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Evaluating the Effectiveness of Clinical Education on Critical Care Practice

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Walden University
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Abstract

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MSN, Walden University, 2013

ADN, Genesee Community College, 2007

Project Submitted in Partial Fulfillment

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Abstract

In 2016, the targeted temperature management (TTM) nursing protocol was updated and implemented at a large hospital in South Carolina. Development of a comprehensive evaluation program became a priority project due to reports that 75% of TTM cases during a 2-year period did not meet national benchmarks for quality and safe care for TTM patients. Therefore, this project answered the questions about whether the development, implementation, and standardization of ongoing TTM education would bridge the gap between knowledge and practice (transference of education). The purpose of this project was to evaluate the effectiveness of the education program launched regarding TTM in meeting specific course objectives. Kirkpatrick's levels of evaluation and the Donna Wright Competency Assessment model were used to guide educational development, assessment, and evaluation. Sources of evidenced included the American Heart Association's 2015 postcardiac arrest recommendations in conjunction with evidenced-based practice research obtained using Walden University's library. Analytic strategies such as gap analysis and benchmarking were used in this project. The results from Kirkpatrick's levels of evaluation as it applies to TTM education suggest a positive impact on patient care. It is recommended that TTM programs have a consistent well-developed education implementation plan, including a sustainable evaluation plan, for ongoing assessments and continued improvements. Implications for nursing practice and positive social change include increased bedside skill practice, improved patient care through benchmark reporting, improved patient outcomes, and increased awareness of the success of TTM.

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Section 1: Nature of the Project

Introduction

Cardiac arrest (CA) occurs widespread across the United States, with more than 325,000 cases of out-of-hospital cardiac arrest (OHCA) and 200,000 cases of in-hospital cardiac arrests (IHCAs) occurring annually (Narsingam, Abella, Grossestreuer, & Chan, 2017). Survival rates for both OHCA and IHCA are generally low however, there are therapies such as post-arrest implementation of targeted temperature management (TTM) that have been established to improve survival in these patients (Narsingam et al., 2017). TTM, for comatose survivors of both OHCA and IHCA, is the recommended therapy for hospital-based treatment for improved in-hospital survival and long-term clinical outcomes (Fordyce et al., 2018). Post-CA implementation of TTM is used for neuroprotection by maintaining the temperature of the brain at predetermined levels by various techniques (Swagata, & Ashok Kumar, 2015). In 2015, the American Heart Association (AHA) updated the recommendations for post-CA care and TTM therapy. In the 2015 AHA Guideline update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, the recommendation is that for any comatose adult patient with return of spontaneous circulation (ROSC) after OHCA or IHCA, TTM should be implemented as it is a Class I therapy treatment, whether the CA is shockable or nonshockable (Park, Oh, Choi, & Wee, 2018). In 2017 a new TTM education program was launched at the organization to improve quality and safe patient care, standardize patient care, align the program with the hospitals strategic plan, and assist in competency development for bedside nurses.

Problem Statement

TTM is a type of therapy used to control the body's core temperature through a specific set of timed phases following a post-CA event who achieves ROSC to prevent or minimize neurological damage. The development of a comprehensive TTM program is necessary due to concerns surrounding patient safety incidents (PSIs) that are being reported on 75% of all hypothermia cases in the organization from July 2015 to March 2017. In reviewing the PSIs being reported for TTM patients, patient care is jeopardized due to the health care professional's lack of education in managing a TTM patient as evidenced by not following the nursing protocol interventions, not following the AHA timeline recommendation for TTM therapy, and manually manipulating the patient's targeted temperature goal against the organizations protocol. A gap analysis of 250 critical care nurses further identified the lack of standard practice per the nursing protocol and lack of knowledge of safe practice. Therapeutic hypothermia for specific patients post-ROSC after a CA event is a valid intervention in which nurses play a vital role; nurses must understand the physiologic basis for TTM, as well as the nursing responsibilities related to patient care, because these are the keys to achieving optimal patient outcomes (Bucher et al., 2013).

The TTM continuum of care is a specific set of timed phases when attempting to reach metrics that demonstrates quality and safe care set forth by the AHA for the TTM patient. In 2016, the organization was unsuccessful in meeting these metrics; therefore, in 2017, a new TTM education program was launched to improve the national benchmark metrics (i.e., to improve patient care and patient safety).

In 2016, the benchmark metrics for the organization were recorded as follows:

1. Door-to-start therapy time benchmark is < 60 minutes; 2016 averages were 2-3 hours.
2. Induction time benchmark is set for 2-4 hours; 2016 averages were 6 hours.
3. Maintenance benchmark is set for 24 hours; 2016 averages were 21 hours.
4. Rewarming benchmark is set for 12-18 hours; 2016 averages were 24 hours.
5. Normothermia benchmark is set for 48 hours; 2016 averages were 12-24 hours.

In reviewing this information, the need for a comprehensive education program for the TTM patient is necessary.

Purpose Statement

The organization, in response to decreased benchmark metrics and high volume of PSI reports regarding TTM patients, developed an educational program for TTM to improve nursing knowledge and competency but also included strategic plans to improve the patient safety and quality of care benchmark metrics. My purpose in this project was to evaluate the effectiveness of the education program launch regarding TTM in meeting specific objectives. The objectives and organization's strategic plan for the TTM program included meeting all benchmark metrics of quality and safe care, improving nursing knowledge and competency management for the TTM patient, and decreasing the number of reportable PSI regarding TTM patients.

