DEVELOPMENT AND EVALUATION OF A SEPSIS SIMULATION WITH UNDERGRADUATE NURSING STUDENTS

BY

Kelly Martinez

Dissertation Proposal Submitted to the School of Graduate Studies
in Partial Fulfillment of the Requirements for the Degree of
Doctorate in Education

Southern Connecticut State University
New Haven, Connecticut

July, 2020

DEVELOPMENT AND EVALUATION OF A SEPSIS SIMULATION WITH UNDERGRADUATE NURSING STUDENTS

BY

KELLY MARTINEZ

This doctoral dissertation was prepared under the direction of the candidate's dissertation sponsor, Dr. Barbara Aronson, in the Department of Nursing, and has been approved by the members of the candidate's dissertation committee. It was submitted to the School of Graduate and Professional Studies was accepted in partial fulfillment of the requirements for the degree of Doctor of Education.

Barbara Aronson, PhD, RN, CNE Sponsor — July 14, 2020 Date

Linda Warren EdD, RN, CCRN
Second Reader — 15 July 2020 Date

Kimberly O. Lacey, MSN, CNE — Digitally signed by Kimberly O. Lacey, DNSc, MSN, CNE DNSc, Date: 2020.07.18 11:20:26 -04'00'

Kimberly Lacey, DNSc, RN,CNE
Third Reader — Date

07/20/2020

Cheryl Resha, Ed.D., RN
Department Chairperson — Date

ABSTRACT

This study evaluated if undergraduate nursing students in their final academic year can appropriately recognize and respond to a patient displaying signs of deterioration in a response to rescue simulation. Participants were senior level baccalaureate nursing students in a Northeast university. The student nurses' ability to recognize and respond to patient deterioration due to sepsis according to the Surviving Sepsis Campaign (SSC) definitions were examined. Participating students reviewed preparation materials and resource components followed by a simulation-based learning experience which followed the International Nursing Association for Clinical Simulation and Learning (INACSL) Standards of Best Practice: Simulation^{SM}. The simulation experience was video-recorded and four observers did utilize the Martinez Sepsis Competency Evaluation Tool (MSCET) to assess student ability to recognize and respond to a patient who is deteriorating from sepsis. The MSCET was developed by this principal investigator and validation of this tool was done prior to use. Promoting Excellence and Reflective Learning in Simulation (PEARLS) blended debriefing approach was used to guide the debriefing. Following the debriefing, the Debriefing Assessment for Simulation in Healthcare (DASH) was used to evaluate the debriefing process.

Keywords: undergraduate nursing students, simulation, recognizing, responding, deterioration, sepsis, video-recorded, observers, debriefing.

ACKNOWLEDGEMENTS

It is only with the patience of my family that I was able to complete my educational journey. The support of my husband, Phil, was like no other. Many times he has helped me to finish specific tasks as well as provide emotional support throughout the years. I am thankful for the guidance and support in all the pursuits that he has provided. With his help, I was able to complete this dissertation. I'm not sure it would have been possible without him. I am also thankful to my mother who taught me the meaning of hard work and sacrifice. She has shown me how to push through anything, no matter how difficult the challenge. She has also always been there to give me advice or to just lend an open ear. I am thankful to have her. Thank you to my brother who also believed in me and all that I have done.

Others I would like to thank are: To Dr. Ellen Abate for her guidance and wisdom early on in this life journey. To Dr. Barbara Aronson and Dr. Susan Burger for this wonderful program. The education I have gained from this program cannot be compared to anything else. Through this program, I have truly learned what it means to be an educator. To Dr. Barbara Aronson, who taught me patience and persistence; to never give up no matter how many roadblocks stand in your way. Her support was instrumental in my success. Thank you to Rose DeSiena and Mohamad Elzayat for all of your assistance with conducting the simulations for this study. Without your assistance, this study would not be possible. To Mary Acri, who's statistical assistance and guidance was like no other.

Thank you to Dr. Linda Warren, who brought in her expertise in sepsis and critical care nursing. Her experience and ability to help word my thoughts and ideas when reviewing my work was a large part of my success.

Thank you to Dr. Kimberly Lacey for all the time and effort in reading and offering suggestions and guidance throughout this process. I owe a great deal of this success to you.

Thank you to all the faculty of the Ed.D. in Nursing Education program at SCSU and WSCU. To my cohort, thank you for all the wonderful times; it was an honor learning with you. I wish you a lifetime of success.

DEDICATION

To AJ and Emma:

I love you both more than words can say. I know great success in both of your futures.

"Oh, the places you will go…you'll move mountains! You're off to great places. Today is your day! Your mountain is waiting. So…get on your way." —*Dr. Seuss*

Table of Contents

Page

List of Tables

Page

List of Figures

Page

CHAPTER ONE: INTRODUCTION

Introduction to the Topic

Despite some progress, patient errors continue to occur, and safety remains a priority for all health care institutions. The Institute of Medicine (IOM) released *To Err Is Human, Building a Safer Health Care System* in 1999. During the time of this publication, this report documented that errors in healthcare were estimated at 44,000 to 98,000 deaths annually in the United States, costing from $17 to $29 billion dollars (IMO, 1999). Stokowski (2016) discussed how five years after the IMO report was published several studies have shown improvements in the areas of performance standards, error reporting, and improved safety systems. However, these studies have suggested that the IOM's figures continue to underestimate the problem, and continued efforts to improve patient safety are needed. Recent studies estimate that 130,000-575,000 annual inpatient deaths are attributable to medical error (Bleich, 2005; Classen, et al., 2011 & Landrigan et al., 2010; Department of Health and Human Services, 2010; Stokowski, 2016).

Additionally, in 2005, The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) released “An Acute Problem?” This report found issues with the care delivered to hospitalized patients on non-intensive care floors. It was discovered that signs of deterioration were often missed, resulting in the need for the patient to be transferred to intensive care (Adam & Odell, 2005). The report showed that there were care inadequacies in the first 72 hours’ post-admission on surgical floors across the country (Adam & Odell, 2005).

Early recognition protocols have become widely used within the hospital setting and have been shown to have a positive impact on patient outcomes (Subbe & Welch, 2013). Early detection and treatment are key in the prevention of medical errors related to patient deterioration resulting from underlying illness, such as sepsis (Dellinger et al., 2013; Endacott et al., 2012;

Griffiths, Jones, & Bottle, 2013; Kelly, Forber, Conlon, Roche, & Stasa, 2014). Nonetheless, research has shown that missed indicators of patient deterioration have been noted in the hospital setting due to nurses not always knowing when to call for assistance, when to seek advice in a timely manner, and failure to appreciate clinical urgency (Endacott et al., 2012; Endacott & Westley, 2006; Harrison, Jacques, Kilborn, & McLaws, 2005; Adam and Odell, 2005)

Patients with complex health problems carry the risk of issues that may lead to deterioration. Deteriorating hospitalized patients who go unrecognized are frequently mismanaged. The inadequate delivery of care or the delay in response to clinical deterioration is referred to as "failure to rescue" or FTR (Subbe & Welch, 2013). Failure to rescue is the "inadequate or delayed response to clinical deterioration in hospitalized patients" (Subbe and Welch, 2013, p. 6). Failure to recognize and respond and the mismanagement of deteriorating patients has been associated with poor patient outcomes, leading to expensive and often unsuccessful resuscitation procedures (Buykx et al., 2011; Endacott et al., 2014).

The management, misinterpretation, or inability to detect signs and symptoms of deterioration may lead to a delayed or inadequate response and the lack of essential care leading to a FTR event (Subbe & Welch, 2013). Early recognition and prompt treatment may prevent deterioration resulting from underlying illness, such as sepsis, acute myocardial infarction, or a complication of medical care, such as a major hemorrhage after surgery (Griffiths, Jones, & Bottle, 2013; Dellinger et al., 2013). FTR continues to be an area of concern in the United States but can be prevented with early detection and prompt intervention.

Registered nurses must be aware of their surroundings and situations that would put patients at risk for deterioration. They must be able to detect patient cues and early signs and symptoms of changes in patients' conditions. In other words, they must "know what's going on."

This is known as situation awareness (Brady, Wheeler, Muething, & Kotagal, 2014). The concept of situation awareness was originally developed for aviation education but has more recently been measured in anesthesia, surgery, and nursing (Cooper et al., 2010). Cooper et al. (2010) discussed nursing students' knowledge, skill and situation awareness management of the deteriorating patient in a simulated environment. Endsley (1988) as cited by Cooper et al. (2010) stated that situational awareness is the "perception of the elements in the environment within a volume of space and time, the comprehension of their meaning and the projection of their status in the near future" (p. 2310). This concept involves the nurse's ability to recognize specific signs and symptoms displayed by the patient within a specified timeframe. The nurse must also be able to comprehend the patient's presentation and findings to anticipate patient's status in the near future (Brady, Wheeler, Muething, & Kotagal, 2014). According to Brady et al. (2014) situation awareness is achieved by "(1) gathering information, (2) understanding that information in context, and (3) making short-term projections based on current state" (p. 143) to determine needed actions based on the situation.

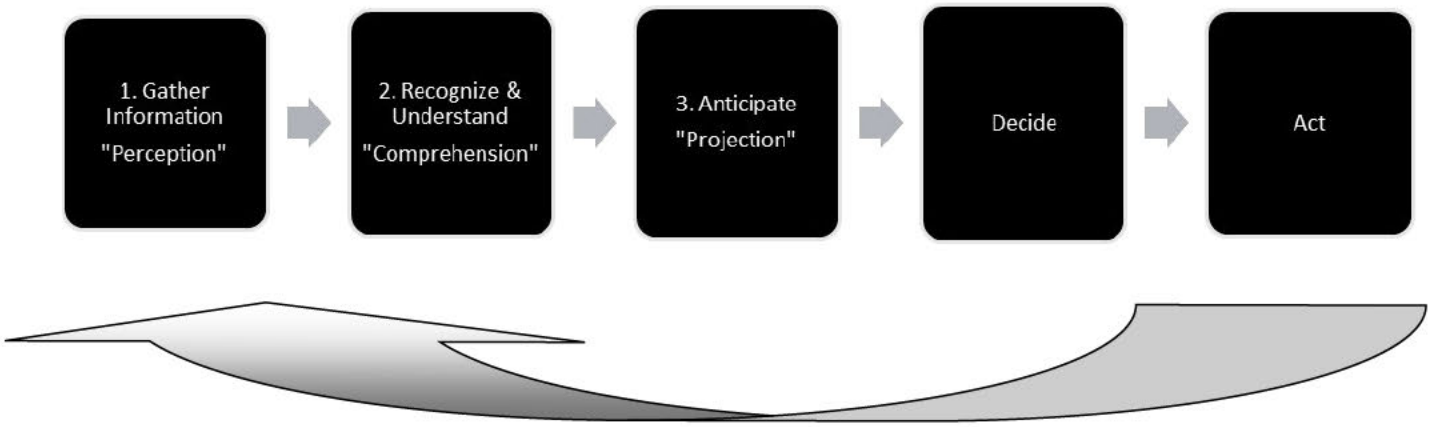

Figure 1. A diagram to demonstrate Situational Awareness

Although Clarke and Aiken (2003) did not outright use the term situational awareness, they did have similar views when discussing experienced and novice nurses' ability to detect complications in patients. These authors also introduced other important aspects such as attending to patient cues, knowing patents' surroundings, anticipating potential issues, nurses knowing their role, boundaries, and expectations. According to Clark and Aiken (2003), responding to rescue events includes assessing patients frequently, attending to cues, recognizing complications, and taking action by instituting appropriate measures and activation of a team response.

These issues emphasize the need for strong clinical assessment skills and critical thinking ability to identify signs of deterioration signs early. Novice nurses may lack the experience and confidence to recognize and report early symptoms of sepsis. Creating meaningful learning experiences for student nurses may assist them in enhancing their assessment and critical thinking skills and learning how to appropriately respond to emergency situations such as sepsis.

Sepsis is the primary cause of death from infection, specifically when it is not quickly recognized and treated (Singer, et al., 2016). What makes sepsis different from other common infections is that it is an atypical, uncharacteristic, dysregulated host response leading to organ dysfunction (Singer, et al., 2016). Sepsis can occur due to acute illness, long-standing comorbidities, medication, and interventions. Specific infections may result in local organ dysfunction without generating a dysregulated systemic host response (Singer, et al., 2016).

Sepsis is a major public health concern, accounting for more than $20 billion (5.2%) of total United States hospital costs in 2011. The reported incidence of sepsis is likely related to the aging population who typically have more comorbidities (Singer, 2016). The Centers for Disease Control and Prevention (CDC) reported an increase in sepsis rates between the years 2000 and

2008. In 2000 the hospitalization rate for sepsis was 621,000; this increased in 2008 to 1,141,000 (CDC, 2014). Sepsis was the sixth most common reason for hospitalization in the U.S. in 1999 with 836,000 hospital stays and an additional 829,500 stays due to a secondary diagnosis of sepsis (CDC, 2014). In 2009, hospital mortality rate from sepsis was about 16 percent. That is more than eight times higher than other hospital mortality rates and has remained unchanged from 2000 (CDC, 2014). In 2016, the CDC stated that more than 1.5 million people develop sepsis each year in the United States, about 250,000 Americans die from sepsis each year, and one in three patients who die in a hospital have sepsis (CDC, 2016). These alarming reports not only show the high cost of health care related to sepsis but also the impact on patients' health and well-being. Sepsis leads to major health complications and increases morbidity and mortality.

Early identification and treatment of sepsis can significantly decrease morbidity and mortality (Dellinger et al., 2013). Aggressive management of severe sepsis is crucial to improving outcomes, and the first step is a timely diagnosis of sepsis. According to the Surviving Sepsis Campaign (SSC) (2016), a grouping of patient treatments referred to as bundles should be started as soon as the patient is identified as having sepsis. Ideally, bundle treatment should be initiated within one hour of identification of sepsis. The bundle should be initiated again within three hours and six hours along with specific patient monitoring and assessments (SSC, 2016). Nurses are in a unique position to recognize early symptoms of sepsis, activate a team response, and begin the aggressive resuscitation process due to their round-the-clock attention and accountability.

Didactic methods of teaching nursing students about patient deterioration may be inadequate in training for today's clinical practice (Buykx et al., 2011). Studies show that nursing students and registered nurses have satisfactory theoretical knowledge but fail to respond

appropriately to patient deterioration (Endacott et al., 2014). Bogossian et al. (2014) conducted a study examining early recognition and situation awareness of sudden patient deterioration by utilizing high-fidelity simulated environments. The undergraduate nursing students in the study were provided with an opportunity to develop and perfect recognition and response skills when caring for patients who were rapidly deteriorating. The results of this study showed that only half of the final-year (senior) students (n=97) had experience caring for rapidly deteriorating patients (Bogossian et al., 2014).

Endacott et al. (2014) conducted a mixed method study examining nursing students' and registered nurses' teamwork skills in a simulation environment involving deterioration scenarios. The simulation scenarios were chest pain, hypovolemic shock and respiratory distress. The participants consisted of three teams, and each team was composed of 32 students and 15 registered nurses. The results showed that objective structured clinical examination performance was similar between registered nurses and students (mean 54% and 49%); however, team emergency assessment measure scores differed significantly between the two groups (57% compared to 38%, $p < 0.01$) (Endacott et al., 2014).

Conventional nursing education includes didactic instruction in the classroom setting and utilizes a clinical environment to practice and develop skills. Clinical experiences provide patient interaction so that nursing students can practice skills, exercise clinical judgment and critical thinking, interact with health care professionals and prepare for entry into practice (Hayden et al., 2014). Creating a meaningful clinical experience for nursing students has become an issue in recent years. With the rise of undergraduate programs and increased student enrollment, finding clinical placements has become challenging. Furthermore, some clinical sites have reduced the number of students allowed on a unit at a given time and have placed restrictions on what

students may do when on the unit. Faculty shortages and facilities not granting students access to electronic medical records has added to the problem. Rapidly changing patient census, increased acuity and decreased hospital stays all create barriers to students' ability to participate in clinical learning experiences (Hayden et al., 2014).

In addition, the rise in morbidity and mortality among hospitalized patients throughout the United States heightens concerns about professional competency (Fowler-Durham & Alden, 2008). Pressure has been placed upon faculty to better prepare competent graduates. Nursing educational strategies in didactic and clinical settings are influential in determining critical thinking and clinical decision-making ability as well as in developing the psychomotor skill performance of new graduates (Fowler-Durham & Alden, 2008).

A recent landmark study in simulation strongly suggests that academic nurse educators can safely replace a portion of the traditional clinical setting with simulation. The National Council of State Boards of Nursing (NCSBN) conducted the National Simulation Study (2014), a large-scale, randomized, controlled study to compare the effectiveness of simulation-based teaching strategies. This study randomized ten pre-licensure programs across the United States and placed them into one of three groups for comparison: (1) the control group where students had traditional clinical experiences (no more than 10% of clinical hours could be spent in simulation), (2) Students who had 25% of their traditional clinical hours replaced by simulation and (3) Students who had 50% of their traditional clinical hours replaced by simulation (Hayden et al., 2014). Students were assessed on clinical competency and nursing knowledge. The students also assessed their learning experiences in the clinical setting and in the simulation setting (Hayden et al., 2014). The study revealed that there were no statistically significant differences in clinical competency as assessed by clinical preceptors and instructors, there were

no statistically significant differences in comprehensive nursing knowledge, and there were no statistically significant differences in NCLEX pass rates among the three study groups (Hayden et al., 2014). This study provided evidence that substituting high-quality simulation experiences for up to half of traditional clinical hours produces comparable educational outcomes and adequately prepares nursing students for practice.

Simulation refers to scenarios that mimic situations that occur in the clinical environment and are designed for teaching and enhancing skills, to demonstrate procedures, to promote decision-making and critical thinking (Jeffries, 2005). This teaching method allows the educator to control the learning environment through scheduling of practice, providing feedback, and minimizing or introducing environmental distractions (Beaubien & Baker, 2004). Simulation has become a popular teaching method in nursing education. Simulation can provide specific, controlled case scenarios where students can practice and advance their skills and competence in a safe environment. This technique provides the opportunity to enhance judgment and critical thinking skills when faced with an emergent clinical situation. Simulation can also assist the undergraduate nursing student to develop a true perception of the possibilities that can occur when caring for these patients and the unpredictable nature of clinical practice (Kelly et al., 2014).

This study evaluated a standardized simulation-based experience and instrument for the assessment of the competency of nursing students in relation to patient deterioration developed by this principal investigator. Specifically, patient deterioration focused on sepsis. The simulation used in this study was developed to meet the educational competencies set by the American Association of Colleges of Nursing (AACN), the Nurse of the Future (NOF) Nursing Core Competencies, the Quality and Safety Education in Nursing (QSEN), and on best practices

outlined by the International Nursing Association for Clinical Simulation and Learning (INACSL).

Rationale for the Study

Health care consumers and employers expect graduate nurses (first-year registered nurses following completion of a degree program) to have the skill sets to perform in situations involving deteriorating patients (Purling & King, 2012; Kelly et al., 2014). However, student nurses may not have the opportunity to participate in a response to rescue event in their clinical rotations. If a patient is displaying signs of deterioration, an experienced nurse often takes control of the situation, or a rapid response team is called, depriving the student nurse of the learning opportunity. Given the short timeframe of most clinical experiences, and the infrequency and unpredictability of sepsis events, it is a challenge to adequately prepare students for these types of emergency situations. Schools of nursing must offer students opportunities to practice responding to rescue events in a safe environment without the risk of patient harm.

