al. (2018) asked the question, could continued simulation education help sustain confidence and decreased mortality in general medical-surgical units with licensed practical nurses and registered nurses? The study was conducted at a 650-bed Canadian teaching hospital, with 10 different medical units consisting of licensed practical nurses and registered nurses. A total of 123 registered nurses participated and 32 licensed practical nurses. All nurses participated in the post-intervention questionnaire, with 42 nurses completing the 3-month follow-up questionnaire. Nurses with critical care or high-acuity work experience were excluded, as well as non-licensed personnel. A paper-based survey using the 12-item Clinical Decision-Making Self-Confidence Scale as well as a 17-item multiple-choice questionnaire to test knowledge. The pre-intervention survey was completed 3 months before the simulation training, and a post-intervention survey was completed 3 months after simulation training. Simulation training was completed in a 4-hour education course, which began with a 1-hour didactic session and four 40-minute simulation sessions with a simulation educator mixing high and low-fidelity simulation using skills training and assessing with intervention. After completing the 3-month post-intervention survey with a confidence scale and knowledge questionnaire, both confidence and knowledge were found to have a significant difference in knowledge scores and confidence scale ($p<0.001$). In comparison, pulseless cardiac arrests decreased from 59% of medical emergency scenarios to 52%, and a return of spontaneous circulation improved to 16%. A weakness of the study is the lack of response at the 3-month post-intervention period. The study also could have had further follow-up after 3 months with statistical data with pulseless cardiac arrest as well as the return of spontaneous circulation data.

Bavare et al. (2019) asked the question, if encouraging self-determination qualities and providing practice within simulated scenarios with training, would this promote participation in rapid responses? This was based on the Self-Determination theory, which involved encouraging autonomy and competence through practice in didactic and simulated training to overcome negativity and self-doubt relating to medical emergencies. This study occurred at Baylor College of Medicine and the Texas Children's Hospital in Houston, Texas. There were 42 care providers which included 22 advanced practice providers as well as 20 pediatric residents who participated. A conceptual program was developed involving didactic training, case studies, airway maintenance, communication, and simulations for cardiac and neuro-respiratory. These activities were coordinated into a 4-hour workshop which was attended by all participants. Twenty-question pre-tests and post-tests were used to assess knowledge acquisition, as well as assessing autonomy and competence using a 5-point Likert scale. During the 6 months of the study, three workshops were held to accommodate all 42 participants. When comparing pre-test and post-test scores for rapid response knowledge, surgical provider scores showed a significant difference. With pediatric and surgical scores, both showed improvement in clinical knowledge as well as self-determination scores. Weaknesses of the study included a small sample size, a lack of diversity in the participant population, and a lack of study on validity and reliability. The study also needed more data points for comparison in order to provide generalizability to other hospital populations.

Bliss and Aitken (2018) asked the question, did simulation assess a registered nurse's ability to assess deteriorating and critical patients? This was done to identify if

assessing and responding to patient status deterioration could be improved using a scenario-based simulation scenario. All simulations and studies took place at London University in the United Kingdom. Eight registered nurses took part in the simulation and the post-simulation interviews. All registered nurses were employed in acute medical or surgical units. All participants were part of 4 weeks of simulation, with 2.5 hours of simulation per week to add to 10 hours per participant. Simulation participants were guided to develop skills in the basic emergency assessment to cover airway, breathing, circulation, disability, and exposure. Participants also participated in a classroom session that covered hemodynamics and cardiac pathophysiology with electrocardiogram information. Afterward, all simulation participants were interviewed for overviews on the role of simulation and the impact on their practice. This was performed with 12 questions given to all nurses. Of the participants, seven out of eight nurses found that the simulation scenarios assisted them in retaining the ABCDE of emergency assessment and would impact their clinical practice. All registered nurses felt that the simulation had a positive impact on their practice and would recommend further simulated scenarios. Limitations of the study included the small sample size of eight, the data limited to qualitative data, as well as the limited follow-up after the initial simulation to determine a change in practice with further interviews.

