Evaluating Nurses' Self-Efficacy related to In Situ Mock Code Simulation Training

By
Nicole Wedzina, ANP

A DNP project submitted to the
School of Nursing
State University of New York
in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice

February 2021

University at Buffalo
School of Nursing

DNP Project Approval Form

This is to certify that Nicole Wedzina
(Name of Student)

successfully disseminated their project entitled:

Evaluating Nurses' Self-Efficacy related to In Situ Mock Code Simulation Training

on January 11 (Date), 20 21 .

DNP Project Advisor (Required)
Nancy Campbell, PhD, FNP, NP-C, CARN-AP, FAANP, FIAAN, FAAN
(Typed Name)
Nancy Campbell
(Signature)

Committee Member 1*
(Typed Name)
(Signature)

Committee Member 2*
(Typed Name)
(Signature)

Committee Member 3*
(Typed Name)
(Signature)

*If applicable

Acknowledgements

I cannot express enough thanks to my project committee, especially Dr. Nancy Campbell my project advisor, for her continued support and encouragement when I was coming down to the wire. I offer my sincere appreciation for her expertise that she provided.

My completion of this project could not have been possible without the support of the Mock Code QI committee at my work facility, especially Shannon and Matt. Hopefully, our mock code program vision will become a reality soon.

Finally, to my patient and understanding husband, Jeret: my deepest gratitude. Your support and encouragement through all my endeavors are appreciated and duly noted. It is a great comfort that you are always there for me, especially when I need it the most. And to my boys, Sean and Joey, thank you for all your understanding and tolerant. My heartfelt thanks.

"I find that the harder I work, the more luck I seem to have." -Thomas Jefferson

Table of Contents

Abstract

Background and Significance: Hospital nurses need skills and confidence to take action during codes. In situ mock codes (ISMCs) can improve nursing confidence during emergency situations.

Purpose, Aims, and Objectives: This study's purpose was to identify knowledge gaps in ISMC training to enhance future ISMC education and improve nurses' self-efficacy during code situations.

Theoretical Framework: Albert Bandura's Self-Efficacy Theory emphasizes need for effective learning to promote improved self-efficacy perceptions of task performance.

Methods and Design: This study was a secondary data analysis from survey results of 311 nurses using the Mock Code Self-Efficacy Survey (MCSES), a validated measurement tool. Descriptive and inferential statistics were used to describe nurse self-efficacy of 12 code skills. Differences in self-efficacy between medical-surgical (MS) and critical care (CC) nurses were examined and weak clinical areas identified.

Results: CC nurses had increased confidence in 11 of 12 clinical skills when compared to MS nurses. The only skill with no difference in confidence was recognizing asystole. Nurses with past mock code experience (PMCE) had more confidence in all 12 clinical skills than those without. In all comparisons, dysrhythmia identification requiring defibrillation and identifying the first code medication administered were the weakest.

Conclusion: Overall, CC nurses and nurses with PMCE had higher confidence levels in performing the 12 clinical skills.

Future Implications: Lower confidence levels were discovered in MS nurses and nurses with less PMCE. Performing ISMCs routinely on MS units can increase nurses' experience and confidence in code situations.

Keywords: in-situ mock codes, nurses' self-efficacy in code situations, mock code training

Over 200,000 in-hospital cardiopulmonary arrests (IHCAs) occur each year in the United States (Josey et al., 2018). As first responders, hospital nurses must have the skills and confidence to promptly take action during a code situation. Patients who have a cardiac arrest in the hospital have a survival rate of approximately 10% to 23.9% (Herbers & Heaser, 2016). Positive outcomes for the patients during a medical emergency are dependent on the abilities of the nurses and code team to deliver the care needed quickly and precisely during the critical first few minutes of a cardiac arrest (Herbers & Heaser, 2016). Prompt initiation of cardiopulmonary resuscitation (CPR) and defibrillation are crucial for promoting survival, as every minute of postponed treatment decreases survival by 10% (Nallamothu et al., 2018). Many nursing skills, such as CPR, require evolving practice to ensure individuals can perform efficiently and competently (Mcphee, 2018). In the American Heart Association (AHA) 2013 Consensus Statement, a recognized gap was noted that IHCA survival rates differ greatly between different hospitals, which led to calls for action from the Institute of Medicine (Josey et al., 2018).

Nursing staff are not as confident or comfortable as they would like to be when using the Basic Life Support/Advanced Cardiac Life Support (BLS/ACLS) skills in a true code situation (Herbers & Heaser, 2016). Nurses experience high levels of anxiety and have difficulty recalling the knowledge and demonstrating the skills required during medical emergencies (Herbers & Heaser, 2016).

The overarching purpose of this QI project is to analyze and evaluate the data obtained from the results of the MCSES survey to develop a needs assessment for the implementation of an ISMC simulation training program. The program goal is to optimize simulation training to help improve nurses' perception of self-efficacy and increase knowledge and skills during a code situation.

Background and significance

It is clear that mortality from IHCA remains a large problem in the United States (Risaliti, Evans, Buehler, Besecker, Ali, 2018). Code situations can be very demanding and emotionally charged (Williams et al., 2016).

One study reported that the skills gained from these training methods steadily deteriorate in as little as two weeks followed by a substantial reduction in these skills within six months of training (Herbers & Heaser, 2016). ACLS skills decrease at a faster rate than BLS skills. The AHA recognizes the need for additional training, stating that along with BLS/ACLS, organizations should provide periodic reinforcement or refresher courses for periodic assessment of staff members' knowledge and skills (Herbers & Heaser, 2016).

One disadvantage of formal BLS/ACLS training class is the little similarity it has to resuscitation in the hospital setting. At the Mayo Clinic, nurses and nursing assistants are required to validate proficiency of emergency medical response and proper use of equipment on a regular basis during competency evaluations. This program is designed to validate knowledge and skills, but does not provide a learning opportunity for the nursing staff to have hands-on practice with the skills and knowledge needed during a code (Herbers & Heaser, 2016). This is a limitation of the current training and competency within different systems.

During BLS/ACLS training courses, knowledge gained without successive reinforcement begins to decrease almost immediately and may be actually lost within three months. The value of reinforcement by repetitive training is well documented in the clinical literature on CPR and is the basis of the AHA's current Resuscitation Quality Improvement Program (Josey et al., 2018).

Team training and communication are also an area of focus for IHCA success. The AHA 2013 consensus statement endorsed that providers promote a coordinated team response which includes certain role responsibilities for each team member (Spitzer, Evans, Buehler, Ali, &

Besecker, 2019). This would help to ensure high quality CPR and to minimize pauses in compressions. Despite this recommendation, descriptions of in-hospital resuscitation teams with specific roles and responsibilities are lacking (Spitzer et al., 2019). Lack of clear code team organization and communication is a regularly indicated problem within true code and mock code events. In order to improve this aspect of code blue resuscitation situations, more emphasis should be placed on educating code team members about specific roles and responsibilities (Josey et al., 2018).

The importance of sustained and frequent ISMC training is supported by the observation that ample potential for improved BLS/CPR performance persists despite more than five years of effort to reform practice (Josey et al., 2018). The actual requirement for CPR recertification every two years has recently been questioned. Currently, the use of more frequent learning sessions are being assessed and employed. The optimal interval in between training sessions to maintain a consistent proficiency level is still an active area of on-going research (Josey et al., 2018).

In the study performed by Josey et al. (2018), a beneficial association was demonstrated between increased ISMC training and patient survival in a multihospital healthcare system. The use of mock code simulation can improve nurses' confidence by repetition, allowing nurses to evaluate their progress and increase their self-efficacy by making the nurses more confident in their ability to perform CPR skills.

Self-efficacy has been linked to improved nursing performance (Oetker-Black & Davis, 2019). Although CPR is a necessary element of nursing education, there is limited research on the role of self-efficacy in the performance of resuscitation skills in a clinical setting (Oetker-Black & Davis, 2019). Students with low levels of self-efficacy disclosed higher levels of stress when working in a health care environment (Oetker-Black & Davis, 2019). Unfortunately, there are limited studies on mock code simulation in nurses and self-efficacy as a predictor of success in enacting CPR skills.

Project purpose, aims and objectives

Despite advances in CPR and widespread life-support training programs, the outcomes of resuscitation are fluctuating. There is an actual need for organizational improvement to strengthen the resuscitation process (Sodhi, Singla, Shrivastava, 2014). The purpose of this QI project was to analyze and evaluate the data obtained from the results of the MCSES survey to develop a needs assessment for the implementation of an ISMC simulation training program. The overall project goal will be to optimize simulation training to help improve nurses' perception of self-efficacy and increase knowledge and skills during a code situation.

The project objectives were to: 1) establish a baseline needs assessment using the data from the MCSES survey in order to identify needs and deficits in CPR skills that can be included in future simulation training; 2) identify gaps in practice to refine mock codes to reflect necessities discovered in the needs assessment; and 3) enhance training related to the needs assessment.