Teaching strategies need to foster the development of decision-making skills individually and in teams through scenario-based activities, clinical experiences, and simulation (Bucknall et al., 2016). The critical thinking skills necessary for practice are developed through experiences that include patient assessment, early recognition, being situationally aware, seeking assistance in a timely manner, the ability to reach help appropriately, effective communication, and skill proficiency (Bogossian et al., 2014; Buykx et al., 2011; Kelly et al., 2014). Bogossian et al. (2014) recommend that strategies such as regular rehearsal of responding to the deteriorating patient become a mandatory component of students' clinical preparation, focusing on clinical performance, teamwork, and situation awareness. Learning through simulation is a suitable

educational tool to provide these much-needed learning experiences in a safe, controlled environment.

Significance of the Study

Evidence to date supports the concept that there are inadequacies in assessment skills and nursing caring for deteriorating patients (Purling & King, 2012; Subbe & Welch, 2013). Moser (2014) discussed how patients do not always present with classic, but often vague, subtle signs and symptoms of sepsis. For example, this is seen at times with elderly patients. Subbe and Welch (2013) discussed that with deteriorating patients; signs and symptoms are not always subtle but are followed by extended periods of documented signs of deterioration, such as physiological abnormalities, and may have been preventable (Subbe & Welch, 2013).

Therefore, given the acute severity of patient deterioration and mismanaged care, it is imperative that all nursing programs prepare their students for this type of acute medical situation. Swenty and Eggleston (2011) evaluated the use of simulation practices in a baccalaureate nursing programs. They discussed how the Joint Commission's 2008 National Patient Safety Goals and other professional organizations encourage the use of simulated drills to prepare students and health care professionals in enhancing skills, gaining confidence, and increasing critical thinking, to improve patient safety outcomes. The IOM report, *To Err is Human: Building a Safer Health Care System* (1999) affirms that simulation training is recommended to assist in the prevention of medical errors. The report declares that "… health care organizations and teaching institutions should participate in the development and use of simulation for training novice practitioners, problem-solving, and crisis management, especially when new and potentially hazardous procedures and equipment are introduced" (p. 179). Given the unpredictability of the clinical setting and specific cases of patient deterioration, it is evident

that nursing students must be prepared for this type of acute, life-threatening clinical situation. Sepsis was chosen as the exemplar clinical situation for this study

The implications related to the literature indicate a need to focus on formal education related to early recognition of the initial signs and symptoms of patient deterioration with immediate management aimed to improve survival outcomes of patients (Robson, Beavis & Spittle, 2007; Poeze, Solberg, Greve, & Ramsay, 2005). The significance of this study is that focused learning experiences on patient deterioration has the potential to increase competence in nursing students resulting in a potential decrease in patient morbidity and mortality and improved patient outcomes.

Problem Statement

Newly graduated registered nurses may not have the necessary experience or confidence to be acutely aware of their surroundings and react to emergencies appropriately. Bucknall et al. (2016) discussed how novice nurses are less focused on cue selection and do not recognize important cues, are limited in their data search strategies, are less quick to react, are highly task oriented. They tend to follow rules without paying attention to the situation, take more time to collect assessment findings, and are slow in decision-making. Graduate nurses quickly become engrossed in the complexity of patient care and the high consequences of decision-making involved with clinical practice. This transition, role change, lack of experience, and basic-level of knowledge can create overwhelming feelings for graduate nurses, making it difficult to recognize and care for the deteriorating patients (Purling & King, 2012).

In accordance with the competencies and guidelines set forth by the AACN, QSEN, and the IOM, nursing education needs to include learning experiences centered on high risk, low frequency patient care scenarios seen in the clinical setting. It is imperative for nursing students

to understand the important role nurses have in detecting and acting in a critical situation of patient deterioration. These situational experiences should include patient assessment, seeking assistance in a timely manner, effective communication, and skill proficiency (Kelly, et al., 2014). The use of simulation is one of the approaches to fulfill this requirement. With simulation students will be able to use scaffold learning to build upon past experiences or serve as a substitute for lack of experience (Kelly, Hopwood, Rooney, & Boud, 2016).

The overall aim of creating a simulated experience is to rehearse and practice clinical skills in order to reduce clinical errors and improve patient outcomes (Kelly, Hopwood, Rooney, & Boud, 2016). Focused education on patient deterioration through the use of simulation will hopefully better prepare students for clinical practice, potentially leading to a decrease in patient morbidity and mortality and improved patient outcomes.

Purpose Statement

The first purpose of this study was to develop a simulation-based experience for nursing students to assist them to recognize and respond to patients displaying signs of deterioration related to sepsis in a safe and protected environment. To ensure the simulation experience was consistent with best practices in simulation, it was based on INACLS Standards of Best Practice (2016b). To ensure consistentency with evidence-based standards, the Surviving Sepsis Campaign (SSC) Guidelines (2017) was utilized. This simulation-based experience included preparation materials, pre-briefing, a case scenario, and debriefing known as the Martinez Sepsis Competency Simulation Module (MSCSM).

The second purpose of this study was to develop and evaluate an instrument to measure the skills and behaviors of nursing students who participate in the MSCSM. The Martinez Sepsis Competency Evaluation Tool (MSCET) was used to assess nursing

students' ability to competently respond to a simulation scenario involving a patient with sepsis. The areas of focus are patient safety, assessments, communication, core measures (standards of care and treatment processes), and documentation. The MSCET was sent to experts for review to establish content validity before students participated in the MSCSM, and based on their review, the instrument was adjusted. Inter-rater reliability of the relevance, clarity, and consistency scores of the MSCET as determined by a panel of experts were also calculated. Student scores on the MSCET for the areas of focus and total scores on the instrument were calculated to assess overall student performance.

A third purpose of the study was to evaluate students' satisfaction with the simulation-based experience and the debriefing model entitled the Promoting Excellence and Reflective Learning in Simulation Approach to Health Care Debriefing (PEARLS). Student satisfaction was assessed using a reliable and valid instrument: the Debriefing Assessment for Simulation in Healthcare (DASH).

The desired outcomes following the simulation include that students had a greater understanding of the importance of recognizing subtle signs of early deterioration, desired behaviors, and expectations once they are working as registered nurses. At the end of this simulation, students should have been able to correctly identify the early signs of deterioration related to sepsis according to the SSC (2017), and respond appropriately using established guidelines.

Research Questions

RQ1: What are the content validity scores of the Martinez Sepsis Competency Evaluation Tool (MSCET) as measured by a panel of experts?

RQ 2: How do undergraduate nursing students, in their senior year of nursing school, manage patients who are deteriorating or at risk for deterioration during a simulation sepsis scenario as measured by scores on the MSCET in the areas of patient safety, assessments, communication, core measures and documentation?

RQ 3: What is the inter-rater reliability of the relevance, clarity, and consistency scores of the MSCET as determined by a panel of experts?

RQ 4: How satisfied are senior level nursing students with the Promoting Excellence and Reflective Learning in Simulation (PEARLS) debriefing method in improving their performance during the simulation as measured by the debriefing assessment for simulation in health care (DASH) student survey?

Definition of Terms

Conceptual definitions present the abstract or theoretical meaning of concepts being studied (Polit & Beck, 2017). For this study, conceptual definitions are as follows:

1) Deterioration: "The act or process of becoming worse" (Merriam-Webster, 2016).
2) Failure to rescue (FTR): "The inadequate or delayed response to clinical deterioration in hospitalized patients" (Subbe and Welch, 2013, p. 6). Failure to prevent a clinically important deterioration or a complication of medical care (Agency for Healthcare Research and Quality [AHRQ], 2017).
3) Sepsis: "A life-threatening organ dysfunction caused by a dysregulated host response to infection" (Singer, et al., 2016, p.801). "The presence (probable or documented) of

infection together with systemic manifestations of infection" (Dellinger et al., 2013, p. 168). "Sepsis is a systemic, deleterious host response to infection leading to severe sepsis" (Dellinger et al., 2013, p. 167).

4) Septic shock: A subset of sepsis resulting in circulatory and cellular metabolic abnormalities that are extremely serious enough to increase the patient's mortality (Singer et al., 2016).
5) Early Goal Directed Therapy (EGDT): Defined as treatment within 6 hours of presentation involving intensive monitoring and aggressive management of specific parameters to specified targets to optimize oxygen delivery to tissues (Dellinger et al., 2013).
6) Rapid response system (RRS) or rapid response team (RRT): A group of individuals who are specifically trained to respond to declining patients (Shearer et al., 2012).
7) Situation awareness: "Knowing what's going on." "The perception of the elements of the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future" (Brady, Wheeler, Muething, & Kotagal, 2014, p. 144).
8) Simulation: "An educational strategy in which a particular set of conditions are created or replicated to resemble authentic situations that are possible in real life. Simulation can incorporate one or more modalities to promote, improve, or validate a participant's performance" (INACSL, 2016a, p. S44).
9) Simulation-based experience: "A broad array of structured activities that represent actual or potential situations in education, practice, and research. These activities allow participants to develop or enhance knowledge, skills, and/or attitudes and

provide an opportunity to analyze and respond to realistic situations in a simulated environment" (INACSL, 2016a, p. S45).

10) Participant: One who participates in a simulation-based activity for the purpose of gaining or demonstrating specific skills (INACSL, 2016a).
11) Facilitator: An individual who provides guidance, support, and structure as well as pre-briefing and debriefing during the simulation experience (INACSL, 2016a, p. S42).
12) Assessment: A process providing information or feedback to an individual or group usually related to knowledge, skills, and attitudes (INACSL, 2016a, p. S40).
13) Competence: "Demonstrate the ability to perform a specific role or skill based on standardized criteria." "The criteria may include a set of defined behaviors that guide the identification, development, and evaluation of one's ability to perform a specific role" (INACSL, 2016a, p. S40).
14) Pre-briefing: An orientation session before the actual simulation experience where the facilitator(s) provide information and/or instructions to the participants. "The purpose of the pre-briefing is to establish a psychologically safe environment for participants" (INACSL, 2016a, p. S43).
15) Debriefing: A facilitator led activity that follows the simulation activity using an evidence-based model. "Participants' reflective thinking is encouraged, and feedback is provided regarding the participants' performance while various aspects of the completed simulation are discussed. Participants are encouraged to explore emotions and questions, reflect, and provide feedback to one another. The purpose of

debriefing is to move toward assimilation and accommodation to transfer learning to future situations" (INACSL, 2016a. P. S41).

16) Evaluation: "…focuses on the measurement of outcomes or achievement of the objectives at a discrete moment in time…" (INACSL, 2016a. p. S26).

17) Heart Failure Simulation Competency Evaluation Tool©: A tool originally used to assess students in a simulation scenario involving heart failure. This is a check list where students receive a check if the task was completed in each of the seven criteria. The six criteria are: 1) initial patient safety, 2) activities, 3) assessments, 4) communication, 5) interventions, 6) core measure education, and 7) documentation. When this tool is applied in a simulation exercise it is usually followed by a debriefing of the participants (Aronson, Glynn, & Squires, 2010).

18) The Martinez Sepsis Competency Evaluation Tool (MSCET): A tool based upon the Heart Failure Competency Simulation Tool used to assess the nursing student's ability to competently respond during a simulation scenario involving a patient with sepsis. The areas of focus are patient safety, assessment, communication, interventions, and documentation (Appendix B).

19) The Martinez Sepsis Competency Simulation Module (MSCSM): A simulation learning experience where the simulation is based upon a fictitious patient who is showing signs and symptoms of deterioration from sepsis. This simulation-based experience was developed based on the INACSL Standards for Best Practice (Appendix A).

20) Promoting Excellence and Reflective Learning in Simulation (PEARLS): A blended debriefing approach where educators purposefully combine strategies for debriefing

depending on learner type and expertise, learning objective(s), amount of time available, educator expertise, and other considerations that influence the effectiveness of specific debriefing strategies (Cheng et al., 2016; Eppich & Cheng, 2015).

21) Debriefing Assessment for Simulation in Healthcare tool (DASH): A behaviorally based rating scale that provides valid and reliable data for use in the simulation setting. It was based on evidence and theory about how people learn and change in experiential contexts (NLN, 2015a; Center for Medical Simulation Debriefing Assessment for Simulation in Healthcare, 2009).

Introduction to Conceptual Framework

This dissertation drew upon two theories: Social Learning Theory and the NLN Jeffries Simulation Theory. Social Learning Theory is a hybrid of behaviorist and cognitivist perspectives (Utley, 2011). Social Learning Theory explains human behavior as a "continuous reciprocal interaction between cognitive, behavioral, and environmental determents" (Bandura, 1977, p. 2). Social Learning Theory values the influence of the environment on learning and sees learning as a social process in which the individual can learn by watching others (Utley, 2011). The concept of modeling or learning through observation is essential to Social Learning Theory. However, Bandura (1977) points out that people do not enact everything that is modeled. Learners are more likely to adopt a model behavior if it results in outcomes they value. Social Learning Theory utilizes the concept of self-efficacy, referring to individual's perception of how well prepared they are to perform a task (Ngo & Murphy, 2005). A common medical problem that causes deterioration is sepsis. Ngo and Murphy (2005) discussed the application of Social Learning Theory to create an education model for nurses regarding sepsis education. The authors showed that by increasing nurses' knowledge and self-efficacy related to sepsis, the patient

would have a more positive outcome. In this study, sepsis served as the example of deterioration in the learning component. Through simulation, nursing students were given a learning model where they experienced the active role of the nurse in a situation where a patient portrays early signs of deterioration due to sepsis.

The implementation of the Social Learning Theory supported the need for education of patient deterioration through the use of simulation. As discussed previously, practical experience is vital to the student nurses' education. The traditional clinical setting cannot guarantee these experiences, and simulation is a safe, practical and controlled learning environment. The NLN Jeffries Simulation Theory (Jeffries, 2016) was utilized as a guideline in designing and implementing the simulation experience. The motivation behind choosing this theory was based on the suggestions of the INACSL Standards of Best Practice: Simulation (SM) (2016b). The Jeffries Simulation Theory originated as a framework and was recently named as a theory. In 2005, the National League for Nursing and Dr. Pamela Jeffries published *A Framework for Designing, Implementing, and Evaluating Simulations Used as Teaching Strategies in Nursing*. Since that time, the framework has become the essential handbook for nurse educators involved in simulation (Jeffries, 2016). The NLN Jeffries Simulation Framework has been used in nursing education and serves as a guideline in conducting simulations (Hallmark, Thomas, & Gantt, 2014).

The NLN Jeffries Simulation Theory and the INACSL Standards of Best Practice: Simulation^{SM} (2016b) provided a strong foundation for simulation design and education. This simulation scenario followed clear guidelines and contained concise learning objectives and appropriate program and educational level problem solving components to meet the learning objectives as suggested by The NLN Jeffries Simulation

Theory. Students were assigned roles during the simulation scenarios. The students were involved in a pre-briefing where they were oriented to the scenario and were provided with necessary patient background information. Following the simulation there was a debriefing session guided by Promoting Excellence and Reflective Learning in Simulation (PEARLS). PEARLS is a blended approach to debriefing that encourages educators to combine various debriefing strategies to alter discussions to meet the learner needs (Cheng et al., 2016).

The Heart Failure Simulation Competency Evaluation Tool (Aronson, Glynn, & Squires, 2012) served as the template for the Martinez Sepsis Competency Evaluation Tool (MSCET) Martinez Sepsis Competency Evaluation Tool (MSCET). This tool was used to assess the nursing students' ability to competently respond during a simulation scenario involving a patient with sepsis and act accordingly. The areas of focus in this tool are patient safety, assessment, communication, interventions, and documentation. This tool was intended to support and facilitate experiential learning according to The NLN Jeffries Simulation Theory (Appendix B).

The NLN Jeffries Simulation Theory (Jeffries, 2016) and INACSL Standards of Best Practice: Simulation^{SM} (2016b) both stress the importance of debriefing as it allows for feedback and reflection on simulation performance. Jeffries (2016) explains that debriefing is essential when using simulation with novice nursing students. The educator is challenged to not fully lead or control the simulation and debriefing experience. Learning should take place in collaboration with fellow students, through the experience and discussion as well as reflection. The NLN Jeffries Simulation Theory discusses the use of student-centered learning as opposed to educator-centered learning. Jeffries (2016) discussed that facilitators need to create a learner-centered, "guide on the side" approach to facilitation, allowing participants to do most of the discussion during debriefing and that not all "facilitation" must be led by the "facilitator" (p. 25).

Debriefing ensures the best possible learning outcomes through enhancing self-awareness, self-efficacy, and transfer of knowledge, skills, and attitudes (INACSL, 2016a). Through debriefing, students enhance clinical skills and increase situational awareness through role development, which, in turn, promotes patient safety (INACSL, 2016a).

Assumptions

This study was subjected to the following assumptions:

1. Undergraduate nursing students will volunteer to participate in this study.
2. Performance during simulation reflects nursing practice.
3. Students will participate in all components of the MSCSM.
4. Undergraduate nursing students participating in this study will provide honest answers to the responses on the DASH.
5. Nursing faculty will allow the researcher to recruit for participation in the study

Limitations and Delimitations

This study was subjected to the following limitations:

1. The sample may have been minimal regarding participation, ethnicity and gender, which may have affect the generalizability of the findings.

There is a possibility that this study may have been subjected to the following delimitations:

1. This study was limited to nursing students in Connecticut.
2. The evaluation to this study will concentrate on nursing students' ability to recognize and respond to the patient displaying signs of deterioration due to sepsis.
3. This study will focus on adult patients only; no pediatric patients will be discussed.

Summary of Chapter One

Simulation for undergraduate nursing students provides a meaningful learning experience of choice within a controlled, safe environment. Simulation can be used to focus on infrequent situations within the clinical setting or to enhance needed clinical and assessment skills. The goal of this simulation-based experience (MSCSM) was to improve skills, increase competence, increase social awareness, and increase the understanding of the care needed for patients showing signs of deterioration due to sepsis. It was essential that proper evaluation and feedback were provided to the students during the simulation. The development and evaluation of the MSCET enabled faculty to assess students' competency reliably and to provide meaningful feedback to students during debriefing. Students who participated in this MSCSM had the opportunity to participate in evaluating their experiences during the simulation and debriefing.

This chapter introduced the reader to the research problem, the significance of the problem and the rationale for the study. It also defined terms, concepts, identified assumptions, and limitations relevant to the study. This chapter also introduced the theoretical framework of the study, defined problem and purpose statements and research questions guiding the study. Chapter two will discuss a comprehensive review of the literature and further explain the theoretical framework of the study.

CHAPTER TWO: OVERVIEW OF THE LITERATURE

Registered nurses play an essential role in the direct care of patients. Nurses have a responsibility to anticipate possible causes of patient deterioration, detect early clinical signs of deterioration, and act swiftly and appropriately to maintain patient safety (Bogossian et al., 2014; Kelly, Forber, Conlon, Roche, & Stasa, 2014). Because deterioration can happen with any patient, nurses should be able to recognize and manage deteriorating patients. This includes novice nurses within their first year of practice and recently graduated nurses (Purling & King, 2012). However, studies have shown that nurses often do not detect the warning signs of clinical deterioration in the early stages (Purling & King, 2012; Kelly, et al., 2014; Buykx et al., 2011). There is a need for formal education related to the early recognition and management of patients who experience a change in patient condition before entering the workforce (Burney et al., 2012; Robson, Beavis & Spittle, 2007; Tromp, et al., 2010).

Chapter one introduced sepsis as a national patient safety problem and the importance of the early recognition and management of this complication. It also introduced the concept of FTR and situational awareness, and highlighted the need for schools of nursing to better prepare graduates to respond to clinical deterioration. Simulation is identified as an effective strategy to teach problem identification, psychomotor skills, and clinical judgment. Chapter two includes a literature review of patient deterioration and FTR, sepsis, sepsis criteria and treatment guidelines. It will also include a summary of nursing education standards, including the concept of situational awareness, the effectiveness of simulation as a teaching/learning strategy, and debriefing. Lastly, a discussion on the conceptual framework of the study is provided.

