THE FIRST FIVE MINUTE PROGRAM DERIVED FROM MOCK CARDIOPULMONARY ARREST IMPLEMENTATION

by

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A DNP Project Submitted to the Faculty of the

COLLEGE OF NURSING

In Partial Fulfillment of the Requirements

For the Degree of

DOCTOR OF NURSING PRACTICE

In the Graduate College

THE UNIVERSITY OF ARIZONA

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THE UNIVERSITY OF ARIZONA
GRADUATE COLLEGE

As members of the DNP Project Committee, we certify that we have read the DNP project prepared by Morgan Elise Del Principe, titled The First Five-Minute Program Derived From Mock Cardiopulmonary Arrest Implementation, and recommend that it be accepted as fulfilling the DNP project requirement for the Degree of Doctor of Nursing Practice.

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Final approval and acceptance of this DNP project are contingent upon the candidate's submission of the final copies of the DNP project to the Graduate College.

I hereby certify that I have read this DNP project prepared under my direction and recommend that it be accepted as fulfilling the DNP project requirement.

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ACKNOWLEDGMENTS

I would like to thank my three committee members who worked so hard to help make this project possible. I am grateful for the guidance, encouragement, and expertise you all shared which allowed me to be successful in completing this project. Thank you Dr. DeBoe, Dr. Huls, and Dr. Carlisle. I appreciate all of you so much.

I want to acknowledge the “fab five” and thank you all for being my second family throughout this program. Fate brought the five of us together first semester of this program and for that, I am so thankful. I seriously would not be walking that stage in December if it weren’t for you girls. Thank you for the endless support and encouragement. These friendships will be ones that last a lifetime. Danielle, Karly, January, and Valerie, I love you girls!

I would like to thank my incredible boyfriend, Drew. You have shown me endless love, support, and patience while I persisted through this doctoral degree. Thank you for being my rock and for constantly believing in me. I would not have made it here without you. I love you more.

Finally, I would like to thank God for the countless blessings in my life and for opening doors I didn’t even know I wanted to walk through until He showed me. I am so fortunate to have His guidance.

DEDICATION

This is dedicated to my wonderful parents, Patti and Gregg. You two have always supported my dreams and have encouraged me in every way possible. You have made me believe in myself and know that I am capable of anything. I see how hard the two of you have worked to build the life you have, and I hope to be able to do the same. Thank you for constantly pushing me to be the very best version of myself. I would be lost without you two. I hope that I have made you proud. I love you both, to the moon and back.

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ABSTRACT

Purpose: The purpose of this quality improvement project was to increase nursing staff's confidence in performing crucial tasks which must be completed during the first five minutes of an in-hospital cardiopulmonary arrest.

Background: Cardiopulmonary arrests are clinical emergencies which have a high risk of morbidity and mortality. A healthcare team who is trained in how to manage these emergencies may help improve patient outcomes. An evidence-based method to improve nursing staff's confidence and skill set while reducing staff anxiety in responding to cardiopulmonary arrests is mock code education and implementation. Specifically, education regarding tasks which should be completed within the first five minutes of a cardiopulmonary arrest is pertinent.

Methods: The first five minute program consisted of a pretest and posttest design with an educational session. There were a total of 18 participants who voluntarily completed this educational session. The pretest evaluated the nursing staff's baseline confidence levels in performing specific tasks imperative to the first five minutes of a cardiopulmonary arrest. The participants were then educated about how to properly perform these tasks. The participants were able to practice these skills during a portion of hands-on learning. The confidence levels in performing the same tasks were reassessed after the completion of the educational session to evaluate a change in confidence levels.

Results: The pretest, educational session, and posttest were completed by 18 participants. The first five minute program showed an increase in mean confidence levels of nursing staff in performing each task. These tasks included calling a code, responding to a code, understanding designed code team roles, backboard placement, chest compressions, bag-valve mask ventilation,

locating items within the code cart, applying defibrillator pads and cardiac leads, turning on the defibrillator, delivering a synchronized defibrillation to the patient, understanding which rhythms are shockable versus non-shockable, and code documentation.

Conclusions: The use of the first five minute program as an educational session to increase nursing staff's confidence in performing crucial tasks required during an in-hospital cardiopulmonary arrest was successful. The sustainability and dissemination of this project are important to assure the continued use of the first five minute program.

INTRODUCTION

Cardiopulmonary arrests are medical emergencies that pose a high risk of death, irreversible neurologic injury, and functional disability. In-hospital cardiopulmonary arrests (IHCAs) affect over 290,000 adults every year in the United States (US) (Anderson et al., 2019). These arrests are more commonly cardiac arrests (50-60%) presenting with non-shockable rhythms as opposed to respiratory arrests (15-40%). For patients who experience an IHCA, the survival rates are 10-23.9%. With each passing minute in which cardiopulmonary resuscitation (CPR) is delayed, the survival rate decreases by 7% to 10% (Herbers & Heaser, 2016). Although many healthcare workers are required to be basic life support (BLS) and/or advanced cardiac life support (ACLS) certified, if these skills are not practiced frequently, the knowledge gained from these courses can deteriorate within as little as two weeks. Education and skill retention training regarding IHCAs will give patients the best chances of survival.

Background Knowledge and Significance

IHCAs are critical emergencies that have a high risk of mortality. However, a team who is efficiently trained in how to manage these critical emergencies may help improve patient outcomes and survival rates. Not only do IHCAs pose a high mortality risk, but they also cost the US healthcare system a significant amount of money. The financial burden on the US healthcare system associated with hospitalization after cardiac arrests continues to increase (Damluji et al., 2018). The total cost of hospital stays associated with cardiac arrests in the US is about $33 billion per year. Because IHCAs are so prevalent and impactful to the healthcare system, a method to approach these medical emergencies efficiently and effectively is imperative. The American Heart Association (AHA) (2021) recommends mock code blue education and

implementation to improve outcomes of cardiopulmonary arrest in the hospital setting. In a study by Josey et al. (2018), it was concluded that hospitals that have active standardized in-situ mock code training show improvements in IHCA survival rates. Mock code blue training can also help improve staff confidence, reduce staff anxiety, and enhance skill sets for members of the healthcare team (Herbers & Heaser, 2016).

During the initial moments of an IHCA, there are crucial steps that healthcare workers must perform in order for the code to be executed efficiently once the code team arrives. Therefore, a program was implemented by Wise et al. (2020) called the *First Five Minutes*. This program focused on the AHA's "Get With the Guidelines" recommendations. This program established pertinent tasks to implement during the initial five minutes of a 'code blue.' The tasks included backboard placement, chest compressions, timely medication administration, defibrillation pad and cardiac lead application, bag-valve mask (BVM) ventilation, and code documentation. After implementation of this program, the elapsed time between initiation of the code and implementation of these interventions decreased. Individuals who participated in this program deemed it helpful in preparing them to respond to patients in cardiopulmonary arrest. This program is a form of mock code education and training.

Efficiently managing an IHCA during the initial five minutes until the code team arrives is crucial to patient survival. This quality improvement (QI) program is essential to nursing practice as well as the advanced practice nurse. As a nurse practitioner caring for patients' post-cardiac arrest, the interventions which are performed during an IHCA are crucial to the survival and post-cardiac arrest care of the patients. Methods to enhance the confidence and skill set of the healthcare team during IHCAs must be established. In order to give a patient the highest

chance of survival, the healthcare team must be meticulously trained and educated regarding IHCAs and how to intervene appropriately and efficiently.

Local Problem

As a member of the code team at Northwest Medical Center (NWMC) in Tucson, AZ, the project coordinator recognized a dire need for improvement in rapid recognition and intervention during IHCAs. Oftentimes, there is a delay in completing crucial tasks during the initial moments of a cardiopulmonary arrest. Currently, this acute care hospital does not implement any form of in-situ mock code training. NWMC previously had a mock code program but due to changes in management, educators, and staff turnover, the program dissolved. Nursing staff is required to be BLS and/or ACLS certified at NWMC, however there are no continuing educational opportunities to maintain and improve response efforts of IHCAs. Unfortunately, the project coordinator experienced firsthand the negative effects on patient outcomes which may be improved by the implementation of a mock code program. Areas for improvement were identified thus developing a plan to implement an evidence-based in-situ mock code training centered around the first five minutes of an IHCA. The stakeholders involved at this clinical location include the patients, nursing staff, unit educators, and unit directors. In order to implement this program, approval was obtained from the director of nursing, chief nursing officer, and chief executive officer.

Intended Improvement

Project Purpose

One method which has been nationally successful is in-situ mock code blue implementation (AHA, 2021). In a children's hospital in Alabama, the *First Five Minute*

program regarding pertinent tasks during the first five minutes of a code was deemed effective in improving response time of the nursing staff and their confidence (Josey et al., 2020). Therefore, in-situ mock code education regarding the first five minutes of an IHCA should be implemented as an evidence-based intervention at NWMC. The purpose of this evidence-based project was to enhance the confidence and knowledge of nursing staff during a cardiopulmonary arrest after implementation of a first five minute in-situ mock code blue program.

Project Question

The inquiry into this clinical problem leads to the question: Compared to the nursing staff's baseline knowledge of cardiopulmonary arrests, will the implementation of a first five minute mock code blue education program improve nursing staff's confidence and knowledge in responding to IHCAs at NWMC in Tucson, AZ?

Project Objectives

The purpose of this QI project is to implement a program that provided education and training to nursing staff about how to properly intervene in IHCAs. In-situ mock code simulations are proven to improve patient outcomes and survival rates following IHCAs (Josey et al., 2018). These simulations have also been shown to improve the healthcare staff's confidence and performance while reducing anxiety regarding IHCAs (Herbers & Heaser, 2016). The first five minutes of an IHCA are crucial in improving survival rates. Therefore, education and training regarding the first five minutes of a code was implemented. The specific aims of this QI project are:

- Aim 1: Introduce a first five minute education program as an innovative educational session that is evidence-based and deemed effective.

- Aim 2: Educate and train nursing staff who voluntarily attend the mock code education regarding the critical interventions which should be performed during the first five minutes of an IHCA.
- Aim 3: Improve the confidence of nursing staff in performing the initial tasks required during an IHCA after the education provided during a first five minute program.

Theoretical Framework

Implementation of a first five minute mock code program requires guidance from theory in order to provide successful teaching strategies which will engage adults in this education. The adult learning theory is a cognitive learning theory which explains educational and learning methods in which adults respond most effectively (Merriam, 2018). This theory was developed by Malcolm Knowles in 1968 and is also known as andragogy. There are five key assumptions which include: (1) self-concept, (2) adult learner experience, (3) readiness to learn, (4) orientation of learning, and (5) motivation to learn.

