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Training Pre-Licensure Nursing Students As First Responders In Clinical Emergencies

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TRAINING PRE-LICENSURE NURSING STUDENTS AS FIRST RESPONDERS IN CLINICAL EMERGENCIES

Yale University School of Nursing

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Nursing Practice

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This DNP Project is accepted in partial fulfillment of the requirements for the degree Doctor of Nursing Practice.

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INTRODUCTION

Nurses provide bedside care around the clock and are often first to witness and respond to patients experiencing clinical emergencies (Vural et al., 2017). Similarly, nursing students may be caring for patients during periods of clinical deterioration or clinical emergencies. Undoubtedly, cardiopulmonary arrest (CPA) situations are critical and require immediate action from first responders, including the healthcare team and possibly nursing students. "Code Blue," a famous hospital emergency code, is used to alert the emergency response team of CPA event (Monangi et al., 2018). The Code Blue team aims to dispatch trained resuscitators to the CPA patient in the shortest possible time (Barbetti & Lee, 2008). However, after a Code Blue is called, an estimated three to five minutes may elapse before the code team arrives at the bedside (Loucks, Leskowski, & Fallis, 2010). A delayed response in these situations is of great concern as it could result in negative outcomes for those patients (Schriver et al., 2003). This delay is translated into lost lives (Franklin, 2007).

The first responder, in most inpatient clinical settings, is likely to be a nurse (Hunziker, Tschan, Semmer, Howell, & Marsch, 2010). Nursing interventions are vital as delayed defibrillation is associated with lower rates of survival after in-hospital CPA (Chan, Krumholz, Nichol, & Nallamothu, 2008). Unfortunately, recent evidence suggests that senior pre-licensure nursing students, as well as new graduate nurses, are not well prepared to use emergency life-saving equipment and to respond appropriately to patients who are experiencing clinical emergencies (Kindl, Martin, Spade, Williams, & Clarke, 2017). Due to unexpected nature and infrequent occurrences of CPA, students may not experience and integrate the management of clinical emergencies by the end of their studies (Sapiano, Sammut, & Trapani, 2018), leaving

pre-licensure students unprepared to manage these CPA situations as practicing nurses. Today, faculty and students have the advantage of high-fidelity simulation to develop students' knowledge and skills as first responders. In the controlled environment of the laboratories, students can practice their role as first responders during life-threatening clinical events, rather than the actual events in clinical settings where patients' lives are at stake (Simko, Henry, McGinnis, & Kolesar, 2014).

Therefore, the purpose of this educational intervention was to prepare junior and senior nursing students, who are soon to be new graduate nurses, to provide adequate and timely life-saving care in clinical emergencies. The educational intervention was implemented by using the CART mnemonic©, crash cart video demonstration, and CPA simulated scenarios. With the educational intervention, junior and senior nursing students were able to perform basic and essential interventions before the arrival of the code team. This was significant, as most students might not ever encounter an actual CPA event in their clinical practicums.

METHOD

Theoretical Framework

This project was guided by Patricia Benner's theory, *From Novice to Expert* (Benner, 1982). Benner's theory illustrated that experience leads to the acquisition of clinical knowledge, judgment, and capacity for prioritization. The model pointed that acquisition and development of clinical skills must transition through five levels of proficiency: Novice, Advanced Beginner, Competent, Proficient, and Expert (Benner, 1982). Nursing students are at the novice stage in Benner's theory (Benner, 1982). In this stage, nursing students are task-oriented and require guidelines to care for patients. They are not able to grasp the clinical situation and they lack

examples of past concrete experiences to guide their clinical practice. These senior nursing students are not able to judge and prioritize aspects of clinical emergencies, and their clinical skills are limited. Without the educational intervention, nursing students may unable to perform the duty during the code situation despite it being within their role.