The DNP Essentials

This DNP project meets the American Association of Colleges of Nursing (2006) DNP Essentials II and III. DNP Essential II, Organizational and Systems Leadership for Quality Improvement and Systems Thinking, is addressed through the project deliverable of a Mock Code Squad team using refined simulation training based on the needs assessment discoveries with the ultimate endeavor of improving nurses' self-efficacy during a code situation. DNP Essential III, Clinical Scholarship and Analytical Methods for Evidence-Based Practice, is addressed through conducting a review of existing evidenced-based literature and identifying gaps in knowledge and best practice standards to demonstrate the benefits of ISMCs to assist in formulating this project. There is also data collection, statistical data analysis, and dissemination of findings that focus on analytical methods.

Theoretical framework

The theoretical framework that is most appropriate for this study is Albert Bandura's Self-Efficacy Theory that originated from his Social Cognitive Theory. Self-efficacy is defined as people's judgement of their ability to execute courses of action to complete certain types of performances (Oetker-Black & Davis, 2019). This theory defines self-efficacy in two components: outcome expectations and efficacy expectations. Outcome expectations are defined as a person's conclusion that a certain behavior will lead to a given outcome; and efficacy expectations are the notions that one can successfully complete a task (Oetker-Black & Davis, 2019). Self-efficacy measures target performance proficiencies that are situation specific.

The self-efficacy theory is centered on the principal belief that psychological procedures, serve as means of developing and augmenting expectations of personal efficacy (Bandura, 1977). For this study, the psychological construct of self-efficacy will be developed by obtaining new knowledge and skills through simulation. People fear and tend to avoid intimidating situations that they believe surpass their coping skills, whereas they will participate in activities in which they judge themselves as confident (Bandura, 1977). Bandura (1977) states that efficacy expectations influence how much effort people will dedicate and how long they will pursue when faced with obstacles and undesired experiences. Therefore, the stronger the perceived self-efficacy, the more productive the efforts may be as a direct effect of increased confidence (Bandura, 1977).

According to Bandura (1977), expectations of personal efficacy are based on four sources of information: (1) performance accomplishments; (2) vicarious experience; (3) verbal persuasion; and (4) physiological states. Performance accomplishments are important because repeated success of personal mastery leads to strong self-efficacy (Bandura, 1977). Vicarious experience is a valuable element as some expectations are derived from ancillary activities. Observing others' performance can assist in proficiency improvement by persuading themselves that if others can do it, they should be able to attain the same outcome (Bandura, 1977). Verbal persuasion can influence a person's behavior through suggestion that they are able to successfully cope during a stressful situation (Bandura, 1977). Emotional arousal increases during challenging and nerve-wracking events. This physiological concept can be a valuable source of information that can affect perceived self-efficacy in overcoming anxiety during these types of circumstances (Bandura, 1977).

This theoretical framework emphasizes the need for effective learning in nursing to yield high self-efficacy. This thinking coincides with simulation training in nursing education to improve nurses' perception of self-efficacy as a predictor of success, as students with low levels of self-efficacy have reported higher levels of stress when working in the healthcare environment (Oetker-Black & Davis, 2019).

A lack of conceptual understanding may be why students cannot routinely convert skills from past experiences in simulation settings to real patients in the clinical setting (Oetker-Black & Davis, 2019). This self-efficacy theory could provide a measure for knowledge regarding CPR skills (Oetker-Black & Davis, 2019).

Review of the literature

Simulation-based health care education

Simulation-based medical education is an emerging field that empowers students and trainees to practice skills, augment knowledge, and develop self-confidence in a safe and controlled environment with no risk to patients (Williams et al., 2016). The complexity and capacity of simulation-based learning programs have increased substantially over the last decade, as there has been a significant growth in the use of simulation to educate health care professionals (Roussin & Weinstock, 2017). During the past 10 years, the United States and other regions have supported the use of simulation-based education as a substitute for traditional clinical time for undergraduate nursing students (Doolen et al., 2016).

In the 2014 landmark study by the National Council of State Boards of Nursing (NCSBN), the authors discovered that up to a 50% substitution of traditional clinical time with high-fidelity simulation (HFS) yielded no statistically significant differences in outcomes from those with more conventional methods of clinical hours (INACSL Standards of Best Practice: SimulationSM Simulation Design, 2016). According to the authors, the optimal way to facilitate quality simulation is to integrate best practices into a simulation program (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014). Hayden et al. (2014) discovered the effectiveness of both clinical and simulation hours as educational methods that can lead to positive and successful student outcomes.

Code blue situations can be very challenging and highly emotional, which can lead to intense interpersonal exchange. Therefore, practice in a regulated environment can be advantageous for both nursing students and nurses. Ultimately, this can facilitate improved provider confidence, as well as improved patient safety and outcomes (Williams et al., 2016).

Responder performance

The nurse's role as a first responder in cardiac arrest situations is critical to patient survival (Chu, 2018). Studies reveal that after CPR training, nurses' CPR skills increase from 9.42% to 78.3%; meanwhile, three months after CPR training, nurses' CPR skills mean score decreased from 78.3% to 67.8% (Chu, 2018). Therefore, these types of nursing skills require continuous practice to ensure individuals can perform competently and consistently (McPhee, 2018).

Clarke et al. (2018) conducted a prospective study of ISMCs at a single teaching hospital. This study was a training initiative that simulated mock codes 2-3 times per month on Medical/Surgical and Telemetry floors throughout the hospital. The authors calculated a CPR fraction by dividing the cumulative time that the manikin received chest compressions by the total pulseless time. Clarke et al. observed a significant improvement in CPR fraction over the course of the program.

The implementation of in-hospital resuscitation teams is another method to help improve team training and communication during a cardiac arrest. In the retrospective comparison study of pre- and post-intervention implementation metrics by Spitzer et al. (2019), they discovered that by developing a “pit crew” model for IHCA resuscitation, they could improve code team performance. The authors discovered that this model showed statistically significant improvements in compression rates and team communication post-intervention, as well as a trend toward a reduction in the number of shockable rhythms that were not defibrillated.

High-quality CPR positively affects patient survival rates, but it is well-established that CPR skills deteriorate overtime. A solution to this issue is regular practice of CPR skills. ISMCs is an effective way to maintain competency of these life-saving skills (Chu, 2018).

Confidence levels

Deteriorating patient situations can be anxiety triggering situations for new graduate nurses (McPhee, 2018). McPhee (2018) decided to trial deliberate mock codes in a nurse residency program which allowed them extra time in small groups to be able to practice mock codes multiple times, as well as fix mistakes. The author set up simulation experiences for small groups, in which they practiced a scenario multiple times and rotated roles, followed by a debriefing. The nurse residents (NRs) shared that they found the deliberate mock code practice to be valuable. One hundred percent of the NRs felt that the simulation allowed them to build their knowledge and help them gain confidence in their ability to manage their response to a declining patient.

Herbers and Heaser (2016) implemented a mock code quality improvement program to increase nurses' confidence while enhancing their performance when responding to medical emergencies. For their study, in situ simulation was the method of integration of the mock codes. Along with a 12% improvement rate of initiating chest compressions and delivering the first shock, post-survey results revealed the staff members' perceived confidence levels to initiate chest compressions increased to 100% favorable (from 82%), and overall confidence of participating in a code situation increased to 98.8% (from 86.5%). Ultimately, this shows that mock code training leads to an increase in nurse-perceived confidence levels.

Low self-confidence has been referenced as a barrier to performing high-quality CPR (Morton, Powers, Jordan, & Hatley, 2019). Mock code simulation can increase nurses' self-confidence in performing in a code event. According to Morton et al. (2019), the use of HFS mock code training with medical-surgical nurses increases self-confidence. In the quasi-experimental study by Morton et al., the mean self-confidence score significantly increased from 32.2 to 38.7 of 40 after HFS code training. It is important to acknowledge that providing nurses with opportunities for recurrent practice is valuable in order to improve self-confidence (Morton et al., 2019).

IHCA survival outcomes

IHCA outcomes differ in hospitals across the United States. Nallamothu et al. (2018) interviewed 158 individuals across nine different hospitals, including physicians, nurses, other clinical staff, and administration to discover how top hospitals organize their resuscitation teams to achieve high IHCA survival rates. The authors identified four themes: (1) team design, (2) team composition and roles, (3) communication and leadership during IHCA, and (4) training and education. Nallamothu et al. discovered core elements of designated teams, participation of diverse disciplines, clear roles, better communication and leadership, and in-depth mock codes that were associated with better outcomes at top-performing hospitals.