In order to use the adult learning theory (ALT) for the implementation of IHCAs, the five key assumptions should be assessed and met (Merriam, 2018). Initially, self-concept of the adult learners should be evaluated. Adults prefer a more independent and self-directed approach to learning. In order to incorporate this key assumption, the first five minute program should be directed more by the participants which allows for individual growth. This will be a hands-on program as opposed to a lecture which allows for more independent contribution and variation. Secondly, the adult learner experiences should be assessed. Each participant will have diverse experiences, backgrounds, and knowledge of IHCAs. These experiences and knowledge may be

shared among the group to help further the overall educational goals of this mock code program. Thirdly, the readiness to learn of the participants is imperative. Adults are more inclined to participate in learning experiences when they are directed towards growth and improvement of the individual and their work. The participants must understand the ultimate goal of this mock code program is to improve the nursing staff's confidence and knowledge regarding IHCAs which may lead to enhanced patient outcomes following an IHCA. The motivation of enrolling in this educational opportunity is to enhance the nursing staff's individual knowledge which will allow them to act as a cohesive team during critical emergencies. This leads into the fourth key concept which is orientation of learning. Adults desire learning opportunities which are applicable to their occupation and are valuable. This first five minute program includes practical and nurse-centered interventions which will help improve nursing staff's confidence and knowledge regarding one of the most critical emergencies which occur in the hospital setting. Lastly, adults are intrinsically motivated to learn by various components which are not solely limited to monetary compensation. For example, adults may be motivated to learn by individual self-esteem, personal growth and development, and the motivation as a healthcare worker; to help improve patient outcomes and give patients the highest chance of survival. This motivation may help encourage nursing staff to enroll in this educational opportunity. The adult learning theory will use a cognitive and humanistic approach to guide the first five minute program by implementing and emphasizing the most highly regarded components of adult learning.

Literature Synthesis

Evidence Search

A literature review was conducted surrounding cardiopulmonary arrests and mock code blue education and implementation. A literature grid was created (Appendix G). The databases included PubMed and Cumulative Index of Nursing and Allied Health Literature (CINAHL). The advanced search method was utilized, and the following key terms were searched including: "in-hospital cardiopulmonary arrest," "mock code blue," "mock code blue education," "CPR," "ACLS," "BLS," and "cardiopulmonary arrest guidelines." This search yielded 2,212 articles. The search was modified to include articles which were published in English within the last five years. However, by sorting through these articles and examining their titles and abstracts, many were identified as non-applicable to the direction of this study. Articles which included out-of-hospital cardiac arrests or cardiac arrests among pediatric patients were excluded. Therefore, 13 of these articles were deemed applicable due to the evidence they provided surrounding IHCAs and the implementation of mock code programs to enhance the confidence, knowledge, and performance of healthcare workers.

Comprehensive Appraisal of Evidence

The literature supports the AHA's guidelines which aim to improve survival from cardiac arrests (AHA, 2021). These clinical guidelines are targeted at promoting the adoption of mock code training programs which incorporate aspects of ACLS and BLS outlined by AHA, thus providing a culture of action through mock code training (AHA, 2021; Au et al., 2019; Clark et al., 2019; Honarmand et al., 2018; Merchant et al., 2020). The research indicates that mock code blue training programs may improve patient outcomes due to a timelier implementation of

lifesaving measures following the early identification of a cardiac arrest (Bircher et al., 2019; Herbers & Heaser, 2016; Josey et al., 2018; Wise et al., 2020). This research also demonstrates that mock code education allows the information taught in traditional ACLS/BLS classes to be practiced in a hands-on simulation which may result in improved staff confidence and knowledge in responding to an IHCA (Au et al., 2019; Clarke et al., 2019; McPhee, 2018; Munezero et al., 2018; Nascimento et al., 2020; Williams et al., 2016).

Strengths of Evidence

A strength present among most of the studies is that the AHA's guidelines which were developed for cardiopulmonary arrest were utilized (Au et al., 2019; Clarke et al., 2019; Herbers & Heaser, 2016; Honarmand et al., 2018; Josey et al., 2018; McPhee, 2018; Merchant et al., 2020; Williams et al., 2016; Wise et al., 2020). Because the ACLS and BLS guidelines outlined by the AHA (2021) were the underlying strategies driving these studies, the information may be more generalizable because these same guidelines are recommended nationally. Prospective studies were included in this evidence appraisal which provide information over a long period of time. Bircher et al. (2019) was performed over a nine-year time period while Clarke et al. (2018) was performed over a three-year time period. This allowed for a plethora of information and a large sample size. Au et al. (2019) and Nascimento et al. (2020) are systematic reviews of randomized controlled trials providing a very high level of evidence contributing to the overall strength of this evidence appraisal.

Weaknesses of Evidence

A weakness is that many studies in this literature search were QI projects with small sample sizes (Herbers & Heaser, 2016; McPhee, 2018; Wise et al., 2020). Small sample sizes

were a common weakness among other studies, which were not QI projects, including Au et al. (2019) and Munezero et al. (2018). Results from studies with small sample sizes may reduce internal and external validity thus reducing the statistical significance of the results.

Gaps and Limitations

A limitation includes the lack of theoretical framework discussed in the studies. One systematic review actually included theoretical reflections as part of the exclusion criteria for study selection (Nascimento et al., 2020). In the three retrospective studies, data sources were a limitation. Data came only from resuscitation records, notes from the healthcare staff, and administrative data regarding the events as opposed to obtaining this information in real time (Honarmand et al., 2018; Josey et al., 2018; Merchant et al., 2020). Information can be missed when performing retrospective analyses because the researchers are limited by another individual's report as opposed to being able to inquire about the process themselves. Another limitation among four other studies is the lack of accounting for varied experiences among healthcare staff in responding to codes (Au et al., 2019; Clarke et al., 2019; Herbers & Heaser, 2016; Williams et al., 2016). This is a confounding variable which is not accounted for or measured. These studies evaluated the performance of the group rather than the performance of the individual person and therefore did not account for any effect of those who may have participated in multiple codes in the past.

A gap in the studies is due to the fact that some studies were directed towards medical/surgical units as opposed to intensive care units (ICUs) or emergency departments (EDs) (Honarmand et al., 2018; Wise et al., 2020). Therefore, some retrospective studies did not incorporate results from units where IHCAs may be seen more frequently. Although, healthcare

staff on these units tend to have more experience in responding to IHCAs and are thus more knowledgeable and prepared, information should still be obtained from IHCAs on these units to differentiate the patient outcomes due to varying levels of knowledge. Honarmand et al. (2018) also discussed the need for the evaluation of pre- and post-cardiac arrest care which may establish further areas for research and more opportunities for improvement in patient outcomes. Another gap in research is that the mock codes mentioned in this evidence synthesis are focused heavily on the role of the nursing staff. Adding emphasis on the role of the respiratory therapist, pharmacist, and provider should be included as well. Research surrounding mock code implementation for other disciplines in the hospital would be beneficial to the overall evidence regarding mock codes.

METHODS

Project Design

The first five minute program is a QI project aimed at implementing education and training for nursing staff regarding proper interventions during an IHCA at NWMC in Tucson, AZ. This project specifically focuses on important tasks which should be performed within the first five minutes of an IHCA. The AHA's (2021) recommendations regarding ACLS and BLS are the underlying guidelines which guided this QI project. A pretest/posttest design was used to measure the confidence of nursing staff in performing specific interventions required during an IHCA.

Prior to the in-person educational session, the participants completed a pretest questionnaire. This questionnaire assessed the baseline confidence of the nursing staff in performing specific interventions during an ICHA. The specific questions on this survey were

developed by the project coordinator with guidance from previous research (Wise et al., 2020) and the AHA's (2021) resuscitation guidelines. The participants then attended the in-person educational session regarding IHCA. During this time, the project coordinator discussed and demonstrated the imperative tasks which should be performed during the first five minutes of an IHCA. At the end of the session, the participants were able to practice these hands-on-skills. After the educational session, the participants were given a posttest questionnaire which was identical to the pretest questionnaire. These survey responses were used to provide an analysis about whether the first five minute educational program was effective in helping nursing staff feel more confident in performing specific tasks required during an IHCA.

Model for Implementation

QI projects are often guided by the Model for Improvement (MFI) which was developed by Associates in Process Improvement (Institute for Healthcare Improvement [IHI], 2022a). QI projects aim to improve the safety, efficacy, and efficiency of different aspects of healthcare. This change model focuses on guiding the planning, implementation, and eventual adoption of proposed improvements into practice. The MFI assesses components of QI projects such as what it is that is going to be accomplished, how we will know that a change has resulted in an improvement, and if that change has not resulted in improvement, what can we alter to ensure that it does. By utilizing the MFI in relationship to the first five minute program, the expected goal was to improve the confidence of nursing staff in responding to IHCAs. To ensure that the change has resulted in improvement, the pretests were compared to the posttests. The expected improvement was that the nursing staff feels more confident in performing tasks specific to an IHCA after the implementation of the first five minute program.

Plan-Do-Study-Act (PDSA) Cycle

The PDSA cycle is a tool developed by the IHI (2022b) which is utilized to evaluate change and provide modifications which may allow for the most successful adoption of a QI project. This tool tests a proposed change or QI project by establishing a plan to test the change (plan), implementing the proposed change (do), evaluating and assessing the results of the change (study), and determining which adjustments should be made to further enhance the success of implementation and adoption of the change into practice (act) (Figure 1). The PDSA cycle uses a structured approach to evaluating QI projects on a smaller scale with the ultimate goal of adopting and implementing the interventions on a larger scale with more profound outcomes.

Plan

The initial phase of the PDSA cycle is planning (IHI, 2022b). This phase requires detail-oriented preparation and project development to ensure for successful implementation of the QI project. During this phase, the project coordinator informed and gained approval from necessary personnel in the hospital to implement this project. The project coordinator consulted with the director of nursing, chief nursing officer, and chief executive officer at NWMC to gain support for the implementation of an educational mock code program. The project coordinator also developed the specific teaching and assessment tools which were implemented during the first five minute educational session. The ACLS and BLS guidelines outlined by the AHA (2021) were used to guide the teaching points. The project coordinator developed the pretest and posttest questionnaires based on the important teaching points established by the guidelines. One demographic question was included which inquired about years of experience in healthcare. The

project coordinator coordinated with the unit educators to determine the most convenient time, place, and dates for the program implementation. Finally, the project coordinator posted fliers to inform the staff of this voluntary educational opportunity.