Review of the Research Literature

A literature review was conducted and reviewed. Literature was collected from the Cumulative Index to Nursing and Allied Health (CINAHL), Google Scholar, JSTOR, Medline, PubMed and ProQuest databases on studies published between January 1, 1990 and 2016 using the following subject headings: nursing, nursing education, nursing education deterioration, sepsis, nursing education sepsis, nursing education simulation, simulation, situational awareness and situational awareness nursing.

The rationale for such a wide range of dates was due to the report published in 1999 by the Institute of Medicine, *To Err is Human: Building a Safer Health System*, which raised awareness about medical errors in the healthcare world and promoting patient safety. The report was based upon analysis of numerous studies by multiple organizations and concluded that between 44,000 to 98,000 people die each year as a result of preventable medical errors. The studies included in this report were considered for this study. The push for decreased medical errors and increased patient safety is still of great emphasis today.

The search revealed a wide range of studies that focused on patient deterioration, sepsis criteria, sepsis guidelines, sepsis treatments, and nursing education standards. In addition, several articles that discussed how nurses identify and respond when faced with deteriorating patients, when they seek assistance, how competent they feel caring for these patients as well as nursing points of view, perceptions, and experiences were identified. Studies were excluded from review if they were not available in English or if they were published prior to 1990. Studies that pertained to nursing programs in the United States, Canada, and Australia were reviewed. An ancestral search utilizing the articles that

discussed patient deterioration, sepsis criteria, sepsis guidelines, sepsis treatments, and nursing education was also conducted. The Campaign for Surviving Sepsis (2016) was utilized as it sets the standards for sepsis identification, treatment, and goals for patient safety. Finally, INACSL Standards of Best Practice: Simulation℠ (2016b) were reviewed because these are the international evidence-based guidelines used in nursing education, pertaining to simulation as a teaching modality.

Synthesis and Critique of Research Findings

Patient Deterioration and Failure to Rescue

Medical errors occur in a variety of settings. Being admitted to a hospital does not necessarily ensure patient safety for acutely ill patients (Subbe & Welch, 2013). Deteriorating patients in the hospital who go unrecognized are frequently mismanaged. The inadequate delivery of care resulting in FTR can lead to concerns over patient safety, affect the patient's well-being, and poor patient outcomes (Bogossian et al., 2014, Buykx et al., 2011; Endacott et al., 2014). Common themes in the literature regarding patient deterioration and FTR include: failure to identify patient signs of deterioration, uncertainty about when to seek assistance, failures in communication between staff members, and lack of experience.

Several studies explored patient deterioration and the ability of nurses to properly intervene (Jones & Johnstone, 2017; Endacott et al.; 2012; Purling & King, 2012). Jones and Johnstone (2017) explored intentional blindness in the critical care, emergency, and perioperative settings and describe intentional blindness as the "failure to see things that are in plain sight on account of being unexpected" (p. 1). The researchers analyzed four case scenarios focusing on how nurses identify and manage gaps or discontinuities in practice. The researchers obtained a purposeful sample of registered nurses (*n*=71). Fifty-five of the participants worked in

either the intensive care unit, emergency department or perioperative unit. The remainder worked in either a neuroscience, rehabilitation, or transitional care setting. Data were collected through in-depth semi-structured interviews using three methods: face-to-face interviewing (*n*=15), telephone interviewing (n=46), and e-mail interviewing (*n*=10). The results of this study showed that intentional blindness could be explained by a failure to recognize and act upon signs of deterioration. In three of the four case scenarios, vital signs were measured and recorded on a regular basis; however, participants failed to recognize changes in vital signs as early signs of deterioration. The participants also failed to either recognize a change in patient's physical appearance as an abnormal occurrence, and often did not reassess the patient. The high-stress and complex nature of the clinical settings in which these cases occurred coupled with a high cognitive workload, noise and frequent interruptions, create the conditions for intentional blindness (Jones & Johnstone, 2017).

In a mixed method study, Endacott et al. (2012) examined how registered nurses (*n*=34) identify and respond to deteriorating patients. The setting for this study was a rural hospital. The simulation utilized trained actors. The registered nurses had to complete two simulation exercises consisting of a patient with chest pain and a patient with respiratory distress. Data were collected using an Objective Structured Clinical Examination (OSCE) rating system which assessed the performance of the registered nurses during the two simulation exercises. This rating system includes a scoring tool based on clinical practice guidelines and expert panel reviews. Students gained points in the OSCE assessment for correct observations, history taking, and patient management, such as oxygen administration and pain management. The simulations were videotaped. Participants were interviewed while they watched the videotaped simulations and reflected on their performance. A qualitative thematic analysis of the videos and review of the

data was completed. The researchers found that the videotaped simulation reviews provided additional insight of nurses' decision-making that were not evident from OSCE scoring alone. The researchers found that the strain on registered nurses to assess and manage complex patients has increased. This finding was related to physiological variables in the hospital which led to less than optimal patient outcomes. Contributing factors identified were nurses having the feeling of uncertainty as to when to call for assistance or not seeking assistance in a timely manner. Themes generated from the data were: exhausting autonomous decision making, misinterpreting the evidence, conditioned response, and missed cues (Endacott et al., 2012).

Purling and King (2012) completed an integrated review of the literature on factors that influence new graduate nurses' preparedness for recognition and response to patient deterioration in the acute care setting. Seventeen primary research studies drawn from novice and experienced registered nurse experiences were selected for this review. A manual thematic analysis was used to identify themes across the reviewed studies. The authors found that newly graduated nurses struggle with when to seek assistance due to lack of experience and often feel overwhelmed in the transition of becoming a self-reliant registered nurse. This transition and lack of experience make it difficult for these nurses to identify and care for deteriorating patients and seek rapid assistance.

Of the 17 studies reviewed, 14 recognized the importance of clinical support from nursing colleagues and medical officers in decision-making to escalate care. The studies showed that nurses frequently requested assistance from their peers when unsure about a task, skill, or aspect of nursing care. There were negative feelings and fears of being ridiculed or that professional credibility could be damaged if there was trouble in communicating concerns to the doctor. Also, nurses described incidents where doctors either disregarded or did not respond to

their concerns about a patient which delayed their decision to call for assistance, leaving them unsupported and distressed (Purling & King, 2012).

The second theme was a lack of nurse experience as identified in 11 of the 17 studies. These studies showed that lack of nurse experience is a barrier to interpreting signs of deterioration and affects the quality and quantity of patient assessment. The next theme was overwhelming workload as seen in 10 of the 17 studies. These studies highlighted how overwhelming workload is a barrier to adequate assessment and recognition of the deteriorating patients. Ten studies identified holistic patient assessment as the fourth theme. This theme refers to going beyond the vital signs and looking at the whole picture in the patient assessment. It was found that graduate nurses struggle with this due to lack of experience. Theme five was past experiences. Seven studies discussed that past experiences influenced the nurse's ability to recognize and respond to the deteriorating patient. The last theme was a lack of available resources as seven studies found a lack of adequate or accessible resources was a major barrier to recognizing and responding to declining patients (Purling & King, 2012).

Researchers in Australia conducted a multi method study to identify links between failure to respond to deteriorating patients and lack of seeking assistance, failure to activate a rapid response system (RRS), and communication deficits (Shearer et al., 2012). The study was conducted as a comprehensive network of four metropolitan teaching hospitals over an eight-week timeframe. Data was collected by a point prevalence survey, chart audit, observation and structured interviews of staff. Shearer et al., 2012 indicated that there were cognitive and sociocultural barriers for failing to activate the RRS. The majority of staff did not activate the RRS even though they recognized patients met the criteria (69%). In addition, 75% of respondents were either 'quite concerned' (36%) or 'very concerned' (39%) about their patient

during this time. Sixty-two percent of respondents did not recognize that their patient met the criteria for activating a RRS, and of these, 47% thought the patient would deteriorate despite treatment (Shearer et al., 2012). One of the main sociocultural barriers stated by respondents was a feeling that they should be able to manage patients Independently (41% for nursing staff and 39% for medical staff). Some of the explanations for the missing RRS activations were that nurses felt the situation was under control (54.2%), the ICU team was already involved but no beds were available (30.1%), and the team involved was experienced with this type of patient and felt RRS activation was not required (16.9%). Other reasons for not activating a RRS were poor communication by the medical team (15.7%); additional skills were not required to manage the patient (9.6%); no further clinical observations were completed (7.2%); altered thresholds for RRS activation but alterations were not documented (4.8%); and the belief they were too junior to activate RRS (Shearer et al., 2012, p. 573).

In a single-center mixed method study, Pattison and Eastham (2012) investigated the experiences of members of a RRT, factors associated with patient management and survival to discharge. The researchers analyzed the quantitative data using SPSS +17 and 19, and qualitative data was analyzed using grounded theory principles (Pattison & Eastham, 2012). The results reveled a large proportion of referrals (124/407 = 30.5%) were made by medical staff. For 97 (97/407 = 23.8%) referrals, there was a delay between the point at which patients deteriorated and the time when patients were referred. The average delay was nearly three hours (95% CI 1.97–3.95; SD 9.56). Themes found in the qualitative data included indications for referral, facilitating factors for referral, barriers to referral and consequences of referral (Pattison & Eastham, 2012).

Cioffi, Salter, Wilkes, Vonu-Boriceanu, and Scott (2006) explored clinicians' responses to abnormal vital signs in a busy emergency room with in a hospital. This was conducted as a qualitative descriptive study. The participants were placed into one of three focus groups. Eighteen volunteer registered nurses and medical officers (MOs) who worked in the emergency room were interviewed. Transcriptions of the focus groups were transcribed and analyzed using a process of constant comparison and contrast and a description of clinicians' responses to abnormal vital signs. The results revealed three main categories of clinicians' responses to abnormal vital signs which were: identification, reporting and implementing action. The clinicians recognized, reported, and acted on the abnormal vital signs; however, delays in responding to the abnormal vital signs were due to a variety of reasons. The main reasons identified were issues with documentation and the ability to seek advice, appropriate staff for guidance and assistance, ineffective communication, fear of reprimand, inexperience, workload, distractions, and interruptions (Cioffi et al., 2006). A common theme seen in these studies was a fear of hierarchy, intimidation, or criticism when communicating with senior or experienced colleagues which were identified as common barriers in communication. However, Shearer et al. (2012) and Cioffi et al. (2006) also found that there were barriers in communication due to delays in reaching the correct staff, inability to contact the inpatient team, frequent interruptions, and the poor quality of the team's communication.

Research focusing on nurses' perceptions and experience related to this issue has been conducted (Lea & Cruickshank, 2007; Williams, Newman, Joes, & Woodard, 2011). Lea and Cruickshank (2007) explored new graduate nurses' perceptions on the role of transitioning from new graduate nurses into practice. Lea and Cruickshank (2007) found that lack of experience, knowledge, and confidence, led to feelings of intimidation and difficulty making decisions. The

researchers used a qualitative hermeneutic-phenomenological framework. A purposive sample was drawn from eight rural health care facilities where participants were employed as new graduate nurses in the first year of a graduate nurse transition program. The results showed that the ward culture, workload, and level of responsibility within rural healthcare facilities were of concern for new graduates, and this influenced their retention within the rural nursing workforce. This study highlighted that there are specific phases of the transition experience that are unique to graduate nurses in rural practice settings. Lack of experience, knowledge, and confidence, led to feelings of intimidation and difficulty making decisions (Lea & Cruickshank, 2007).

Nurses have been found to hold certain views when seeking assistance when caring for a deteriorating patient. Williams et al. (2011) conducted a study focusing on perceptions and experience of nurses who use a RRT in a community hospital setting. The researchers used focus groups to facilitate discussions of nurses' experiences, thoughts, and feelings about RRT experiences. To guide the focus group, a 15-question topic guide was utilized focusing on nurses' experiences with RRTs. The study was conducted at a community hospital and had a sample size of 13. The hospital implemented a nurse-led RRT in 2005, consisting of nurses from the intensive care unit and the emergency department and a respiratory therapist. The hospital also had hospitalists who occasionally respond to RRTs but were not required to attend. The population for this study was comprised of nurses who "worked on medical units that have access to a RRT, a medical-surgical unit, a cardiac care unit, and 12-bed observation unit" (Williams et al., 2011, p. 266).

Data analysis suggested nurses have both negative and positive experiences with RRTs. Nurses expressed that RRTs are a great learning experience and helpful for new nurses, but nurses need to know how to recognize deterioration and initiate a call. Participants stated that

you needed to know your patient and have a sense, “a gut feeling” that something is wrong with your patient (Williams et al., 2011, p. 268). However, as discussed in other studies, experience is helpful in developing the skill of ‘knowing your patient’ (Purling & King, 2012). One theme focused on the specific role hospital staff played within the RRT and the thoughts nurses had about working with them. Participants discussed the need for communication and team problem solving to produce better patient outcomes. However, participants also discussed feelings of being criticized at times for activating the RRT. Negative comments, reactions, and criticism for calling a RRT led to feelings of self-doubt and made nurses reluctant to call a RRT the next time they encountered a deteriorating patient (Williams et al., 2011). The last theme of systems reflected organizational issues with RRTs. Here nurses discussed how using the RRT system effectively was a way to work around barriers such as unavailability of assistance from coworkers and how properly using RRTs can lead to better patient outcomes and likely save the hospital unnecessary patient care hours and expenses (Williams et al., 2011).

In summary, the literature to date discusses nurses’ ability to identify and properly intervene when caring for a patient who is deteriorating and nurses’ perceptions and experience when involved in seeking assistance. Some literature discussed new graduate nurses’ levels of preparedness when faced with these patients. However, little is known about how to prepare novice nurses for these realities.

Sepsis and Bundle Treatment

Sepsis clinical practice guidelines were developed in 2008 by the Surviving Sepsis Campaign (SSC) to guide in the management and treatment of sepsis. The SSC guidelines were revised in 2008 and again in 2012. Most recently the SSC updated the guidelines to reflect changes in definitions and recommendations for 2016 (SSC, 2016; Rhodes et al., 2017). Sepsis is

defined as “life-threatening organ dysfunction caused by a dysregulated host response to infection” (p. 305). Septic shock “is a subset of sepsis with circulatory and cellular/metabolic dysfunction associated with a higher risk of mortality” (p. 305). Due to the severity of sepsis, recommended treatment guidelines have changed over the years. The original conceptualization of sepsis as an infection was made by the patient displaying at least two of the four SIRS (Systemic Inflammatory Response Syndrome) criteria which solely focused on inflammatory responses. These responses are related to body temperature, heart rate, respiratory status, and white blood cell count as displayed in Table 1 (Singer et al., 2016).

Table 1.

SIRS (Systemic Inflammatory Response Syndrome). Patients must meet two or more of the criteria.

Temperature	Heart rate	Respiration rate	White blood cell count
>38°C	>90 beats per minute	>20 breaths per minute	>12,000/mm3
<36°C		PaCO2<32mmHg (4.3kPa)	<4000/mm3
			>10%immature bands

Note. Adapted from “The third international consensus definitions for sepsis and septic shock (Sepsis-3).” By M. Singer, C.S. Deutschman, C.W. Seymour, M. Shankar-Hari, D. Annane, M. Bauer, M…., D.C. Angus, 2016, *JAMA*. 2016; *315* (8), 802.

Recently, Singer et al. (2016) discussed how the use of SIRS as a descriptor of sepsis pathobiology has been challenged. Sepsis is now believed to involve an initial activation of both “pro- and anti-inflammatory responses, along with major modifications in non-immunologic pathways such as cardiovascular, neuronal, autonomic, hormonal, bioenergetics, metabolic, and

coagulation all of which have prognostic significance" (p. 803). Other contributing factors are age, comorbidities, injuries, surgeries, medications, and infections (Singer et al., 2016).

SIRS criteria can also be present in patients who never develop infection and who may never experience adverse outcomes. Kaukonen, Bailey, Pilcher, Cooper, and Bellomo (2015) discussed how one in eight patients in critical care settings in Australia and New Zealand who developed infection and new organ failure did not have the requisite minimum of two SIRS criteria to fulfill the definition of sepsis and experienced prolonged courses associated with significant morbidity and mortality. These findings led Singer et al. (2016) to believe that solely relying on the SIRS criteria to diagnose patients may not be totally accurate.

Due to inconsistences with defining sepsis, the European Society of Intensive Care Medicine and the Society of Critical Care Medicine assembled a task force to define term related to sepsis. This was needed as advances in sepsis have been made in to the pathobiology, patient management, and epidemiology, all of which suggest the need for reexamination. The task force consisted of 19 critical care, infectious disease, surgical, and pulmonary specialists in January 2014 (Singer et al., 2016). Sepsis has most recently been defined as "life-threatening organ dysfunction caused by a dysregulated host response to infection" (Singer et al., 2016, p. 804). Nonspecific SIRS criteria such as changes in body temperature or neutrophilia will continue to assist in the general diagnosis of infection. These criteria can accompany in the identification findings of specific infections such as rashes, dysuria, or peritonitis that focus attention toward the likely anatomical source of the infection and the infecting organism. Sepsis involves organ dysfunction, indicating a pathobiology more complicated than infection in addition to accompanying inflammatory response (Singer et al., 2016).

Septic shock is considered a subset of sepsis resulting in circulatory and cellular metabolic abnormalities that are extremely serious enough to increase the patient's mortality (Singer et al., 2016). Patients diagnosed with septic shock can be identified with the clinical components of sepsis consisting of persistent hypotension severe enough to require vasopressors to maintain mean arterial pressure equal to or greater than 65 mm Hg along with a serum lactate level >2 mmol/L (18 mg/dL) despite adequate volume resuscitation. With these criteria, hospital mortality has exceeded 40% (Singer et al., 2016).

Therefore, identifying sepsis quickly allows for early goal-directed therapy. Screening patients for sepsis includes monitoring for signs and symptoms of infection. Changes in vital signs, mental status, urine output, lab values, and alterations in tissue perfusion may all be signs of sepsis (Miller, 2014). The SSC strongly recommends the use of their suggested treatment guideline referred to as bundles, which were recently updated in 2015. According to Rhodes et al. (2017) treatment bundles have and will change as new evidence improves our understanding of how best to care for patients with severe sepsis and septic shock. The guideline bundles recommend specific treatments at designated times to best provide optimal patient responses. Tables 2 and 3 list the recommendations interventions to be done within the first three and six hours of a patient being identified with sepsis. During this time, one of the goals is to maintain a mean arterial pressure (MAP) ≥ 65mmHg. If the patient is experiencing persistent hypotension (MAP < 65 mm Hg) after initial intravenous fluid administration or if initial lactate was ≥4 mmol/L, the appropriate step would be to re-assess volume status and tissue perfusion and document findings according to Surviving Sepsis Campaign, Document Reassessment of Volume Status and Tissue Perfusion (2015) recommendations as shown in Table 2 and

documentation of reassessment of volume status and tissue perfusion by one of the two recommendations are shown in Table 3 (SSC, 2015).

Table 2.

Surviving Sepsis Campaign Bundles

Within 1 hour of recognition of severe sepsis or septic shock, initiate the following and complete within 3 hours	Within 6 hours of recognition of severe sepsis or septic shock
Measure lactate level.	Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation) to maintain a mean arterial pressure (MAP) ≥ 65mmHg.
Obtain blood cultures prior to administration of antibiotics.	In the event of persistent hypotension after initial fluid administration (MAP < 65 mm Hg) or if initial lactate was ≥ 4 mmol/L, re-assess volume status and tissue perfusion and document findings.
Administer broad spectrum antibiotics. Administer 30ml/kg crystalloid for hypotension or lactate ≥4mmol/L.	Re-measure lactate if initial lactate elevated.

Note. Adapted from Surviving Sepsis Campaign Bundles, 2015.

Table 3.

Document Reassessment of Volume Status and Tissue Perfusion by one of the two recommendations.