In 2013, the AHA and the Institute of Medicine (IOM) presented a national "call-to-action" to improve IHCA survival rates (Josey et al., 2018). Josey et al. (2018) performed a descriptive study across a 26-hospital healthcare system to assess if there was a correlation between more active ISMC training and increased IHCA survival. Josey et al. were one of the first researchers to establish a beneficial association between increased ISMC training and patient survival outcome after IHCA.

The education and training of hospital staff who respond to cardiac arrest events is essential to improving outcomes (Clarke et al., 2018). Increasing the implementation of ISMC training programs is one way to narrow the gap between IHCA and patient survival outcomes.

Methods

Design

This study was a secondary analysis of data obtained from nurses from the results of the MCSES survey. The data was obtained as part of the hospital setting's Quality Improvement (QI) committee's actions to document the need for both expanded and enhanced ISMC simulation training for the staff. The analysis of the data helped to discover and evaluate a needs assessment with respect to ISMCs. The ultimate program goal is to optimize simulation training to help improve nurses' perception of self-efficacy and increase knowledge and skills during a code situation.

Setting

The setting was both CC and MS floors at a large urban hospital, which is a tertiary care center within a network of hospitals included in a non-profit healthcare system that provides care in Western New York.

Subjects and Recruitment

Upon receiving full approval from the UB's Institutional Review Board (IRB) (Appendix A.), the MCSES survey data was analyzed. A convenience sample was used, as the setting's QI committee had already distributed the survey and collected the results. The study's PI is part of the QI team at her place of employment, which was the setting for the study. A convenience sample was used of nurses who are employed on CC and MS floors within the study site who meet the following inclusion criteria a) 18 years of age and older, b) graduated from an accredited nursing school with an associates or baccalaureate in nursing, and c) participated in the MCSES survey. As part of the QI team of the setting facility, the researcher had permission and access to the data results from the MCSES survey answers. The purpose of this needs assessment was to identify gaps in knowledge related to ISMC training to improve future ISMC simulation education and training.

Needs Assessment to Identify Gaps in Practice with Mock Codes

Upon the code team's arrival to code events on the MS floors, it became very obvious that the staff was unorganized and lacked training. The QI committee identified multiple issues during codes, such as lack of rescue breathing, inability to recognize dysrhythmias, and absence of designated team roles and structure. Therefore, the educational department and QI committee devised a plan to survey nurses to understand the nurses' current skill set and identify knowledge deficits.

After identifying the gaps in knowledge related to ISMC training, the expectation is that with the information obtained, future educators are able to optimize mock code simulation training by formulating the code scenarios based on the results and disparities discovered from the needs assessment data.

Data Collection

Study variable. The main variable of this study was nurses' self-efficacy. The variables that were under study to determine nurses' self-efficacy were 12 clinical skill items:

1. How confident are you at assessing and identifying a patient in respiratory failure?
2. How confident are you at assessing and identifying a patient with no pulse?
3. How confident are you at providing rescue breathing for a client with a pocket mask or resuscitation bag?
4. How confident are you at initiating chest compressions for a client without a pulse?
5. How confident are you at recognizing bradycardia on the cardiac monitor?
6. How confident are you at recognizing tachycardia on the cardiac monitor?
7. How confident are you at recognizing asystole on the cardiac monitor?
8. How confident are you at recognizing ventricular fibrillation on the cardiac monitor?
9. How confident are you at recognizing pulseless ventricular tachycardia on the cardiac monitor?
10. How confident are you at identifying which dysrhythmias would require an unsynchronized shock (defibrillation) in cardiopulmonary arrest?
11. How confident are you at naming the first medication given to a client in cardiopulmonary arrest during a code blue situation.
12. How confident do you feel functioning as part of the team in a code blue situation for client in cardiopulmonary arrest?

The 12 clinical skills were further grouped into three subscales. Subscale 1 was EKG recognition (items 5-9), Subscale 2 consisted of initial CPR assessment (items 1-4), and Subscale 3 contained items of action during a code (items 10-12). The visual analog scale answers ranged from 0 to 10 with 0 being “No Confidence” and 10 being “Total Confidence”. There were two main comparison groups under study to determine if the levels of confidence between them were statistically significant; (1) CC nurses versus MS nurses and (2) nurses with PMCE versus nurses without.

Demographic tool. The first part of the survey was a demographic tool that was a total of four questions defining different characteristics of the participants (Appendix B). Four demographic questions were included in this section of the questionnaire: (1) How many years have you been working as a nurse?, (2) What gender do you identify as?, (3) What unit do you currently work on?, and (4) Do you have past experience with mock codes? This information was used to delineate differences in the unit trained/skill level of the nurse in order to separate into the following groups; (1) unit and (2) PMCE. It also allowed the researcher to define other characteristics, such as years experience as a nurse,

Measurement tool. The measurement tool used for this study was the Mock Code Self-Efficacy Scale (MCSES) adapted from Oetker-Black and Davis (2019) (see Appendix C). Permission has been granted by the author of the tool to use the tool for this study (see Appendix D). The tool consists of 12 questions on clinical skills, listed above. The MCSES is a standardized tool that is shown to have reliability, face, and content validity. Reliability using Cronbach’s alpha was calculated for the three subscales: a) EKG recognition 0.87, b) initial CPR assessment 0.82, and c) actions during code 0.75 (Oetker-Black & Davis, 2019). Face validity was established by five senior undergraduate nursing students and no confusing questions were identified (Oetker-Black & Davis, 2019). Content validity was established by two experts who actively teach CPR skills, and evaluated each item for relevance, clarity, and sufficiency (Oetker-Black & Davis, 2019). A content validity index was used to rate the relevance of each item using a 4-point scale. All the items received a score of either 3 or 4 by the experts, which indicated that all the items had content validity (Oetker-Black & Davis, 2019).

The data were collected as part of a mandatory education assignment for the nurses that included a short video and PowerPoint presentation followed by the survey. The data collection was via an online learning platform that the facility's education department uses for continuing education for the staff.

Data Analysis

Data analysis was conducted using Statistical Package for Social Sciences (SPSS). The analysis was a combination of both descriptive and inferential statistics. Initially using descriptive statistics, the overall frequencies for self-efficacy related to the 12 clinical skills and four demographic questions were analyzed using the complete sample for baseline data. Using inferential statistics, there were two steps of data analysis comparisons. The two main comparison groups under study were: (1) CC versus MS nurses and (2) nurses who have had PMCE versus nurses who have not. Independent t-tests were performed to compare the self-efficacy of group differences. The analysis of data determined if there were differences in nurses' self -efficacy regarding mock codes when compared by work unit and PMCE.

Comparison group one: Units. The first section was the comparison of CC versus MS nurses. The sample was divided into two groups by their work unit. There was a total of 12 units; nine MS units (4N, 5E, 5NC, 5W, 6E, 6W, 7E/8E, Float, MRU) and three CC units (CVICU, ICU, ED). Therefore, this grouping variable was reduced to CC versus MS nurses. Data analysis comparison of the unit grouping variable was completed using both question sets; (1) 12 clinical skills and (2) three subscales. They were compared to see if there was a statistical difference between the groups and levels of confidence of each of the question sets.

A chi-squared association table was also examined to analyze the relationship between units and PMCE to determine if working on either CC or MS units increased nurses' PMCE.

Comparison group two: PMCE. The second section was a comparison of nurses who have had PMCE versus nurses who have not had PMCE using the complete sample. Data analysis comparison of the PMCE grouping variables was completed using both question sets; (1) 12 clinical skills and (2) three subscales. They were compared to see if there was a statistical difference between the groups and levels of confidence of each of the question sets.

A final analysis was completed comparing years of experience as a nurse to PMCE to examine if the nurses with more years of experience were more likely to have PMCE.

The information acquired determined if the levels of confidence were statistically significant between the groups. This data was used to answer the following research questions: (1) Are CC trained nurses more confident than MS nurses in the 12 clinical skills?, (2) Do CC nurses have more experience than MS nurses with mock codes?, (3) Do nurses with PMCE have increased confidence in the 12 clinical skills?, (4) Are nurses with greater years of experience more likely to have PMCE?, and (5) What are the specific clinical skills in each group comparison that have the lowest confidence scores?.

The overall data provided the development of a needs assessment to identify gaps in knowledge related to ISMC training in nursing practice. The ultimate goal of this project was to development a needs assessment in order to optimize future simulation training and education to help improve nurses' perception of self-efficacy and increase knowledge and skills during a code situation.

Results

There was a total of 311 nurses surveyed. Some participants did not answer all of the questions, which will be described below. The answers ranged from 0 to 10 with 0 being “No Confidence” and 10 being “Total Confidence” on a visual analog scale.