Do

The second phase of the PDSA cycle is when the change is actually implemented and data is collected (IHI, 2022b). During this phase, the project coordinator actually executed the first five minute program. A disclosure form, pretest, educational seminar, and a posttest were given to the participants. The project coordinator evaluated any challenges or unexpected events during the project's implementation. This led into the third step in the PDSA cycle where these challenges were studied and resolved to ensure optimal usability.

Study

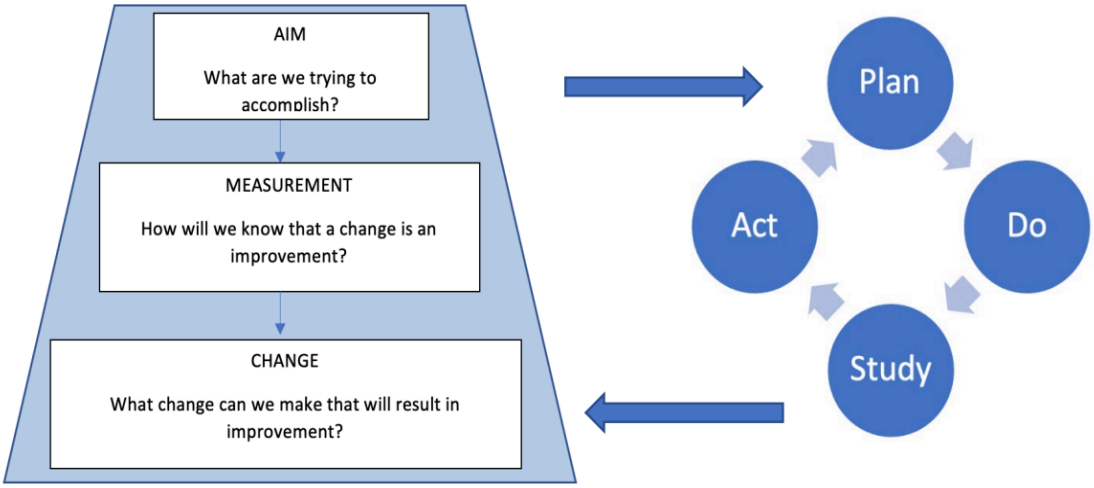
The third phase of the PDSA cycle involves studying the results and data to determine how effectively the program met its objectives and aims (IHI, 2022b). The pretest and posttest scores were evaluated to conclude if the program did in fact improve nursing staff's confidence in performing specific tasks of IHCAs. A data analysis was performed using a visual graph to summarize the findings. In appraising the results, the project coordinator may also find that the years of experience of the participants may have an impact on the results. A summary of the findings was established by the project coordinator and presented to the project committee members and the unit educators to prompt a constructive conversation and reflection of the results.

Act

The final phase of the PDSA cycle is act which involves incorporating the results from the QI project and modifying the interventions in order for the project to be sustainable and applicable to practice (IHI, 2022b). Initially, the first five minute program must be evaluated to ensure it was successful in improving nursing staff's confidence in responding to IHCAs and performing the associated tasks during the first five minutes of an IHCA. If the project is deemed successful in achieving its intended goals, the project coordinator will discuss further implementation and utilization of this program within this facility and also outside of this facility at NWMC's sister hospitals. If the project is not successful in achieving its intended goals, the project team will develop modifications in order to make the program more effective. Once these modifications are made, a new PDSA cycle will be initiated in order to successfully increase the confidence of nursing staff in responding to IHCAs.

Figure 1

The Model for Improvement



(Adapted from *Model for Improvement*, by the Institute for Healthcare Improvement, retrieved from http://www.ihi.org/resources/Pages/HowtoImprove/default.aspx, Copyright 2022).

Setting and Stakeholders

The setting of this project was at Northwest Medical Center in Tucson, AZ. NWMC is a 300-bed acute care hospital that specializes in emergency services, strokes, bariatrics, neurology, neurosurgery, and heart failure (Northwest Healthcare, 2022). The team at NWMC is committed to providing safe and quality care. However, prior to implementation of the first five minute program at this facility, NWMC did not have mock code education or a mock code program. There are multiple different units within the hospital, all of which have a unit educator. The unit educators were huge facilitators in the launch of this QI project. The participants in which this project was targeted towards included nursing staff (registered nurses and nurse technicians). There were fliers posted around NWMC to disseminate information about the first five minute program in order to recruit participants. The data was collected in a teaching room set up appropriately for a mock code. This room was a non-occupied patient room which includes a bed with a mannequin designed for mock code practice, a code blue button on the wall, and a code cart. NWMC was the setting for recruitment as well as data collection.

The director of nursing, chief nursing officer, and chief executive officer provided verbal authorization for the implementation of this project at NWMC. The director of nursing/chief nursing officer provided written consent (Appendix A). The key stakeholders of this project included the patients, nursing staff (registered nurses & nurse technicians), unit educators, and unit directors. The nursing staff were primary stakeholders as they are the individuals who will actually receive the educational material surrounding IHCAs. The support, buy-in, and approval of members of NWMC who were in management, education, and supervising roles was imperative for the successful implementation of this project. The unit educators were pivotal to

this project as they helped in spreading the information about this educational opportunity to their staff and actually attended the educational sessions themselves. The educators planned to attend the sessions so that if this QI project was successful in achieving its goals, they may implement this educational opportunity at NWMC going forward. The educators were also present for additional questions or concerns by the nursing staff. The patients were considered stakeholders because the end goal from implementing this project was to improve patient outcomes following IHCAs.

Planning the Intervention

The QI project intervention was focused around educating nursing staff on which tasks should be performed within the first five minutes of an IHCA and how to perform those tasks. The director of nursing, unit directors, unit educators, and nursing staff were notified of the intended educational sessions via a flier posted around NWMC by the project coordinator (Appendix C). The flier explained what the project involved, including a pretest, an educational session with hands-on learning, and a posttest. The flier also included an estimated time required for the educational session along with dates, times, and locations in which the session was held. There was one total session completed.

Once the participants arrived at the educational session, they were given a disclosure form for the QI project which further described details of participation (Appendix B). After viewing the disclosure form, the participants were asked to complete the pretest. The project coordinator provided them with a paper copy of the pretest and posttest which were stapled together. Participants were encouraged to be as honest as possible with their answers as the answers are kept anonymous. The first question was about demographics, asking the years of

experience of the participant. The following questions were all related to initial tasks which should be completed within the first five minutes of an IHCA (Appendix D). The questions were formatted for the participant to select their confidence in performing specific tasks on a scale of 1-5. Once the participants completed the initial pretest, the project coordinator began the educational session.

The project coordinator started the session by discussing why rapid recognition and intervention during an IHCA is so crucial (Bircher et al., 2019; Josey et al., 2018). ACLS and BLS guidelines outlined by the AHA (2021) were discussed as the underlying recommendations driving this educational session. These guidelines serve as a national standard for IHCAs, and mock code programs help support the solidification of these skills (Clark et al., 2019). The project coordinator discussed important steps which must be taken during the first five minutes of an IHCA (Appendix E). These tasks included calling a code, responding to a code, understanding designed code team roles, backboard placement, chest compressions, BVM ventilation, locating items within the code cart, applying defibrillator pads and cardiac leads, turning on the defibrillator, delivering a synchronized defibrillation to the patient, understanding which rhythms are shockable versus non-shockable, and code documentation. Many of these tasks pertinent to the first five minutes of a code are outlined by Wise et al. (2020) in their study focused on the AHA's "Get With the Guidelines" recommendations. The participants were educated about specific roles of each individual during an IHCA which may help aide in the organization and efficiency of the code team (Appendix E). After the education was complete regarding these topics, the participants had an opportunity to perform hands-on practice of these skills. The participants were free to ask any questions they may have had.

After implementation of the educational and hands-on portion of the project, the participants were asked to complete a posttest. The posttests were provided as a printed copy which were stapled to the participants' pretest. Again, the participants were encouraged to be as honest as possible with their answers. The posttest was identical to the pretest (Appendix D). The responses were analyzed by the project coordinator.

Participants and Recruitment

In order to be considered a participant in this QI project, the individual must have been an employee of NWMC and a member of the nursing staff at the time of implementation. Nursing staff includes registered nurses and nurse technicians. This program may be beneficial to respiratory therapists, pharmacists, pharmacy technicians, and advanced practice providers but the education delivered in this project was primarily directed towards nursing staff. The participants voluntarily consented to attending the educational session and receiving the educational material. Because the project was implemented on a small scale and the project was strictly educational, the exclusion criteria was limited. Convenience sampling was used to recruit participants for this QI project. Convenience sampling, also known as haphazard sampling or accidental sampling, is non-random and is based on practicality (Etikan et al., 2016). Participants were recruited and included in the study based on their accessibility and desire to participate. Participants were recruited through fliers posted around NWMC (Appendix C). Participation in the first five minute program was completely voluntary for educational purposes. The sample size goal was to have at least 15 members of nursing staff participate in the project.

Consent and Ethical Considerations

Ethical considerations must be accounted for when performing scientific research in order to protect the participants' rights. The project coordinator developed a program which maximizes benefits and minimizes harm (Office of Extramural Research [OHRP], 2018). This is one complementary expression of beneficent actions. Beneficence is an ethical consideration which ensures that the project will "do no harm." This project included multiple stages prior to implementation which helped ensure beneficence. The project was reviewed by the Institutional Review Board (IRB) at the University of Arizona. The IRB provided protection for human research participants by guaranteeing that the project aligns with ethical standards and guidelines (Grady, 2015). Once approval was obtained from the IRB, then implementation of the project was able to proceed (Appendix A).

Prior to participants engaging in the educational session about IHCAs, the disclosure form was reviewed by each participant (Appendix B). This document informed the participant that their participation in the QI project was completely voluntary and if they chose to refuse participation, they may do so at any time. No risks of participating in this QI project were identified. The benefits included advancing the nursing staff's knowledge by understanding necessary interventions required during the first five minutes of an IHCA thus increasing confidence in being an active member of the code team during an IHCA. To ensure participant privacy, the pretest and posttest results remained anonymous, and the information gathered from the surveys were properly stored. The content provided in the educational session was based on current cardiopulmonary arrest evidence and guidelines. This content was delivered in an appropriate and professional manner.