Nature of the Doctoral Project

The nature of this project centered on the development of a thorough evaluation plan following an educational program launch in measuring its success. Using

Kirkpatrick's levels of evaluation, I was able to prove that the educational program directly contributes to changing the culture of care and standardization of practice as well as meeting organizational and national goals. Using anonymous survey evaluations, pretesting, and posttesting, I demonstrated that the educational program increased the level of education gained by the learner as well as translation into practice at the organizational level. This evaluation process also demonstrated the effects on patient care, patient safety, and national benchmark reporting related to competent patient care.

Precise evaluation of the project outcome must be performed to enhance the effectiveness, improve the shortcomings, and adjust the future direction of the program (Seunghee Lee et al., 2014). My approach and steps followed the levels of the evaluation model created by Kirkpatrick. The model was extensively reviewed and consists of four levels of evaluation designed to appraise workplace training (Kirkpatrick & Kirkpatrick, 2013). To gain a comprehensive and systematic perspective on nursing professional development, I used Kirkpatrick's evaluation model because it provides a useful evaluation framework (Lim, Wu, Hu, Gu, & Lim, 2016). This framework consisted of the following phases: summative evaluations (Kirkpatrick's Level 1) will show greater than 80% of the participants rated an "excellent" regarding meeting the TTM class objectives and facilitator objectives. Data from this equated to customer satisfaction and confirm the quality of the activity and the satisfaction with the instructor (DeSilets, 2018). Kirkpatrick's Level 2 successfully showed growth in knowledge via pre and posttest knowledge assessments about TTM practice at class completion. A decrease in PSI's reported about TTM patient care and management signified Kirkpatrick's Level 3

(behavioral). The data were collected here and provided supportive information on how or whether participants have been able to use or apply what they have learned in practice at the bedside (DeSilets, 2018). Finally, the last phase showed successful benchmark reporting on all phases of therapy and organizational impact (Kirkpatrick's Level 4) for TTM.

Significance

Blewer et al. (2013) found that communication challenges and lack of education were the two most highly identified barriers by participants in caring for a TTM patient. To ensure there were no communication gaps during this project, I asked all key stakeholders to participate in this project. Key stakeholders included a representative from the following areas: critical care nursing, critical care management, nursing director, critical care physician, nursing informatics, and clinical education. The significance of this project is to demonstrate the importance of a well-developed evaluation plan in measuring success post implementation of an educational program. The evaluations and benchmark reporting of this evaluation was compared with the objectives set forth in the initial planning phase for the TTM education. The evaluation plan also provided guidance for the future learning needs and practice gaps for continued growth opportunities and continue to implement current evidenced-based practice to improve patient outcomes of the TTM patient. The evaluation of outcomes framework can be replicated in other educational offerings and used a tool to objectively assess successful implementation.

Post-CA therapy, TTM, had been an underused therapy at the organization despite the updated protocol and specific patient inclusion/exclusion criteria outlined.

Implications from this project include increased awareness of TTM throughout all disciplines within the organization including its potential benefits in patient care for post-CA patients and increased interdisciplinary communication and collaboration of care regarding post-CA patients and implementation of TTM.

Summary

Most of training and development professionals are so busy that it is incredibly challenging to have a systematic approach when developing educational program design execution and evaluation (Kirkpatrick & Kirkpatrick, 2013). A focused TTM program led to increased confidence and usage among participants (Blewer et al., 2013). Without a structured evaluation plan, it cannot be determined whether the educational offering met the objectives and goals that I identified. It was crucial that, in the evaluation plan, I looked at multiple aspects (or levels) of competency to identify the depth of its effects.

Section 2: Background and Context

Introduction

My purpose in this project was to evaluate the effectiveness of the education program launched regarding TTM in meeting specific course objectives. In this doctoral project, I sought out and evaluate the effectiveness of the TTM program by assessing the educational gap between knowledge and bedside application to improve quality and safe patient care and to evaluate the implementation of a standardized ongoing TTM education program in its achievement toward national safe patient benchmarks. The framework of evaluation that I used to guide educational development, assessment, and evaluation was Kirkpatrick's levels of evaluation and the Donna Wright Competency Assessment model.

Concepts, Models, and Theories

The model that I used to assist in the educational development was the Donna Wright Competency model. This framework is guided by three main concepts: (a) collaboration in identifying the needs, (b) ensuring the employee is at the center of the education need, and (c) ensuring management and leadership are involved in creating a culture of successful education. The evaluation framework I was used is Kirkpatrick's Levels of Evaluation. Kirkpatrick's four-level model of evaluation criteria is to assess an educational program in the following areas: reaction, learning, behavior, and organizational (Praslova, 2010). Kirkpatrick's Level 1 (summative evaluations) showed that greater than 80% of the participants rated an "excellent" regarding meeting the TTM class objectives and facilitator objectives (which was me). Data from this equated to

customer satisfaction and confirm the quality of the activity and the satisfaction with the instructor (DeSilets, 2018). For the second level, staff successfully showed growth in knowledge via pre and posttest knowledge assessments about TTM practice at class completion (Kirkpatrick's Level 2 evaluation learning). This level demonstrated learning and measures the knowledge or skill that has been acquired during the learning activity (DeSilets, 2018). The pretest was given via Learning Management System (MyQuest) and questions will be taken from a credible test for assessment verification. The pretest had no passing score and the staff members had one attempt. The posttest was given via Learning Management System (MyQuest) and questions were taken from a credible test for postassessment verification. The posttest had a passing score of 80% and the staff members had two attempts. The posttest should also reveal an increase in knowledge from baseline (pretest).