Descriptive statistics were used to analyze the total scores of each of the four demographic questions. The years of experience as a nurse ranged from 0-45 years with 11.75 the average number of years (n=293). There were 18 (5.8%) missing answers for this question. There were 267 (85.9%) females and 27 (8.7%) males (n=294). There were 17 (5.5%) missing answers for this question. Of the 311 nurses, 77 (24.8%) work on a CC unit and 146 (46.9%) work on a MS unit (n=223). There were 88 (28.3%) missing answers for this question. Of the 292 nurses who answered the PMCE question, there were 170 (58.2%) nurses that had PMCE, while 122 (41.8%) nurses did not. There were 19 (6.1%) missing answers for this question.

Descriptive statistics were then used to analyze the total scores of each of the individual items. For each of the 12 clinical skill questions between 273-277 nurses answered each question out of the total 311 nurses surveyed.

Comparison Group One: Units

Using an independent t-test, the first comparison analyzed CC versus MS nurses (after the total sample was divided into two groups by unit) using both question sets; (1) 12 clinical skills and (2) three subscales. In 11 of the 12 clinical skills, there was a significant difference in confidence scores between CC and MS nurses, as outlined in Table 1. Clinical skill question number seven, “Recognizing asystole on the cardiac monitor”, was the only clinical skill that did NOT have a significant difference in scores between CC and MS nurses.

[Insert Table 1 about here]

Next a comparison of CC versus MS nurses using the three subscales was examined. In all three subscales, there was a significant difference in confidence scores between CC and MS nurses, as outlined in Table 2.

[Insert Table 2 about here]

The final part of the group one comparison was an analysis of a chi-squared test that discovered a statistically significant association between units and PMCE; $x^2(1)=8.919$, $p=.003$, as outlined in Table 3.

[Insert Table 3 about here]

Comparison Group Two: PMCE

Using an independent t-test, the second comparison analyzed nurses who have had PMCE versus nurses who have not had PMCE (after the total sample was divided into two groups by PMCE) using both question sets; (1)12 clinical skills and (2) three subscales. In all 12 clinical skills, there was a significant difference in confidence scores between nurses who have had PMCE versus nurses who have not, as outlined in Table 4.

[Insert Table 4 about here]

Next a comparison of nurses who have PMCE versus nurses who have not had PMCE using the three subscales was examined. In all three subscales, there was a significant difference in confidence scores between nurses who have had PMCE versus nurses who have not, as outlined in Table 5.

[Insert Table 5 about here]

The final analysis compared years of experience as a nurse to PMCE. There was a significant difference in years of nursing experience for those who have had PMCE (M=15.3054, SD=12.638) and those who have not had PMCE (M=6.5657, SD 9.614); t(280)=6.322, p=.000.

Discussion

Total Sample Analysis

When comparing the total sample, the three skills that had the lowest level of confidence were (1) Question 10: Identify which dysrhythmias would require an unsynchronized shock (defibrillation) in cardiopulmonary arrest (M=6.72), (2) Question 11: Name the first medication given to a client in cardiopulmonary arrest during a code blue situation (M=7.18), and (3) Question 9: Recognize pulseless ventricular tachycardia on the cardiac monitor (M=7.49).

Missing data. It is unclear why some of the respondents did not answer all of the demographic questions. It may be that the participants did not find an answer that accurately reflects their description. The respondents may not have been understanding of the legitimate purpose of their answers or were afraid of repercussions. Fortunately, the sample size was large enough that the data analysis was unaffected by the missing answers.

Comparison Group One: Units

In all, but one, of the clinical skills, CC nurses had an increased level of confidence over MS nurses. The only clinical skill that was not statistically significant was recognizing asystole. Hence, CC and MS nurses felt equally confident at recognizing asystole on the cardiac monitor.

When comparing the CC versus MS nurse analysis, the three skills that had the lowest level of confidence in CC nurses were (1) Question 10: Identify which dysrhythmias would require an unsynchronized shock (defibrillation) in cardiopulmonary arrest (M=8.44), (2) Question 11: Name the first medication given to a client in cardiopulmonary arrest during a code blue situation (M=8.71), and (3) Question 1: Identify and assess a client in respiratory failure (M=8.93). The three skills that had the lowest level of confidence in MS nurses were (1) Question 10: Identify which dysrhythmias would require an unsynchronized shock (defibrillation) in cardiopulmonary arrest (M=5.80), (2) Question 11: Name the first medication given to a client in cardiopulmonary arrest during a code blue situation (M=6.62), and (3) Question 9: Recognize pulseless ventricular tachycardia on the cardiac monitor (M=6.82).

When comparing CC versus MS and the three subscales, CC nurses had greater confidence levels than MS nurses in all three subscales. The subset that had the lowest confidence levels in both CC and MS nurses was “Actions During Code”. This subset includes questions 10-12, which includes the two of the three clinical skills that have the lowest confidence levels of both CC and MS nurses.

Comparison Group Two: PMCE

When comparing the confidence levels of participants who have had PMCE to those who have not, those who have had PMCE were more confident in all 12 skills. Of the 12 clinical skills, the three that had the greatest difference of means were (1) Question 10: Identify which dysrhythmias would require an unsynchronized shock (defibrillation) in cardiopulmonary arrest (MD=2.67), (2) Question 9: Recognize pulseless ventricular tachycardia on the cardiac monitor (MD=2.23), and (3) Question 11: Name the first medication given to a client in cardiopulmonary arrest during a code blue situation (MD=2.11). Whether or not the nurse had PMCE, the three clinical skills with the lowest confidence level were the same between the two groups. Of note, these were the same three clinical skills that had the lowest levels of self-confidence in MS nurses also.

When comparing nurses who had PMCE versus those who did not in regard to the three subscales, nurses who had PMCE had greater confidence levels than those without in all three subscales. The subset that had the lowest confidence levels in both nurses who had PMCE and those who did not have PMCE was “Actions During Code”. This subset includes the questions 10-12, which again includes the same two clinical skills that have the lowest confidence levels of the total sample, CC nurses, MS nurses, nurses with PMCE, and nurses with no PMCE.

Total Group Comparison

Upon summarization of all the group comparisons, including the total sample, CC nurses, MS nurses, and PMCE, there are two clinical skills that are in each of the groups as having the lowest confidence levels (1) Question 10: Identify which dysrhythmias would require an unsynchronized shock (defibrillation) in cardiopulmonary arrest, and (2) Question 11: Name the first medication given to a client in cardiopulmonary arrest during a code blue situation. In the total sample, MS nurses, nurses with PMCE, and nurses with no PMCE groups, question nine "Recognize pulseless ventricular tachycardia on the cardiac monitor and upon assessment of the client" was also recognized as having lower confidence level in the above three groups.

These clinical skills that have the lowest confidence levels are gaps in knowledge as the nurses felt the least amount of confidence performing them. Future ISMC simulation training scenarios should be refined to focus on these gaps in practice. Mock codes should be optimized to reflect this need by implementing scenarios that incorporate these skills.

When comparing years of experience as a nurse to PMCE, it was determined that nurses with more years of experience had increased PMCE. This fact is not surprising, as a nurse is more likely to encounter mock codes the longer that they have been a nurse. It was also discovered that nurses who work on CC units have increased PMCE. This provides a rationale for the need for additional ISMC training on MS floors.

Strengths and Limitations

A strength of this study was that it had a large sample size. The data analysis revealed a robust number of statistically significant outcomes. The measurement tool that was used to survey the nurses was a standardized tool. This project was originally initiated by the QI committee which provided the researcher access to data. A limitation of this study was the missing demographic information that lead to participant data being unusable. Another limitation was this was a secondary data analysis.

Future Implications

The results of the study revealed that MS nurses overall had decreased confidence levels in skill assessment and were less likely to have PMCE than CC nurses. Nurses with PMCE were more confident in performing the clinical skills that those without PMCE. Therefore, mock codes should be performed routinely on MS units to improve mock code experience and increase confidence while performing in code situations. Optimization of ISMCs should include the clinical skills identified that the nurses felt the least amount of confidence performing to yield full benefit. A component of the improvement of ISMCs would be to develop and implement scenarios that included the skills that had the lowest confidence levels.

Dissemination of the Results

The final results of the project were disseminated to stakeholders with discussion regarding the strengths and limitations of the study, as well as potential future implications of continued ISMC training. The findings were presented to the facility's education and QI committee and faculty committee members to show how simulation can be optimized and how the application of continued scheduled mandatory in-services of ISMC simulation training and practice should be encouraged. This paper will also be submitted for publication.

Conclusion

In-situ simulation is one answer that could help to improve staff members' confidence, skills, and knowledge, while improving patient outcomes after an IHCA. Mock code training offers an opportunity to identify and analyze issues with the existing code process. In this study, a need for increased ISMC training for MS nurses and optimization of simulation scenarios were identified. The use of revised mock code simulations can improve nurses' confidence and performance by repetition, allowing nurses to evaluate their progress and make necessary practice changes during an emergency situation.