Timeline

A timeline (Appendix F) was developed to ensure proper progression of the QI project. Adjustments were made to the timeline dates and progress based on approvals received by the University of Arizona College of Nursing, the IRB, and project implementation.

Data Collection

The pretests and posttests were created using google docs and were printed for dissemination during the project implementation. The pretests and posttests were stapled together to ensure the same participant completed both parts of the evaluation. There were no participant identifiers required for the tests and thus the results remained anonymous. The test results were accessed by only the project coordinator.

Many of the pretest and posttest questions were adapted from a study by Wise et al. (2020). Wise et al. (2020) performed a QI project surrounding interventions which should be performed during the first five minutes of an IHCA. Therefore, questions were based on specific interventions derived from this study with the addition of others developed by the project coordinator. The pretest and posttest were identical. Three doctoral-prepared nurse practitioner specialists reviewed the surveys to ensure accuracy and reliability. The tests included a demographic question about the years of experience of the participant. This was a fill-in-the-blank question. The remaining questions used a Likert scale response format to assess the participants' confidence levels in performing tasks specific to the first five minutes of an IHCA (Appendix D). These tasks included calling a code, responding to a code, understanding designed code team roles, backboard placement, chest compressions, BVM ventilation, locating items within the code cart, applying defibrillator pads and cardiac leads, turning on the defibrillator,

delivering a synchronized defibrillation to the patient, understanding which rhythms are shockable versus non-shockable, and code documentation. A five-point Likert scale was used allowing the participants to state the degree of confidence in performing each task. The responses included "5 = strongly agree," "4 = agree," "3 = neither agree or disagree," "2 = disagree," and "1 = strongly disagree." The results of the pretest were compared to the results of the posttest. The tests each contained 13 questions with one fill-in-the-blank question and 12 Likert scale response formatted questions. The maximum score was 60 indicating a highly confident participant. The minimum score was 12 indicating a highly unconfident participant.

Data Analysis

The pretests and posttests were analyzed using descriptive statistics. The results depicting the confidence levels of the nursing staff regarding each task was represented through a bar chart. The data from the printed pretests and posttests were inputted into an Excel document which was saved on a password-protected computer. The Likert scale style questions were analyzed as ordinal data based on the level of confidence the participant reported. The scores of the pretest and posttest reflect the following meanings: "5 = strongly agree," "4 = agree," "3 = neither agree or disagree," "2 = disagree," and "1 = strongly disagree." The mean scores among 18 participants were calculated for each question. In order to compare the scores, a bar graph was depicted to show the mean scores for each question for both the pretest and posttest. Another bar graph showed the change in mean scores from pretest to posttest for each question. In addition to this evaluation, a question on the pretest and posttest asked how many years of experience each participant had in their current role. These results were evaluated by determining the mean and standard deviation of that data set.

RESULTS

The project coordinator held a session at NWMC on August 29, 2022. There were a total of 18 participants who attended this educational session. The sample size goal for this QI project was 15 and therefore the project coordinator was highly satisfied with the number of participants who attended this session. All 18 participants completed the pretest, educational session with hands-on learning, and posttest. The results regarding the confidence levels of the nursing staff will be discussed in depth.

Sample Size and Demographics

A total of 18 members of NWMC's nursing staff completed the pretest, in-person educational session with hands-on learning, and the posttest. There was one demographic question included in both the pretest and posttest regarding the years of experience of the participant. Many individuals answered this question using months of experience as notably many of these participants were new graduate registered nurses. The mean number of months of experience of the participants was 16.28 months with a standard deviation of 29.43 months. This indicated a high variation in the level of experience of each participant. The least amount of experience among the participants in their current roles was noted to be one month. The most amount of experience among participants in their current roles was 120 months.

Outcomes

The pretest and posttest both included 12 identical Likert scale questions. Each question was used to evaluate the confidence level of the participant in performing specific tasks which should be completed during the first five minutes of an IHCA. The questions were assessed using a five-point Likert scale. The responses included "5 = strongly agree," "4 = agree," "3 = neither

agree or disagree," "2 = disagree," and "1 = strongly disagree." The results of the pretests and posttests were analyzed by the project coordinator. The mean score for each question was calculated and verified using Excel. The mean scores from the pretest and posttest were evaluated for each question using a bar graph (Figure 2). The change in mean score from pretest to posttest was demonstrated using a bar graph as well (Figure 3).

Calling a Code

The first question stated, "I feel confident in knowing when to call a code." The participants answered using the Likert scale. The responses included "5 = strongly agree," "4 = agree," "3 = neither agree or disagree," "2 = disagree," and "1 = strongly disagree." The mean pretest score was 3.44 and the mean posttest score was 4.33 (Figure 2). This showed a 0.89 increase in mean confidence level from pretest to posttest (Figure 3). Every participant's confidence level either stayed the same or increased after the educational session and hands-on learning.

Responding to a Code

The second question stated, "I feel confident responding to a code." The participants answered using the Likert scale. The responses included "5 = strongly agree," "4 = agree," "3 = neither agree or disagree," "2 = disagree," and "1 = strongly disagree." The mean pretest score was 2.56 and the mean posttest score was 3.39 (Figure 2). This showed a 0.83 increase in mean confidence level from pretest to posttest (Figure 3). Every participant's confidence level either stayed the same or increased after the educational session and hands-on learning.

Figure 2

Mean Confidence Levels Among 18 Participants: Comparison of Pretest and Posttest Scores

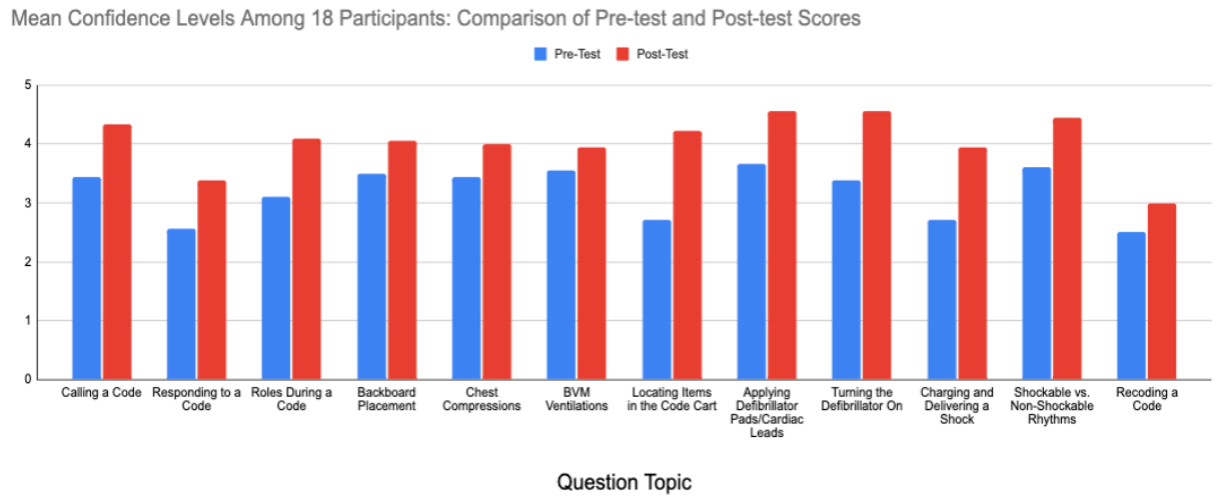
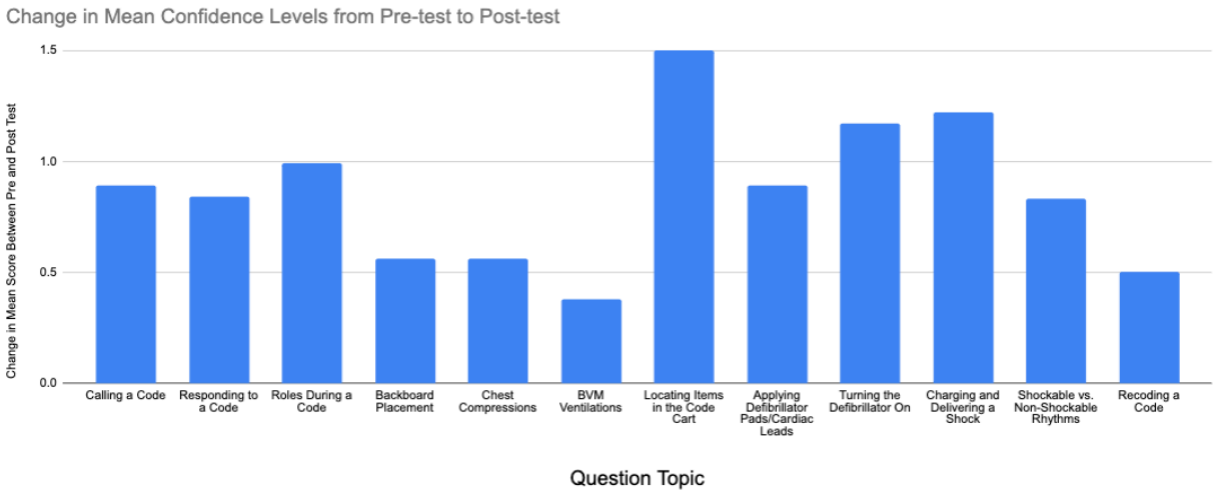


Figure 3

Change in Mean Confidence Levels from Pretest to Posttest



Roles During a Code

The third question stated, “I feel confident knowing the designated roles of each member of the code team.” The participants answered using the Likert scale. The responses included “5 = strongly agree,” “4 = agree,” “3 = neither agree or disagree,” “2 = disagree,” and “1 = strongly disagree.” The mean pretest score was 3.11 and the mean posttest score was 4.1 (Figure 2). This showed a 0.99 increase in mean confidence level from pretest to posttest (Figure 3). Every participant’s confidence level either stayed the same or increased after the educational session and hands-on learning.

Backboard Placement

The fourth question stated, “I feel confident placing a backboard behind the patient.” The participants answered using the Likert scale. The responses included “5 = strongly agree,” “4 = agree,” “3 = neither agree or disagree,” “2 = disagree,” and “1 = strongly disagree.” The mean pretest score was 3.5 and the mean posttest score was 4.06 (Figure 2). This showed a 0.56 increase in mean confidence level from pretest to posttest (Figure 3). Every participant’s confidence level either stayed the same or increased after the educational session and hands-on learning.