Kirkpatrick Level 3 (behavioral) showed a decrease in PSI's reported about TTM patient care and management. The data that was collected here provided supportive information on how or whether participants have been able to use or apply what they have learned in practice at the bedside (DeSilets, 2018). This showed successful change in culture, change in practice, and standardization of care at the bedside. Successful benchmark reporting on all phases of therapy, Kirkpatrick's Level 4, showed an organizational impact for TTM. This level focused on cost analysis, financial value, quality, or outcomes that can be used to guide executive decision making (DeSilets, 2018). This shows successfully integration and application of education and skills into

practice. It is with these models that I constructed a standardized evaluation process for the TTM program.

Relevance to Nursing Practice

When considering relevance to nurses, I contemplated the meaning of this program for nurses, as well as the importance for nurses. With a standardized evaluation program for TTM therapy, nurses can be sure that the knowledge and practice would be assessed and disseminated in a standardize fashion. It will be through this consistency that nursing culture on each unit will evolve as areas of opportunity are identified. Having a focused, simulation-oriented, TTM educational intervention can lead to increased confidence, knowledge retention, and TTM usage among participants (Blewer et al., 2013).

The evaluation plan assessed and reported on benchmark metrics where I can provide objective data on the program's care management strengths and opportunities of growth within each unit. Embedded in the evaluation process, I can isolate specific patient cases and the nurses who managed them at the bedside to discuss care management opportunities, therefore placing the accountability back on the nurse to own their practice. It is with the evaluation process that validates the need for changes in practice based on benchmark reporting and changes to the content within the class based on pretesting and posttesting.

Local Background and Context

The TTM program has lacked leadership and ownership in the hospital since 2014. In 2015, the AHA revised the recommendations and guidelines for post-CA

management and TTM therapy (previously called *induced hypothermia*). Once the guidelines were released, the hospital began implementing the new guidelines without a formal education plan. It was not until May of 2016 that an interprofessional committee came together to begin reviewing PSIs being reported on the care and management of the TTM patient. The interprofessional committee sought a structured education regarding this therapy, a standardized way to implement the new protocol, and information to evaluate success. In gathering predata for this project, I found a large gap in standardized nursing patient care as evidenced by the gap analysis. There was an updated nursing guideline disseminated without nurses' knowledge of the existence or content, again reflected in the gap analysis. I also saw that patient safety concerns were being reported and that evidenced-based practice interventions were not being implemented based on the updated protocols recommendations. Finally, I saw that the 2016 patient outcomes were below the national standards: The door-to-start therapy time benchmark should be less than 60 minutes, whereas in 2016, averages were 2 to 3 hours. Induction time benchmark is set for 2 to 4 hours, whereas 2016 averages were 6 hours. Maintenance benchmark is set for 24 hours, whereas 2016 averages were 21 hours. Rewarming benchmark is set for 12 to 18 hours, whereas 2016 averages were 24 hours. The normothermia benchmark is set for 48 hours, whereas 2016 averages were 12 to 24 hours.

In March of 2017, a new educational plan was developed and implemented organization wide; however, an evaluation plan has not been established to objectively determine whether the education program met the goals that were outlined in the initial

planning stages: decrease PSIs being report, standardized education, and improve national benchmark metrics to promote quality and safe care.

Role of the DNP Student

As the DNP student, it was my job to research evidenced-based evaluations tools/frameworks and select the most appropriate one to implement in the organization to evaluate the TTM program. Once an evaluation tool/framework was identified, it was my role to establish the criteria based on the national benchmark metrics, organizational goals/protocol, and project goals as established by the TTM task force (previously referred to as the *interprofessional committee*). Once the evaluation tools were accepted and approved by the TTM committee, I implemented them at specific times using Kirkpatrick's levels of evaluation as my guide. All evaluations were anonymously captured and analyzed for comparison. It was my responsibility to compare all levels of evaluations and predata and postdata to demonstrate the effects of the educational program in the organization, as well as reporting on goals/outcomes met.

Role of the Project Team

The role of the project team was to provide the DNP student with feedback and approvals on all implementation items. I provided weekly updates status and prepare a presentation on the outcomes and how an educational program changes nursing culture. The presentation included effects at the organizational level using data on national benchmark reporting. Successfully meeting national benchmark metrics demonstrated improvement of safe patient care. The goal was to present this at a senior leadership meeting once completed.

Summary

My role as the DNP student was to use Kirkpatrick's levels of evaluation and the Donna Wright Competency Assessment model to guide educational development, assessment, and evaluation. In this doctoral project, I sought to find and evaluate the effectiveness of the TTM program by assessing the educational gap between knowledge and bedside application to improve quality and safe patient care as well as to evaluate the implementation of a standardized ongoing TTM education program in its achievement toward national safe patient benchmarks.

Section 3: Collection and Analysis of Evidence

Introduction

Nursing professional development plays a pivotal role in an organization by assisting in the standardization and structure for major categories such as orientation/on-boarding, new and ongoing education requirements, competency management, and role development. One of the goals when it comes to education development is the evaluations of the education; I wanted to know whether I met the goals, objectives, and outcomes outlined to meet unit-based, organizational, and/or national standards.