Rapid Response Teamwork

Colman et al. (2019) asked the question, would integrating rapid cycle deliberate practice (RCDP) methodology into simulation-based team training improve learner confidence and teamwork within the rapid response scenario? This was asked in contrast to using traditional reflective debriefing in response to certain concepts within the rapid

response that require non-technical skills. The setting of this study was within the pediatric critical care division of an acute care hospital with registered nurses and registered respiratory therapists with at least 2 years of critical care experience. The simulation workshops were held for those that respond to rapid response and medical emergency calls in the non-critical care units. Forty-three registered nurses and 33 respiratory therapists participated in the simulation workshops with surveys after each session. During 1 month, twenty-five 3-hour simulation-based team training sessions were held in which the registered nurses and registered respiratory therapists participated in using the rapid cycle deliberate practice method and were surveyed after each cycle scenario. Surveys included confidence in teamwork skills such as delegation of tasks, global assessment, and identifying the team. Post-cyclic surveys using the Clinical Training Scale rated team performance from unacceptable (0) to perfect (10). These scores were found to improve from mean scores of poor (1.7 to 3.8) prior to rapid cycle deliberate practice to average or good (6.6 to 7.6) post-debriefing using the rapid cycle deliberate practice method after scenarios. Surveys of participants also noted subjective improvement and reported an inability to lead the rapid response, identify roles, and communicate. The study identified performance improvement by subjects using evaluation of performance during simulated scenarios of pediatric critical care registered nurses and registered respiratory therapists with 2 years or more of critical care experience. The exclusion criteria made it so the likely candidates to lead the rapid response scenario were determined, and their target population was identified and accurately observed. Weaknesses within the study would be the sample size and the number of identified scenarios which were kept to three in order to assess improvement.

By only using three simulated scenarios, subjects could have improved performance based on repeat exposure rather than the learning of role identification which may be necessary outside of those specific circumstances.

Reed et al. (2017) performed a study based around improving rapid response and medical emergency coordination using interdisciplinary team-based simulation training. This team-based training included physicians, residents, nurse practitioners, registered nurses, and registered respiratory therapists. The study was performed in a 71 neonatal intensive care unit (NICU) at an academic hospital at Mercy Children's Hospital in Kansas City, Missouri. These simulation-based team trainings were performed over 65 sessions split between day shift and night shift to involve all staff which included 280 registered nurses employed in the Level IV NICU. There were 65 sessions held with one session per month, each involving training and use of calling a medical emergency, following the medical emergency protocol, rapid assessment, closed-loop communication, and defining roles. High-fidelity and low-fidelity simulations were used within the team-based simulation training that was based upon real-life scenarios faced within neonatal intensive care such as respiratory distress due to tracheostomy dislodgement. Simulation facilitators provided debriefing after each scenario going over strengths and weaknesses and gathering subjective feedback from participants on confidence levels. After 4 years of intensive team-based simulation training, medical emergency scenarios dropped from three to eight per month and zero to two per month. Subjective reports from staff state that medical emergency scenarios run smoother within the team. Weaknesses of the study included a lack of objective data for comparison of the

pre and post-intervention. The study could also have a longer, objective data collection on the number of medical emergencies called per month after the intervention.

Zohour et al (2021) asked the question, would using scenario-based clinical simulation help alleviate anxiety and aid in skills in caring for premature neonates? The study occurred in the neonatal intensive care unit and the training unit at the University Specialized Hospital in Alexandria, Egypt. A total of 60 students who participated in the study that were divided into two groups were assigned—half to the Traditional Orientation group (control group) and half to the Scenario-Based Clinical Simulation group (experimental group). Both groups completed day one orientation together and completed the pre-orientation anxiety assessment based on the State-Trait Anxiety Inventory to get a baseline assessment of anxiety per student. An observational checklist was developed over 148 items (covering vital signs, handover, cord care, weight measurement, intravenous therapy, and more) of which two observers scored students on skill performance. Two lectures were given about holistic nursing care of preterm neonates to the experimental group, as well as a clinical skill demonstration on mannequins with follow-up simulation of holistic care. These simulations were followed by debriefing on the experience afterward. Pre-orientation and intervention, the experimental group had 76.7% scoring for anxiety while afterward 6.7% scoring for anxiety. In comparison, the control group scored 70% for anxiety while they scored 43.3% after orientation. Significant differences were noted between control and experimental groups regarding neonatal skills after the intervention, with experimental groups showing scores improved over control. Limitations of the study included a small

sample size as well as a lack of diversity in the setting which could include nursery premature neonates.