Chest Compressions

The fifth question stated, “I feel confident performing chest compressions.” The participants answered using the Likert scale. The responses included “5 = strongly agree,” “4 = agree,” “3 = neither agree or disagree,” “2 = disagree,” and “1 = strongly disagree.” The mean pretest score was 3.44 and the mean posttest score was ‘4’ (Figure 2). This showed a 0.56 increase in mean confidence level from pretest to posttest (Figure 3). Every participant’s

confidence level either stayed the same or increased after the educational session and hands-on learning.

Bag-Valve Mask Ventilations

The sixth question stated, “I feel confident delivering ventilations via bag-valve mask.” The participants answered using the Likert scale The responses included “5 = strongly agree,” “4 = agree,” “3 = neither agree or disagree,” “2 = disagree,” and “1 = strongly disagree.” The mean pretest score was 3.56 and the mean posttest score was 3.94 (Figure 2). This showed a 0.38 increase in mean confidence level from pretest to posttest (Figure 3). Every participant’s confidence level either stayed the same or increased after the educational session and hands-on learning.

Locating Items in the Code Cart

The seventh question stated, “I feel confident finding an ambu bag, medications, endotracheal tubes, and defibrillator pads on the code cart.” The participants answered using the Likert scale. The responses included “5 = strongly agree,” “4 = agree,” “3 = neither agree or disagree,” “2 = disagree,” and “1 = strongly disagree.” The mean pretest score was 2.72 and the mean posttest score was 4.22 (Figure 2). This showed a 1.5 increase in mean confidence level from pretest to posttest (Figure 3). Every participant’s confidence level either stayed the same or increased after the educational session and hands-on learning.

Applying Defibrillator Pads and Cardiac Leads

The eighth question stated, “I feel confident placing the defibrillator pads and cardiac leads in the correct location on the patient.” The participants answered using the Likert scale. The responses included “5 = strongly agree,” “4 = agree,” “3 = neither agree or disagree,” “2 =

disagree," and "1 = strongly disagree." The mean pretest score was 3.67 and the mean posttest score was 4.56 (Figure 2). This showed a 0.89 increase in mean confidence level from pretest to posttest (Figure 3). Every participant's confidence level either stayed the same or increased after the educational session and hands-on learning.

Turning the Defibrillator On

The ninth question stated, "I feel confident turning on the defibrillator." The participants answered using the Likert scale. The responses included "5 = strongly agree," "4 = agree," "3 = neither agree or disagree," "2 = disagree," and "1 = strongly disagree." The mean pretest score was 3.39 and the mean posttest score was 4.56 (Figure 2). This showed a 1.17 increase in mean confidence level from pretest to posttest (Figure 3). Every participant's confidence level either stayed the same or increased after the educational session and hands-on learning.

Charging and Delivering a Shock

The tenth question stated, "I feel confident charging and delivering a synchronized shock to a patient." The participants answered using the Likert scale. The responses included "5 = strongly agree," "4 = agree," "3 = neither agree or disagree," "2 = disagree," and "1 = strongly disagree." The mean pretest score was 2.72 and the mean posttest score was 3.94 (Figure 2). This showed a 1.22 increase in mean confidence level from pretest to posttest (Figure 3). Every participant's confidence level either stayed the same or increased after the educational session and hands-on learning.

Shockable Versus Non-Shockable Rhythms

The eleventh question stated, "I feel confident knowing which rhythms are shockable versus non-shockable." The participants answered using the Likert scale. The responses included

"5 = strongly agree," "4 = agree," "3 = neither agree or disagree," "2 = disagree," and "1 = strongly disagree." The mean pretest score was 3.61 and the mean posttest score was 4.44 (Figure 2). This showed a 0.83 increase in mean confidence level from pretest to posttest (Figure 3). Every participant's confidence level either stayed the same or increased after the educational session and hands-on learning.

Recording a Code

The twelfth and final question stated, "I feel confident recording a code." The participants answered using the Likert scale. The responses included "5 = strongly agree," "4 = agree," "3 = neither agree or disagree," "2 = disagree," and "1 = strongly disagree." The mean pretest score was 2.5 and the mean posttest score was '3' (Figure 2). This showed a 0.5 increase in mean confidence level from pretest to posttest (Figure 3). When analyzing the results to this final question, the project coordinator noted that two participants actually decreased their confidence levels from the pretest to the posttest. Otherwise, every other participant's confidence level either stayed the same or increased after the educational session and hands-on learning.

DISCUSSION

Summary

Cardiopulmonary arrests are medical emergencies which should be addressed with knowledge, competency, and skill. All nursing staff at NWMC are required to be BLS certified, and some nursing staff are required to be ACLS certified. Unfortunately, if the skills learned during these training courses are not practiced frequently, the knowledge gained from these trainings may deteriorate within two weeks (Herbers & Heaser, 2016). Therefore, the AHA (2021) recommends code blue education and implementation to help improve patient outcomes

after IHCAs. Mock codes have been shown to improve staff confidence, reduce staff anxiety, and enhance skill sets of members for the healthcare team.

The primary objective of this QI project was to educate the nursing staff at NWMC regarding crucial tasks which should be performed during the first five minutes of an IHCA. The intended outcome was to increase the nursing staff's confidence in performing these specific tasks. The findings support that implementing the first five minute program does increase nursing staff's confidence in performing critical tasks during an IHCA.

Interpretation

In order to analyze the results of the initial demographic question which inquired about years of experience of each participant, the mean and standard deviation were calculated. The results were reported in months as many participants had listed months of experience. The results showed a mean of 16.28 months with a standard deviation of 29.43 months. These results indicated a high variation in the level of experience of each participant. The least amount of experience was one month and the most was 120 months. This variation was beneficial as there were participants with differing levels of experience. This may have allowed for the sharing of ideas and knowledge based upon each participant's diverse background. This supports Malcolm Knowles' adult learner experience assumption of the adult learning theory (Merriam, 2018).

The following 12 questions on the pretest and posttest were evaluated as Likert style questions. Again, the responses included "5 = strongly agree," "4 = agree," "3 = neither agree or disagree," "2 = disagree," and "1 = strongly disagree." The mean confidence level which was shown to improve the most after the educational session was locating items in the code cart. This task, in addition to turning on the defibrillator and charging/delivering a shock from the

defibrillator, all increased in mean confidence levels by over one whole point. The mean confidence level which improved the least after the educational session was BVM ventilations. Properly recording a code was the second lowest improvement in mean confidence level after the educational session. This was the only question where two participants actually reported that their confidence in performing the task decreased after receiving the education and training on the specific task. The participants' scores either stayed the same or increased for all other questions. This may be due to the density of the code sheets when having not been exposed to them previously. The participants may have thought recording a code was simple but may have been intimidated by the complexity of the code documentation sheet.

Overall, there was an increase in mean confidence levels from pretest to posttest for every question. Therefore, the first five minute program was shown to be effective in improving nursing staff's confidence in performing each task evaluated by this QI project. These tasks included calling a code, responding to a code, understanding designed code team roles, backboard placement, chest compressions, BVM ventilation, locating items within the code cart, applying defibrillator pads and cardiac leads, turning on the defibrillator, delivering a synchronized defibrillation to the patient, understanding which rhythms are shockable versus non-shockable, and code documentation.

Implications

Practice

This QI project was centered around crucial tasks which should be performed within the first five minutes of an IHCA. This project demonstrates that the first five minute program is a valuable educational session which can increase nursing staff's confidence in performing

specific critical tasks during a cardiopulmonary arrest. All nursing staff at NWMC should be educated through the first five minute program to help improve their confidence in responding to IHCAs. This program should be a requirement of all nursing staff who are already employed by NWMC. Also, new nursing staff should be educated using this program during orientation to the hospital. This program may be implemented and easily expanded within the hospital setting. The implementation of this program may allow for improved outcomes after IHCA.

Education

This QI project includes pertinent education related to cardiopulmonary arrest interventions. This project may be further disseminated through the educators at NWMC. The educators of the intensive care unit were present during the presentation of the first five minute program and were highly impressed with the results. The educators plan to continue this program with all nursing staff, especially with the new graduates. This program may allow for further educational development regarding mock cardiopulmonary arrests at NWMC. For example, this may facilitate the formation of an official mock code team and implementation of formal mock codes at NWMC. The AHA (2021) recommends mock cardiopulmonary arrest education and implementation as it has been shown to improve outcomes and survival rates of IHCAs. Mock code training in addition to the first five minute program may further improve staff confidence, reduce staff anxiety, and enhance skill sets for the healthcare team during an IHCA (Herbers & Heaser, 2016).

Research

This project found that the first five minute program was effective in improving the nursing staff's confidence in responding to IHCAs. Future research may be tailored to other

members of the healthcare team who are pertinent to the success of an IHCA. For example, a first five minute program could be developed for respiratory personnel or pharmacy staff to help improve the confidence levels of these interdisciplinary teams in their roles during an IHCA.

Policy

Currently, there is no policy at NWMC regarding mock code blue implementation and education. However, after discussing the results of the first five minute program with the unit educators, a decision was made to change requirements of each member of the nursing staff. Moving forward, the educators will require each new employee (seasoned & new graduates) to attend the first five minute educational session. The educators are also going to require each member of the current nursing staff to attend a station at the NWMC's skill's fair in October to obtain this education as well. Therefore, by the end of October 2022, each member of NWMC's nursing staff will be trained in how to perform the crucial steps which should be completed within the first five minutes of an IHCA by utilizing the components of this QI project. The components of the skill's fair education will be further discussed in depth in the dissemination section

Limitations

The main limitation the project coordinator encountered was time restriction. Because of the need to complete this QI project in a timely fashion, there were less opportunities to continue implementing this project and obtaining results from more participants. The sample size goal was 15 participants, and the actual sample size was 18. Therefore, there were a sufficient number of participants. However, a longer period of time to perform this QI project would have allowed the project coordinator to implement more first five minute program sessions and collect more data.