References

American Association of Colleges of Nursing. (2006). *The essentials of doctoral education for advanced nursing practice*.: Author.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191–215. doi: 10.1037/0033-295x.84.2.191

Chu, R., & Robilotto, T. (2018). Mock code training to enhance CPR skills. *Nursing Made Incredibly Easy!, 16*(2), 11-15. http://dx.doi.org/10.1097/01.nme.0000529957.11904.8d

Clarke, S. O., Julie, I. M., Yao, A. P., Bang, H., Barton, J. D., Alsomali, S. M., … Bair, A. E. (2018). Longitudinal exploration of in situ mock code events and the performance of cardiac arrest skills. *BMJ Simulation and Technology Enhanced Learning, 5*(1), 22–26. http://dx.doi.org/10.1136/bmjstel- 2017-000255

Doolen, J., Mariani, B., Atz, T., Horsley, T. L., Rourke, J. O., Mcafee, K., & Cross, C. L. (2016). High-fidelity simulation in undergraduate nursing education: A review of simulation reviews. *Clinical Simulation in Nursing*, *12*(7), 290–302. doi: 10.1016/j.ecns.2016.01.009

Hayden, J. K., Smiley, R. A., Alexander, M. R., Kardong-Edgren, S., & Jeffries, P. (2014). The NCSBN National Simulation Study: A longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. *Journal of Nursing Regulation*, *5*(2). doi: 10.1016/s2155-8256(15)30062-4

Herbers, M. D., & Heaser, J. A. (2016). Implementing an in situ mock code quality improvement program. *American Journal of Critical Care, 25*(5), 393–399. http://dx.doi.org/10.4037/ajcc2016583

INACSL Standards Committee (2016). INACSL standards of best practice: Simulation^SM Simulation design. *Clinical Simulation in Nursing, 12*(S), S5-S12.

http://dx.doi.org/10.1016/ j.ecns.2016.09.005.

Josey, K., Smith, M. L., Kayani, A. S., Young, G., Kasperski, M. D., Farrer, P., … Raschke, R. A. (2018). Hospitals with more-active participation in conducting standardized in-situ mock codes have improved survival after in-hospital cardiopulmonary arrest. *Resuscitation, 133*, 47–52. http://dx.doi.org/10.1016/j.resuscitation.2018.09.020

Mcphee, K. (2018). Deliberate practice mock codes for new graduate nurses. *Journal for Nurses in Professional Development, 34*(6), 348-351. http://dx.doi.org/10.1097/nnd.0000000000000494

Morton, S.B., Powers, K., Jordan, K., & Hatley, A. (2019). The effect of high-fidelity simulation on medical-surgical nurses' mock code performance and self-confidence. *Medsurg Nursing, 28*(3), 177-182.

Nallamothu, B. K., Guetterman, T. C., Harrod, M., Kellenberg, J. E., Lehrich, J. L., Kronick, S. L., … Chan, P. S. (2018). How do resuscitation teams at top-performing hospitals for in-hospital cardiac arrest succeed? *Circulation*, *138*(2), 154–163. doi: 10.1161/circulationaha.118.033674

Oetker-Black, S. L., & Davis, T. (2019). Psychometric evaluation of the Mock Code Self-Efficacy Scale. *Nursing Education Perspectives, 40*(1), 35–40. http://dx.doi.org/10.1097/01.nep.0000000000000341

Risaliti, C., Evans, K., Buehler, J., Besecker, B., & Ali, N. (2018). Decoding Code Blue: A process to assess and improve code team function. *Resuscitation, 122*. http://dx.doi.org/10.1016/j.resuscitation.2017.11.039

Roussin, C. J., & Weinstock, P. (2017). SimZones: An organizational innovation for simulation programs and centers. *Academic Medicine*, *92*(8), 1114–1120. doi: 10.1097/acm.0000000000001746

Sodhi, K., Singla, M. K., & Shrivastava, A. (2014). Institutional resuscitation protocols: Do they affect cardiopulmonary resuscitation outcomes? A 6-year study in a single tertiary-care centre. *Journal of Anesthesia, 29*(1), 87–95. http://dx.doi.org/10.1007/s00540-014-1873-z

Spitzer, C. R., Evans, K., Buehler, J., Ali, N. A., & Besecker, B. Y. (2019). Code blue pit crew model: A novel approach to in-hospital cardiac arrest resuscitation. *Resuscitation, 143*, 158–164. http://dx.doi.org/10.1016/j.resuscitation.2019.06.290

Williams, K., Rideout, J., Pritchett-Kelly, S., Mcdonald, M., Mullins-Richards, P., & Dubrowski, A. (2016). Mock Code: A code blue scenario requested by and developed for registered nurses. *Cureus*. http://dx.doi.org/10.7759/cureus.938

Table 1

Unit Grouping Statistics of 12 Clinical Skills (N=198)

#	Clinical Skill	Unit	n	Mean	SD	t	df	Sig.
1	Assess and identify a client in respiratory distress	Critical Care	68	8.93	1.66	3.622	195	.000
		Med-Surg	129*	7.87	2.097			
2	Assess and identify a patient with no pulse	Critical Care	68	9.46	0.999	2.744	192	.002
		Med-Surg	130	8.85	1.657			
3	Provide rescue breathing for a client with a pocket mask or resuscitation bag	Critical Care	68	9.09	1.411	3.918	190	.000
		Med-Surg	129*	7.89	2.299			
4	Initiate chest compressions for a client without a pulse	Critical Care	68	9.49	1.044	4.049	195	.000
		Med-Surg	130	8.44	1.992			
5	Recognize bradycardia on the cardiac monitor	Critical Care	67*	9.55	1.034	2.388	194	.005
		Med-Surg	130	8.95	1.938			
6	Recognize tachycardia on the cardiac monitor	Critical Care	68	9.51	1.113	2.185	192	.012
		Med-Surg	130	8.98	1.861			
7	Recognize asystole on the cardiac monitor	Critical Care	68	9.41	1.567	1.070	195	.286
		Med-Surg	129*	9.14	1.762			
8	Recognize ventricular fibrillation on the cardiac monitor	Critical Care	68	9.24	1.34	5.099	195	.000
		Med-Surg	130	7.48	2.671			
9	Recognize pulseless ventricular tachycardia on the cardiac monitor	Critical Care	68	9.04	1.530	6.141	195	.000
		Med-Surg	130	6.82	2.778			
10	Identify which dysrhythmias would require an unsynchronized shock (defibrillation) in cardiopulmonary arrest	Critical Care	68	8.44	2.174	6.754	168	.000
		Med-Surg	129*	5.80	2.813			

11	Name the first medication given to a client in cardiopulmonary arrest during a code blue situation	Critical Care	68	8.71	2.081	4.855	186	.000
		Med-Surg	130	6.62	3.199			
12	Function as part of the team in a. code blue situation for client in cardiopulmonary arrest	Critical Care	68	9.26	1.378	5.998	195	.000
		Med-Surg	130	7.22	2.622			

*=missing one observation

Table 2

Inferential Statistics of Subscales by Unit (N=198)

Subscale	Unit	n	Mean	SD	t	df	Sig
EKG recognition	Critical Care	68	46.62	6.015	4.204	196	.000
	Med-Surg	130	41.28	9.507			
CPR assessment	Critical Care	68	36.96	4.366	4.436	196	.000
	Med-Surg	130	32.93	6.779			
Actions during code	Critical Care	68	26.41	4.869	6.967	196	.000
	Med-Surg	130	19.60	7.248			

Table 3

Association Analysis of Unit Versus Past Mock Code Experience (N=223)

		Past Mock Code Experience		
		Yes	No	
				Total
Unit	Critical Care	56	21	77
	Med-Surg	76	70	146
Total		132	91	223

Table 4

Past Mock Code Experience Grouping Statistics of 12 Clinical Skills (N=259)

#	Clinical Skill	PMCE	n	Mean	SD	t	df	Sig
1	Assess and identify a client in respiratory distress	Yes	151	8.74	1.692	6.047	185	.000
		No	108*	7.23	2.311			
2	Assess and identify a patient with no pulse	Yes	151	9.46	.998	5.001	148	.000
		No	108*	8.55	1.921			
3	Provide rescue breathing for a client with a pocket mask or resuscitation bag	Yes	149**	8.91	1.475	5.442	167	.000
		No	109	7.61	2.373			
4	Initiate chest compressions for a client without a pulse	Yes	150*	9.33	1.150	5.719	156	.000
		No	109	8.17	2.068			
5	Recognize bradycardia on the cardiac monitor	Yes	150*	9.55	1.046	5.021	136	.000
		No	108*	8.44	2.416			
6	Recognize tachycardia on the cardiac monitor	Yes	150*	9.59	.970	5.087	132	.000
		No	107**	8.51	2.333			
7	Recognize asystole on the cardiac monitor	Yes	149**	9.63	1.029	4.151	138	.000
		No	108*	8.75	2.292			
8	Recognize ventricular fibrillation on the cardiac monitor	Yes	150*	8.88	1.843	6.582	170	.000
		No	108*	6.96	2.831			
9	Recognize pulseless ventricular tachycardia on the cardiac monitor	Yes	151	8.42	2.192	6.794	180	.000
		No	108*	6.19	3.112			
10	Identify which dysrhythmias would require an unsynchronized shock (defibrillation) in cardiopulmonary arrest	Yes	150*	7.83	2.499	7.772	204	.000
		No	109	5.16	3.034			