Practice-Focused Question

Does the development and implementation of a formalized TTM education program bridge the gap between knowledge and bedside application to improve quality and safe patient care (transference of education)? Does the implementation of a standardized ongoing TTM education program assist in achievement of national safe patient management benchmarks?

Sources of Evidence

Sources of evidence will include publicly disseminated reports, public websites, books, peer-reviewed articles, anonymous questionnaires for preapproved consent, along with online based anonymous surveys. I used the testing scores from the pretest and posttest knowledge assessment given to the learner who takes the educational offering. I gathered data on PSI reports containing TTM patients or therapy and I used data provided by the machines to assess the phases of therapy timeline and compare it to the national benchmarks metrics. No patient sensitive information was shared in this process.

Analysis and Synthesis

After reviewing the evaluations at each level as outlined in Kirkpatrick's levels of evaluation, the data showed that the learner gained knowledge of the TTM program as evidenced by an increase in testing scores from pretesting to posttesting (Level 2 evaluations). I also demonstrated that the education program met the level once evaluations as evidenced by the data assessed from the learners' evaluation tool used postclass, showing an average of 80% or higher rating, an excellent in objectives met. I will also show marked reduction in the quantity of PSIs reported that pertained to TTM concerns (Level 3 evaluations). Finally, I demonstrated an increased compliance in meeting the national benchmark metrics on TTM cases and compare them with the predata collected (Level 4 evaluations). Metrics evaluated are the following:

1. Induction time benchmark is set for 2-4 hours.
2. Maintenance benchmark is set for 24 hours.
3. Rewarming Benchmark is set for 12-18 hours.
4. Normothermia benchmark is set for 48 hours.

From this data, I conclude that a well-developed education program can be linked to increased compliance and competence in nursing bedside management of a targeted temperature patient, linking it to increased patient safety management, and potential increase in organizational notoriety (application for the Beacon Award in Excellence), recognition (Resuscitation Center of Excellence), Quality Improvement recognition, and Magnet redesignation story.

Summary

Qualitative and quantitative evaluations of educational programs can enhance the development, effectiveness, and dissemination of comparative quality reports and quality improvement efforts (Abdulghani et al., 2014). Education program development is necessary for hospitals to embark on; however, in the initial planning stages, having all key stake holders is essential. Having a representative from nursing professional development can be instrumental in many aspects of the planning process, but it is the development of a thorough evaluation plan that can assist in propelling the educational program forward, create sustainability, and provide continuous feedback for the advancement of the program and improve quality and safe patient care.

Section 4: Findings and Recommendations

Introduction

A gap analysis of 250 critical care nurses identified a lack of standard practice per the nursing protocol and lack of knowledge of safe practice. The practice-focused questions were as follows: Does the development and implementation of a formalized TTM education program bridge the gap between knowledge and bedside application to improve quality and safe patient care, and does the implementation of a standardized ongoing TTM education program assist in achievement of national safe patient management benchmarks?

My purpose in this project was to evaluate the effectiveness of the education program launched regarding TTM in meeting specific course objectives using Kirkpatrick's levels of evaluation and the Donna Wright Competency Assessment model. Sources of evidence included publicly disseminated reports, public websites, books, peer-reviewed articles, anonymous questionnaires for preapproved consent, along with online-based anonymous surveys that I obtained using intranet searches and the Walden University Library. I used a top-down analytic strategy to evaluate the literature and remove irrelevant articles based on the practice-focused questions and purpose of this project.

Findings and Implications

There were 219 nurses who completed the TTM class from February 2017 until December 2018. I eliminated 21 participants because those nurses had left the organization; therefore, I sent anonymous electronic surveys to 198 intensive care nurses

who successfully completed the targeted temperature classes from February 2017 until December 2018 who, at the time of this study, were still employed at the organization. A total of 131 responses were successfully captured and used in the findings. I collected data retrospectively to assess internal patient safety concerns reported for TTM patients, anonymous classroom evaluations, the volume of TTM patients per fiscal year (FY), and the associated benchmark metric analysis of the TTM patients.

The participants were required to answer nine questions using an anonymous electronic survey related to care of the TTM patient. The questions pertained to specific safety and quality topics discussed in the original class. The answers to these questions are also part of the organization's protocol that was taught in the original class. I also obtained demographical data including years of experience, volume of patients cared for since the class, and intensive care unit (ICU) location of work. This data were significant to assess whether there are any noted trends or correlations in knowledge or practice gaps. After careful assessment of all the data collected, using Kirkpatrick's levels of evaluation framework, I was able to validate the effectiveness of the education program launch regarding TTM.