Synthesis and Summary

After carefully reviewing the literature, there is a discrepancy in studies concentrated on registered nurses and using simulation to assist with preparation for rapid response and medical emergency scenarios. There is a section of literature focused on how using simulation and associated training can assist registered nurses and other personnel to subjectively improve confidence levels while simultaneously improving assessment and response to rapid response and medical emergency situations. Simulation has data to show improvement in the ability of registered nurses to assess and prevent significant deterioration leading to cardiac arrest with prevention. While some of the research has focused on qualitative versus quantitative data with smaller sample sizes, this could be supported by creating a simulation protocol for new graduate and experienced registered nurses to assist with encouraging competence and response to rapid response/medical emergency scenarios. This research assists this project by focusing specifically on using the Rapid Cycle Deliberate Practice method as well as using a mix of high fidelity and low fidelity simulation in order to support technical skills in basic life support as well as non-technical skills using closed-loop communication and clear role determination.

CHAPTER III

Needs Assessment

The purpose of the project is to implement simulated scenarios in order to ascertain whether simulated training in rapid response and medical emergency scenarios improves the confidence and competence of registered nurses when performing tasks under real-life duress. This was found after identifying a common factor of a lack of practice or skill whether this is from being newly licensed or a lack of exposure to medical emergencies and rapid responses. As such, this project is intended to expose registered nurses to simulated scenarios and then evaluate performance through both subjective and objective data.

Target Population

The target population is medical-surgical registered nurses, particularly new graduate nurses. This population was identified due to the number of nurses employed within the field and that new graduate nurses often enter the profession with little hands-on experience in medical emergencies and rapid response scenarios. This is in part due to the inability of clinical experiences to always prepare registered nurses for medical emergencies and the preference for prevention of the emergency rather than participation in an event. As such, many new graduate registered nurses enter the profession with very little preparation for medical emergencies.

Setting

The setting for this project is a hospital system in the southeastern US, consisting of a level one trauma center and four outlying facilities serving their various communities. The project will primarily be performed at the two main hospital campuses

with over 700 beds. Within this facility, the medical-surgical units will be the location where the project is designed to take place. While future implementation of the project may encompass critical care, emergency, and other settings this initial project goal is targeting the medical-surgical nursing units.

Sponsors and Stakeholders

For this project, the Adult-Gerontological Clinical Nurse Specialist associated with the Nursing Education department was identified as the project partner. The Clinical Nurse Specialist (CNS) is both educated on clinical skills vital to the project's success as well as integrated into the hospital by providing roaming education and support during working shifts. This CNS primarily works with the medical-surgical floors within the level one trauma center and can both assist with project implementation and has a vested interest in seeing the project succeed.

As stakeholders, the Centralized Nursing Education department and the nurse educators associated with the level one trauma center would be stakeholders in this project. Each of the nursing educators is associated with a primary division but supports one another when a large project is being enacted. In this instance, all nursing educators for the level one trauma center would be considered stakeholders as the primary target of the population falls under their jurisdiction for onboarding and maintenance of educational needs for patients and nurses alike.

Desired Outcomes

The goal of this project is to see an improvement in the performance of new graduate and experienced registered nurses during rapid response and medical emergency scenarios. High acuity events such as acute decompensation of a patient's health can

cause stress among nursing staff who are not adequately prepared to perform life-saving tasks under pressure. This project allows for simulated practice of medical emergency and rapid response events in order to practice core skills such as closed-loop communication and designating roles in tandem with basic life support to better improve patient outcomes.