11	Name the first medication given to a client in cardiopulmonary arrest during a code blue situation	Yes	151	8.10	2.729	5.586	199	.000
		No	107**	5.99	3.318			
12	Function as part of the team in a code blue situation for client in cardiopulmonary arrest	Yes	151	8.68	1.852	6.878	257	.000
		No	108*	6.62	2.963			

*=missing one observation
**=missing tow observations

Table 5

Inferential Statistics of Subscales by Past Mock Code Experience (N=260)

Subscale	PMCE	n	Mean	SD	t	df	Sig
EKG recognition	Yes	151	45.76	6.401	6.421	257	.000
	No	108*	38.77	11.041			
CPR assessment	Yes	151	36.26	4.382	6.796	258	.000
	No	109	31.41	7.084			
Actions during code	Yes	151	24.56	6.102	7.970	258	.000
	No	109	17.60	7.990			

*=missing one observation

Appendix A

UB IRB Approval Letter

Appendix A
UB IRB Approval Letter

University at Buffalo
The State University of New York

University at Buffalo Institutional Review Board (UBIRB)
Office of Research Compliance | Clinical and Translational Research Center Room 5018
875 Ellicott St. | Buffalo, NY 14203
UB Federalwide Assurance ID#: FWA00008824

NOT HUMAN RESEARCH DETERMINATION

December 10, 2020

Dear Nicole Wedzina,

On 12/10/2020**,** the University at Buffalo IRB reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	Evaluating nurses' self-efficacy related to in situ mock codes (ISMC) simulation training
Investigator:	Nicole Wedzina
IRB ID:	STUDY00005050
Funding:	None
Grant ID:	None
IND, IDE, or HDE:	None
Documents Reviewed:	• Appendix G-Permission to use MCSES.docx, Category: Other; • NWedzina-ISMC and nurses' self-efficacy project, Category: IRB Protocol; • Oetker-Black validated survey tool.pdf, Category: Surveys/Questionnaires;

The IRB determined that the proposed activity is not research involving human subjects. IRB review and approval is not required.

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are being considered and there are questions about whether IRB review is needed, please submit a study modification to the IRB for a determination. You can create a modification by navigating to the initial submission and selecting 'Create Modification / CR'.

If you have questions, please contact the UBIRB at 716-888-4888 or ub-irb@buffalo.edu. Please include the project title and number in all correspondence with the UBIRB.

Appendix B

Mock Code Self-Efficacy Scale: Part A Demographics

Appendix B
Mock Code Self-Efficacy Scale: Part A Demographics

A. Demographic Information

1. How many years have you been working as a nurse?

   ____

2. What gender do you identify as?
   a. Male
   b. Female
   c. Prefer not to answer

3. What unit do you currently work on?
   a. 4N
   b. 5E
   c. 5W
   d. 5NC
   e. 6E
   f. 6W
   g. 7E/8E
   h. 7W
   i. MRU
   j. Float
   k. ED
   l. CVICU
   m. ICU
   n. Prefer not to answer

4. Do you have past experience with mock codes?
   a. Yes
   b. No

Appendix C

Mock Code Self-Efficacy Scale: Part B MCSES Tool

Appendix C
Mock Code Self-Efficacy Scale: Part B MCSES Tool

B. Mock Code Self-Efficacy Scale tool

For the following questions, please rate your confidence by circling the designated number on a scale from 0 to 10 with 0 being “No Confidence” and 10 being “Total Confidence”.

1. How confident are you at assessing and identifying a patient in respiratory failure?

   0 1 2 3 4 5 6 7 8 9 10
   No Confidence Total Confidence

2. How confident are you at assessing and identifying a patient with no pulse?

   0 1 2 3 4 5 6 7 8 9 10
   No Confidence Total Confidence

3. How confident are you at providing rescue breathing for a client with a pocket mask or resuscitation bag?

   0 1 2 3 4 5 6 7 8 9 10
   No Confidence Total Confidence

4. How confident are you at initiating chest compressions for a client without a pulse?

   0 1 2 3 4 5 6 7 8 9 10
   No Confidence Total Confidence

5. How confident are you at recognizing bradycardia on the cardiac monitor?

   0 1 2 3 4 5 6 7 8 9 10
   No Confidence Total Confidence

6. How confident are you at recognizing tachycardia on the cardiac monitor?

   0 1 2 3 4 5 6 7 8 9 10
   No Confidence Total Confidence

7. How confident are you at recognizing asystole on the cardiac monitor?

0 1 2 3 4 5 6 7 8 9 10
No Confidence Total Confidence

8. How confident are you at recognizing ventricular fibrillation on the cardiac monitor?

   0 1 2 3 4 5 6 7 8 9 10
   No Confidence Total Confidence

9. How confident are you at recognizing pulseless ventricular tachycardia on the cardiac monitor?

   0 1 2 3 4 5 6 7 8 9 10
   No Confidence Total Confidence

10. How confident are you at identifying which dysrhythmias would require an unsynchronized shock (defibrillation) in cardiopulmonary arrest?

    0 1 2 3 4 5 6 7 8 9 10
    No Confidence Total Confidence

11. How confident are you at naming the first medication given to a client in cardiopulmonary arrest during a code blue situation?

    0 1 2 3 4 5 6 7 8 9 10
    No Confidence Total Confidence

12. How confident do you feel functioning as part of the team in a code blue situation for a client in cardiopulmonary arrest?

    0 1 2 3 4 5 6 7 8 9 10
    No Confidence Total Confidence

Appendix D

Permission from author to use MCSES

Appendix D
Permission from author to use MCSES

(A) Request for permission:

☆ Niky Wedzina
nwedzina@buffalo.edu use MCSES
To: sblack@walsh.edu

February 15, 2020 at 8:10 PM
NW

Dear Dr. Oetker-Black,

I know you are busy, so I will keep this brief.

My name is Nicole Wedzina. I am a student at the University at Buffalo in the Post-MS DNP program. I work as an Adult Nurse Practitioner in the NeuroCritical Care unit at a local hospital.

I am part of a Mock Code Squad at the facility we work at. For my DNP project, after each simulation mode code training, I would like to evaluate the nurses' self-efficacy and confidence regarding emergency code situations.

I am writing to ask permission to use the Mock Code Self-Efficacy Scale, as in your article *Psychometric Evaluation of the Mock Code Self-Efficacy Scale*, you have shown that the scale has reliability, as well as content and face validity.

Thank you for your time,

Nicole Wedzina
nwedzina@buffalo.edu

(B) Permission:

Sharon Black
Re: Permission to use MCSES
To: Wedzina, Nicole

February 21, 2020 at 11:42 AM
SB

6

Siri found new contact info in this email: Sharon Black sblack@walsh.edu add to Contacts...

You have my permission to use the scale. It may not be adapted.

Sharon L Oetker- Black RN, Phd, JD, ANEF, FAAN
Professor and Director of Nursing Research, Byers School of Nursing
2020 E Maple Street North Canton OH 44720
(P) 330-244-4779 (E) sblack@walsh.edu
www.walsh.edu

WALSH UNIVERSITY
A Catholic University of Distinction

This message and any attachments are intended for the individual or entity named above. If you are not the intended recipient, please do not forward, copy, print, use or disclose this communication to others; also please notify the sender by replying to this message, and then delete it from your system.

From: Wedzina, Nicole <nwedzina@buffalo.edu>
Sent: Saturday, February 15, 2020 8:10 PM
To: Sharon Black <sblack@walsh.edu>
Subject: Permission to use MCSES

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

EVALUATING NURSES' SELF-EFFICACY RELATED TO IN SITU MOCK CODE SIMULATION TRAINING

By: Nicole L. Wedzina

Fall 2020

University at Buffalo The State University of New York

BACKGROUND AND SIGNIFICANCE

Background

- In-hospital cardiac arrest (IHCA) mortality remains a large problem in the US
- Skills gained from training methods steadily deteriorate
- Self-efficacy linked to improved nursing performance
- Low levels of self-efficacy disclosed higher levels of stress

Gap in Practice

- QI committee identified issues during code situations
- Surveyed nurses to discover skill set
- Discovered gaps in practice to efficiently and effectively improve future In-situ mock codes (ISMCs)

Significance

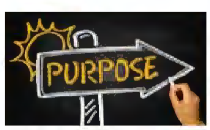
- Beneficial association between ISMC training and positive patient outcomes
- Use of mock code simulation can:
  - Improves nurses' confidence
  - Improve nurses' performance
  - Improve patient outcomes

PROJECT PURPOSE, AIMS AND OBJECTIVES

1846

Purpose

- Need for organizational improvement to strengthen the resuscitation process



The purpose of this QI project was to analyze and evaluate the data obtained from the results of the MCSES survey to *develop a needs assessment* for the optimization of an ISMC simulation training program.