Repeat focused exam (after initial fluid resuscitation) by licensed independent practitioner including	Two of the following
Vital signs	Measure CVP
Cardiopulmonary findings	Measure ScvO2
Capillary refill	Bedside cardiovascular ultrasound
Pulse	Assessment of fluid responsiveness with passive leg raise or fluid challenge
Skin findings	

Note. Adapted from Surviving Sepsis Campaign, Document Reassessment of Volume Status and Tissue Perfusion, 2015.

Due to the overwhelming rates of incidence and mortality from sepsis, the Center for Medicare and Medicaid Services has mandated evidence-based care and reporting for all patients with sepsis, under the Severe Sepsis and Septic Shock Management Core Measures which include the SSC initial bundles as well as the bundles to be implemented at 3-hour and a 6-hour after diagnosis is confirmed (Schorr & Barnes-Daly, 2017; Dellinger et al., 2012). Nursing education is the first step toward appropriate sepsis screening leading to prompt diagnosis and treatment. Hospitals have traditionally focused on sepsis awareness in the acute care setting; however, worse patient outcomes on the non-acute patient units are believed to be due to delays in sepsis recognition and treatment (Schorr & Barnes-Daly, 2017; Dellinger, 2012; SSC, 2016).

A large-scale study by Levy et al. (2010) was conducted based on the SSC guidelines (Levy et al., 2010). The objective was a performance improvement initiative targeted at changing clinical behavior through bundles based on SSC guidelines on process improvement and patient outcomes. This study was done as a multifaceted intervention to facilitate compliance with SSC guidelines in the acute care setting and hospital wards of individual hospitals and regional hospital networks in the U.S., Europe, and South America (n=165). Guidelines were bundled into two sets to be completed within 6 and 24 hours. Data was collected from January 2005 through March 2008 (Levy et al., 2010). From these sites, data was collected on 15,022 patients and an analysis was performed to determine if bundle compliance was associated with decreased mortality.

Results indicated that "compliance with the entire resuscitation bundle increased from 10.9% in the first site quarter to 31.3% by the end of 2 years ($p < 0.0001$). Compliance with the entire management bundle increased from 18.4% to 36.1% by the end of 2 years (p=0.008). Hospital mortality decreased from 37 to 30.8% over 2 years (p=0.001). The adjusted odds ratio for mortality improved the longer a site was in the Campaign, resulting in an adjusted absolute drop of 0.8% per quarter and 5.4% over 2 years (95% CI, 2.5–8.4%)" (Levy et al., 2010, p. 226-227). Participation in the campaign was associated with continuous quality improvement in sepsis care and a reduction in overall hospital mortality or sepsis related mortality rates (Levy et al., 2010).

Schorr and Barnes-Daly (2017) revealed results similar to Levy et al. (2010). Their study, conducted at Sutter Health in California, demonstrated that patients with sepsis who were transferred to the ICU from a hospital ward had higher mortality rates than patients who were directly admitted to the ICU with sepsis (Schorr & Barnes-Daly, 2017). Due to these findings, a

one-year pilot program focusing on early identification of and intervention for patients with new or worsening sepsis was conducted. The study included the following steps: educate nurses on sepsis and the pathophysiology of systemic inflammatory response syndrome; create a sepsis screening tool that screens every patient, every shift; instruct staff to activate the RRT when a sepsis screen is positive; create a protocol that includes the RRT, validation of a positive sepsis screen, and immediate care using the 3-hour sepsis bundle. The pilot demonstrated a combined 50% reduction in mortality from severe sepsis and septic shock. The following year, the program was successfully implemented in six Sutter Health regional hospitals, followed by system-wide dissemination (Schorr & Barnes-Daly, 2017).

Additional studies have shown the positive impact on patient outcome when the SSC guidelines and early intervention were implemented (Herrán-Monge et al., 2016; Bloos et al., 2014). Herrán-Monge et al. (2016) studied long-term compliance with the SSC bundles and related outcomes. The method of the study was prospective, observational, and multicenter, involving numerous ICU settings over a five-month period. During this time, the researchers conducted an evaluation of SSC bundle compliance in the first six hours of when patients presented with sepsis and the management in the following over the next 24 hours. The authors compared the findings to a historical cohort at the same ICUs following an educational program five years earlier. The study cohort was comprised of 231 severe sepsis cases, and the historical cohort included 217 cases. There was increased compliance with the six-hour bundle in the current cohort when compared to the historical cohort (27.7% versus. 9.7%, $p<0.001$), and lower compliance with the 24-hour bundle (4.3% versus 12.9%, $p<0.001$). Hospital mortalities decreased from 37.3% to 27.1% ($p=0.02$) and from 45.3% to 36.7% ($p=0.06$). This reduction occurred linearly with the number of six-hour bundles completed (p for trend<0.001). All six-

hour bundle measures were associated with lower ICU mortality rates. In addition, measurement of plasma lactate, blood cultures, and administration of broad-spectrum antibiotics were associated with lower in-hospital mortality (Herrán-Monge et al., 2016).

Bloos et al. (2014) discussed that when treating a patient with severe sepsis, timely and effective antimicrobial therapy and source control, or controlling the source of sepsis, is vital and has become a key element in the resuscitation bundles proposed by SSC. The researchers conducted a prospective observational multicenter cohort study that explored the association between initial infection management according to sepsis treatment recommendations and patient outcomes. This was done in 44 separate ICU settings with 1,011 patients. The patients were either diagnosed with severe sepsis or septic shock. The authors examined the times of antibiotic treatment, source control, and adequacy of antibiotic treatment. Median time to antibiotic treatment 2.1 (IQR 0.8 – 6.0) hours and 3 hours (-0.1 – 13.7) to surgical source control. Only 370 (36.6%) patients received antibiotic treatment within one hour after organ dysfunction. In 422 patients receiving surgical or interventional source control, those who received source control later than 6 hours after onset of organ dysfunction had a significantly higher 28-day mortality than patients with earlier source control (42.9% versus 26.7%, $p < 0.001$). This study indicates that a delay in source control beyond six hours may have a major impact on patient mortality, and timely delivery of antibiotic treatment is associated with improved patient outcomes. However, the researchers also discovered that compliance with guideline recommendations required improvement (Bloos, 2014).

Nurses are directly involved in the care of patients at risk for developing sepsis as well as the treatment of patients with sepsis. The SSC recognizes that sepsis and septic shock are life-threatening emergencies and require rapid intervention to decrease patient mortality (Rhodes et

al., 2017). Nurses' knowledge of the recommendations and guidelines can help to ensure that patients with sepsis receive therapies that are based on the latest scientific evidence (Kleinpell, Leanne, & Schorr, 2013). However, research has shown that there are nursing knowledge deficits in recognizing signs and symptoms of sepsis, understanding treatment of sepsis and the treatment rationale which results in delays in delivering patient treatment (Poeze et al., 2004).

Nursing Education

Differences in-novice nursing practice and the experienced registered nurse is described in Benner's work, *From Novice to Expert: Excellence and Power in Clinical Nursing Practice* (Benner, 1983). This concept is based on a descriptive study that delineates characteristics of five levels of nursing competency. These five levels are the novice, advanced beginner, competent, proficient, and expert. As the nurse acquires experience, there is a progression through three aspects: the novice moves from dependence on principle and begins to rely on past experiences; the novice moves from viewing relevant parts to being able to see the whole picture and be able to rank relevant parts; and the novice moves from an observer to an involved participant (Benner, 1983). Therefore, a nurse's knowledge, skills, and critical thinking evolve over time with experience (Benner, 1983; Purling & King, 2012).

Jarzemsky (2012) discussed the works of Benner, Sutphen, and Leonard (2010) as these authors stated, learning through the clinical environment and learning through acquired experience was a great strength in nursing education in the United States. A landmark study of professional nursing conducted by the Carnegie Foundation in 2010 suggested that "nursing education as an assimilation of several professional apprenticeships, including knowledge, skills, clinical reasoning, and ethical formation" (p. 357) and that the clinical learning experience offers "powerful learning experiences, especially when educators integrate clinical and classroom

teaching" (p. 357). When students are in the clinical setting they are working directly at the bedside, with patients and the health care team. From this experience, students learn to recognize areas of concern and how to respond accordingly. The investigators viewed the high-stakes experience of the clinical setting as necessary for nursing students "to be aware of the need to actively think about and use their knowledge" (Jarzemsky, 2012, p. 357).

Experience allows the registered nurse to develop the ability to look at a patient and see the whole picture. When the nurse is able to see the whole picture, the nurse has the ability to respond to patients accordingly (Benner, 1983; Purling & King, 2012). Some graduate nurses have been found to be lacking in clinical exposure where they would have gained experience and utilized critical thinking skills as well as developed the ability of processing and ranking information (Burger et al., 2010; Purling & King, 2012).

Due to lack of experience, the graduate nurse may miss subtle clues of deterioration that can be detrimental to the patient's health. In 2004, the National Council of State Boards of Nursing (NCSBN) surveyed approximately 7,500 graduate nurses concerning their nursing education. According to this survey, graduates voiced feelings of inadequate preparation regarding clinical experiences or skills they had not practiced during their education. The survey revealed that a mere 55.9% of the graduates felt confident in their skills related to their clinical experience (Li & Kenward, 2006; Jarzemsky, 2012). One of the missed skills identified was recognizing and responding to patients who display signs of deterioration (Bogossian et al., 2014).

Early detection of patient deterioration is a skill that should be an important focus in nursing curriculum (Buykx et al., 2011). Nursing education starts in the classroom setting utilizing didactic teaching techniques, however research has shown that current methods of

teaching and assessing nursing students may be inadequate in training students for today's clinical practice (Buykx et al., 2011). The critical thinking skills necessary for nursing practice may be better developed through clinical experiences that promote early recognition, awareness of sudden patient deterioration, appropriate time response and teamwork, which are necessary to improved patient morbidly and morality (Buykx et al., 2011; Bogossian et al., 2014). It is imperative for nursing students to understand the important role nurses have in detecting and acting in a situation of patient deterioration. Such situational experiences should include "patient assessment, seeking assistance in a timely manner, effective communication, and skill proficiency" (Kelly et al., 2014, p. 724). Bogossian et al. (2014) recommend strategies such as regular rehearsal in order for students to be able to identify when to seek assistance. In addition, team management of the deteriorating patient should become a mandatory component of students' clinical preparation focusing on clinical performance, teamwork and situation awareness.

In terms of the patient who is deteriorating from sepsis, nurses play a vital role in assessment and monitoring for early signs and symptoms of sepsis. They must also be able to adequately care for these patients and monitor for worsening signs or progression in recovery (Aitken et al., 2011). Research has shown there are nursing knowledge deficits in recognizing signs and symptoms of sepsis, understanding treatment guidelines, and understanding the rationale of the given treatment. This may lead to a delay in the identification of sepsis and treatment which affects the well-being of patients (Poeze et al., 2004). Studies discovered that nurses provided suboptimal care at times due to the inability to detect deterioration and seek rapid assistance for their patients (Purling & King, 2012).

Education on sepsis at the under graduate level should focus on the pathophysiology; patient's signs and symptoms; diagnosis of sepsis including diagnostic testing; when to call for assistance; and sepsis treatment and guidelines set forth by the Surviving Sepsis Campaign. Successful outcomes can be achieved through education and implementation of sepsis guidelines (Dellinger et al., 2013). The Surviving Sepsis Campaign committee discussed that education regarding sepsis and the suggested guidelines can lead to improved nursing care and ultimately decrease in the number of patients diagnosed and hospitalized with sepsis, as well as, decreasing the healthcare financial burden (Dellinger et al., 2013). Sepsis education with nursing students is imperative. Nurses spend a significant amount of time with patients including monitoring patient status, assessment, and providing essential patient care. Prompt identification of a patient with sepsis may greatly improve the patient's outcome and may prevent mortality (Dellinger et al., 2013). Education on implementing sepsis protocols and providing "performance feedback" may lead to improved nursing care (Dellinger et al., 2013, p. 173). Sepsis education can increase awareness, decrease hospital costs and length of stay, improve patient care and most importantly, save lives (Dellinger et al., 2013; Miller, 2014).

Simulation is a reliable teaching strategy to provide the student nurse with the experience of caring for a patient who is deteriorating. If conducted according to best practices, simulation can provide the learning opportunities that are not always readily available in the clinical settings, and the simulation experience can be replicated for all learners. Simulation enhances learning experiences by "providing students with an opportunity to recognize and analyze a specific clinical problem within the context of a realistic environment" (Jarzemsky, 2012, p. 357).

Professional Standards

Nursing education has shifted from the traditional recalling of information to a competency-based, student-centered approach. This has been done to ensure that nursing students develop the needed level of competency to begin practice. To ensure competency in nursing education, professional organizations have developed specific professional standards.

The American Association of Colleges of Nursing (AACN) has established educational competencies in the Essentials of Baccalaureate Education for Professional Nursing Practice (2008). Schools of nursing must integrate these essentials into their curricula to prepare highly qualified nurses to practice in today's complex healthcare environment. There are a total of nine essentials. Of these, two applied to this study (Table 4) (The American Association of Colleges of Nursing, 2008).

Table 4.

AACN Essentials applicable to this study.

Essentials	Characteristics of Essentials	Correlation to This Study	
Essential VI: Interprofessional Communication and Collaboration for Improved Patient Health Outcomes.	Effective communication and collaboration among health care professionals in delivering safe and effective patient care.	It is imperative that undergraduate nursing students understand the expectations, their role and the role of other health care team members.	Nurses face great difficulty with hierarchy, understanding their roles, and boundaries in effective communication.
Essential IX: Baccalaureate Generalist Nursing Practice.	Describes general nursing practice at the completion of baccalaureate nursing education, encompassing knowledge, skills, and	. Prepare graduates to care for patients across the life spectrum and for practice as a member of the healthcare team.	Graduates will be prepared to care for those with acute and chronic illnesses and comorbidities, some of these may lead to patient

	attitudes outlined in Essentials I-VIII.	deterioration such as those discussed in this study.

Note. Adapted from The Essentials of Baccalaureate Education for Professional Nursing Practice by the American Association of Colleges of Nursing (AACN), 2008. Retrieved from http://www. aacn.nche.edu/Education/essentials.

In 2006, the Massachusetts Department of Higher Education (DHE) and the Massachusetts Organization of Nurse Executives (MONE) organized a conference named Creativity and Connections: Building the Framework for the Future of Nursing Education and Practice. This conference was composed of 32 experts in nursing education and practice (Massachusetts Department of Higher Education & Massachusetts Organization of Nurse Executives 2010). These experts researched and reviewed standards of care, initiatives, and best practices in nursing education to lay the groundwork for future nursing education. From this conference, a core set of nursing competencies, entitled the Nurse of the Future (NOF): Nursing Core Competencies rooted in nursing knowledge was developed. Knowledge, attitudes, and skills (KAS) display the essential areas of learning and are identified for each competency (DHE & MONE, 2010). There are ten competencies described in the Nurse of the Future. Six of the ten competencies were applicable to this study as displayed in Table 5 (DHE & MONE, 2010).

Table 5.

NOF Nursing Core Competencies applicable to this study

Competencies	Characteristics of Competencies			Correlation to This Study
Patient-centered care the foundation of all nursing education and practice.	Patient-centered care involves all nursing actions that identify and integrate patients' needs and provides for those needs.	Coordinating appropriate patient care, communicate, advocate for the patient, and optimize disease prevention.		Nurses place the patient as a priority, assess the patient needs, and communicate these needs to other health care professionals.
Communication, teamwork and collaboration	Nurses must be able to effectively interact and communicate to create and enhance shared decision making.	Lack of communication causes an increase of unfavorable outcomes.		These are critical components in delivering appropriate caring to patients who show signs of deterioration
Safety	Nurse are responsible for minimizing risks to patients through system effectiveness and individual performance.	Nurses must understand what entails safety, how to create an environment that fosters safety, and how to maintain safety.		Nurses must be competent in developing and maintaining the skills to provide quality and safety to patients.
Quality improvement	Involves the continuous improvement of care delivery, quality, efficiency, and outcomes of patient care.	Achieved through collecting and reviewing data to use in the process of decision-making, evaluation and improvement in patient outcomes.	Enhanced patient care is achieved through the implementation of action plans to examine health issues and the application of best practice to improve patient safety.	Strives to increase the quality of care through education, EBP, innovation, leadership and advocacy.

Evidence-based practice (EBP)	EBP prepares nurses with the education needed to handle the health care challenges of today.	Linked to specific outcomes and the identification of clinical problems that relate to patients and nursing.	Through KAS, nurses develop knowledge through EBP nurses learn to deliver research based patient care to optimize patient outcomes.

Note. Adapted from the Creativity and Connections, Building the Framework for the future of Nursing Education and Practice: Nurse of the Future Nursing Core Competencies, by Massachusetts Department of Higher Education Nursing Initiative & Massachusetts Organization of Nurse Executives, 2010. Retrieved from http://www.mass.edu/currentinit/documents/nursingcorecompetencies.pdf

The American Association of Colleges of Nursing (AACN) has developed standards for nursing competencies entitled "Quality and Safety Education in Nursing" (QSEN, 2014). Using the Institute of Medicine (2003) competencies for nursing, QSEN faculty have defined nursing education quality and safety competencies focusing on knowledge, skills, and attitudes to be developed in nursing pre-licensure programs to address each competency: patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics (QSEN, 2014). Three of these competencies were applicable to this study and shown in Table 6.

Table 6.

QSEN Competencies applicable to this study

Competencies	Characteristics of Competencies		Correlation to This Study
Teamwork and collaboration	Nurses must function effectively within nursing and inter-professional teams, maintaining communication, respect, and partaking in shared decision-making to provide optimal patient care.		Nurse to be aware of self-strengths, limitations, role and scope of practice. Develop skills to overcome obstacles that interfere with communication.
Evidence-based practice (EBP)	Integrating best current evidence with clinical expertise along with patient and family preferences in the efforts to provide optimal health care.	Knowledgeable with current research and best practices, valuing the need for continuous improvement in clinical practice, knowing limitations, when to question rationale of care, be able to find, use and understand EBP.	Stress the importance of being able to discriminate between valid and invalid reasons for modifying evidence-based clinical practice based on clinical expertise or patient preferences.
Safety	To minimize the risk of harm to patients and providers through both system effectiveness and individual performance.	Linked to using strategies to reduce risk of harm and use appropriate strategies to reduce reliance on memory.	Expects nurses to be able to examine basic safety design principles as well as commonly used unsafe practices.

Note. Adapted from QSEN Competencies by Quality and Safety Education in Nursing, 2014.

These standards state that undergraduate nursing programs need to prepare students to adequately respond to rapidly changing situations after graduation. It is not enough that students be tested on this knowledge in the classroom setting. To be competent, nursing students need hands-on experience while in school to develop the necessary skills to manage patient deterioration. Simulation provides an opportunity for students to practice and develop these skills in a safe environment without the possibility of patient harm.

Traditionally, nursing education has been delivered as on a combination of theory and practice. The practice of patient interactions and skills conventionally take place in a clinical setting. As the number of nursing programs, and student enrollment increases and nursing faculty continue to decrease along with strong provisions in the clinical setting, difficulties have occurred. Clinical settings have not always provided an ideal learning environment for students. These situations have affected the learning experiences of nursing students, leading to a potential decrease in competency (Hayden et al., 2014). If students cannot learn the needed skillsets within the traditional clinical settings, educators must develop creative ways to prepare competent nursing students. The BSN Essentials, NOF, and the QSEN Competencies set the benchmarks of entry level to nursing practice.

In addition, clinical experiences cannot be guaranteed, and students may not have the opportunity to experience medical situations such as patient deterioration. Students must be prepared to care for this patient population as a lack of preparation may lead to mismanaged care and poor patient outcomes. Providing simulated experiences would be in accord with the AACN, NOF and QSEN guidelines on preparing students for today's complex healthcare setting and most importantly the promotion of patient safety.