This will be assessed in two ways. The first is a direct comparison of rapid response and medical emergencies called over 6 months before enacting simulation training, to 6 months after in order to determine the number of unsuccessful medical emergency resuscitations as well as the number of successful transfers to intensive care. The second comparison will be surveys distributed to all participants before project initiation and afterward assessing confidence with assessment and skill performance during a medical emergency and rapid responses. The desire is to see a statistically significant increase in successful transfers to critical care from a medical emergency and rapid responses, as well as an increase in the confidence of participants.

SWOT Analysis

Table 1

SWOT Analysis of Simulation Project

Strengths	Weakness	Opportunities	Threats
Facility integration of Centralized Nursing Educators	Time constraints	Decreased patient mortality and morbidity	Facility research funding
Designed using familiar skills such as CPR	Internal education staffing constraints	Increased staff nursing confidence in emergency scenarios	Unit staffing (resignations, transfers, lack of available staff)
Participants are peers in nursing	Participation		

Strengths	Weakness	Opportunities	Threats
units to connect to real-life		Results can support further research into simulation support for registered nursing training	
The simulation used by the facility during annual competencies			

This project holds strength in implementation since the current project involves the facilities' own Centralized Nursing Educators. Collaborating with the staff, current staff resources, and staff familiarity with leadership and peers alike bolsters the likelihood of project approval, participation, and success. This also will hold significant weight for the participating educators and management upon project completion as data may yield positive results for the facility and the staff. In conjunction with this, the facility also integrates small, simulated scenarios during their annual competencies which this project will allow hands-on practice with real-life emergency scenarios to better prepare and retain valuable skills and knowledge for the future.

In contrast, two of the largest constraints of the project will be time and staffing. The education department has limited staff for night shift and weekend shifts which will potentially limit participation for those registered nurses that exclusively work those hours. The second point of weakness would be the participation of registered nurses in the project. As this project implementation would occur during the coronavirus pandemic, many registered nurses and even nursing students have an extortionate amount of mental and emotional fatigue due to the stress in the healthcare field. As such, participation may be limited by new graduate nurses and registered nurses engaging in self-care and non-mandatory work tasks.

The project has the potential to decrease mortality and morbidity among patients in the facility due to increased confidence and competency of registered nurses post-simulation. Should the project results be compiled and published in the resulting literature, the information could be used as a foundation to perform quality improvement or further research into improving mortality rates and registered nurses.

Primary threats to the project would be staffing levels which can be affected by a variety of factors such as facility benefits, the coronavirus pandemic, or personal desires of staff. The project could also be affected by the ability of the facility to fund further research and the ability to pay for educator hours should the need outside of their scheduled salary arise.

Resources

Resources for this project would consist of personnel, physical assets, and time allotment. Personnel would be those team members chosen for the project to help coordinate and participate in project implementation as well as to collect data. Physical assets for the project include the mannequins to allow participants in the simulation to perform skills such as cardiopulmonary resuscitation techniques as well as "assessment". Ideally, these mannequins will have the capability to have compressions performed as well as medication administration. The mannequins will also be accompanied by mock crash carts that will have materials to give simulation participants the ability to get the feeling of setting up equipment during stressful scenarios such as setting up suction tubing, drawing up medications, and using a handheld doppler ultrasound in order to look for pulses. The final needed resource is the time allotted for simulations to be completed. Ideally, each scenario will take 20-30-minutes for a total of 90-minutes for all three

scenarios to be completed. This would need to be coordinated with the medical-surgical nursing units as well as the nursing educators in order to make them available for the greatest allotment of participants.

While speaking with the nursing educators for the facility, there are at least five mannequins that allow for compression and cardiopulmonary resuscitation. There are two mock crash carts the facility owns that are used for the advanced cardiac life support courses provided for new graduate nurses and new hires for the facility. The facility also has two mannequin torsos used for competencies that have central lines placed, which could be used with the simulation project. As far as time allotment, this would be the toughest resource due to staffing constraints and the coordination around yearly competencies for the medical-surgical nurses and not impede in-unit scheduling.

Team Members

A majority of the team will consist of members from the Centralized Nursing Education department for the designated facilities. The Project Leader will work with the other members to coordinate the proper implementation of the simulation while working within the constraints of the facility and current policies. The nursing manager, or Project Coordinator, will be tasked with assisting the Project Leader in order to bring the material to the nursing educators along with assisting in setting up times for the participants to take part in the simulations. The Project Coordinator was chosen due to facility affiliation as well as having a direct connection to the staff planned for implementation.