Project objectives:

- Establish a baseline needs assessment
- Identify needs and deficits in CPR skills
- Optimize future simulation training

Research Questions

1. Are critical care (CC) trained nurses more confident than medical-surgical (MS) nurses in the 12 clinical skills?
2. Do CC nurses have more experience than MS nurses with mock codes?
3. Do nurses with past mock code experience (PMCE) have increased confidence in the 12 clinical skills?
4. Are nurses with greater years of experience more likely to have PMCE?
5. When comparing groups, what are the clinical skills that have the lowest confidence scores?

THEORETICAL FRAMEWORK

1846

Theoretical framework: Albert Bandura's Self-Efficacy Theory

- Self-efficacy:
  - People's judgement of their ability to execute actions to complete certain performances
  - Measures target performance profi iencies that are situation specific
- Theory defines self-efficacy in two components:
  - *Outcome expectations*
  - *Efficacy expectations*

Theoretical framework: Albert Bandura's Self-Efficacy Theory

- The stronger the perceived self-efficacy, the more productive the efforts may be as a direct effect of increased confidence
- Expectations of personal efficacy are based on four sources of information:
  - (1) performance accomplishments
  - (2) vicarious experience
  - (3) verbal persuasion
  - (4) physiological states

Theoretical framework: Albert Bandura's Self-Efficacy Theory

- Emphasizes need for effective learning in nursing to yield high self-efficacy
- Coincides with simulation training
- Low levels of self-efficacy have higher levels of stress

LITERATURE REVIEW

1846

Literature review key topics

- **Four main topics:**
  - Simulation-based healthcare education
  - Responder performance
  - Confidence levels
  - IHCA outcome survival

Simulation-based healthcare

- Empowers students to practice skills, augment knowledge, and develop self-confidence in a safe environment with no risk to patients (Williams et al., 2016)
- Facilitate improved provider confidence, and improved patient safety and outcomes (Williams et al., 2016)
- 2014 landmark study by the National Council of State Boards of Nursing:
  - 50% substitution of traditional clinical time with HFS yielded no statistically significant differences in outcomes from those with more conventional methods of clinical hours (INACSL Standards of Best Practice: SimulationSM Simulation Design, 2016)

Responder performance

- Nurse's role as a first responder in cardiac arrest situations is critical to patient survival (Chu, 2018)
- CPR skills deteriorate overtime
- Nursing skills require continuous practice to ensure individuals can perform competently and consistently (McPhee, 2018)
- Clarke et al. (2018) conducted a prospective study of ISMCs:
  - Training initiative that simulated mock codes
  - Calculated a CPR fraction
  - Observed a significant improvement over the course of the program

Confidence levels

- Deteriorating patient situations can be anxiety triggering situations for new graduate nurses (McPhee, 2018)
- Simulation allowed building of knowledge and confidence in ability to manage response to a declining patient (McPhee, 2018)
- Low self-confidence is a barrier to performing high-quality CPR (Morton et al., 2019)
- Mock code simulation can increase nurses' self-confidence in performing in a code event (Herbers and Heaser, 2016)
- Providing nurses with opportunities for practice is valuable to improve self-confidence (Morton et al., 2019)

IHCA survival outcomes

- Beneficial association between increased ISMC training and patient survival outcome after IHCA (Josey et al., 2018)
- Education and training of staff who respond to cardiac arrest events is essential to improving outcomes (Clarke et al., 2018)
- Increasing ISMC training programs can narrow gap between IHCA and patient survival outcomes (Clarke et al., 2018)

METHODS

1846

- **Design:**
  - Secondary analysis of data from the results of the MCSES survey
- **Setting:**
  - CC and MS floors at a large urban hospital
- **Subjects and recruitment:**
  - Convenience sample of 311 nurses employed in critical care and med-surg
  - Inclusion criteria:
    - a)18 years of age and older
    - b) graduated from an accredited nursing school
    - c) participated in the MCSES survey

Demographic Questions

- **Four questions:**
  1. How many years have you been working as a nurse?
  2. What gender do you identify as?
  3. What unit do you currently work on?
  4. Do you have past experience with mock codes?

Measurement Tool

- Mock Code Self-Efficacy Scale (MCSES)
- Variable: Nurses' self-efficacy
- Tool consists of 12 questions on clinical skills
  - Grouped in three subscales
- Shown to have reliability, face, and content validity

NOTE: Adapted from Oetker-Black and Davis (2019)

V sual Analog scale answers

- Scale from 0-10
- 0 = No confidence
- 10 = Total Confidence

Sample Questions

For the following questions, please rate your confidence by choosing a designated number on a scale from 0 to 10 with 0 being "No Confidence" and 10 being "Total Confidence".

1. How confident are you at assessing and identifying a patient in respiratory failure?

0 1 2 3 4 5 6 7 8 9 10

No Confidence Total Confidence

10. How confident are you at identifying which dysrhythmias would require an unsynchronized shock (defibrillation) in cardiopulmonary arrest?

0 1 2 3 4 5 6 7 8 9 10

No Confidence Total Confidence

Data Collection

- Mandatory education for nurses
- Collected via online learning platform
- Included a video and PowerPoint

University at Buffalo The State University of New York

RESULTS & DISCUSSION

University at Buffalo The State University of New York

Total Sample Demographics

- 311 nurses surveyed
- Years of experience as a nurse ranged from 0-45 years
  - 11.75 the average number of years
- 267 (85.9%) females and 27 (8.7%) males
- 77 (24.8%) work on CC unit
- 146 (46.9%) work on MS unit
- 170 (58.2%) nurses that had PMCE
- 122 (41.8%) nurses did NOT have PCME

University at Buffalo The State University of New York

Total Sample Clinical Skill Comparison

- **Three skills** that had the **lowest level of confidence**:
  1. Identify which dysrhythmias would require an unsynchronized shock (defibrillation) in cardiopulmonary arrest (M=6.72) (Question #10)
  2. Name the first medication given to a client in cardiopulmonary arrest during a code blue situation (M=7.18) (Question #11)
  3. Recognize pulseless ventricular tachycardia on the cardiac monitor (M=7.49). (Question #9)

Table 1

Unit Grouping Statistics of 12 Clinical Skills (N=198)

#	Clinical Skill	Unit	n	Mean	SD	t	df	Sig.
1	Assess and identify a client in respiratory distress	Critical Care	68	8.93	1.66	3.622	195	.000
		Med-Surg	129[a]	7.87	2.097			
2	Assess and identify a patient with no pulse	Critical Care	68	9.46	0.999	2.744	192	.002
		Med-Surg	130	8.85	1.657			
3	Provide rescue breathing for a client with a pocket mask or resuscitation bag	Critical Care	68	9.09	1.411	3.918	190	.000
		Med-Surg	129[a]	7.89	2.299			
4	Initiate chest compressions for a client without a pulse	Critical Care	68	9.49	1.044	4.049	195	.000
		Med-Surg	130	8.44	1.992			
5	Recognize bradycardia on the cardiac monitor	Critical Care	67[a]	9.55	1.034	2.398	194	.005
		Med-Surg	130	8.95	1.938			
6	Recognize tachycardia on the cardiac monitor	Critical Care	68	9.51	1.113	2.185	192	.012
		Med-Surg	130	8.98	1.861			

#	Clinical Skill	Unit	n	Mean	SD	t	df	Sig.
7	Recognize asystole on the cardiac monitor	Critical Care	68	9.41	1.567	1.070	195	.286
		Med-Surg	129[a]	9.14	1.762			
8	Recognize ventricular fibrillation on the cardiac monitor	Critical Care	68	9.24	1.34	5.399	195	.000
		Med-Surg	130	7.48	2.671			
9	Recognize pulseless ventricular tachycardia on the cardiac monitor	Critical Care	68	9.04	1.530	6.141	195	.000
		Med-Surg	130	6.82	2.778			
10	Identify which dysrhythmias would require an unsynchronized shock (defibrillation) in cardiopulmonary arrest	Critical Care	68	8.44	2.174	6.754	168	.000
		Med-Surg	129[a]	5.80	2.813			
11	Name the first medication given to a client in cardiopulmonary arrest during a code blue situation	Critical Care	68	8.71	2.081	4.855	186	.000
		Med-Surg	130	6.62	3.199			
12	Function as part of the team in a code blue situation for client in cardiopulmonary arrest	Critical Care	68	9.26	1.378	5.998	195	.000
		Med-Surg	130	7.22	2.622			

a=missing one observation

Table 2

Inferential Statistics of Subscales by Unit (N=198)