DNP Essentials Addressed

The Doctor of Nursing Practice (DNP) Essentials are foundational competencies which advanced nursing practice roles are based upon (American Association of Colleges of Nursing [AACN], 2006). These eight DNP Essentials are at the core of doctoral prepared advanced practice nurses (APRN). Among these eight DNP Essentials, this DNP project addressed three of them: DNP Essential III, DNP Essential V, and DNP Essential VIII. DNP Essential III, or Clinical Scholarship and Analytical Methods for Evidence-Based Practice, was addressed in this QI project as it involved the translation of evidence-based findings into practice by distributing and incorporating new knowledge. The project coordinator was able to appraise evidence surrounding IHCAs to determine the best evidence to implement into practice. Essential V, or Health Care Policy for Advocacy in Health Care, was addressed in this QI project as the initiation of a first five minute program led to the formation of a preliminary mock code team at NWMC. This project helped advocate for an official code committee at NWMC which aims to improve health care delivery and patient outcomes. Lastly, DNP Essential VIII, or Advanced Nursing Practice, was addressed through this QI project because this project was aimed at supporting and guiding other nurses to achieve excellence in nursing practice. During an IHCA, nurses must demonstrate an advanced level of accountability. Therefore, the first five minute program was implemented using evidence-based care to educate nurses with the ultimate goal of improved patient outcomes.

Conclusions

The first five minute program is an educational mock code session used to teach nursing staff about the crucial tasks which should be performed during the first five minutes of an IHCA.

The educational session was delivered in person at NWMC. A total of 18 individuals voluntarily participated in the first five minute program. After analyzing the results, the first five minute program was proved successful in improving nursing staff's confidence levels in performing specific critical tasks during an IHCA. These tasks included calling a code, responding to a code, understanding designed code team roles, backboard placement, chest compressions, BVM ventilation, locating items within the code cart, applying defibrillator pads and cardiac leads, turning on the defibrillator, delivering a synchronized defibrillation to the patient, understanding which rhythms are shockable versus non-shockable, and code documentation. Therefore, the first five minute program is an appropriate and effective intervention which may be used to educate and improve nursing staff's confidence in performing crucial tasks during an IHCA.

Plan for Sustainability

The sustainability of the first five minute program may be achieved through using the PDSA cycle (IHI, 2022b). This cycle is utilized to determine modifications which can be made to provide the most successful adoption of a QI project into practice. The final stage of the PDSA cycle is act which involves making certain modifications and developing a plan for sustainability if the project is deemed successful. As mentioned above, this QI project was shown to be effective in improving nursing staff's confidence in performing specific tasks during an IHCA. The only task in which two participants reported a decrease in confidence from pretest to posttest was recording a code. Therefore, the code recording education should be further developed. A suggestion to further this part of the educational session is to implement a true mock code and have each participant record the code using the code sheets. This may help improve the confidence levels of each participant in recording a code.

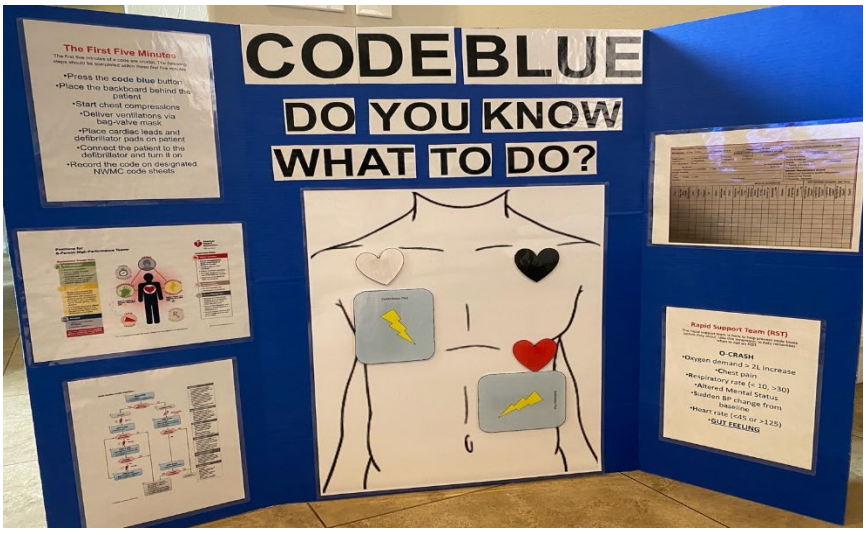
Plan for Dissemination

After discussing the results with the unit educators, they requested to obtain the educational material from the project coordinator so that they may implement this project at NWMC in the future. They found the information to be extremely beneficial, especially to the new graduate nurses who attended. The project coordinator suggested that this education be implemented as part of new employee orientation for both seasoned nursing staff and new graduates. The educators of each unit agreed with this suggestion and plan to use this program going forward.

The educators discussed the results of the first five minute program amongst themselves and determined that each member of the current nursing staff at NWMC should also obtain this pertinent education. Therefore, the unit educators requested that the project coordinator formulate a first five minute program poster that can be displayed at the annual skill's fair at NWMC (Figure 4).

Figure 4

First Five Minute Program Skill's Fair Poster



They requested that the poster contain the education provided during the first five minute program with some questions which may be used to evaluate the nursing staff's competency in completing this education. The skill's fair occurs at the end of October 2022. This is a method in which the first five minute program can be disseminated hospital wide. If there are positive results from this hospital-wide education, distribution of the first five minute program to NWMC's associated sister hospitals may be facilitated by the educators and chief nursing officer.

APPENDIX A:

NORTHWEST MEDICAL CENTER SITE APPROVAL LETTER / THE UNIVERSITY OF ARIZONA INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

Northwest Medical Center
6200 N. La Cholla Blvd.
Tucson, AZ 85741

April 20th, 2022

University of Arizona Institutional Review Board
c/o Office of Human Subjects
1618 E Helen St
Tucson, AZ 85721

Please note that Ms. Morgan Del Principe, UA Doctor of Nursing Practice student, has permission of Northwest Medical Center to conduct a quality improvement project at our facility for her project, "The First Five Minute Program Derived From Mock Cardiopulmonary Arrest Implementation."

Ms. Del Principe will conduct a survey of health care providers at Northwest Medical Center. She will recruit providers through posted fliers. The flier will provide a description of the project, what the participants will be asked to do, the time involved, and a date, time, and location for the educational seminar. Ms. Del Principe's activities will be completed by January 1st, 2023.

Ms. Del Principe has agreed to provide to my office a copy of the University of Arizona Determination before she recruits participants. She will also will present aggregate results to the providers at their monthly staff meeting.

If there are any questions, please contact my office.

Signed,

Northwest Medical Center
Interim Assistant Chief Nursing Officer/Director of Nursing

ANA E. POZIER, RN BSN
520.241.7226

THE UNIVERSITY OF ARIZONA
Research
Innovation & Impact

University of Arizona IRB
845 N Park Ave., Suite 537A
Tucson, AZ 85719
Fax: 520-621-9810
VPR-IRB@arizona.edu

NOT HUMAN RESEARCH

July 27, 2022

Morgan Del Principe

Dear Morgan Del Principe:

On 7/27/2022, the IRB reviewed the following submission:

Type of Review:	Initial Study
Title:	The First Five Minute Program Derived From Mock Cardiopulmonary Arrest Implementation
Investigator:	Morgan Del Principe
IRB Submission ID:	STUDY00001613
Sponsor:	None
Prime Sponsor:	None
IND, IDE, or HDE:	None
Documents Reviewed:	• Advisor Attestation.pdf, Category: Other; • IRB Data Collection Tools.docx, Category: Data Collection Tool; • IRB Educational Material.docx, Category: Participant Material; • IRB Participant Disclosure Form .pdf, Category: Consent Form; • IRB Protocol for Determination of Human Research_First Five Minute Program.docx, Category: IRB Protocol; • IRB Recruitment Material.docx, Category: Recruitment Materials; • IRB Site Authorization Letter.docx, Category: External Site Authorization;

The IRB determined that the proposed activity is not research involving human subjects as defined by DHHS and FDA regulations.

THE UNIVERSITY OF ARIZONA
Research
Innovation & Impact

University of Arizona IRB
845 N Park Ave., Suite 537A
Tucson, AZ 85719
Fax: 520-621-9810
VPR-IRB@arizona.edu

IRB review and approval by this organization 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 made and there are questions about whether these activities are research involving humans in which the organization is engaged, please submit a new request to the IRB for a determination. You can create a modification by clicking **Create Modification / CR** within the study.

All Covered Individuals must disclose all sponsored and non-sponsored Research Projects to the Office for Responsible Outside Interests (OROI) prior to Conducting Research if the individual is an Investigator. Please visit the OROI website for more information.

We value your feedback and would appreciate you taking the time to complete our survey about your experience with the IRB staff:
https://uarizona.co1.qualtrics.com/jfe/form/SV_ehQ04WxNA06b42i.

If questions arise at any time during your study, please email the general IRB inbox at VPR-IRB@arizona.edu.

APPENDIX B:

CONSENT DOCUMENT (DISCLOSURE FORM)

The First Five Minute Program Derived From Mock Cardiopulmonary Arrest Implementation

Project Coordinator: Morgan Del Principe, BSN, RN, DNP Candidate

The purpose of this project is to implement a first five minute mock cardiopulmonary arrest program as an effective evidence-based quality improvement project to improve nursing staff's confidence in responding to in-hospital cardiac arrests. The goal is to educate the nursing staff about pertinent tasks which should be performed during the first five minutes of a cardiac arrest aiming to increase the confidence and knowledge of nursing staff in responding to these critical emergencies.

If you choose to take part in this project, you will be asked to:

1. Complete a short pretest survey (2 minutes)
2. Participate in the first five minute educational session (25 minutes)
3. Complete a short posttest survey (2 minutes)

There are no foreseeable risks associated with participating in this project. Benefits of participation may include an increase in confidence and knowledge in responding to in-hospital cardiac arrests. Your survey responses are anonymous. Your name will not be collected or linked to your answers.

If you choose to participate in the project, participation is voluntary, refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may withdraw at any time from the project. In addition, you may skip any question that you choose not to answer. By participating, you do not give up any personal legal rights you may have as a participant in this project.

For questions, concerns, or complaints about the project, you may contact:

Morgan Del Principe, BSN, RN
DNP-AGACNP Candidate
520-405-8720
morgandp@email.arizona.edu

You agree to have your responses used for this project.

APPENDIX C:

RECRUITMENT MATERIAL (RECRUITMENT FLYER)

CODE BLUE

Do you know what to do?

The First Five Minute Program

Interested in learning more about how to intervene in cardiac arrests? Attend this educational session!