Project Design

This was a single site; one-group, repeated measures design. All subjects were recruited from the University of California, Irvine (UCI) School of Nursing pre-licensure programs. Each subject participated in identical, manikin-based simulations and received the same educational intervention. Dependent variables include knowledge gains and skill competence. Knowledge was measured by three knowledge tests (pretest, posttest I, and posttest II) and simulated clinical emergency events (first 5-minutes of a CPA) were used to evaluate the impact of the educational intervention on skill competence. The project was reviewed and exempted by the Institutional Review Boards of both universities (UCI and Yale University).

Project Participants

The participants were recruited from the junior and senior pre-licensure student population at UCI School of Nursing of which the researcher is not a faculty member of student courses. Participants were informed participation is voluntary and has no bearing on any course grade. Inclusion criteria were junior and senior pre-licensure nursing students, who have completed Basic Life Support (BLS) and hold a current BLS from the American Heart Association. Exclusion criteria were students who are licensed vocational nurses, paramedics, and Emergency Medical Technicians. These students may have previous exposure to the role of the first responder in clinical emergencies from working experience. Each participant received

two cardiac pocket guides from the American Association of Critical Care Nurse after this project.

Setting of Data Collection. Data collection was done with Sim Man 3G™ (Laerdal Medical Corporation, Wappinger Falls, NY). All simulators were pre-programmed with the simulation and environmental settings were made to be as identical as possible with all equipment used in the simulation provided by the UCI simulation center.

CART Mnemonic©

CART Mnemonic© stands for

C: Check pulse be prepared for **C**PR if indicated

Check the **C**ode status (Do not resuscitate, full code, or limited code)

Call the **C**ode (Code CPA),

Crash **C**art to bedside

A: **A**irway

Apply backboard

Assemble **A**mbu-bag or **A**pply oxygen devices (face mask, non-rebreather mask)

R: **R**each for equipment in the crash cart (defibrillator pads and ECG leads)

T: **T**urn on the defibrillator monitor

Timeframe of 5 minutes

Think critically (Have I done everything while waiting for the code team to arrive?).

The CART Mnemonic© had been content-validated by experts in CPA management. The expert panelists include an interventional cardiologist, two emergency department nurse practitioners, a registered nurse from hospital CPA team, and a chair from resuscitation

committees.

Simulation CPA Scenarios

These 10-minute parallel simulations depicted patients in the hospital setting who experienced CPA due to cardiac arrhythmia, and Laerdal's SimMan 3G simulator will be used. During the simulation, the patient complained of acute chest pain with sustained ventricular tachycardia. There is intravenous access but no oxygen. Supplies available to the subjects were normal saline intravenous fluid, dynamic monitor with vital signs (ECG, heart and respiratory rates, pulse oximetry value and blood pressure), a paper chart (to eliminate any issues with a non-familiar electronic health record types), a phone, and crash cart contains oxygen delivery devices, backboard, defibrillator, and defibrillator pads. There were no confederates or detractors used in this simulation.

An initial simulation was conducted to establish a nursing student's skill competence before receiving the educational intervention. Then another parallel version of the initial CPA simulation was used to evaluate a change in skills competence. The sequence of the two CPA simulated scenarios (initial and post-intervention) were identical, however patient history was slightly varied. Participants were randomly selected and assigned to groups of six students and remained with the same group throughout the simulation sessions. Each simulation scenario time was 8-10 minutes and followed by guided reflection session for a debriefing for 30-40 minutes. Following the conclusion of the simulated scenario, students were provided with a debriefing. In the debriefings, the students were encouraged to reflect on and analyze their performance leading to meaningful learning (Dreifuerst, 2009). During the debriefing, data would not be collected.

Instruments Completed by Participants

Demographic Questionnaire

All participants completed five demographic questionnaire which included age, gender, number of prior simulation experiences, enrolled program, prior simulation exposure, previous employment of the nursing students as a nurse helper (i.e., nurse's aide, care partner, etc.) and previous experience of CPA.