Situational Awareness

Cooper et al. (2010) quoted Endsley (1988) who defined situational awareness as the "perception of the elements in the environment within a volume of space and time, the comprehension of their meaning and the projection of their status in the near future" (p. 2310). Situational awareness is an attribute that nurses must develop. It is important for nurses to understand and be aware of their surroundings, the patient's surroundings, and situations that would put patients at risk for deterioration (Brady et al., 2014).

As discussed in Chapter One, according to Brady et al. (2014) situation awareness is achieved by "(1) gathering information, (2) understanding that information in context, and (3) making short-term projections based on current state" (p. 143). Brady et al. (2014) provide a model of three levels of situational awareness. Each level has a unique set of interventions to address. Figure 1 was adopted from these authors as they explained Ensley's model of situational awareness. This figure illustrates how situational awareness is applied in the care of a hospitalized patient. Level 1 is gathering information including interventions to target health threats and data gathering from all parties around risk status. Level 2 involves understanding the information in context as well as comprehension and interpretation of the data. This level may include diagnostic tools or protocols to bring expert clinicians to the bedside. Level 3 is making short-term projections based on current patient status. At this level, awareness could include time-bound plans and the implementation of specific pathways (Brady et al., 2014).

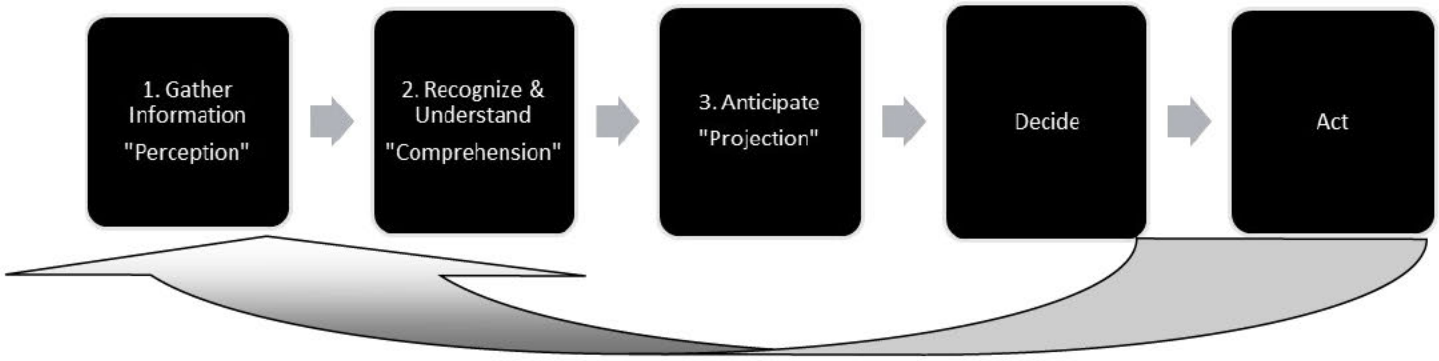

Figure 2. A diagram to demonstrate Situational Awareness

Physical abnormalities such as changes in vital signs and diagnostic testing are important ways to recognize deterioration but may be limited relative to detecting subtle changes such as feelings and mental status changes (Brady et al., 2014). Van den Bruel, Thompson, Buntinx, and Mant (2012) conducted a study related to using or listening to "gut feelings." Incorporating "gut feelings" into communication and care delivery may improve situation awareness, increasing the awareness of risk detection (Brady et al., 2014; Van den Bruel et al., 2012). Other ways to increase situational awareness are through structured communication tools, standardized handoff documents and encouraging patients and families to share their thoughts and perceptions involving plans of care (Brady et al., 2014).

It may be argued that the Brady et al. (2014) model of situational awareness may be more applicable to the experienced registered nurse. Clarke and Aiken (2003) published *Failure to Rescue*. This paper discussed issues related to failure to rescue and considered both the experienced and the novice nurses in situations where they may be faced with deteriorating patients. Although Clarke and Aiken (2003) did not offer a model, they did discuss nursing expectations and roles. The identified concepts are: surveillance, assessment, attending to cues, recognize and respond, anticipate patients' needs and complications, know patient surroundings,

taking action, and know and understand nursing's role (Clarke & Aiken, 2003). Situational awareness has been studied in various other professional fields; for instance, offshore drilling crews (Sneddon, Mearns, & Flin, 2013), the armed forces (Tardan, Bourgeon, & Darses, 2016) and in anesthesia (Schulz, Endsley, Kochs, Gelb, and Wagner, 2013). Lavoie, Cossette, and Pepin (2016) sought to test baccalaureate-level nursing students' clinical judgment and situational awareness in a simulation scenario involving patient deterioration. The participants included 15 critical care experts and 234 baccalaureate-level nursing students enrolled in a critical care course. Queries were developed from evidence-based practices and guidelines regarding nurses' assessment and response to patient deterioration and a list of nursing diagnoses. The instrument was given to three cohorts of nursing students who participated in a high-fidelity simulation with a scenario involving hypovolemic hemorrhagic shock. The student's performance was assessed with a post-simulation survey. Results indicated that lower scores related to situational awareness may have been related to assessment practices of nursing students and their reliance on medical assistance (Lavoie, Cossette & Pepin, 2016). However, this result may be due to inexperience with deteriorating patients and lack of education or experience with situational awareness. Simulation can assist with developing this experience and teaching situational awareness. Dym et al. (2014) studied teaching medical residents situational awareness during cardiac arrest and rapid responses. The researchers hypothesized that residents' situational awareness and the ability to manage a cardiac arrest or rapid response can be improved with simulation training. The researchers established a sample consisting of medical residents (n=48) who participated in eight high-fidelity scenarios. The results of the study showed that a greater level of situational awareness led to an increase in performance when faced with acute patient issues and better choices related to patient care (Dym et al., 2014).

One mixed-method study identified characteristics that may predict primary outcome measures of clinical performance, teamwork, and situational awareness in the management of deteriorating patients using high-fidelity simulation (Bogossian et al., 2014). The simulation included cardiac, shock, and respiratory scenarios. The participants consisted of 97 undergraduate nursing students in the final year of their nursing program. The students were placed in groups of three. The simulated experience included a pre-briefing, a pre-test, three video recorded simulations using simulated patient actors with deteriorating conditions and a post-simulation debriefing. Clinical performance, teamwork, and situational awareness were evaluated using standardized tools. The results showed that only nine student groups passed the clinical performance simulation exercises (1%), and teamwork was found to be strongly associated with knowledge and past experiences (Bogossian et al., 2014). However, situational awareness scored low at 41%. The researchers stated that this may be due to program requirements, curricula and pedagogy, simulation exposure, and clinical experience. The researchers also suggest that this may be due to poorly developed skills in nursing education (Bogossian et al., 2014).

In summary, situational awareness is a skill that develops with novice nurses who may not have acquired the necessary experience in their nursing programs. This perception combined with the concept that novice nurses can be placed under pressure with demanding workloads may lead to a decrease in situational awareness. Improving students' knowledge and situational awareness can be achieved through rehearsal of responding to deteriorating patients and team management skills focusing on clinical performance, teamwork, and situational awareness (Bogossian et al., 2014)

McKenna et al., (2014) fount similar results. These researchers explored nursing students' situational awareness in a simulation exercise focusing on patient deterioration scenarios. These researchers used the FIRST2ACT model as their nursing intervention. Situational awareness was measured quantitatively using the Situation Awareness Global Assessment Tool. This tool measured four domains: physiological perception (patient parameters), global perception (surroundings), comprehension (interpretation of information), and projection (forecasting outcomes) (McKenna et al., 2014). In this study 97 nursing students participated in three video-recorded simulations with actors playing the roles of deteriorating patients. Overall, situational awareness was low (41%), and there was no significant association between situational awareness and student demographic characteristics. Across the scenarios, the physiological perception was limited at an average of 26%, and physiological cues were found to be the lowest scoring area. The comprehension score was higher at 44%, but global perception of the patients' environment was found to be at low at 32%. Projection, including predicting physiological parameters and potential medications or investigations, was rated highest but this was only 59%.

The above studies focused on situational awareness and nursing. They exhibited how undergraduate baccalaureate nursing students may not receive the clinical experience necessary to foster the skill of situational awareness. Furthermore, they suggest that undergraduate nursing education programs require significant changes in curriculum including recognizing and responding to patient cues and complications which may be difficult for novice nurses (Clarke & Aiken, 2003). Without this skill, novice nurses depend on experienced nurses to serve as "safety checks" by offering support, consultation, and perhaps co-monitoring patients at risk for deterioration. Furthermore, anticipating patients’ needs and complications and seeking help are necessary skills that all nurses must possess to ensure adequate response time. Novice nurses

may not have the required experience to identify these signs and complications but should understand the importance of addressing abnormal findings, finding resources and support, and seeking assistance despite feeling overwhelmed. They should be able to anticipate patient needs, have the awareness of the patient surroundings, and the ability to assess the medical equipment and devices in use and delivery of treatment to ensure safety (Clarke & Aiken, 2003).

It is imperative for nurses to know and understand their role when caring for deteriorating patients and patients who are at risk for deterioration. It is also important the nurse is aware of the expectations and actions taken when confronted with this type of critical scenario. For example, if a nurse has a patient who is deteriorating and has difficulty contacting the covering physician, the nurse should know what is acceptable within the nursing scope of practice, such as providing oxygen, ordering laboratory tests or obtaining an intravenous access (Clarke & Aiken, 2003.

Lastly, taking action involves instituting quick and appropriate measures and activating a rapid response team if needed. Even before an emergency occurs, the nurse should anticipate possible complications and assemble the necessary equipment and supplies. If an emergency occurs, the nurse must be able to administer lifesaving treatment and continue to assess the patient. Therefore, it is essential for nurses to collaborate and communicate clearly with other nurses, physicians, and healthcare personnel (Clarke & Aiken, 2003).

Simulation as a Teaching Strategy

The IOM's The Future of Nursing: Leading Change, Advancing Health (2010) and the QSEN competencies stress how nurses must be prepared to handle the increased demand to deliver safe and effective care (Jarzemsky, 2012). Due to high numbers of enrolled students and

a decrease in the number of clinical sites, nursing education has turned to simulation to fulfill the clinical requirements (Jarzemsky, 2012).

Traditionally, nursing students receive their learning experiences through the classroom, skills laboratory, and the clinical environment (Jarzemsky, 2012). Innovative approaches are needed to promote the QSEN competencies and to tackle issues surrounding clinical experiences in nursing education (Jarzemsky, 2012). The AACN (2008) believes that simulation experiences provide "an effective, safe environment for learning and applying the cognitive and performance skills needed for practice" (p. 34). Simulation can enhance self-confidence, psychomotor skills, and professional role development and can be considered a tool in the assessment of student competency regarding knowledge and technical skills. Although direct patient care is the most essential aspect of clinical education, the balance between actual and simulated patient care may change (AACN, 2008).

Simulation is an educational strategy in which a specific medical condition or case scenario is replicated in a realistic atmosphere where nursing students can practice and strengthen their skills in a safe, controlled environment. A set of conditions are created or replicated to resemble authentic situations that are possible in real life (INACSL, 2016a). Simulation has been used effectively for several years in other disciplines including law enforcement (Zhang & Brown, 2013) and aviation training (Hamstra, Brydges, Hatala, Zendejas, & Cook, 2014). Over the past two decades, there has been an increase in the use of simulation in health care education in all areas of medical training and practice. Research has displayed how simulation has positively impacted medical education (Issenberg & Scalese, 2014). Today, simulation is used to educate nurses (INACSL, 2016a), doctors (Issenberg & Scalese, 2014), respiratory therapists (King et al., 2013), and many other health care providers.

When utilizing high-fidelity simulation, it is strongly advised that the developer of the simulation follow the standards set forth by the INACSL. The INACSL Standards of Best Practice: Simulation^{SM} (2016b) were designed to promote simulation in learning, share best practices, offer evidence based guidelines, evaluation and improvement suggestions, and simulation procedures and delivery methods. To ensure the best learning experience for the learner, the INACSL has provided standards to guide the educator or facilitator in providing the best simulation experience possible. The INACSL standards will be applied in this study to guide the simulation.

There is little research discussing graduate nurses' response to deteriorating patients and sepsis. The current literature focuses on the existing and established health care provider and concentrates on cardiac, respiratory, and shock-related scenarios (Endacott et al., 2012; Endacott et al., 2015; Cooper et al., 2011; Buykx et al., 2011; Bogossian et al., 2014; Bucknall et al., 2016). When discussing the advantages of simulation, DeBourgh and Prion (2011) reviewed the benefits of using simulation to train nursing students in detecting and responding to patients who are deteriorating. These researchers conducted a quasi-experimental pre-test and post-test study with 285 nursing students to investigate simulation experiences focusing on preventing falls. The findings suggested that simulation provided students with knowledge and the necessary skills by challenging them with meaningful experiences that can later be applied to the clinical setting. Another study that supported these claims was conducted by Kelly et al. (2014). These researchers discussed how simulation can provide the opportunity to enhance skills. Simulation can also assist the undergraduate nursing student to gain a true perception of the possibilities that can occur when caring for these patients and the unpredictable nature of clinical practice. This was demonstrated through utilizing a pre-test and post-test design to investigate the impact of

simulation using scenarios of deteriorating patients. The objective was to determine if senior undergraduate nursing students could appropriately recognize and respond to the simulated patient. This study also examined the impact of the students' program of study and years of previous nursing experience related to the students' responses and performance during the simulation (*n*=57). The researchers rated the students technical and communication skills regarding recognition and response to the simulated patient showing signs of deterioration. The study found that there were significant statistical improvements in student scores after the students completed the simulation. In addition, students with greater clinical nursing experience had higher scores than those with less clinical experience, suggested that experience is a contributing factor to student nurses' ability to recognize deterioration, and simulation can provide that experience.

Active participation in simulations involving patient deterioration scenarios would be a highly valuable tool in student nurse preparation. Simulation provides students the opportunity within controlled, clinical-based scenarios to gain experience and appreciation of the unpredictability of clinical practice. In terms of patient deterioration, the use of simulation places emphasis on clinical signs and symptoms of patient deterioration within case scenarios where students would have to determine ways to deal with these acute situations (Endacott et al., 2010). Simulation can also increase situational awareness of sudden patient deterioration and enhance teamwork skills which are vital to patient outcomes. High-fidelity simulated environments provide the opportunity for undergraduate nursing students to develop and refine recognition and response skills (Bogossian et al., 2014).

Research demonstrates how simulation strengthens nursing knowledge. Studies have shown that simulation exercises raise awareness of knowledge deficits, poor decision making

and issues involving the ability to recognize deterioration in patients (Endacott et al., 2012; Endacott et al., 2014; Bucknall et al., 2016. Endacott et al. (2012) studied how registered nurses identify and respond to deteriorating patients in simulation scenarios. These researchers conducted a mixed-methods study using simulated actors to examine how registered nurses identify and respond to deteriorating patients in simulation scenarios. The participants consisted of registered nurses (n=34), and all participants completed two simulation exercises. Data was collected using the Objective Structured Clinical Examination (OSCE) tool to rate and assess performance in the simulation. Items in this tool are based on expert practice, clinical-based guidelines, and expert panel review. Students are scored based on correct behaviors observed; for example, history taking, oxygen delivery, and pain management (Endacott et al., 2012). Video footage of the simulation exercise was used as part of the post-simulation reflection. The simulation scenarios utilized were chest pain and respiratory distress. The researchers discovered themes when gathering the data from the OSCE, video-assisted reflection and interviews with the participants. The first was the nurses expressing exhaustion in autonomous decision-making. Other themes were misinterpretation of the evidence, conditioned response, and missed cues. The researchers found that the video review and associated feedback provided a great deal of insights into nurses' decision-making that were not identified by the other tools and that this was valued by the participants.

When caring for patients it is important for nurses and other health care members to work together as a team. Endacott et al. (2014) examined nursing students' and registered nurses' teamwork while caring for patients who are deteriorating in a simulated environment. The rationale for the authors conducting this study was based upon their findings in previous studies demonstrating a lack of timely recognition of deterioration. This mixed-method design used

three simulation scenarios consisting of chest pain, hypovolemic shock, and respiratory distress. The scenarios were conducted with participants placed in teams of three. The participants consisted of 97 nursing students and 44 registered nurses. Similar to Endacott et al. (2012), the researchers obtained data from the OSCE tool, simulation video footage, reflection, and the Team Emergency Assessment Measure (TEAM) tool to score teamwork. The TEAM tool is a validated tool designed for trained observers to rate nontechnical skills during emergency events such as patient deterioration. This tool was comprised of "11 items based on leadership, teamwork and task management" (Endacott et al., 2014, p. 92-93). The results showed that OSCE were similar for the registered nurses and the student nurses (54% and 49%), but there was significance difference between the two groups for the TEAM scores (57% and 38%, t=6.841, p<0.01) (Endacott et al., 2014). The researchers discovered themes in the combined quantitative and qualitative data in relation to leadership and followership behaviors, seeking assistance behaviors, relying on previous experience, being fixated on details, and team support (Endacott et al., 2014).

A descriptive exploratory study examined nursing students' decision-making during team-based simulations focusing on patient deterioration (Bucknall et al., 2016). The participants were 97 final-year nursing students who completed simulations working together in groups of three. Video footage of the simulations was reviewed to obtain descriptions of individual and team-based decision-making and performance. The researchers focused on how decisions should be made and then focused on the outcomes. Descriptive approaches focused on the sequence of the interviewing steps between the information cues and the outcomes or decision response, and the strategies used by the decision maker (Bucknall et al., 2016). The researchers were more concerned with the thought process of why participants were making the decisions as opposed to

the actual decision. The students were able to recall 11 categories of decisions: information seeking, patient assessment, diagnostic, intervention and treatment, evaluation, escalation, prediction, planning, collaboration, communication and reflection (Bucknall et al., 2016). Patient distress, uncertainty and a lack of knowledge were frequently recalled as influences on decisions. The researchers discovered that students had difficulty with making decisions that were in the best interest of their patients. Common causes were collecting incomplete information and failure to consider alternatives when caring for patients (Bucknall et al., 2016).

Two studies, Cooper et al. (2010) and Buykx et al. (2011) included septic shock as patient deterioration simulation scenarios. However, these simulations focused on septic shock and did not fully discuss if these scenarios demonstrated the early signs of sepsis, meeting the SIRS criteria. In the study done by Cooper et al. (2010), the scenarios did not permit the participants a chance to intervene and prevent septic shock or indicate if the simulation began with the patient in septic shock. Cooper et al. (2010) also included situational awareness. The researchers examined the capacity to which senior year nursing students could identify and respond to patients who were either deteriorating or at risk of deterioration. The researchers used a mixed-method approach and measured knowledge, skill and situational awareness. A total of 51 nursing students participated in the study and completed a knowledge questionnaire and two video-recorded simulated scenarios to assess skill performance. The scenarios replicated deteriorating patients with hypovolemic and septic shock. Situational awareness was measured by randomly stopping each scenario and asking a series of questions related to the situation. The results demonstrated that skill performance improved significantly ($p<0.01$) by the second scenario. However, skill performance declined significantly in both scenarios as the patient's condition deteriorated (hypovolemia scenario: $p=0.012$, septic scenario: $p=0.000$). The mean

situational awareness score across both scenarios was 59% (range 38–82%). Participants had a tendency to identify physiological indicators of deterioration (77%) but had low comprehension scores (44%). The researchers concluded that their findings suggested that nursing students are not prepared to care for deteriorating patients.