I sent the anonymous electronic survey to 198 nurses across five intensive care units. There were 131 responses (66.2% response rate). Table 1 (see Appendix A) shows the breakdown of response rate starting with the ICU work location where the largest response group being from the medical intensive care unit (MICU) (49%). The lowest response groups are surgical trauma intensive care unit (STICU) at 5%, and neuroscience intensive care unit (NSICU) at 5%. When considering the volume of TTM patients

annually in these areas (fewer than one patient a month) and volume of staff trained (less than 30% of the total staff) their lower percentages can be explainable. Table 2 (see Appendix A) shows the breakdown in the years of experience: 50% of the respondents had an average of 3 to 5 years of ICU experience, where 1% of the respondents had experience of 10 or more years. This demographical data can be broken down further to see each unit respondent's experience levels to determine whether there is a correlation in years of experience (nurse retention) and engagement (see Figure 1 in Appendix A). The survey questions asked were to assess the respondent's retention of education from their original class. The percentage of respondents who answered correctly is broken down by unit (see Table 3 in Appendix A). The questions that I chose were based on the organizational evidence-based protocol as well as the class lecture, return demonstrations, posttest, and case study analysis from the original class in which the respondents participated. In reviewing Table 3 (see Appendix A), I can identify the areas of strength based on the respondent's answers; I can also identify the areas of opportunity. In this table, the areas of strength include knowing when to begin therapy (100%), nursing interventions for a patient who is shivering (100%), and knowing when spontaneous breathing trials (SBTs) and spontaneous awakening trials (SATs) can be performed (100%), as all 131 respondents answered these correctly. The areas of opportunity would include, when to treat bradycardia (74%), what to use when assessing for appropriate sedation and paralysis (88%), and timeline of therapy for each phase (88%). I further broke down this data down into each unit's responses to determine where the larger knowledge gap was (see Table 4 in Appendix A).

In Table 4 (see Appendix A), I isolated each individual ICU and their average correct response rates for each induvial question. From this, I saw each ICU's strengths when it comes to TTM management and gaps in knowledge. I also saw what ICUs are strong educationally in TTM therapy, helping to further identify the ICUs that need additional support or education. Further evaluation will need to be done into the volume of cases, number of staff trained, and support services available in these ICUs to develop a full education plan. When evaluating the data collected from the electronic survey alone, in relation to evaluating the overall effectiveness of the education provided, there is a positive correlation with knowledge retained; this is evident where the average survey scores exceed 80%, as this was the benchmarking of a minimal passing average at the organization. There were nine questions asked of the learners, and only one question's average was below 80% (88% of the questions were above 80%). The area in which this benchmark was not met was when the health care provider would treat bradycardia in the maintenance phase (74%). There are several factors that could influence this score, such as variations in practice at the physician level and/or lack of competency-based practice at the bedside (low patient population). Both can heavily influence the respondent's answer. An investigation into these factors needs to be conducted.

Breaking down each ICU's average scores by question helped me understand where the gaps in education and lack of knowledge retention exist. When reviewing Table 4 (see Appendix A), NSICUs and STICUs show the lowest scores across the survey responses. Factors to consider are the volume of TTM patients annually, which is

far below the average in the other three ICUs (0.5 patients per month in STICUs/NSICUs vs. 10 patients per month in MICUs/CVICUs). Their response volume was much less (see Table 1 in Appendix A), translating into larger fluctuations based on the incorrect responses. Despite STICU's and NSICU's lower response rates, they had a smaller population of trained nurses (10 RNs in STICUs, seven RNs in NSICUs) who received this electronic survey. Compared with the 68 RNs in CVICU and the 57 RNs in MICUs, this is a considerable difference and affected the overall percentages. Analysis of this table suggests that STICUs and NSICUs would need a remediation education plan for the staff trained, but also tailored educational classes to meet the needs of the majority in these units. Implications from these results suggest that a well-developed education plan coupled with consistent bedside application foster conversion of education into a long-term competency or translation of education into practice.

In using the framework of Kirkpatrick's levels of evaluation, I can objectively determine that education has a direct effect on patient safety and quality of care. Kirkpatrick's Level 1 is a summary of the actual class: Did the learner like the class and did the leaner feel like the class meet all the objectives stated at the beginning? Table 5 (see Appendix A) shows the objectives listed on the anonymous classroom evaluation form filled out by all participants immediately postclass. My goal was to see an 80% or higher in all objectives postclass, and based on this collative retrospective data, I can see this was clearly met. This implicated that the initial class satisfied the learners' needs for practice.

When analyzing for Kirkpatrick's Level 2 evaluations, I used the pretest and posttest data associated with the class. Figure 2 (see Appendix A) shows the comparison of pretests versus posttest. I collected the tests grades anonymously and averaged them per FY. A substantial improvement from the pretest to the posttest exists. In FY 2017, the average pretest score was 35% of 100%; this compares with the posttest score of 81% of 100%. Again, in FY 2018, the average pretest score was 44% of 100% compared with the posttest 85% of 100%. Kirkpatrick's Level 2 requires demonstration of education or practice. The posttest scores show knowledge acquired that was not previously seen on the pretest. This demonstrates an objective growth of knowledge and therefore meets Kirkpatrick's Level 2 evaluation.

In Kirkpatrick's Level 3 evaluations, the target was behavioral change. Figure 3 (see Appendix A) shows the comparison of total TTM patient cases by volume to the number of patient safety concerns (bedside behavior) reported for FY 2017 and FY 2018. In 2017, there were 60 TTM cases across the organization in which 41 cases had a patient safety concern related to their care. This means that 68% of TTM cases had a bedside behavior concern or issue that could have caused patient harm. In 2018, there were a total of 86 TTM cases in which 17 had a patient safety concern, meaning only 19% of TTM cases had reported a patient a bedside behavioral concern. This substantial drop in patient safety concerns shows that bedside behavior had drastically improved and, therefore, meets Kirkpatrick's Level 3 evaluations.