Knowledge Tests

A 5-item, multiple-choice questionnaire developed by the author was administered to the subjects pre-, post-CART Mnemonic© and crash cart video, and post simulation (Knowledge Pretest, Posttest I, and Posttest II). The Post-test I and II were parallel versions of the Pre-test. All of five questions addressed nursing interventions applicable to the care of a patient during the first 5-minute of a CPA. These questionnaires were content validated by nurses who have expertise in CPA situations. Additionally, ten pre-licensure students who were not a part of the project tested all questionnaires. This to ensure that knowledge gain was not a result from repeating the questionnaires. The limitation from repeated measures of testing questionnaires was that knowledge gain might improve from participants test on similar questionnaires.

The rationale for pretest was to assess the student's baseline knowledge. The posttest I was to evaluate knowledge gain from the CART mnemonic© and viewing of the crash cart video on the YouTube platform. Lastly, the posttest II was to evaluate any knowledge gain from the simulated clinical scenarios of the CPA.

Instruments completed by Reviewers

Time to Task (TTT) Assessment for Skills Competency

To determine if the educational intervention made a difference in skill competence, following the post-assessment for knowledge, the participants participate in a simulated CPA event and evaluated as competent if the group could complete the designated nursing interventions during the first five minutes of CPA simulation. By utilizing the *TTT Assessment for Skills Competency* checklist, participants were evaluated on the completion of the tasks and the time spent to complete those tasks. For instance, one nursing student applied the backboard while another nursing student applies defibrillator pads. Assessment of the completion of tasks was based on each group effort and not by the individual participant. In a clinical CPA, resuscitation is not an individual effort, but teamwork. The expected group tasks to complete in five minutes of the simulation include: 1) Check pulse, 2) Check code status, 3) Call a Code, 4) Bring the crash cart to patient's bedside, 5) Apply backboard, 6) Perform chest compressions, 7) Apply oxygen devices, 8) Apply defibrillator pads, 9) Turn on the defibrillator.

Data Collection Procedure for Participants

Examination for TTT

For simulation, one examiner monitored and annotated skill initiation (Time to Task) of the established time to accomplish the nursing interventions. American Heart Association (2017) has been utilizing time-dependent measures such as "time to first compression" and "time to first shock" in CPR guidelines. Additionally, using the objective of the time to task assessment as a method to measure task done successfully and with the appropriate quality would eliminate discrepancies between evaluators (Shinnick & Woo, 2018).

Statistical Analysis

Data analysis was performed with SPSS version 24.0 (IBM Corp, Released 2016) and included independent t-tests to determine the mean scores of knowledge differentiating between pretest, posttest I, and posttest II.

RESULTS

Knowledge

There were statistically significant increase in knowledge from pre to post training at all three testing intervals: Pretest & Posttest I (*p* <.001), Pretest & Posttest II (*p*<.001), and Posttest I and Posttest II (*p* <.001).

Skills Competency

After the educational intervention, seven tasks were performed on time by all groups (check pulse, crash cart to bedside, CPR initiation, backboard application, oxygen devices application, defibrillator pads application, and turn on the defibrillator). Prior to the educational intervention, only four tasks were performed on time by all groups (crash cart to bedside backboard application, and turning on the defibrillator).

DISCUSSION

Limitations of this study include single site project with small number of participants (n=24). While it was aimed for group completion of tasks, it would be more specific to include individual student performance evaluation. Other limitations include two examiners to evaluate skills competency using TTT and debriefing. Future studies that incorporate opportunities for individual participant assessment of skills competency may provide further insight into the value of this educational intervention.

CONCLUSIONS

Based on results from implementation, subject matter expert responses, and thorough literature review of current evidence and best practice, this project has validated the need for training pre-licensure nursing students as first responder in clinical emergencies. The educational intervention (CART mnemonic© and simulation) has the potential to improve knowledge and skills competent in pre-licensure nursing students responding to clinical emergencies of cardiopulmonary arrest.

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