Subscale	Unit	n	Mean	SD	t	df	Sig
EKG recognition	Critical Care	68	46.62	6.015	4.204	196	.000
	Med-Surg	130	41.28	9.507			
CPR assessment	Critical Care	68	36.96	4.366	4.436	196	.000
	Med-Surg	130	32.93	6.779			
Actions during code	Critical Care	68	26.41	4.869	6.967	196	.000
	Med-Surg	130	19.60	7.248			

Table 3

Association Analysis of Unit Versus Past Mock Code Experience (N=223)

		Past Mock Code Experience Yes	No	Total
Unit	Critical Care	56	21	77
	Med-Surg	76	70	146
Total		132	91	223

$x^2(1)=8.919$, $p=.003$

Table 4

Past Mock Code Experience Grouping Statistics of 12 Clinical Skills (N=259)

#	Clinical Skill	PMCE	n	Mean	SD	t	df	Sig
1	Assess and identify a client in respiratory distress	Yes	151	8.74	1.692	6.047	185	.000
		No	108*	7.23	2.311			
2	Assess and identify a patient with no pulse	Yes	151	9.46	.998	5.031	148	.000
		No	108*	8.55	1.921			
3	Provide rescue breathing for a client with a pocket mask or resuscitation bag	Yes	149**	8.91	1.475	5.442	167	.000
		No	109	7.61	2.373			
4	Initiate chest compressions for a client without a pulse	Yes	150*	9.33	1.150	5.719	156	.000
		No	109	8.17	2.068			
5	Recognize bradycardia on the cardiac monitor	Yes	150*	9.55	1.046	5.021	136	.000
		No	108*	8.44	2.416			
6	Recognize tachycardia on the cardiac monitor	Yes	150*	9.99	.970	5.087	132	.000
		No	107**	8.51	2.333			

#	Clinical Skill	PMCE	n	Mean	SD	t	df	Sig
7	Recognize asystole on the cardiac monitor	Yes	149**	9.63	1.029	4.151	138	.000
		No	108*	8.75	2.292			
8	Recognize ventricular fibrillation on the cardiac monitor	Yes	150*	8.88	1.843	6.582	170	.000
		No	108*	6.96	2.831			
9	Recognize pulseless ventricular tachycardia on the cardiac monitor	Yes	151	8.42	2.192	6.794	180	.000
		No	108*	6.19	3.112			
10	Identify which dysrhythmias would require an unsynchronized shock (defibrillation) in cardiopulmonary arrest	Yes	150*	7.83	2.499	7.772	204	.000
		No	109	5.16	3.034			
11	Name the first medication given to a client in cardiopulmonary arrest during a code blue situation	Yes	151	8.10	2.729	5.586	199	.000
		No	107**	5.99	3.318			
12	Function as part of the team in a code blue situation for client in cardiopulmonary arrest	Yes	151	8.68	1.852	6.878	257	.000
		No	108*	6.62	2.963			

*=missing one observation
**=missing tow observations

Table 5

Inferential Statistics of Subscales by Past Mock Code Experience (N=260)

Subscale	PMCE	n	Mean	SD	t	df	Sig
EKG recognition	Yes	151	45.76	6.401	6.421	257	.000
	No	108*	38.77	11.041			
CPR assessment	Yes	151	36.26	4.382	6.796	258	.000
	No	109	31.41	7.084			
Actions during code	Yes	151	24.56	6.102	7.970	258	.000
	No	109	17.60	7.990			

*=missing one observation

Years of Experience vs Mock Code Experience

- Compared years of experience as a nurse to PMCE
- Greater years experience; increased PMCE

Lowest Confidence Scores of Skills by Unit

- Only one skill, recognizing asystole, was not statistically significant

CC nurses	MS nurses
• Question #10; Identify which dysrhythmias would require on unsynchronized shock (defibrillation) in cardiopulmonary arrest (M=8.44)	• Question #10; Identify which dysrhythmias would require on unsynchronized shock (defibrillat on) in cardiopulmonary arrest (M=5.80)
• Question #11; Name he first medicati n given to a client in cardiopulmonary arrest during a code blue si uati n (M=8.71)	• Question #11; Name the first medication given to a cl ent in cardiopulmonary arrest during a code blue situation (M=6.62)
• Question #1; Identify and assess a client in respiratory failure (M=8.93)	• Question #9; Recognize pulseless VT on the cardiac monitor and upon assessment of the client (M=6.82)

Lowest Confidence Scores of Skills by PMCE

Past mock code experience	No past mock code experience
• Question #10; Identify which dysrhythmias would require on unsynchronized shock (defibrillation) in cardiopulmonary arrest (M=7.83)	• Question #10; Identify which dysrhythmias would require on unsynchronized shock (defibrillation) in cardiopulmonary arrest (M=5.16)
• Quest on #11; Name the f rst medicat on given to a client in card opulmonary arrest during a code b ue situation (M=8.10)	• Question #11; Name the first medication given to a client in cardiopulmonary arrest during a code blue situation (M=5.99)
• Question #9; Recognize pulseless VT on the cardiac monitor and upon assessment of the client (M=8. 2)	• Question #9; Recognize pulseless VT on the cardiac monitor and upon assessment of the client (M=6.19)

Strengths and Limitations

STRENGTHS

- Large sample
- Statistically significant outcomes
- Standardized measurement tool
- Project initiated by QI committee

LIMITATIONS

- Alteration of design due to pandemic
- Missing data on demographic tool
- Secondary data set analysis

CONCLUSIONS

Conclusions

- MS nurses overall had decreased confidence levels in skill assessment and were less likely to have PMCE than CC nurses
- Nurses with PMCE were more confident in performing the clinical skills
- Nurses with more years experience had increased PMCE

University at Buffalo The State University of New York

Recommendations for Future Training

- Mock codes should be performed routinely on MS units
- Optimization of ISMCs should include the clinical skills identified has having lower levels of confidence
- Survey compliance

University at Buffalo The State University of New York

DNP essentials

- DNP Essential II:
  - Organizational and Systems Leadership for Quality Improvement and Systems Thinking
- DNP Essential III:
  - Clinical Scholarship and Analytical Methods for Evidence-Based Practice

University at Buffalo The State University of New York

References

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191–215. doi: 10.1037/0033-295x.84.2.191

Chu, R., & Robilotto, T. (2018). Mock code training to enhance CPR skills. *Nursing Made Incredibly Easy!, 16*(2), 11-15. http://dx.doi.org/10.1097/01.nme.0000529957.11904.8d

Clarke, S. O., Julie, I. M., Yao, A. P., Bang, H., Barton, J. D., Alsomali, S. M., … Bair, A. E. (2018). Longitudinal exploration of in situ mock code events and the performance of cardiac arrest skills. *BMJ Simulation and Technology Enhanced Learning, 5*(1), 22–26. http://dx.doi.org/10.1136/bmjstel- 2017-000255

Herbers, M. D., & Heaser, J. A. (2016). Implementing an in situ mock code quality improvement program. *American Journal of Critical Care, 25*(5), 393–399. http://dx.doi.org/10.4037/ajcc2016583

INACSL Standards Committee (2016). INACSL standards of best practice: Simulation^{SM} Simulation design. *Clinical Simulation in Nursing, 12*(S), S5-S12. http://dx.doi.org/10.1016/ j.ecns.2016.09.005.

Josey, K., Smith, M. L., Kayani, A. S., Young, G., Kasperski, M. D., Farrer, P., … Raschke, R. A. (2018). Hospitals with more-active participation in conducting standardized in-situ mock codes have improved survival after in-hospital cardiopulmonary arrest. *Resuscitation, 133*, 47–52. http://dx.doi.org/10.1016/j.resuscitation.2018.09.020

Mcphee, K. (2018). Deliberate practice mock codes for new graduate nurses. *Journal for Nurses in Professional Development, 34*(6), 348-351. [illegible]

Morton, S.B., Powers, K., Jordan, K., & Hatley, A. (2019). The effect of high-fidelity simulation on medical-surgical nurses' mock code performance and self-confidence. *Medsurg Nursing, 28*(3), 177-182.

Oetker-Black, S. L., & Davis, T. (2019). Psychometric evaluation of the Mock Code Self-Efficacy Scale. *Nursing Education Perspectives, 40*(1), 35–40. http://dx.doi.org/10.1097/01.nep.0000000000000341

Williams, K., Rideout, J., Pritchett-Kelly, S., Mcdonald, M., Mullins-Richards, P., & Dubrowski, A. (2016). Mock Code: A code blue scenario requested by and developed for registered nurses. *Cureus*. http://dx.doi.org/10.7759/cureus.938

University at Buffalo The State University of New York

QUESTIONS???