Finally, Kirkpatrick's Level 4 evaluations represent a global influence, meaning the educational initiative had an effect at an organizational level. Successful benchmark

reporting on all phases of therapy showed successful integration and application of education and skills into practice. In Figure 4 (see Appendix A), I collected, retrospectively, benchmark metrics from the surface cooling devices used to treat the TTM patients and collated that data based on FY. As seen in this figure, there was a true definition of *success* in meeting all four benchmark metrics for FY 2018. The induction phase should be reached no more than 4 hours after initiation; FY 2016 showed an average time of 5.2 hours versus FY 2018, which showed an average time of 2.3 hours. A lower time to targeted temperature gives the patient the highest likelihood of neurological recovery and higher quality of life/recovery. The maintenance phase is a consistent 24 hours at the targeted temperature; in FY 2016 the average was 18 hours versus FY 2018, which was 25 hours. This metric is significant to keep the brain cool for the full 24 hours and minimize inflammation to prevent further neurological damage. In this metric specifically, going more than 24 hours is still considered acceptable and still meets the criteria of success.

The rewarming phase is a timed phase by using the 2015 AHA's recommended rate of 0.25° C per hour (AHA, 2015). This rate was not in use until 2017. In 2016, the organizational policy was to rewarm in the course of 24 hours, a rate that has been calculates out to be 0.1° C per hour. In FY 2016, the implemented protocol at that time was nearly met with an average of 23.8 hours; the protocol was outdated. In FY 2017, the average rewarming time was 20 hours, which is longer than it should take to rewarm. In this metric, there is a window of time to allow of variances in rewarming: 12 to 18 hours. The organization was at an average of 16.2 hours, which was in the window of success in

this metric. Finally, the normothermia phase, which, by protocol, is a set 48 hours; FY 2016 showed an average of 16 hours versus current data, which showed an average of 48.6 hours.

The implications from each level of Kirkpatrick's evaluation framework as it applies to the TTM educational program showed a direct positive correlation from education to improved patient care. The education and knowledge provided had converted to bedside application, consistent translation into practice, and improved safe quality patient care.

Recommendations

TTM therapy is a class one therapy for post-CA victims. It is taught in advanced cardiac life support classes through the AHA and is a key aspect of patient neurological preservation and recovery. It is my recommendation that hospitals who offer this mode of therapy for their population have a well-developed education program. In this educational offering the facilitator/instructor should ensure the bedside protocol is reviewed and discussed in its entirety. Patient case analysis, data analysis, and troubleshooting should be topics involved in the education program. The facilitator/instructor needs to address the question, "How is this going to affect me in my job?" Adult learners want to know how they can apply this knowledge immediately and want instant satisfaction when it comes to educational offerings. The educational offering should combine all three learning domains: auditory, kinesthetic, and cognitive. Finally, providers must ensure that the educational program has a thorough evaluation program to monitor for success, gaps, and barriers throughout the course offerings.

Strengths and Limitations of the Project

The strengths of this project were the ability to gather historical data to demonstrate change, positive or negative. The electronic survey made it easy to engage the participants, considering their diverse units, schedules, and lifestyles. The surface cooling machines added another element of strength to collate the benchmarking data from cases in prior years to add more weight to the changes since the TTM education program was implemented.

Some of the limitations include the ability to track patients' outcomes (i.e., quality of life at discharge, Glasgow coma scale, deceased, or cognitive limitations from baseline). Having this data would be helpful in strengthening the argument that TTM therapy is beneficial and can help save lives.

Section 5: Dissemination Plan

During this project, I connected with nurse directors, nurse managers, physicians in the critical care areas, as well as professionals from other disciplines. The plan of dissemination began with the critical care quality committee. This committee meets monthly and consists of multiple disciplines within the critical care areas. The overall goal is to improve the overall quality of care in the critical care setting. This would be an ideal forum to begin the dissemination.

Next, I discussed this project with the clinical education director, chief learning officer, chief nursing officer, and associate chief officer regarding acceptable forums for dissemination, the appropriate audience, and the use of electronic forums for dissemination. The organization uses electronic newsletters for widespread dissemination of information, education, and organizational updates.

Analysis of Self

This project has strengthened my ability to lead a group, grow professionally in my own field, and enhance my time management skills, as well as increase my awareness and growth of prioritization and organizational skills. As a nursing professional development practitioner, skills in managing projects, sustaining projects, and facilitating interprofessional and interdisciplinary project teams are among my job responsibilities. This project has heightened my abilities to perform these specific skills and apply them in my own professional development (Smith & Johnson, 2019).

The barriers that I experienced completing this project have enriched my problem-solving skills at the same time as enhanced by communication techniques.

As a nurse, I talk about evidence-based practice and quality improvement, but I do not understand what it means to make that happen. This project has allowed me to explore the depths of evidenced base practice research and implementation alongside evaluation of implementation and analyzing if I met the goals. This project gave me a solid foundation where I can use and apply all the knowledge and skills gained toward other projects within my career.

Summary

This project added a new level to my professional career and to my personal growth. I have learned about the steps to identify a problem and how to lead a group to achieve goals. The implementation process was well structured, and the evaluation aspect of this project was the most rewarding part. The evaluation showcased what strengths the program has, what areas of opportunity I have, how well the nurses learned and grew from the education, and improvements in patient care. As a professional development specialist, this is exactly what I are attempting to achieve in my line of work but sometimes fall short. I believe this experience will allow me to enhance my line of work and my profession.