Shift Coordinators A and B were chosen as senior nursing educators for the day shift (Coordinator A) and night shift (Coordinator B) respectively. The shift coordinators will be responsible for working with respective peers on each shift in order to validate

competency with the simulation scenarios and materials as well as assisting the Project

Coordinator in setting up schedules in which to garner the largest amounts of participants

during scheduled shifts. The Project Implementation Members, or the other members of

the Centralized Nursing Education team, will be trained in running the simulation

scenarios and gathering data which is to be reported back to appropriate Shift

Coordinators. After the simulations have been completed for the designated day, the data

is to be reported back to the Project Leader and Project Coordinator in order to be

recorded and analyzed. This process will be assisted by the Clinical Nurse Specialist on

the night shift due to the availability of staff to fill in as Project Implementation Members

on the night shift.

Cost-Benefit Analysis

The primary cost of the project would include the salary costs of the centralized

nursing education faculty. The facility supports the needed mannequins, the mock crash

carts, as well as the tools to implement low-fidelity simulation using the simulation center

and educational classrooms in a variety of settings. Due to the use of low-fidelity

simulation, much of the data coordination can be performed by the Project Manager and

not by an external program or participatory body.

The benefits of the project include the facility staff registered nurses' confidence

which may lead to retention and less costs of orientation. A second benefit of the project

would include decreasing the cost of mortality, which would include autopsy costs,

litigation, as well as investigation costs. These costs are compounded with the loss of

reputation in the community from mortality cases, so if the project can make a significant

decrease, it would prove a fruitful venture for the facility.

Summary

After reviewing the strengths and weaknesses of the project along with implementation, by using low-fidelity simulation and partnering with the facilities' educators the project feasibility is likely. While working in coordination with the centralized nursing educators, the simulations could be rolled out on both day shift and night shift in order to gather the most participants of the medical-surgical registered nurses by making them readily available on shift—however, the off-shift availability of night shift and weekends will be limited due to staff availability and cost constraints. Overall, the project remains a viable endeavor with its benefits outweighing the costs and challenges.

CHAPTER IV

Project Design

The goal of this MSN project is to improve the confidence and competence of medical-surgical nurses during a medical emergency or rapid response situations through the use of simulated scenarios. This need was identified after reviewing articles and determining a lack of practice or skill with emergency scenarios in the medical-surgical unit was common between new graduate as well as experienced registered nurses. As such, simulated scenarios and surveys were created to allow participants to honestly assess personal skill levels before and after simulation.

Goals and Objectives

The primary goal of the project is to help new graduates and experienced registered nurses improve personal competence and confidence in one's ability to perform during rapid response and medical emergency scenarios. The objective for this project is that all participants will earn an average of seven or above on all five survey questions after completing three simulations and associated debriefing.

Another goal of the project is that through rapid cycle deliberate practice, nurses will be able to recognize increased acuity changes in patient health. The objective of this goal is that participants will accurately identify three proper interventions during the simulated scenarios or the post-simulation debriefing.

These two goals with associated objectives were chosen to succinctly summarize the main drive behind the project creation, and one of the core problems in the nursing profession. Many experienced nurses, as well as new graduate nurses, do not feel

prepared to function in an emergency situation, which can lead to patient mortality and nurse burnout.

Plan and Material Development

Following the establishment of the project's goals and objectives, the Project Leader and Clinical Nurse Education Manager, who will serve as the Project Coordinator will review the schedule of the facility in order to coordinate the use of the classrooms and the simulation laboratory space. As the simulation is low-fidelity, the mannequins can be placed in regular education classrooms for day shift and night shift availability. Setting up the simulation lab will be coordinated between the Project Leader and the Clinical Nurse Educators, who will serve as Project Implementation Members. This will be originally set up during the Training Phase and remain throughout the project implementation duration. The simulations will be facilitated by the Project Implementation Members during the implementation who will be assisted by the Project Leader. During this initial 3-month planning period, the use of the mannequins and the schedule of project sessions will be set up and finalized. The Project Leader is responsible for providing the physical paper media such as the pre-and post-simulation surveys as well as the simulation scenarios. The Project Implementation Members will use the provided simulation scenarios to perform the simulations. The simulation experience will consist of scenarios that will provide learners the opportunity to assess a patient with a presenting set of symptoms. The Project Implementation Members will also complete debriefing using Rapid Cycle Deliberate Practice. The pre-and post-simulation surveys consist of five Likert scale questions where participants will score personal competence and skill before and after simulation participation.