- Learn and practice crucial tasks necessary during the first five minutes of a code
- End goal is to increase nursing staff's confidence and knowledge
- Completely voluntary
- Complete a pretest, educational session, and posttest (30 minutes)
- Dates and times are as follows:

Please contact Morgan Del Principe, BSN, RN, DNP Candidate with any questions at (520) 405-8720 or at morgandp@email.arizona.edu

APPENDIX D:

EVALUATION INSTRUMENTS (PRETEST AND POSTTEST SURVEY)

First Five Minute Program Pretest

1. How many years of experience do you have in your current role?

Using a scale from 1-5 please answer the following questions:
- 5: strongly agree
- 4: agree
- 3: neither agree or disagree
- 2: disagree
- 1: strongly disagree

2. I feel confident in knowing when to call a code

   5 4 3 2 1

3. I feel confident responding to a code

   5 4 3 2 1

4. I feel confident knowing the designated roles of each member of the code team

   5 4 3 2 1

5. I feel confident placing a backboard behind the patient

   5 4 3 2 1

6. I feel confident performing chest compressions

   5 4 3 2 1

7. I feel confident delivering ventilations via bag-valve mask

   5 4 3 2 1

8. I feel confident finding an ambu bag, medications, endotracheal tubes, and defibrillator pads on the code cart

   5 4 3 2 1

9. I feel confident placing the defibrillator pads and cardiac leads in the correct location on the patient

    5 4 3 2 1

10. I feel confident turning on the defibrillator

    5 4 3 2 1

11. I feel confident charging and delivering a synchronized shock to a patient

    5 4 3 2 1

12. I feel confident knowing which rhythms are shockable versus non-shockable

    5 4 3 2 1

13. I feel confident recording a code

    5 4 3 2 1

First Five Minute Program Posttest

1. How many years of experience do you have in your current role?

Using a scale from 1-5 please answer the following questions:
- 5: strongly agree
- 4: agree
- 3: neither agree or disagree
- 2: disagree
- 1: strongly disagree

2. I feel confident in knowing when to call a code

   5 4 3 2 1

3. I feel confident responding to a code

   5 4 3 2 1

4. I feel confident knowing the designated roles of each member of the code team

   5 4 3 2 1

5. I feel confident placing a backboard behind the patient

   5 4 3 2 1

6. I feel confident performing chest compressions

   5 4 3 2 1

7. I feel confident delivering ventilations via bag-valve mask

   5 4 3 2 1

8. I feel confident finding an ambu bag, medications, endotracheal tubes, and defibrillator pads on the code cart

   5 4 3 2 1

9. I feel confident placing the defibrillator pads and cardiac leads in the correct location on the patient

5 4 3 2 1

10. I feel confident turning on the defibrillator

5 4 3 2 1

11. I feel confident charging and delivering a synchronized shock to a patient

5 4 3 2 1

12. I feel confident knowing which rhythms are shockable versus non-shockable

5 4 3 2 1

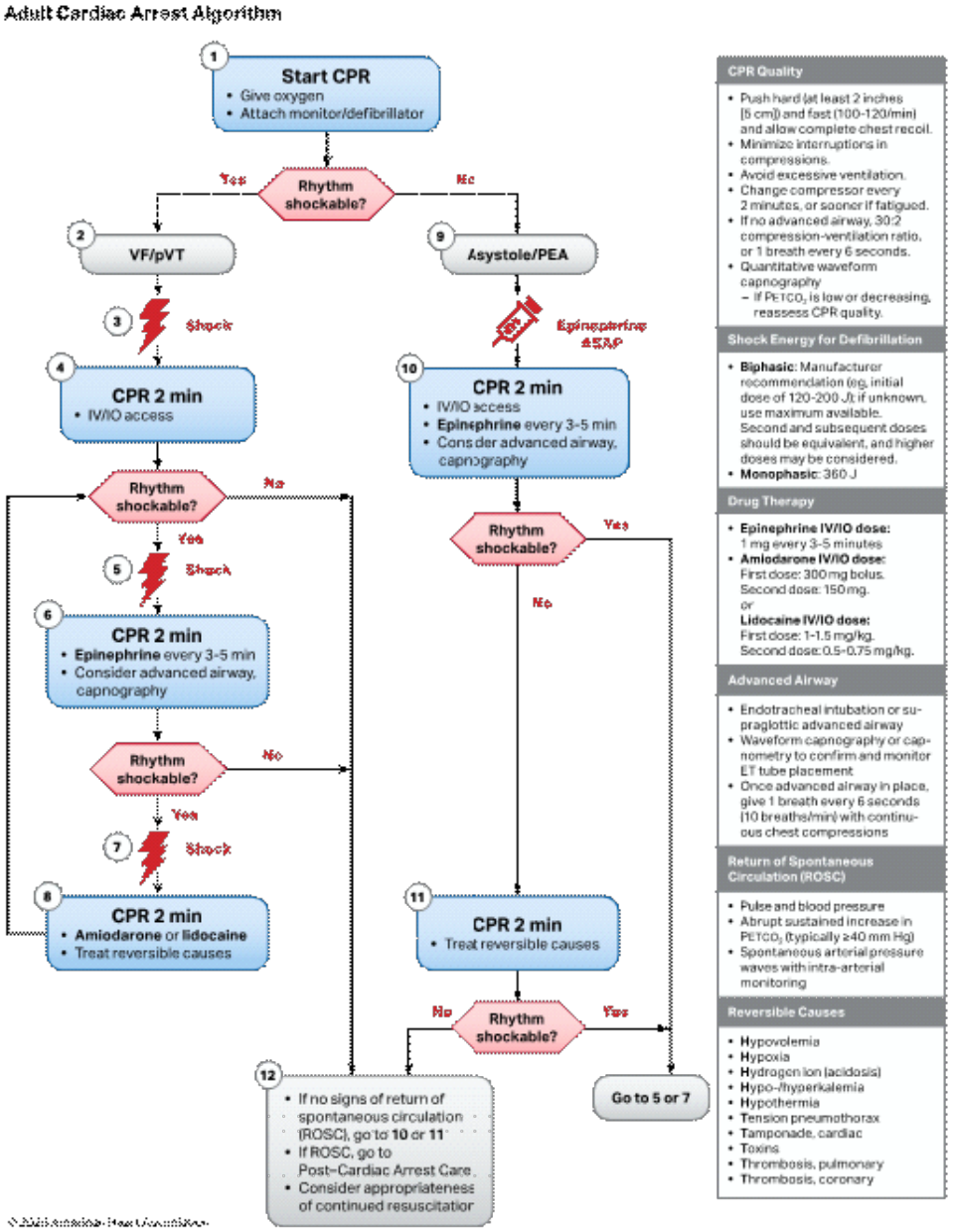
13. I feel confident recording a code

5 4 3 2 1

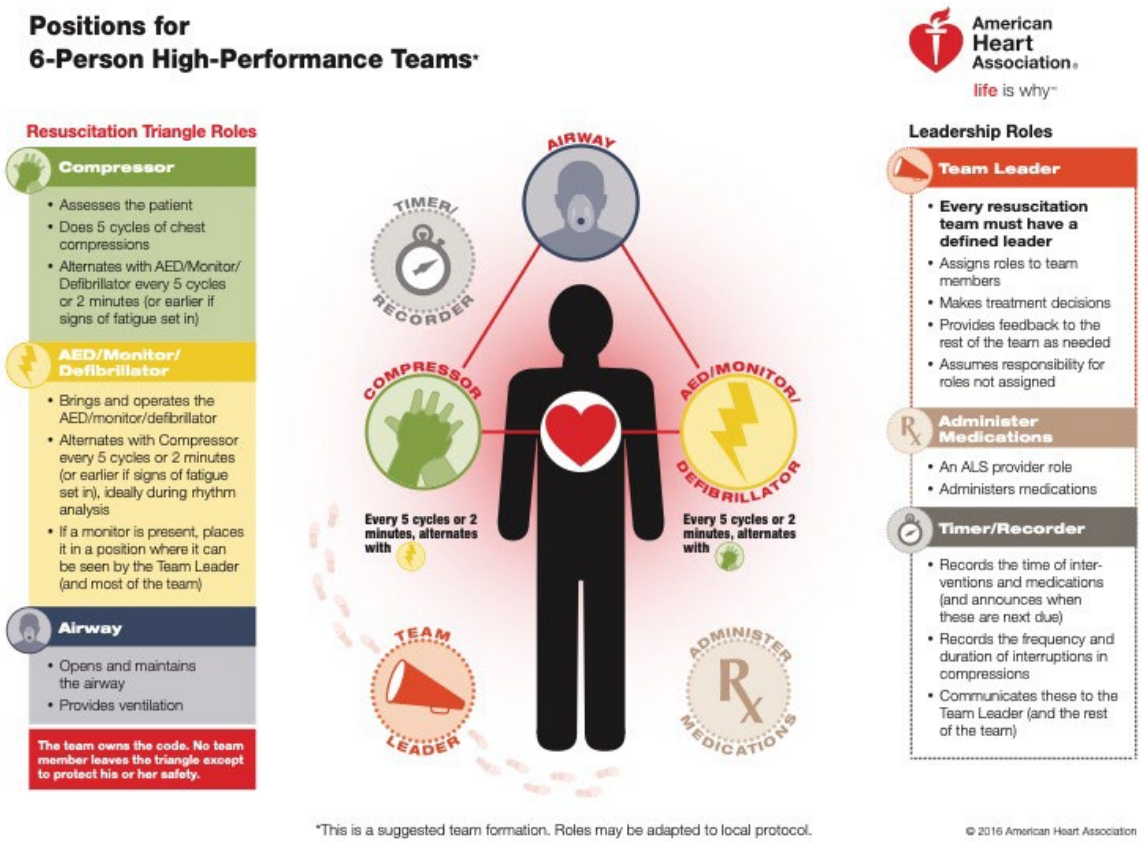
APPENDIX E:

PARTICIPANT MATERIAL (WRITTEN GUIDELINES AND VISUALS)

AHA ACLS Algorithm



(The American Heart Association, retrieved from https://cpr.heart.org/en/resuscitation-science/cpr-and-ecc-guidelines/algorithms#adult, Copyright 2022).



(The American Heart Association, retrieved from https://cpr.heart.org/en/resuscitation-science/cpr-and-ecc-guidelines/algorithms#adult)

APPENDIX F:

PROJECT TIMELINE

Completion Date	Planning	Pre-implementation	Implementation	Evaluation
May 22, 2022	Submit proposal to project chair			
May 23 to 30, 2022		Make necessary changes		
May 30, 2022		Obtain proposal approval from chair		
May 30, 2022		Schedule Proposal Defense with committee members		
June 13, 2022		Proposal Defense Presentation		
June 13-17, 2022	Make committee revisions to proposal			
June 20, 2022		Submit IRB documents		
August 15, 2022		Obtain IRB approval		
August 22-24, 2022			Implement: Collect data	
September 1-30, 2022				Analyze Data
October 3, 2022				Final Defense Presentation of project results
October 5, 2022				Present findings to stakeholders

**Dates subject to change depending on approvals from IRB*

APPENDIX G:

LITERATURE REVIEW GRID

Project Question: Compared to the nursing staff's baseline knowledge of cardiopulmonary arrests, will the implementation of a first five minute mock code blue education improve nursing staff's confidence and knowledge in responding to IHCAs at NWMC in Tucson, AZ?