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Appendix A: Tables and Figures

Table 1

Response Rate

Unit	Number of completed surveys (%)
MSICU	15%
CVICU	26%
NSICU	5%
MICU	49%
STICU	5%

Table 2

Years of Experience

Years of experience	%
0-2 years	29%
3-5 years	50%
6-10 years	20%
10+ years	1%

Table 3

Survey Questions and Percentage Correct

Question	% correct
1. Recommended temperature selection?	92%
2. When should therapy begin?	100%
3. Timeline of therapy for each phase	88%
4. What temperature warrants a paralytic?	91%
5. Can you replace electrolytes in the rewarming phase?	92%
6. Provide two nursing interventions for a patient who is shivering	100%
7. What do you use to assess for appropriate sedation and paralysis?	88%
8. When do you treat bradycardia in the maintenance phase?	74%
9. SBT's and SAT's can be performed in what phase of therapy?	100%

Table 4

Individual Unit Correct Response Percentages

Questions	MSICU	CVICU	NSICU	MICU	STICU	Average score
Recommended temperature selection?	94%	92%	89%	95%	88%	92%
When should therapy begin?	100%	100%	100%	100%	100%	100%
Timeline of therapy for each phase	100%	96%	74%	98%	70%	88%
What temperature warrants a paralytic?	90%	92%	90%	94%	90%	91%
Can you replace electrolytes in the rewarming phase?	91%	94%	90%	96%	90%	92%
Provide two nursing interventions for a patient who is shivering	100%	100%	100%	100%	100%	100%
What do you use to assess for appropriate sedation and paralysis?	100%	100%	100%	100%	100%	100%
When do you treat bradycardia in the maintenance phase?	98%	96%	70%	100%	74%	88%
SBT's and SAT's can be performed in what phase of therapy?	78%	76%	69%	78%	66%	74%

Table 5

Classroom Summary Evaluation of Class

Class objectives	Excellent	Good	Fair	Poor
Define TTM	86%	12%	2%	0%
Define TTM requirements	87%	12%	1%	0%
Understands the phases of TTM	92%	7.5%	0.5%	0%
Identify nursing management with TTM	82%	16%	2%	0%
Demonstrates using machines for a TTM patient	90%	9.5%	0.5%	0%
Verbalizes the differences between internal and external cooling	99%	1%	0%	0%
Identifies charting requirements for a TTM patient	90%	10%	0%	0%

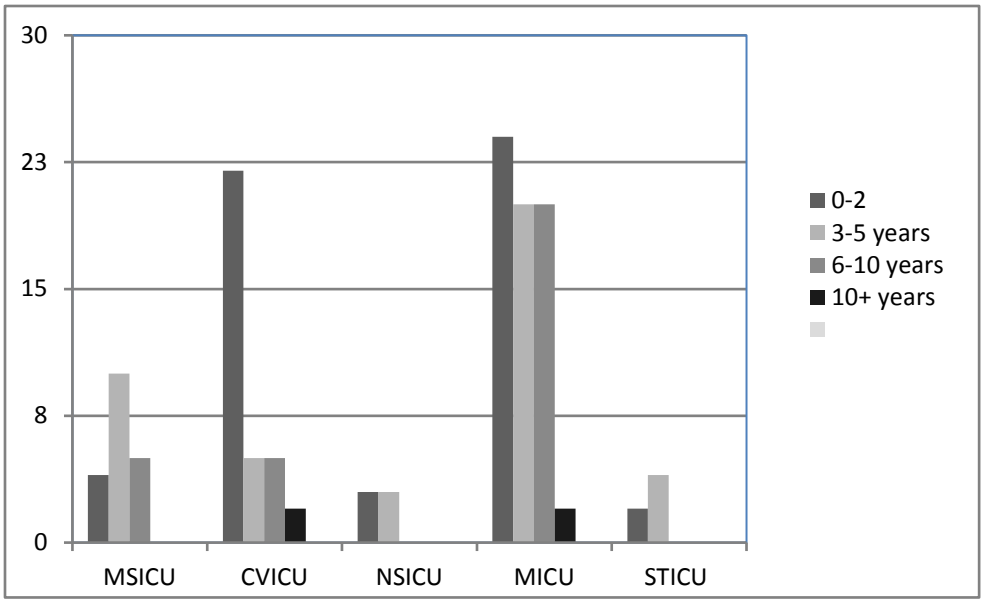

Figure 1. Respondents' experience levels (in years) broken down by individual ICU.