After the planning phase, where scheduling needs for space, personnel, medical-surgical nurse rotations, and equipment will be determined and set, the training phase will occur over 1 month. It is during this month the Project Leader and Project Coordinator will meet with the Project Implementation Members to review the project and the simulated scenario material created by the Project Leader to gain familiarity and practice enacting the simulation. This will be followed by the 3-month implementation phase of the project. During this time, the original schedule will be used in conjunction with the resources used from the facility, such as the low-fidelity simulation mannequins, mock crash carts, and the simulated vital signs provided to the Project Implementation Members given to the participants. Lastly, will be the evaluation phase. During this time, the Project Leader will take the data collected during implementation and analyze it.

Timeline

For this project, the timeline is divided into four unique phases. Table 1 provides a visual for the timeline. Each step of the timeline is tailored towards optimal project success while also being realistic towards the needs of the facility selected for implementation. The first phase is the planning phase. During this phase, the Project Leader and Project Coordinator will collaborate regarding project implementation. During this time the Project Leader will lay out the project's goals and objectives along with supplying adequate research as desired. In return, the Project Coordinator will lay out training expectations for Project Implementation Members and the feasibility of enaction. The two will come together in order to condense project materials and training for Project Implementation Members and other staff, along with securing appropriate permissions to implement the project from proper facility authorities and planning a

schedule. This period will occur over 3 months in order to allow for permissions to be obtained and current job responsibilities of both the Project Leader and Project Coordinator to be performed.

The second phase of the timeline will be the training phase. During this phase, the Project Leader and Project Coordinator will begin holding training sessions for Project Implementation Members using the simulated scenario material and participant evaluation checklists that will be used for the actual project enactment. This phase will take approximately one month in order to ensure all members of the Project Implementation Member team are appropriately trained and both day and night shifts are covered.

The third phase of the timeline will be the implementation phase. During this phase, the simulated scenarios will be completed by the medical-surgical nurses and data will be collected by the Project Implementation Members. This stage will take approximately 3 months for all nurses to participate and complete each of the simulation scenarios. While the timeframe is narrow, this accounts for outside obligations by the Project Implementation Members, Permitting 3-months for the implementation phase to 3 months allows for day and night shift nurses to participate in the simulations and data collection to be monitored while not becoming overbearing on the staff of the facility.

The final phase of the timeline is the evaluation phase. During this phase, the Project Leader will analyze the data and provide results to the Project Coordinator and the hosting facility. This process will take one month in order to allow for proper data analysis along with evaluation of results in order to determine whether the project in its current form could garner further data or should aspects be changed to improve learning.

Table 2

Simulation Timeline for Simulation Project

Simulation Timeline				
Phase:	Phase 1	Phase 2	Phase 3	Phase 4
Phase Name:	Planning	Training	Implementation	Evaluation
Projected Phase Timeline:	3 months	1 month	3 months	1 month
Total Projected Timeline for Project: 8 months				

Budget

For the purpose of this project, many of the needed supplies are owned by the facility, such as the mock crash carts and mannequins, and will be accessible for project implementation use. Materials of cost include supplies for printing project material, such as simulation scenario material with checklists for participant evaluation, and pre-and post-simulation surveys. Estimated costs for paper supplies for project implementation are estimated to be $54.40. The breakdown is as follows:

- Average printer paper costs are $40 for a commercial box of paper

- Average cost for printing a black and white handout is $0.06 per sheet with five sheets needed for each simulation—four participants and one project implementation member—for a cost of $14.40 for handouts.