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
(2021) American Heart Association Category: Clinical Guidelines	Get with the guidelines: resuscitation clinical tools	National Clinical Guidelines	In order to improve survival from cardiac arrest -a culture of action through public training -adopt quality improvement programs -debriefing sessions are extremely important Guidelines for cardiopulmonary arrest and what algorithms to follow	Consistently using the knowledge obtained through advanced cardiac life support (ACLS) and basic life support (BLS) training by utilizing quality improvement programs and education is important in the success of caring for those experiencing cardiopulmonary arrest
(2019) Anderson et al. Category: Support of mock code blue implementation	In-hospital cardiac arrest: a review	Systematic review of randomized controlled trials	290,000 in-hospital cardiac arrests occur each year in the United States and increased awareness to optimize clinical care may help improve patient outcomes after cardiac arrest	The chances of survival after a cardiac arrest are dependent on multiple factors. Proper treatment during and after cardiac arrest are imperative for a patient's chance of survival. Education and improvement programs to enhance interventions during a cardiac arrest may be beneficial.
(2019) Au et al. Category: Support of mock code blue implementation	Improving skills retention after advanced structured resuscitation training: a systematic review of randomized controlled trials	Systematic review of randomized controlled trials	-goal: to improve resuscitation training for healthcare providers because high-quality resuscitation can improve patient outcomes and survival rates following cardiopulmonary arrest -ACLS is noted as the gold standard of structured resuscitation training programs -despite initial training and competence demonstration, suboptimal resuscitation efforts	-Using mock code blue simulations is a method which is preferred in order to retain the skillset required for cardiopulmonary resuscitation -ACLS refresher courses are less effective than mock code blue implementation at retaining skillsets

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
			are noted in practice due to the infrequency of their use -There is a need for the maintenance of these skills -Studies displayed the retention of skills at six months post initial training -Skills were retained better with interactive intervention or frequent simulations -Simulation-based interventions were found to have the largest impact on skills retention -Booster sessions were minimally effective to educate and ensure skill retention	
(2019) Bircher et al. Category: Poor patient outcomes from inadequate cardiopulmonary resuscitation interventions	Delays in cardiopulmonary resuscitation, defibrillation, and epinephrine administration all decrease survival in in-hospital cardiac arrest	Prospective cohort study	-5.7% of patients did not receive instant initiation of cardiopulmonary resuscitation (CPR) upon recognition of pulseless cardiac arrest -Delay in CPR initiation leads to delay in epinephrine administration and defibrillation -Time to initiate all three interventions determine patient survival	-Delays in the initial phases of a cardiopulmonary arrest are life threatening -Methods should be implemented in order to improve the time to these initial life-saving interventions -Ensuring the staff knows what to do in those urgent initial moments is imperative
(2019) Clarke et al. Category: Support of mock code blue implementation	Longitudinal exploration of in situ mock code events and the performance of cardiac arrest skills	Prospective cohort study	-BLS and ACLS courses provided by the American Heart Association (AHA) serve as a standard for cardiopulmonary arrest -Recertification for these courses is every 2 years but	-Mock code blue implementation is imperative to retaining the BLS and ACLS skillset -Mock code blue implementation will improve teamwork and communication -The first five minutes of a code is critical- educate on what to do during these initial moments

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
			knowledge can decrease within 6-12 months of training -As recommended by the AHA, hospitals should perform mock codes to support these skills -Establishing and teaching the first steps in resuscitation is critical -Practicing the first five minutes of what to do during an in-hospital cardiac arrest is best to focus on for mock codes -Mock codes improve skills, communication, and teamwork	
(2018) Damluji et al. Category: Financial effects of cardiopulmonary arrests	Health care costs after cardiac arrest in the United States	Retrospective study	Healthcare costs of hospitalizations associated with cardiac arrest were analyzed from 2003-2012. Hospitalization costs continuously increased over this time period regardless of the length of hospital stay. The researchers adjusted for length of hospital stay and survival status which showed similar results that as the years have progressed, the economic burden of cardiac arrests has continued to increase.	Cardiac arrests cause a great deal of financial burden on the United States healthcare system. Recognizing the cost associated with IHCAs helps demonstrate the need to have trained personnel who may give these patients the best chance of survival. By intervening appropriately the length of hospital stay after an IHCA may be reduced and thus healthcare costs may as well.
(2016) Herbers & Heaser Category: Support of mock code blue implementation	Implementing an in situ mock code quality improvement program	Quality improvement program	-Patients who have a cardiac arrest in hospital have survival rate of 10-23.9% -Nurses experience high levels of anxiety and find it difficult to remember the knowledge and skills they have learned in BLS	-Educating on the importance of ACLS medications, the cardiac leads, positioning of patients including the backboard, bag-mask ventilation, suction set up, and compression depth and chest recoil during mock codes is imperative

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
			and ACLS during an emergency situation -Every one-minute delay in CPR decreases chances of survival by 7% -Skills gained from BLS and ACLS courses can decline within two weeks/ significant loss of knowledge by six months -During the study, staff hesitated to call for help resulting in a delayed initiation of the code -Confidence levels to initiate chest compressions increased, the confidence levels in participating in a code blue increased, and confidence levels of being a team member of a code blue increased after mock code blue implementation -Response time to initiate CPR and defibrillate all increased after mock code blue implementation	-Mock codes decrease time to CPR and defibrillation -Mock codes improve staff confidence in responding to a code blue
(2018) Honarmand et al. Category: Clinical guidelines	Adherence to advanced cardiovascular life support (ACLS) guidelines during in-hospital cardiac arrest is associated with improved outcomes	Retrospective study	-Higher number of deviations from ACLS guidelines during cardiac arrests led to lower chance of achieving return of spontaneous circulation (ROSC) -Higher number of deviations from ACLS guidelines during cardiac arrests also led to	-Adhering to ACLS guidelines established by the AHA is directly related to patient outcomes -It is important to adhere to AHA resuscitation guidelines -Education should be provided to apply the ACLS algorithms -Simulation training modules such as mock codes can incorporate these

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
			decrease in survival and hospital discharge	algorithms and provide feedback to ensure adherence to the guidelines
(2018) Josey et al. Category: Poor patient outcomes from inadequate cardiopulmonary resuscitation interventions AND Support of mock code blue implementation	Hospitals with more-active participation in conducting standardized in-situ mock codes have improved survival after in-hospital cardiopulmonary arrest	Retrospective case control study	-Survival rate of patients experiencing an in-hospital cardiac arrest are significantly higher in hospitals with an active in-situ mock code program than those with a less active in-situ mock code program -Knowledge gained from ACLS/BLS gain decline within three months	-Standardized in-situ mock code programs lead to improvement in patient survival rates and should be implemented frequently
(2018) McPhee Category: Support of mock code blue implementation	Deliberate practice mock codes for new graduate nurses	Quality improvement project / Qualitative study	-Mock code blue practice solidifies skills and muscle memory of code blue scenarios for new graduate nurses -Mock code blues are less intimidating than simulations provided in nursing school or during ACLS/BLS courses -Mock codes improve new graduate nurses' confidence -Mock codes allow the new graduate nurses to familiarize themselves with different roles during a code -Debriefing sessions of mock codes were helpful in discussing what could be improved or done differently	-Mock code blues can be implemented to improve confidence in responding to code blues and allow individuals to better understand their roles during a code
(2020) Merchant et al. Category: Clinical guidelines	Part 1: Executive summary: 2020 American Heart Association guidelines for cardiopulmonary	Executive summary of AHA Guidelines	-In-situ training is recommended in addition to traditional ACLS/BLS courses	-Mock code simulations are recommended by the AHA

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
	resuscitation and emergency cardiovascular care		-provides individuals a realistic training environment as actual patient-care areas are utilized -In-site mock code simulation can focus on technical skills, communication, teamwork, leadership, and role allocation	
(2018) Munezero et al. Category: Support of mock code blue implementation	Assessment of nurses' knowledge and skills following cardiopulmonary resuscitation training at Mbarara Regional Referral Hospital, Uganda	Prospective cohort study	-Pretest was given assessing the competency and knowledge of CPR skills -A training session about AHA BLS guidelines was implemented -Posttest was given to reassess -Posttest was significantly higher indicating that the education provided improved knowledge and skills of BLS training	-Education and implementation of mock codes can help solidify information taught in BLS/ACLS courses
(2020) Nascimento et al. Category: Support of mock code blue implementation	Clinical simulation for nursing competence development in cardiopulmonary resuscitation: systematic review	Systematic review	-Clinical simulation scenarios for resuscitation skills develop nursing competence, increase of cognitive and psychomotor skills, reduce stress levels, and increase confidence in comparison to other methods of instruction including PowerPoint presentations or laboratory skills	-Mock code blue scenarios can help improve confidence levels in staff
(2016) Williams et al. Category: Support of mock code blue implementation	Mock code: a code blue scenario requested by and developed for registered nurses	Literature review	-experienced and new graduate nurses often respond with anxiety during a code -under high stress conditions, nurses struggle with equipment including the code cart,	-Mock code blues can help improve nurses' confidence and relieve anxiety experienced during codes

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
			defibrillator, and bag-valve-mask device -they also struggle with backboard placement, effective compressions, and ventilations -Simulations give nurses the opportunity to learn skills and improve confidence with no risk to patient	
(2020) Wise et al. Category: Support of mock code blue implementation	Development of a "first five minutes" program to improve staff response to pediatric codes	Quality improvement project	-First five minutes: things for all inpatient nurses to do before the code team arrives such as chest compressions, bag-valve-mask ventilation, and epinephrine administration -The initiation of the first five program improved the time to initiate chest compressions, bag-valve-mask ventilation and backboard placement but did not improve time to initial epinephrine administration -First five program focuses on the initial resuscitation period -First five program included in-situ educational program	-The first five minutes of a code blue include some of the most crucial steps necessary to save the patient's life -Education and mock code simulations can improve time to chest compressions, bag-valve-mask ventilation, and backboard placement

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