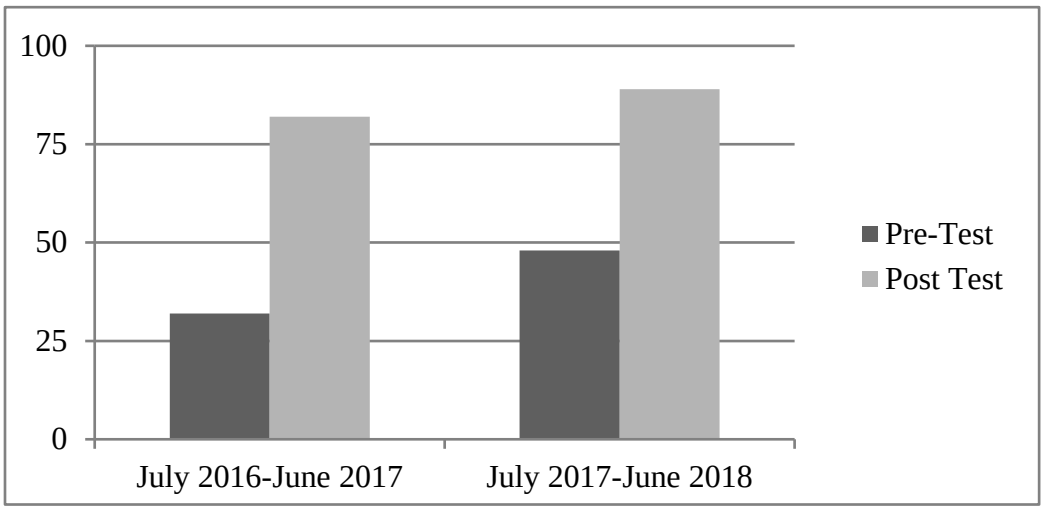

Figure 2. Comparison of pretest scores and posttest scores for Fiscal Years 2017 and 2018. Fiscal Year 2017 the average pretest score was 35% compared with the posttest score of 81%. In Fiscal Year 2018, the average pretest score was 44% compared with the posttest score of 85%.

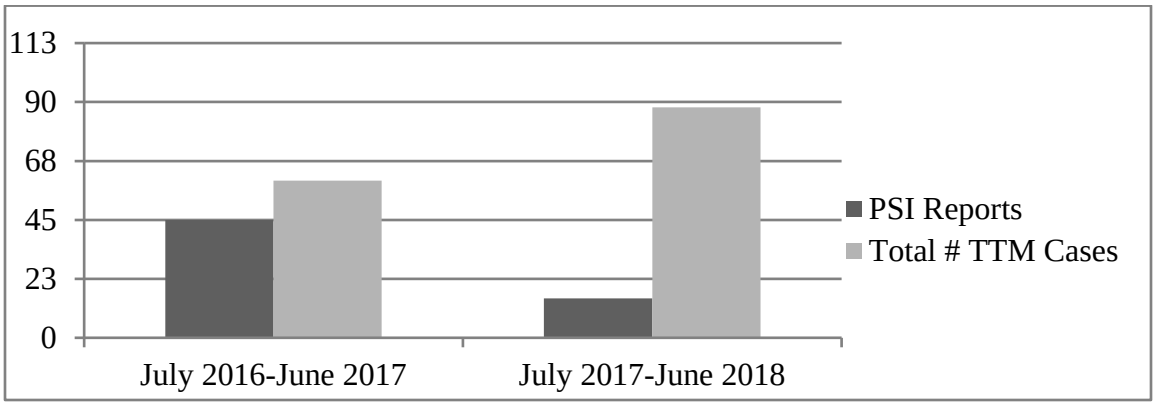

Figure 3. Comparison of total TTM patient cases by volume to the number of patient safety concerns reported for Fiscal Years 2017 and 2018. In 2017, there were 60 TTM cases organization wide in which 41 cases had a patient safety concern. In 2018, there were 86 total TTM cases in which 17 had a patient safety concern.

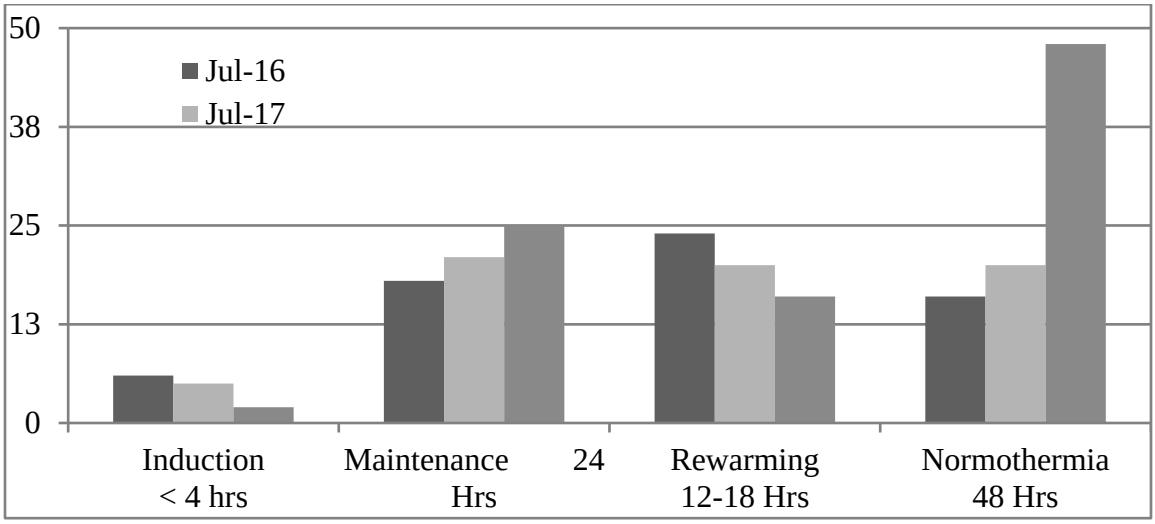

Figure 4. Four reporting benchmark metrics (with the goal to achieve) of quality and safe patient care for a TTM patient for Fiscal Years 2016, 2017, and 2018. The blue represents Fiscal Year 2016, red represents Fiscal Year 2017, and the green represents Fiscal Year 2018. Based on this figure, the benchmark metrics progressing in the appropriate directions to meet the specific goals in the course of 3 fiscal years can be seen.