After coordinating with the clinical nursing education department, it has been determined that teaching is usually budgeted at $200 per participant. This budgeted amount encompasses the use of the classroom and the associated charges for utilities and hospital amenities. The project is planned for two sessions each week for both day and

night shifts for a total of four 90-minute sessions. This will be completed through the 3-month timeline for a total of 48 sessions to be completed. A total of 12 participants will be part of each simulation session, for a cost of $115,200. The projected budget covers staffing, which eliminates the need for a separate calculation. The total budget for the project time would be $115,254.40. This budget will be discussed with the Project Coordinator along with any other budgetary committees in order to determine any financial limitations before implementation. However, the financial and patient benefits of the project are expected to far out-weight any initial financial deficits expected. First, the monetary gains of reducing staff related to burnout and stress of inexperience during a medical emergency and rapid response scenarios will directly lead to a gain in the facility's finances. Each orientation for a new nurse to a facility is estimated to cost between $20,000 and $60,000 depending on the length of orientation and acuity of the unit. Even more important than the financial benefit is the potential reduction in loss of human life from the increased preparedness and confidence of the nurses trained.

Evaluation Plan

After the conclusion of the simulations during the implementation phase, an evaluation of the results will be completed. This will be completed through participant completion of both pre-and post-surveys. Each survey will contain five-Likert scale questions and qualitative questions.

The five Likert scale questions address personal performance and feeling of preparedness for caring for a patient in need of and during a code blue event. Data collected will be used to compare participant feelings and performance before and after completing the simulated scenarios and rapid deliberation. By analyzing the results of

each of the survey questions, a trend can be determined to see if there is a correlation between the project implementation and an increase reported by the participants in personal competence and confidence.

The qualitative questions focus on subjective data and allow an area for a participant to leave personal comments about specific aspects of the simulation training. Areas to be addressed include reflection on what simulation aspects improved or did not improve skills or confidence. This method was chosen as it takes qualitative results while also being more feasible around the location of the project as well as the time constraints of the participants.

Once the results of the survey have been compiled, all data will be shared with the Project Coordinator and the resulting facility. As such, this evaluation plan leads to further discussion on the feasibility of further study or long-term implementation of the simulations to enhance learning and decrease mortality for patients in the facility.

Summary

After creating materials and reviewing the budget and timeline, the project is ready to be presented to the Clinical Nursing Education Department at the facility. After comparing the costs of the project to the cost of orientation and nurse turnover expenses, the project budget balances cost to benefit. The next set is to garner feedback on the completed project materials from the Project Implementation Members and Project Coordinator from the Clinical Nurse Education department at the facility in order to gather recommendations for improvement.

CHAPTER V

Dissemination

The purpose of this project is to determine whether the use of simulation can increase the competence of medical-surgical nurses with personal performance in rapid response and medical emergency scenarios. This deficit was identified after reviewing research on registered nurses within the clinical setting and the current climate of inexperience and lack of education on the proper procedure during a medical emergency and rapid response during their personal practice. After the project simulations were developed, a meeting was scheduled with a member of the Nursing Clinical Education division of the facility in order to discuss the project as well as garner feedback for project improvement.

Dissemination Activity

A presentation was given to a representative from the Clinical Nursing Education department of the given facility. The representative and Project Leader discussed the project simulation in an education classroom across from the simulation lab. The presentation was given using the pre-and post-simulation materials along with the simulation scenarios, which were projected on the board for ease of viewing and access. The presentation began by introducing the topic and previous literature, along with relating the problem from the literature to current practice at the current facility. After working through the initial problem identified and relevant literature, a brief summary of the literature cited was performed while referring to how it was integrated into the project design.

The project handout is then shown, and each scenario is individually discussed with Project Implementation Member directions included. Special attention was given to the instructor checklist which was developed in order to help with the evaluation of participant performance and to allow for detailed feedback during debriefing. Next, the simulation surveys were reviewed. These will be completed by each participant in order to gather data to determine if the simulations increase participant competence and confidence. It was at this point that feedback was obtained from the Clinical Nursing Education representative.