Buykx et. al. (2011) investigated the use of FIRST2ACT simulation model in used with undergraduate nursing students. The FIRST2ACT (Feedback Incorporating Review and Simulation Techniques to Act on Clinical Trends) simulation model was developed based upon best practice and used video feedback to enhance student learning. The FIRST2ACT model contains five components: developing core knowledge, assessment (learning stimulus), simulation, reflective review, and performance feedback. This model was intended to investigate the ability of nurses and midwives to identify of patient deterioration in simulated scenarios. The participants were nursing students (*n*=51), student midwives (*n*=35), and registered nurses (*n*=34). In addition to septic shock, other patient deterioration scenarios used in this study were hypovolemia, post-partum hemorrhage, ante-partum hemorrhage, myocardial infarction, and chronic obstructive pulmonary disease (Buykx et al., 2011). The study showed a significant improvement in self-rated knowledge in all areas examined in this study as the simulation provided a “deeper” level of learning (Buykx et al., 2011). Several themes were revealed in the results, but the most frequently identified was the importance of basic skills in patient assessment and observation in the declining patient (Buykx et al., 2011).

Kelly, Hopwood, Rooney, and Boud (2016) discussed that effective nursing education and training increased the likelihood that patients will receive prompt medical attention when needed, therefore decreasing the risk of FTR. One way to ensure the education and training is met is by incorporating simulation. Simulation helps to fine-tune critical skills such as

understanding illness and conditions, when to seek assistance, communication and situational awareness. Simulation experiences also promoted active learning, improved and increased clinical competence and confidence, and provided students with increased experience in recognizing and responding promptly in an acute situation (Reilly & Spratt, 2007; Kelly, Forber, Conlon, Roche, & Stasa, 2014).

Simulation has been identified to be an effective education tool as it provides a method for students to gain skills, knowledge, and experience. Research has demonstrated the positive effects simulation has on nursing education. However, little research exists on training nursing students to identify and properly respond to a patient who is deteriorating from sepsis. The proposed study will contribute to the current research findings and will add to the body of knowledge that will help reduce this gap in the research.

Debriefing

The most important learning component in a simulation scenario is debriefing (Dreifuerst, 2009). The INACSL recommends that all simulation-based learning experiences should include a planned debriefing session that promotes reflective thinking (INACSL, 2016a). Debriefing involves those involved in a simulation to join in active participation led by the facilitator. Debriefing is intended to enhance knowledge and learning. Adults learn best through active participation, being involved in the learning process, and identifying the problems and reasons behind knowledge gaps (Fanning & Gaba, 2007; Raemer et al., 2011). Debriefing also fosters transferability, which is the application of lessons learned from the simulation and debriefing into future clinical practice (Freeth et al., 2009).

According to Dreifuerst (2009), debriefing is associated with critical thinking, clinical reasoning and clinical judgment and is focused on the learning outcomes and intended objectives

of the experience. According to Dreifuest (2009), the components of debriefing are reflection, emotion, reception, integration, and assimilation. Assimilation and accommodation are the primary goals of debriefing as they are necessary for reflection. Practice professions such as nursing depend on the ability to transfer knowledge into future practice to improve patient outcomes. Debriefing originated as a military concept. Military personnel would discuss accounts following a mission, analyze the information and apply that information to future missions. Debriefing was also applied as therapy after combat or a critical incident to "defuse" a traumatic event. In this context, significant emphasis is placed on the narrative to reconstruct the exact event. In order to promote a purpose of shared meaning, this cognitive reconstruction was performed in groups. Participants would describe what had transpired and then developed new strategies with peers and commanding officers (Fanning & Gaba, 2007, p. 116). Debriefing has also been used extensively by emergency first responders and in experimental psychology (Mitchell & Everly, 1996; Lederman, 1992).

As debriefing evolved, different styles and perspectives evolved. Lederman (1992) discussed that there are seven elements and three phases of debriefing. The seven elements include the "facilitator, the participants, the experience or the simulation, the impact of the simulation, recollection of the simulation, discussion of the experience, and processing time. The first phase of debriefing involves the introduction to systematic reflection including analysis. The second phase is the intense personalization of the analysis of the experience. The third phase is the generalization and application of the experience" (p. 151). Petranek, Corey, and Black (1992) stated that debriefing should contain these "four elements: events, emotions, empathy and explanations" (p. 174). More recently Hall and Tori (2016) conducted an integrated review based on best practice recommendations for debriefing in simulation-based education for Australian

undergraduate nursing students. Hall and Tori (2016) discovered that there were eight themes in the literature regarding best practice guidelines for simulation debriefing. These themes are the types of debriefing, either facilitator led or video-assisted: debriefing simulation as opposed to post-simulation, environment for the debriefing, facilitator of the debriefing, identification of learned outcomes, method of debriefing, and structure of debriefing.

There are several different debriefing models. However, due to the lack of research on nursing students' ability to identify a patient declining, it is difficult to identify the best model to use. What is clear is that the model being used should be based on a structured framework allowing the learner to progress through the identified phases of debriefing: reaction, analysis, and summary or other similar phases and frames (Hall & Tori, 2016). Debriefing follows a constructivist teaching strategy focusing on what was done correctly and what would they would do differently evoking deductive and inductive thinking (Rudolph, Simon, Raemer, & Eppich, 2008; Fanning & Gaba, 2007).

PEARLS is one of many different types of debriefing methods. PEARLS is an integrated conceptual framework that offers a blended approach to debriefing. This debriefing method integrates three common educational strategies used during debriefing, namely, (1) learner self-assessment, (2) facilitating focused discussion, and (3) providing information in the form of directive feedback and/or teaching. Depending on the strategy chosen, the PEARLS debriefing tool integrates a script to guide the debriefing. The PEARLS framework and debriefing script assists many health care educators learning to facilitate debriefings in simulation-based education (Eppich & Cheng, 2015). PEARLS encompasses a framework consisting reaction, analysis, and summary. As Hall and Tori (2016) suggest, debriefing models should also include an analysis phase which makes this strategy unique. In the analysis phase the educators should reflect on the

level of experience the participant has as well as their own debriefing experience as this may influence which educational strategies to use during the debriefing.

Although the literature is limited on the best debriefing models, the existing literature supports that debriefing is an important component of simulation. The debriefing exercise allows active participation of participants, closure of knowledge gaps, increased meaning to learning, and personal insights (Fanning & Gaba, 2007; Raemer et al., 2011). The NLN and INACSL discuss how debriefing in nursing education allows for the reframing of a situation so participants can achieve a clear perspective and enhance critical reflection. Critical reflection consents to an examination of knowledge, assumptions, values, beliefs, and feelings behind an action, thereby bridging past learning to the new situation (INACSL, 2016a; NLN, 2015c).

Conceptual Framework Further Defined

Social Learning Theory is a combination of behavioral and cognitive learning theories which was created to provide a broader model that could explain the wide ranges of learning experiences that occur. This was originally introduced by Bandura and Walters (Bandura, 1963). Social learning theory views people as not being driven by inner forces or environmental influences, but rather by psychological functioning in terms of continuous reciprocal interaction between behavior and its controlling conditions (Bandura, 1977). Social Learning Theory emphasizes the important roles played by "vicarious, symbolic, and self-regulatory processes which receive little attention in many learning theories" (Bandura, 1977, p. 2). What makes this theory different is that other traditional learning theories discuss behavior as a reaction to a direct experienced response or consequence. Social Learning Theory discusses that all learning experiences result from direct experience and can also occur on an indirect level through observation (Bandura, 1977).

Social Learning Theory explains human behavior as a "continuous reciprocal interaction between cognitive, behavioral, and environmental determents" (Bandura, 1977, p. vii). Bandura's Social Learning Theory is centered on the concept that behavior is defined by expectancies and incentives. Expectancies may be divided into three types: expectancies about environmental signs, expectancies about the consequences of actions, and expectancies about self-competence in order to perform the behavior needed to influence the desired outcomes. This is referred to as self-efficacy (Bandura, 1977).

Bandura (1977) discussed incentives as forms of reinforcement which hold a value or a preferred outcome. The outcome can be whatever the individual holds as highly significant. This theory states that behavior is regulated by its consequences or reinforcements. However, this can only happen when the individual fully understands those consequences (Bandura, 1977). These concepts lead to the importance of the relationship between the external environment and its influence on behavior. Bandura's theory also draws attention and awareness to the complexity of behavior and the impact it has on personal attributes. For instance, Bandura (1977) described the relationship between cognitive abilities and self-regulation. "Through verbal and imagined symbols people process and preserve experiences in representational forms that serve as guides for future behavior…Without symbolizing powers, humans would be incapable of reflective thought" (Bandura, 1977, p. 13). Social Learning Theory is also guided by personal dynamics that provide a self-regulatory process. "People are not simply reactors to external influences. They select, organize, and transform the stimuli that impinge upon them (Bandura.1977, p. vii).

Bandura (1977) also discussed learning by direct experience. This concept is based on the idea that learning can be acquired through direct experiences or by observing the behavior of others. The desired behavior learned from direct experiences will be based upon the rewarding or

punishing consequence that follows the particular action with the resulting response being successful or unsuccessful. Through this process identified as differential reinforcement, successful behaviors are eventually selected while unsuccessful behaviors are discarded (Bandura, 1977). However, in Bandura's Theory of Self-Efficacy, Bandura (1977) points out that people do not enact everything that is modeled. Learners are more likely to adopt a model behavior if it results in outcomes they value and then they will reproduce the behavior. Social Learning Theory utilizes the concept of self-efficacy, referring to individual's perception of how well prepared they are to perform a task (Ngo & Murphy, 2005).

The concept of self-efficacy has been used throughout nursing education. A nursing educator is an example of social learning through observation and conscious role modeling. Social learning through role modeling allows the nursing educator or experienced nurses to proactively assist students in understanding the successful and unsuccessful ways of caring for patients. Various aspects of social learning in terms of direct experiences can be seen in the clinical setting and simulation. Simulation has the advantage of creating specific areas in which students may need to focus on or fine-tune specific skills, creating the direct learning experience students need. Although the clinical setting offers patient interactions, the simulation environment allows for student to make mistakes in a safe environment while learning the negative consequences of unsuccessful actions, thus reinforcing the successful actions.

Self-efficacy is one of the key aspects of Social Learning Theory. Self-efficacy provides learning through observation. People learn from watching and being with others, observing what they do, and how they do it (McEwen and Wills, 2011). Simulation would fulfill these criteria and provide experiences for undergraduate student nurses to learn and practice skills in an environment that promotes "observational learning or modeling" (Rutheford-Hemming, 2012, p.

132). Simulation scenarios have shown encouraging connections between simulation and self-efficacy (Pike & O'Donnell, 2010). Simulation in a group setting would be considered a type of social learning. Social learning promotes knowledge and scholarship, increases self-efficacy, and increases confidence in the skills being practiced (Pike & O'Donnell, 2010). For instance, Ngo and Murphy (2005) discussed the application of Social Learning Theory to create an educational model for nurses regarding sepsis education. They report that by increasing nurse's knowledge and self-efficacy related to sepsis, the patient would have a more positive outcome. In this study, sepsis will serve as the example of deterioration in the learning component, and simulation will be employed as a means of recognition and treatment. Through simulation, the nursing students will be given a learning model where they can experience the active role of the nurse in a situation where a patient meets the criteria of deterioration due to sepsis

The NLN Jeffries Simulation Theory (Jeffries, 2016) was also chosen for this study due to the suggestions of the INACSL Standards of Best Practice: Simulation^{SM} (2016a, 2016b). The Jeffries Simulation theory originated as a framework and was recently established as a theory. In 2005, the National League for Nursing and Dr. Pamela Jeffries published "A Framework for Designing, Implementing, and Evaluating Simulations Used as Teaching Strategies in Nursing." Since that time, the framework has become the essential handbook for nurse educators involved in simulation (Jeffries, 2016). The NLN Jeffries Simulation Framework has been used in nursing education to guide the foundation of patient simulation scenarios and to function as a theoretical framework for the continuation of simulation research (Hallmark, Thomas, & Gantt, 2014).

The NLN Jeffries Theory (Jeffries, 2016) contains five constructs that influence learning as a result of simulated learning: the instructor, educational practices, the student, simulation

design, and outcomes (Carson & Harder, 2016). The INACSL Standards of Best Practice: Simulation^{SM} (2016b) assist in shaping and developing simulation while providing structure by focusing on: "terminology, professional integrity of participants, participant objectives, facilitation, facilitator, debriefing process, participant assessment and evaluation, simulation-enhanced inter-professional education, and simulation design" (Carson & Harder, 2016, p. 345).

The main concepts of this theory are as follows. The contextual factors such as circumstance and setting impact every aspect of the simulation and are essential for creating, designing or evaluating a simulation. The context may include the setting or place and the main purpose of the simulation (Jeffries, 2016). The background includes simulation goals and desired outcomes that impact the simulation design. When conducting a simulation, it is very important to include the theoretical perspectives, what tools or resources will be used, and why as well as the relationship the simulation has to the current curriculum (Jeffries, 2016).

There are certain aspects of the simulation design that need to be considered. It needs to include specific learning objectives, therefore serving as a guideline for the simulation scenario development and the associated context and problem-solving difficulty (Jeffries, 2016). Foundations of physical and conceptual fidelity decisions need to be considered. This may include assessing whether to use equipment monolog (physical) and predetermined facilitator response to participants' interventions (conceptual) which are important elements of the simulation design. Other important elements that the design needs to embrace are: observer roles, progression of activities, briefing strategies, and debriefing strategies. The simulation experience needs to be experiential, interactive, collective, and learner-centered and needs to create an environment of trust for the participant and facilitator. The element of trust creates an environment of authenticity promoting engagement of the simulation experience (Jeffries, 2016).

During the simulation experience, there is an interaction between the facilitator and the participants. Although the facilitator is involved in assessing skills, application of educational techniques, and preparation, the facilitator also needs to be able to respond to the participant's needs. The facilitator needs to be able to modify teaching strategies dependent on the students' level of preparation and knowledge; for instance, changing the planned progression of activities to provide appropriate feedback during debriefing (Jeffries, 2016). In contrast, the participants affect the simulation learning experience in relation to participant: age, gender, level of anxiety, self-confidence, simulation preparedness, and roles assigned during simulation. Simulation outcomes may be divided into three areas: participant, patient, and system outcomes. Current literature focuses on "participant outcomes including reaction (satisfaction, self-confidence), learning (changes in knowledge, skills, attitudes), and behavior (how learning transfers to the clinical environment)" (Jeffries, 2016, p. 41).

Recognition and effective response to deteriorating patients is a critical skill that nurses must possess. Studies indicate graduate nurses may not gain this skill due to traditional teaching methods not adequately preparing graduate nurses and lack of experience (Purling & King, 2012). Consequently, nurse educators should incorporate simulation experiences as learning strategies into their teaching activities (Carson & Harder, 2016). Simulation provides opportunities for nursing students to practice skills in a safe setting and meets individual student needs. Simulation is in compliance with the Institute of Medicine's and the Future of Nursing Report's (2010) suggestions on how nurses should practice to the full extent of their education and training, and nurse educators need to practice to their full extent by using available technological resources. To assist graduate nurses in meeting their learning goals and needs,

Social Learning Theory and the NLN Jeffries Simulation Theory will be applied to promote increased knowledge on the signs of patient deterioration.

Summary of Chapter Two

In summary, nursing educators have the responsibility to foster critical thinking skills in nursing students through meaningful learning experiences where students can practice skills in a non-threatening environment. Competency of the graduate nurse includes not only a theory-based approach but a "hands on" approach. Simulation has been identified as a reliable and innovative method in providing the experience student nurses need and may often lack in the clinical setting (Jarzemsky, 2012). Currently there exists a learning gap within nursing education and students' ability to recognize deteriorating patients, particularly early recognition of sepsis. To date, simulations involving deteriorating patients that concentrate on sepsis in the early stages, specifically before the development of septic shock, are limited. Cooper et al. (2010) and Buykx et al. (2011) discussed the role of simulation in nursing education and patient deterioration and used sepsis as an example but focused on sepsis in the later stages where it presents as septic shock.

The majority of research on simulation and education of deteriorating patients through simulation focus on cardiac, respiratory, and shock related scenarios (Endacott et al., 2012; Endacott et al., 2015; Cooper et al., 2011; Buykx et al., 2011; Bogossian et al., 2014; Bucknall et al., 2016). Some of these studies focus on the benefits of using simulation to train nursing students in detecting and responding to patients who are deteriorating, supporting the concept of how simulation enhances skills, decision-making abilities and achieving an understanding of patient outcomes related to nursing actions (DeBourgh & Prion, 201; Kelly, Forber, Conlon, Roche, & Stasa, 2014).

Other studies describe how simulation strengthens nursing knowledge through simulation exercises by raising awareness of knowledge deficits, poor decision making and issues surrounding the ability to recognize deterioration in patients. Endacott et al. (2012) found that the video review and associated feedback provided a great deal of insights into nurses' decision making. Endacott et al. (2015) also discovered themes when studying nursing students in simulation such as leadership and followership behaviors, seeking assistance behaviors, relying on past experience, being fixated on details, and team support. Bucknall et al. (2016) found that students had difficulties with making decisions that were in the best interest of their patients. Common causes were collecting incomplete information and failure to consider alternatives when caring for patients. In this case, simulation played the role of raising student awareness which is highly valuable (Endacott et al., 2012; Endacott et al., 2015; Bucknall et al., 2016).

Studies have found that students who had experience in nursing and the healthcare system had a better understanding and improved care of deteriorating patients; however, research shows simulation can be used to provide that experience. Simulation can assist in providing experience in life-threatening situations and could decrease the risk of FTR with additional knowledge, education and training that includes increased awareness of signs and symptoms and when to seek assistance (Kelly et al., 2014; Kelly et al., 2016).

Most of the research encourages the use of simulation as an effective learning tool as it provides direct experiences, enhances skills, increases communication abilities, increases situational awareness, promotes active learning, develops and increases clinical competence, increases confidence, and provides students with an increase in experience in recognizing and responding promptly in an acute situation (Reilly & Spratt, 2007; Kelly et al., 2014; Kelly, Hopwood, Rooney, & Boud (2016).

Although there is some existing literature on this issue, additional research is needed to advance knowledge and evaluate competence in nursing students when confronted with a deteriorating patient due to sepsis. This author hopes to add new insight into the simulation and nursing education through a developed and evaluated simulation-based experience and instrument for the competency assessment of the nursing students in relation to patient deterioration. The simulation scenario was based on the INACSL Standards of Best Practice: Simulation^{SM} (2016b). It also took into consideration the simulation competencies set forth by the IOM, AACN, and QSEN as well as recommendations from experts in the field.

CHAPTER THREE: METHODOLOGY

Introduction

Sepsis is a life-threatening condition from which many patients do not survive (Dellinger et al., 2013). One reason mortality rates for sepsis are high is that the early signs are very subtle and are often missed upon initial assessment. Continued education is vital for nurses to develop an understanding regarding the causes of sepsis and how they may prevent complications associated with sepsis (Capuzzo et al., 2012). For nursing students, acquiring experience with septic patients is not always available or guaranteed in the clinical setting. Simulation is an alternative to provide the necessary education. Simulation exercises can offer specific case scenarios focusing on patient deterioration and sepsis where nursing students can practice and strengthen their skills in a safe, controlled non-threatening environment (INACSL, 2016a). Research shows there is a gap in the existing literature pertaining to the education of nursing students and their ability to identify patients who are deteriorating due to sepsis and their ability to properly intervene. Currently, there is little research measuring nursing students' competence when faced with a patient who is deteriorating from sepsis and a lack of reliable and valid instruments to measure competence.