The first point of the feedback given was the inclusion of diverse rapid response and medical emergency scenarios that incorporate the most frequently occurring situations at the current facility. The primary examples to include were stroke-like symptoms (such as slurred speech and unilateral weakness) and hypoglycemia (such as lethargy, disorientation, and bradycardia). This would be corroborated by data collected by the Clinical Nursing Education Department at the facility in order to specifically tailor the simulations to the needs of the medical-surgical nurses and the respective patient populations. The second point of feedback was using the current plan being implemented by the facility which goes live in August 2022. The facility plans to run one mock medical emergency per month on a chosen unit in order to increase successful outcomes for a medical emergency. The facility will also implement the "Five First Minutes" plan which details the primary tasks a registered nurse should complete upon the activation of a medical emergency.

At this time as the project leader, there are no current changes or revisions noted. The initial premise as a bedside registered nurse is a problem very close to the project

leader's own clinical practice. That being said, the project leader feels integrating the recommendations of the Nursing Clinical Education representative would be feasible and would benefit the project as a whole.

Limitations

One of the primary limitations to the study is the amount of Project Implementation Members able to assist in enacting the project. The Clinical Nursing Education program at the current facility only has three educators on the night shift, which prevents performing more than three simulations concurrently per session. A second limitation to the project would be the budget, which limits the number of participants able to take part in the project in relation to the costs of manpower and facility usage. The current budget is balanced against facility requirements, cost of staffing, as well as materials used. Further evaluation of the project and discussion with facility directors and the Clinical Nursing Education manager could include cost-saving maneuvers in order to increase the number of participants.

Implications for Nursing

This project has large implications for nursing, specifically those of nurse burnout and patient mortality. Nurses have begun to leave the bedside, one reason being inadequate preparation for the acuity of patients during the Coronavirus pandemic. This project provides preparation for a medical emergency and rapid response scenarios within a controlled environment to gain familiarity and experience. By implementing within the medical-surgical nursing population, the nurses can apply what is learned to a diverse population of patients and affect a large portion of the patient population at the given facility. This in turn can have an effect not only on the local area, but on other facilities as

well should the project be successful and implemented in other patient populations such as pediatrics, obstetrics/women's health, and critical care. Skill competence increases confidence which can positively influence a nurse's decision to stay at the bedside along with decreasing patient mortality by improving performance during a medical emergency.

Recommendations

One of the recommendations given for the project during the presentation to the facility was to include more varied scenarios based on the most common medical emergency scenarios at the facility. These could be coordinated through data gathering from the Nursing Clinical Education department. The data could then be used to tailor the simulations to the specific needs of the nursing staff. This recommendation could strongly improve the project by working on already identified weak points in the assessment of competence using not only rapid response and medical emergency scenarios but specific scenarios that occur frequently. By identifying and addressing these areas, nurse competence will improve along with confidence in practice while specifically correcting deficient knowledge of the medical-surgical nurses at the facility which could carry over to other healthcare facilities.

The second recommendation was integration into the current change being implemented in August 2022. The facility will be performing mock medical emergencies once a month which will occur in a randomly chosen unit. As such, integration with the project could include using mock rapid response scenarios and increasing the mock training/simulated scenarios to one per shift over multiple units per month. The second part of the planned implementation is the "First Five Minutes" model which includes the

tasks a registered nurse should perform during the initiation of a medical emergency scenario such as vital signs, checking a point of care glucose, and rapid assessment. These are already integrated into the evaluator checklist for the Project Implementation Members (Clinical Nurse Educators) but can be further detailed to include each task in the checklist to be thorough.

Conclusion

At the conclusion of the project development and evaluation process, there is a sense of purpose and passion that has been satiated. This project and simulation fulfill both a desperate need in the nursing community as well as one close to home as a bedside clinical practitioner. Making use of simulation as an educator to benefit not only students but bedside clinical staff registered nurses will provide secondary support and experiential learning method to reduce patient mortality while retaining staff at the bedside. Medical-surgical nurses are tasked with seeing a variety of patient populations and treating a multitude of conditions. Implementation of this project could provide support for nurses currently and in the future as the profession grows and evolves with technology and time.

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