The first two chapters of this dissertation discussed undergraduate nursing students in their final semester and their ability to recognize and respond to a patient displaying signs of deterioration in a simulation. In Chapter One, the problem and purpose statement were delineated. The significance of this issue and its impact on patient health, nursing expectations and preparation in the care of patients who are deteriorating were also discussed. Chapter Two included a comprehensive literature review to support and give structure to this study. The literature focused on recognizing and responding to patient deterioration and sepsis, nursing

education and preparedness, the standards set forth by professional organizations, and the importance of simulation in nursing education. Chapter Three provides the research design overview, sample, sample size, recruitment strategies, methodology, data collection and analysis procedures, limitations of the study, steps taken to ensure the protection of the participants and ethical considerations of the participants.

Research Design Overview

Feasibility studies are conducted to determine how well the components of a study work together and to identify if the design proposed for a larger study is realistic and feasible. A feasibility study may include the establishment of procedures, development and evaluation of instruments, assessment of the acceptability of the intervention as perceived by the participants, and the potential efficacy of the intervention and preliminary outcomes (Morris & Rosenblood, 2017). The purposes of this study were to: (1) develop a simulation-based experience to assist nursing students in recognizing and responding to patients displaying signs of deterioration related to sepsis(MSCSM) and (2) develop and evaluate the Martinez Sepsis Competency Evaluation Tool (MSCET) an instrument to measure nursing students' competency in recognizing and displaying signs of deterioration related to sepsis. The MSCET was designed to assess the nursing students' ability to competently respond to a simulated sepsis scenario, specifically in the areas of patient safety, assessment, communication, core measures, and documentation. The MSCET was sent to experts for review to establish content validity before students participated in the MSCSM. The content validity scores from the experts were also evaluated for consistency and reviewer agreement. Student scores on the MSCET for the areas of focus and total scores on the instrument were calculated to assess overall student performance. The third purpose of the study was to evaluate students' satisfaction with the simulation-based

experience and the debriefing model (PEARLS). Student satisfaction of the debriefing was assessed using a reliable and valid instrument, the Debriefing Assessment for Simulation in Healthcare (DASH).

Target Population

The target population was senior level nursing students. The student group was comprised of part-time or full-time student nurses enrolled in an accredited four-year baccalaureate nursing program in the Northeast during the spring semester of their senior year. The rationale for choosing this population was that these students have had suitable clinical experience to participate in the MSCSM and will be practicing as graduate and registered nurses in the near future. Participation in this simulation will ideally prepare newly graduated registered nurses to appropriately recognize and respond to patients displaying early signs of sepsis. Simulation, education, and content experts were recruited to participate as observers to rate students' performance during the simulation, and to evaluate the MSCET for content validity.

Sampling Method, Size, and Setting

After the Institutional Review Board approval at the target university was obtained, a non-randomized, convenience sample of volunteer baccalaureate nursing students was solicited by offering them the opportunity to participate in the research study. Convenience sampling is a non-probability type of sampling where participants are selected due to convenience and accessibility to the researcher (Polit and Beck, 2017). Inclusion criteria included being a part-time or full-time nursing student enrolled in an accredited four-year baccalaureate nursing program as a senior level student during the spring of 2019, at a state university in the Northeast. Exclusion criteria included students not enrolled in a senior level capstone course during spring 2019 semester. There were 55 students in the nursing class that were invited to participate in this

feasibility study. The content validity expert reviewer group consisted of four experts. Four experts were also recruited to view and rate the videos of the student performance using the MSCET. These individuals were recruited to participate in the study via email. The simulation observers and content validity reviewers were experts in simulation and/or sepsis, were registered nurses with a minimum of a Master's degree, and had experience in nursing education, which was the eligibility criteria. This was determined by their current and past clinical experiences, educational experiences and/or their level of expertise with simulation.

Recruitment

Student recruitment occurred on campus. All the students who participated in the study were enrolled in a nursing capstone course for the spring 2019 semester. Being enrolled in this course was a requirement for students to participate in the study. Students were assigned a date to attend and participate in the simulation. The simulation was made as part of the course requirement however, participating in the study was optional. Students had the opportunity to elect not to have their data shared, elect not to be videotaped during the simulation and elect not to complete a demographic form. On the day that the students were assigned to attend the simulation, the students were approached at the beginning of the class. The study was explained. The students were given an introduction and overview of the study, including the informed consent document that described key components of the study, the demographic questionnaire, and the expectations of the participants. During the explanation of the study, the participants could halt participation in the study at any time. Students were sked to review the consent which explained the risks and benefits of participating in the study. It was discussed with the students that although there were no known risks associated with participation in a simulation scenario, the simulation may trigger emotions of past experiences or create a level of personal stress.

Students had the opportunity to ask questions of the researcher. Students who wished to participate in the study were asked to sign the informed consent document and complete the demographic questionnaire.

During the recruitment no faculty were present. This was done to help eliminate student feeling obligated to participate in the study. The participants were reminded that there will be no reflection on academic performance, academic course standing, or grades, and they will not receive any compensation for participation except for the opportunity to increase their knowledge and experience about sepsis and have the opportunity to participate in a research study. After the recruitment and introduction to the study, the students collectively participated in the preparation materials and were then randomly placed in groups of two or three to participate in the simulation.

Development of a Simulation-Based Learning Experience (MSCSM)

The simulation-based experience (MSCSM) for this study was developed following the review of the literature on patient deterioration and failure to rescue, sepsis and bundle treatment, nursing education, professional standards, situational awareness, simulation as a teaching strategy and debriefing. In this scenario, a fictitious patient, Mr. M, age 42, was doing some repairs at his home and stepped on an old nail that went through his work boot and punctured the left foot. The patient did not seek immediate attention. At a later time, he presents to the hospital with signs of sepsis. The signs and symptoms the patient displayed were based upon The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3) (Singer et al., 2016). The desired sets of actions desired form the students were based on the sepsis clinical practice guidelines developed by the SSC (2015). To help organize the simulation-based experience, the NLN Simulation Template was utilized (Appendix A). To ensure accuracy and national

standards were being followed on simulation practices, the INACSL Standards of Best Practice: Simulation SM (2016b) were reviewed and served as a guideline in the development of the simulation. The INACSL Standards of Best Practice are shown in Table 7.

Table 7.

INACSL Standards of Best Practice: Simulation^{SM}

1. Perform a needs assessment to provide the foundational evidence of the need for a well-designed simulation-based experience.
2. Construct measurable objectives.
3. Structure the format of a simulation based on the purpose, theory, and modality for the simulation-based experience.
4. Design a scenario or case to provide the context for the simulation-based experience.
5. Use various types of fidelity to create the required perception of realism.
6. Maintain a facilitative approach that is participant centered and driven by the objectives, participant's knowledge or level of experience, and the expected outcomes.
7. Begin simulation-based experiences with a pre-briefing.
8. Follow simulation-based experiences with a debriefing and/or feedback session.
9. Include an evaluation of the participant(s), facilitator(s), the simulation-based experience, the facility, and the support team.
10. Provide preparation materials and resources to promote participants' ability to meet identified objectives and achieve expected outcomes of the simulation-based experience.
11. Pilot test simulation-based experiences before full implementation.

Note. Adapted from “Standards of best practice simulation^{SM}: Simulation design.” By INACSL Standards Committee, 2016, Clinical Simulation in Nursing, 12(S), S5-S12.

The NLN Jeffries Simulation Theory (Jeffries, 2016) was used as a model in designing and implementing the simulation-based experience to ensure a structured simulation experience. The theory, based on the Framework for Designing, Implementing, and Evaluating Simulations Used as Teaching Strategies in Nursing (Jeffries, 2016), served as an effective model in designing and performing the simulation exercise used in this study. The simulation scenario contained clear learning objectives, appropriate program and educational level problem-solving components to meet the learning objectives as recommended by The NLN Jeffries Simulation Theory (Figure 3). There are three main components of the Jeffries Simulation Theory: the facilitator, the participant, and the educational practices (Jeffries, 2016, p.5).

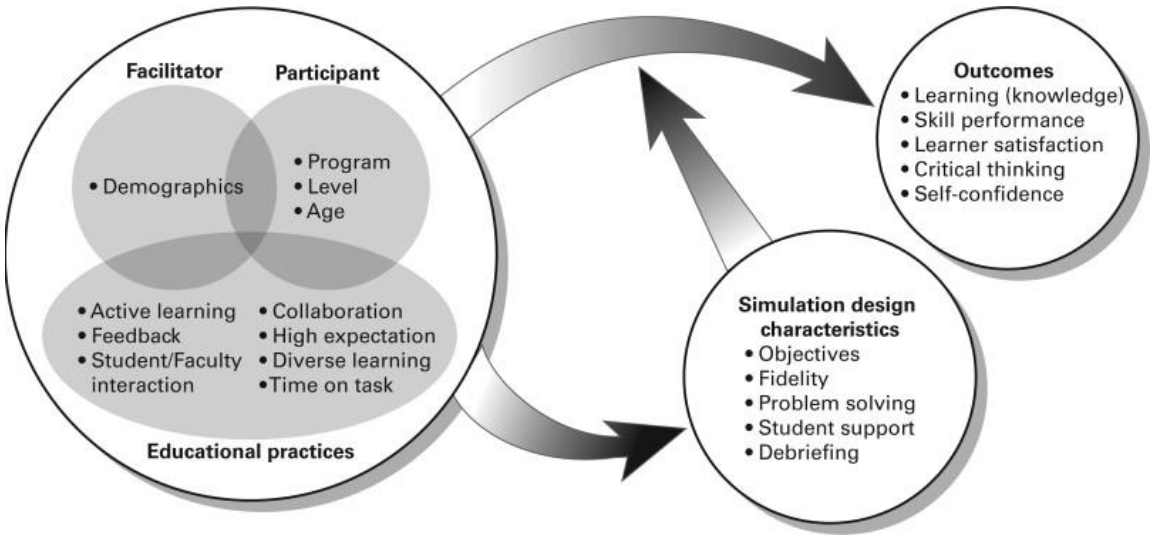

Figure 3. The Nursing Education Simulation Framework. Retrieved from: http://dx.doi.org/10.1016/S2155-8256(15)30037-5

To prepare the students for the MSCSM, preparation materials were given to the students before the simulation in the form of a voiceover PowerPoint presentation with embedded videos. The preparation materials took approximately 30 minutes to review. The PowerPoint was based upon reviewed literature on patient deterioration and failure to rescue, sepsis as defined by The

Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3) (Singer et al., 2016), and sepsis and bundle treatment as defined by the SSC (2015). The presentation included an overview of the problem, incidence of mortality and morbidity, national data on sepsis incidents and effects on patients, and an overview of sepsis including early and late signs and symptoms, and diagnostic criteria. Information on the populations affected by sepsis, Surviving Sepsis Campaign treatment guidelines, and the nurses' role and responsibility when faced with patients deteriorating from sepsis was also included.

Before the students participated in the MSCSM, they were provided with a brief simulation orientation to ensure that they were comfortable and familiar with the simulation environment. The pre-briefing covered the outcomes and objectives of the simulation as displayed in Table 8. Orientation to necessary equipment and resources that were used during the MCSCM was provided. Participants were informed and given a list of the overall expectations and specific behaviors (Appendix B) during the simulation and the roles of the participants as a primary nurse or secondary nurse. The rationale for this list was to provide the participants with an opportunity to ask questions and review behaviors/tasks or equipment that they were not familiar with. They were then given 10 minutes to review the case scenario. Due to having an odd number of students on some of the simulation days, there was the occasional group of three. The simulation used a high-fidelity manikin and included a patient scenario on a medical-surgical floor who developed sepsis following an injury. This simulation portrayed a situation where a patient presented with early signs and symptoms of sepsis. In this simulation, participants had to identify sepsis, seek assistance, and suggest the initiation of Surviving Sepsis Guidelines. Assessment of these behaviors including the ability to recognize sepsis and respond

appropriately was scored by the Martinez Sepsis Competency Evaluation Tool (MSCET) (Appendix B).

Table 8.

Simulation Learning Objectives

By the end of the simulation the participants will:

- Demonstrate an understanding of the pathophysiology, clinical manifestations, and appropriate treatment of sepsis as outlined by the SCC guidelines.
- Recognize deterioration by identifying early signs of sepsis in simulated response to rescue patient scenario during simulation and debriefing.
- Respond appropriately to deterioration by activating a team response.
- Verbalize SCC guidelines by appropriate management of a patient with sepsis in a simulated response to rescue patient scenario during simulation and debriefing.
- Demonstrate effective communication skills during the simulated response to rescue scenario.
- Demonstrate accurate documentation of assessment findings and orders given by the rapid response team during the simulation.

A debriefing with the principal investigator took place after the simulation in an area outside of the simulation room. Health care educators have recognized the essential role of debriefing which is considered the most important aspect of simulation as it is believed that most simulation learning occurs during this time. The process of debriefing involves a discussion between simulation participants and educator(s) where feedback about an observed performance is compared with a standard (Arafeh, Hansen, & Nichols, 2010; Eppich & Cheng, 2015). This reflection and discussion provided the students with insight as to how they may change their practice leading to performance improvement by identifying performance gaps. “A performance gap is the difference between the desired and actual observed performance and can form the

basis for separate lines of questioning in the debriefing" (Eppich & Cheng, 2015, p. 106). Debriefing includes the following essential elements: "(1) active participation with more than just the passive receipt of feedback; (2) developmental intent focused on learning and improvement (more than a performance review); (3) discussion of specific events; and (4) input from multiple sources" (Eppich & Cheng, 2015, p. 106).

INACSL Standards of Best Practice: Simulation SM: Debriefing have been described by the International Nursing Association for Clinical Simulation and Learning, which highlights the importance of a structured framework for debriefing. Several different strategies for debriefing exist and are classified into three broad categories: "(1) promoting learner self-assessment, (2) facilitating focused discussion to promote reflective learning, and (3) providing information in the form of directive feedback and/or focused teaching" (Cheng et al., 2016, p. 420). In the PEARLS blended debriefing approach, "educators purposefully combine strategies for debriefing depending on learner type and expertise, learning objective(s), amount of time available, educator expertise, and other considerations that influence the effectiveness of specific debriefing strategies" (Cheng et al., 2016; Eppich & Cheng, 2015). For this study, PEARLS blended debriefing approach was used as the debriefing method.

PEARLS uses a scripted debriefing technique which assists both novice and experienced simulation educators to effectively implement the PEARLS framework of debriefing. For PEARLS to be effective, the educator needs to adequately prepare the learners to participate in the simulation experience by creating a sense of psychological safety. The PEARLS debriefing script supports simulation educators by: "(1) setting the stage for the debriefing; (2) organizing the debriefing to include initial participant reactions followed by a description of relevant case elements, an analysis of positive and suboptimal areas of performance using the PEARLS

framework to select a debriefing approach, and finally a summary of lessons learned; and (3) formulating questions that empower educators to share clearly their honest point of view about the simulation events" (Eppich & Cheng, 2015, p. 108). Table 9 provides an example of a PEARLS debriefing script.

The PEARLS debriefing framework uses common strategies to provide guidance during the debriefing process. Conditions that may influence the choice of approach to debriefing include time availability, clarity of the learners' rationale for actions, and whether the learning objective/performance gap is related to knowledge, skills, or behaviors (Eppich & Cheng, 2015). PEARLS outlines four distinct phases of the debriefing process: reactions, description, analysis, and summary phases (Figure 4). The reactions phase begins with an open-ended question such as ''How are you feeling?'' to allow learners to vent and express their initial thoughts and feelings. When only one or two learners respond to the initial question, a follow-up question such as ''Other initial reactions?'' or ''How are the rest of you feeling?'' followed by silence often prompts additional reactions. This ensures that all participants have a chance to vent if they choose (Eppich & Cheng, 2015).

Table 9.

PEARLS Debriefing Script

Setting the scene	May occur before the first scenario debriefing: ‘‘I’ll spend about XX minutes debriefing the case with you. I am interested to hear about how you feel now that that case is over. I would like someone to describe what the case was about to ensure we are all on the same page. We will explore the aspects of the case that worked well and why and how. What would you manage differently and why? What was going on in your mind during this experience? We’ll end by summarizing some take-home points and how to apply them to future clinical practice.’’		
Reaction	‘‘How are you feeling?’’ Follow-up question: ‘‘How are the rest of you feeling?’’ ‘‘Other reactions?’’		
Description	‘‘Can someone summarize the case so that we are all on the same page? From your perspective, what were the main issues that you had to deal with?’’ Potential follow up questions: ‘‘What happened next?’’ ‘‘What things did you do for the patient?’’		
Analysis	Signal the transition to the analysis of the case and frame the discussion: ‘‘Now that we are all on the same page, let’s talk about that case. I think there were areas you managed effectively and others that seemed more challenging. I would like to explore each of these with you.’’		
	Learner self-assessment (e.g., plus-delta)	Directive feedback and teaching	Focused facilitation (e.g., alternatives, pros and cons; self-guided team correction; advocacy-inquiry)
	‘‘What aspects of the case do you think you managed well and why?’’	Provide the relevant knowledge or tips to perform the action correctly.	Specifically, state what you would like to talk about (‘‘I would like to spend a few minutes talking about XXX.’’)
	‘‘What aspects of the case would you want to change and why?’’ Close performance gaps selectively using directive feedback and teaching or focused facilitation	‘‘I noticed you [behavior]. Next time, you may want to I [suggested behavior] I because [provide rationale].’’	Elicit underlying rationale for actions.
	Are there any outstanding issues before we start to close?		

Application/ Summary	Learner guided: ‘‘I like to close the debriefing by having each of you to state two take-aways that will help you in the future.’’ Educator guided: ‘‘In summary, the key learning points from this case were I… ’’

Note. Adapted from Promoting excellence and reflective learning in simulation (PEARLS): Development and rationale for a blended approach to health care simulation debriefing. Simulation in Healthcare. By Eppich, W., & Cheng, A, 2015, Simulation in Healthcare, 10(2), 106-115.

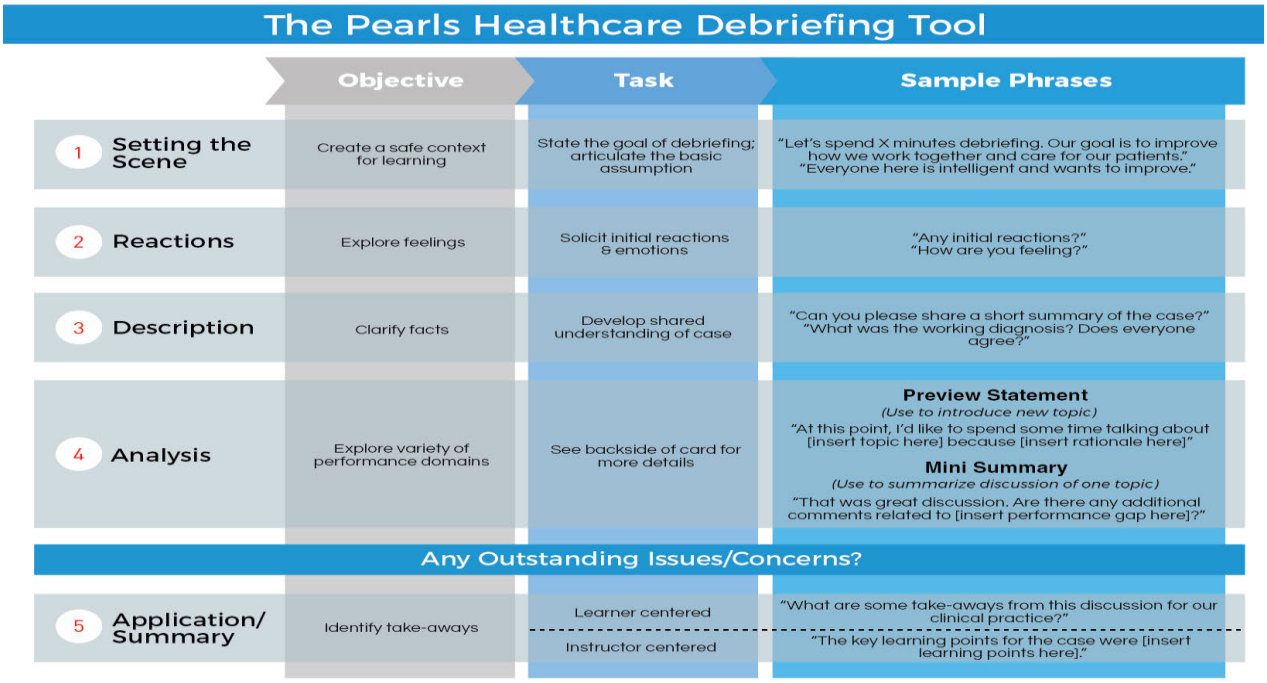

Figure 4. The PEARLS Healthcare Debriefing Tool. Retrieved from: https://debrief2learn.org/pearls-debriefing-tool/

The description phase can be helpful to invite someone to summarize their perspective on key events. It can also be useful in discussing major issues faced during the simulation. Through discussion in this phase, educator(s) and participants can verify there on the are on the same though process and have the same understanding of what occurred during the simulation. If everyone is not having the same understanding about these issues, then the issues can be the basis for a later discussion. It is important to stay focused on the major issues during this time to

maintain good time management. During these opening phases of debriefing, educators should make a note of particular learner concerns and issues so that they may be addressed later in the debriefing (Eppich & Cheng, 2015).

In the analysis phase, educators select the strategy that best fits each specific piece of the performance (Figure 5). Before any debriefing session, educators need to be mindful of their own debriefing experience as well as the participants' level of knowledge and experience. These factors may influence which educational strategies to use during the debriefing (Eppich & Cheng, 2015). To establish which strategy to use for each aspect of a performance, educators should consider the following questions: "(1) Is the rationale for the performance gap clear (i.e., it is clear if the participant states, ''I did not know what to do next,'' thus signifying an underlying knowledge gap)? (2) How much time is available? (3) Does the performance clearly represent cognitive, technical, or behavioral domains?" (Eppich & Cheng, 2015, p. 108). No set combination of variables best designates the use of one educational strategy over another. However, Eppich and Cheng (2015) suggest that the more variables that support the use of a specific strategy, the greater the possibility that it will be suitable in that particular context. These researchers have created a decision support matrix for educators to use while observing a simulation. Educators populate the learning objectives and then in order consider the three screening questions discussed earlier to help them select the educational strategy that best fits that specific performance gap or objective (Eppich & Cheng, 2015).

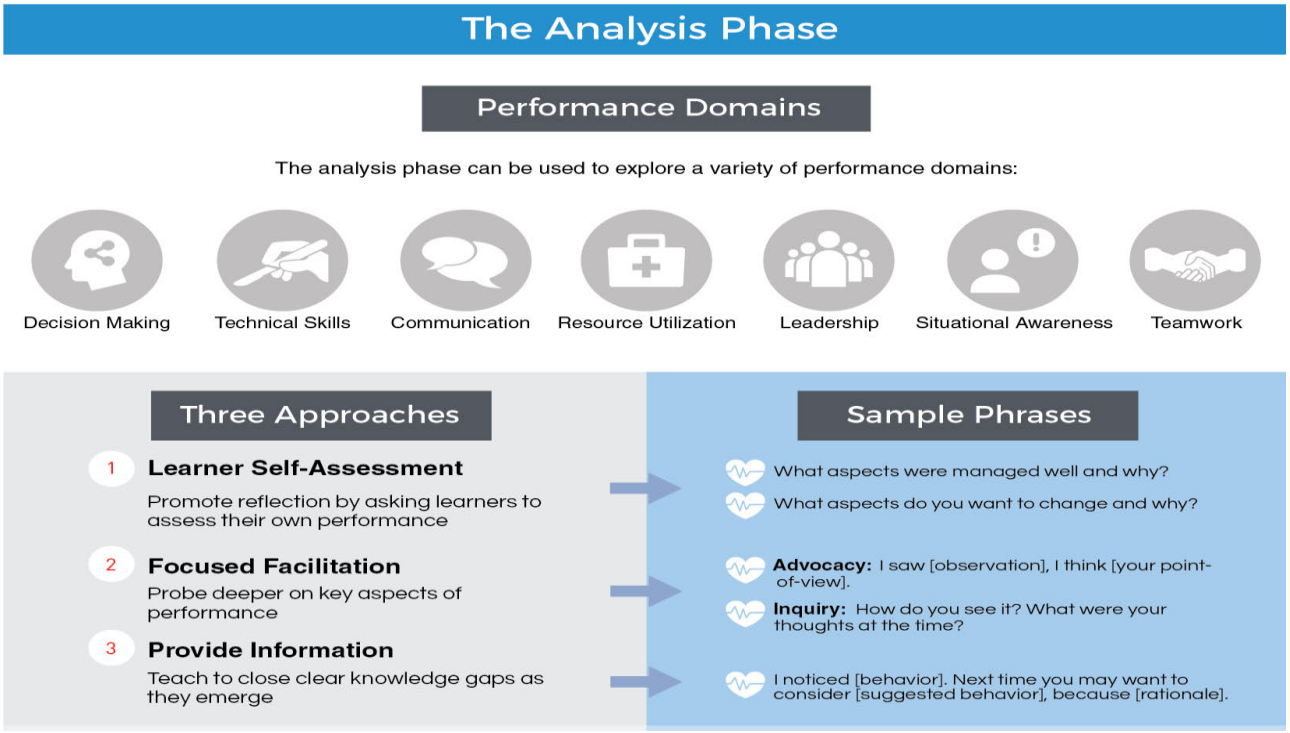

Figure 5. The PEARLS Healthcare Debriefing Tool, Analysis Phase. Retrieved from: https://debrief2learn.org/pearls-debriefing-tool/

If time is limited or if the participants did not share their thoughts and/or emotions during the reactions phase, self-assessment strategies, such as "What went well and what would you change?" are suitable at the beginning of the analysis phase. Often issues related to the simulation can be brought up in a short period which may provide insight regarding what topics are important to participants. Once these issues are identified, the educator can choose which focused facilitation techniques would be best to promote a more in-depth discussion to close performance gaps through directive feedback (Eppich & Cheng, 2015).

The summary phase may be conducted in one of two ways, a learner–guided manner and the educator-guided manner. In a learner-guided manner, the learners are asked to state the main take-home message and anticipate barriers to enact change in their setting. This step allows the

educator to confirm if the learner's take-home messages correspond to the predetermined learning objectives. This technique usually takes more time, and learners occasionally will introduce new topics for discussion while the educator is trying to lead a summary (Eppich and Cheng, 2015). The educator-guided manner can have done by the educator summarizing a concise review of the main take-home messages of the simulation. This technique allows for the educator to have more control over when the debriefing will end. However, when this style is used, it is unable to determine if the learner's take-home messages correspond to the simulation learning objective. (Eppich & Cheng, 2015).

Although there are many applicable debriefing methods, PEARLS adequately meets the needs of this study. The script offers guidance for leading the debriefing and allows for conversations with the participants concentrating on the concept that everyone has the same understanding of the events that occurred in the simulations and the learning outcomes to ensure learning and addressing performance gaps. The structured framework is adaptable for debriefing simulations with a variety of goals, including clinical decision making, improving technical skills, teamwork training, and interprofessional collaboration (Eppich and Cheng, 2015).

The simulations were videotaped allowing for the observers to review at a later date. The main role of the four observers was to view the student simulation videos and score them using the MSCET. Video files were stored in secure online educational software to which only the observers and the principal investigator had access. The four observers also had access to the preparation materials if desired. An email and written letter was sent to the observers with instructions on how to view the videos and how to score the MSCET.

Instrumentation

A total of two instruments were used during this study for data collection. The MSCET is an evaluation tool that was used to evaluate student behaviors and performance during the MSCSM. Student participants evaluated the PEARLS method of debriefing following the simulation using the DASH instrument.

Development of the MSCET

The MSCET was based upon the Heart Failure Simulation Competency Evaluation Tool (HFSCET) developed by Aronson, Glynn, and Squires (2012). This validated tool is used to assess the nursing students' ability to competently respond during a simulation scenario involving a patient with heart failure. The research team who developed the HFSCET consisted of two academic nursing faculty and a nurse educator from an acute care setting. This team completed a thorough literature review of the practice guidelines, national safety initiatives, hospital accreditation standards, and descriptions of best practices related to the care of a patient admitted with heart failure to an acute care setting (Aronson, Glynn, & Squires, 2012). The heart failure population was chosen because heart failure is one of the deadliest and costly conditions in the United States (Aronson, Glynn, & Squires, 2012). The HFSCET simulation package, consists of a detailed patient scenario, user guidelines, a computerized medical record, and the HFSCET. To establish content validity, the scenario and HFSCET were sent to two physicians and two nurses who had extensive experience in caring for this patient population, and revisions were made. The areas focused on in this tool are patient safety, assessment, communication, interventions, and documentation. Evaluators of the simulation rated the participants on the tool as having met or not met the criteria. The evaluation tool originally corresponded to a simulation depicting a patient with heart failure. Correlations among the two raters for the total scale during

Phase 1 of the study were 0.730, 0.763, and 0.777, and improved during Phase 2 also with two rates, the correlation was .839 after instrument revision.

This tool was modified to create the MSCET which reflects the simulation depicting a patient who displays signs of deterioration from sepsis. Areas of modification included signs and symptoms of sepsis as well as vital signs and results of diagnostic studies which meet sepsis diagnosis criteria. This tool also contains a component where participants should call for assistance.

To validate the MSCET, DeVellis' (1991) guidelines for scale development were utilized. The first step in this process was to determine clearly what is to be measured. The purpose of this tool is to measure nursing students' ability to recognize deterioration in patients due to sepsis and act appropriately. Once the purpose of the scale was determined, the next step was to construct the tool. The MSCET started with 93 items and was reduced to 51 final items after initial review. These items are grouped into five categories: initial patient safety activities, assessment, communication, core measures about sepsis, and documentation (Appendix B). The third step was to determine the format for measure. This tool is a dichotomist format for ranking the participants. The participants were ranked as either completed the expected behaviors or tasks or did not meet the expected behaviors or tasks.

The fourth was to have the initial item pool reviewed by a panel of experts. For this study a total of four reviewers were utilized. These experts all had an extensive knowledge of sepsis, the SSC, expectations of nurses when caring for patients displaying signs of sepsis. In addition, these experts were qualified in simulation education and patient care. Polit and Beck (2017) recommend using at least three experts. The expert panel independently rated each item on the instrument for relevance, clarity, and conciseness. Anticipated feedback regarding areas that

were not included in the tools and ways to improve the tool was be expected. This led to the fifth step of considering inclusion of validated items. The projected feedback given by the experts was acknowledged and taken into strong consideration so that validation could occur (DeVellis, 1991).

The next step taken to validate this tool was to calculate content validity. According to Polit and Beck (2017), experts should be asked to evaluate individual items on the tool as well as the tool itself. A common procedure, that was used for this study, was for the item level to have experts rate the items on a four-point scale as follows for relevance: 1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, 4 = highly relevant. For clarity, the four-point scale is as follows: 1 = not clear, 2 = somewhat clear, 3 = quite clear, 4 = highly clear. For conciseness, the four-point scale is as follows: 1 = not consistent, 2 = somewhat consistent, 3 = quite consistent, 4 = highly consistent. From this point each item had a calculated item content validity index I-CVI. In this study four raters were used. After the raters gave their ratings, scores were then added up and divided by the number of experts. Polit and Beck (2017) suggest a value of .90 as the standard for establishing excellence in content validity.

This tool was sent to an expert review panel for tool validation. To choose these experts, the panel had to meet specific criteria. Inclusion criteria included being recognized as an expert in patient deterioration, sepsis, nurse educators with simulation experience, registered nurses, advanced practice nurse, doctoral prepared nurse, or nursing educator who is currently teaching in the classroom, clinical, and or simulation setting or clinically practicing. The expert review panel was asked to review and critique the tool as well as make comments or suggestions. This was done by utilizing an evaluation form where each component was ranked on relevance, clarity, and conciseness (Appendix C). All critiques and comments were taken under

consideration and necessary modifications were made. The agreement between the content reviewers was assessed for inter-rater reliability of the relevance, clarity and consistency scores of the MSCET.

Debriefing Assessment for Simulation in Healthcare Tool – Student Version-Short (DASH)

In addition, evaluation of the debriefing was done through the use of the DASH instrument (Student Version-Short). This tool evaluates the approaches, tactics, and techniques used during simulation debriefings by examination of displayed behaviors. The DASH instrument is grounded on evidence and theory, prompting people to learn and change in experiential contexts (Simon, Raemer, & Rudolph, 2017). The DASH instrument uses a behavior-based rating scale that provides valid and reliable data for use in the simulation setting. There are a total of six elements in the DASH instrument: (1) sets the stage for an engaging learning environment; (2) maintains an engaging context for learning; (3) structures debriefing in an organized way; (4) provokes interesting and engaging discussions and fosters reflective practice; (5) identifies performance gaps; and (6) helps close performance gaps (Simon, Raemer, & Rudolph, 2017). Each of the six elements is defined by its dimension descriptions with positive, noted as (+), and negative (-), behavioral examples. The rating scale is 7 to 1, with 7 indicating extremely effective (outstanding), 6 consistently effective (very good), 5 mostly effective (good), 4 somewhat effective (average), 3 mostly ineffective (poor), 2 consistently ineffective (very poor), and 1 extremely ineffective (abysmal) (Simon, Raemer, & Rudolph, 2017).

The DASH instrument tool has been used in numerous studies and has been shown to have good reliability and validity. Brett-Fleegler et al. (2012) conducted a study to examine reliability of the scores of the DASH instrument when applied to simulation debriefings and to

evaluate whether the instrument's scores demonstrate evidence of validity. Interrater reliability and internal consistency of this instrument were also examined. To assess interrater reliability, intra-class correlations were analyzed for 114 simulation instructors enrolled in DASH training webinar training courses. The participants included nurses, physicians, other health professionals, and Masters and Ph.D. educators who are employed in various healthcare work environments. The training session consisted of four steps. First, the raters familiarized themselves with the DASH rater's handbook followed by the web-based session. Participants were asked to study the 6 elements and create a working knowledge of each element's dimensions. At the start of the session, the trainers were provided a brief summary of each DASH element with highlights of each dimension. Next, the trainers described best practices and common difficulties in rating when using the DASH instrument. In three rounds, the rater trainees watched, rated, and then discussed the separate course introductions and subsequent debriefings. The instructors also reviewed the three debriefing sessions. To assess internal consistency, Cronbach α was calculated for this cohort. The researchers did one measure of validity by comparing the scores across the 3 debriefings of different quality (Brett-Fleegler et al., 2012).

The results showed that intra-class correlation coefficients for the individual six elements were greater than 0.6. The overall intra-class correlation coefficient for the combined elements was 0.74. Cronbach α was 0.89 across the webinar raters. There were statistically significant differences among the ratings for the 3 standardized debriefings ($p < 0.001$), confirming that the DASH scores have good reliability and preliminary evidence of validity (Brett-Fleegler et al., 2012). The Center for Medical Simulation's website (https://harvardmedsim.org) provides simulation educators permission to use the DASH instrument in their simulation programs. The

only condition requested is that the researchers provide CMS copies when publishing articles, abstracts or reports using the DASH.

Data Collection

For this study, demographic information was collected (Appendix E). The questionnaire was given to the participants asking them if they gender identify and, if so, what gender they identify with, age, clinical experience involving patient deterioration, and past work in the medical field. The second area of data that was collected was the participant's scores on the MSCET, assessing their ability to competently respond during a simulation scenario involving a patient with sepsis. The areas of focus were patient safety, assessment, communication, intervention, and documentation. Lastly, evaluation of the debriefing process was completed using the DASH instrument.

After the student sample was obtained and informed consents were signed and collected, students participated in the preparation materials for the study. Following this, the students were randomly placed into groups of two (occasionally three) for the simulation. Following simulation preparation, students were then oriented to the simulation laboratory to become aquatinted with the simulation environment. Prior to beginning the simulation participants were provided with the case scenario and briefed about their roles in the simulation. The principal investigator was present during the simulations to answer questions or address concerns. The simulation was designed to be completed in 30 minutes. If participants did not complete the simulation within this time, the simulation was stopped, and participants continued to the debriefing process. The simulations were video recorded by the principal investigator. Students participating in the simulation underwent debriefing following the PEARLS blended debriefing approach with the principal investigator. The debriefing was not recorded. Upon completion of the simulation-based experience, students were asked to complete the DASH instrument. Table 10 shows the

estimated timeframe of the participant portion of the study. The roles of the participants were either as the primary or secondary registered nurse.

Table 10.

Study Procedures

Components	Estimated time frame
Recruitment	On campus day of simulation
Preparation materials / pre-briefing teaching tool	30 minutes
Orientation to the simulation room	10 minutes
Case scenario presentation	10 minutes
Simulation	30 minutes
Debriefing	30 minutes
Completing the DASH instrument	10 minutes
Faculty rating	Variable

Data Analysis/Procedures

When establishing the content validity scores of the MSCET as measured by a panel of experts, the content validity index (CVI) of each item and subscale, and the total scale were calculated for its relevance, clarity, and conciseness. The I-CVI was calculated by dividing the number of experts who gave a rating of relevance, clarity, conciseness by the total number of experts.

When using the MSCET, participants were evaluated as either met the behaviors/tasks or did not meet the behaviors/tasks in the areas of patient safety, assessment, communication, intervention, and documentation. Student groups received one score rather than individual scores. If either student performed the behavior/task, the item was met and the group received a

score of 1. If the group did not perform the behavior/task than the group received a 0. If the student made mention of a missed component(s) during the debriefing, they did not receive credit for the task. Descriptive statistics were utilized to calculate a total score for each student and the entire group, and individual scores for each content area (patient safety, assessment, communication, intervention and documentation). Once completed, the total scores of the MSCET were calculated. Data was entered into SPSS program by a statistician to ensure accuracy in the descriptive statistics, overall scores, and averages of each of the categories. The DASH instrument was completed by the participants. Descriptive statistics were utilized to summarize individual and group scores for each of the individual elements and total scores.

The inter-rater reliability of the relevance, clarity, and consistency scores of the MSCET as determined by a panel of experts was attempted to be determined. Because this involved greater than two raters and an ordinal ranking response set, a Kendall's W was calculated.

The level of satisfaction by the senior level nursing students with the PEARLS debriefing method was obtained. This was done by having the students complete the Debriefing Assessment for Simulation in Healthcare (DASH) tool. The completed tools were also given to the statistician to calculate the results. A mean and standard deviation of the total score was calculated.

Ethical Considerations

Approval for this study was obtained from the IRB of the university where data was collected. Individual consent was obtained from each participant and all identities were kept confidential. Numeric codes were assigned to each participant to ensure confidentiality. Coercion was limited since this principal investigator did not know the students, and had no influence on student grades or academic standings.

Participants were informed that they would not receive compensation in return for their participation except acquired knowledge of sepsis and experiences gained through simulation. Participants were notified that they could withdraw at any time from the study without any consequences. All data collected for the purpose of this study were kept on an encrypted laptop computer in a password-protected document in a locked area when not in use. All physically collected data and the informed consent and the evaluation tools have been stored in a locked file cabinet to which only the principal investigator has access. All videotaped simulations were logged into a password protected software program where only the principal investigator and the observers have access. The videos did not contain names or student identifiers. They were labeled with participant numerical codes. Videos were not and will not be used for any purpose other than this study. Data will be secured for three years.

Summary of Chapter Three

This chapter provided an outline of the research design, target population, sampling method, size and setting. Recruitment strategies and instrumentation were explained. Data collection and data analysis procedures were outlined, and limitations of the research design and ethical considerations were discussed.

Chapter Four provides a description of the sample and a summary of the results including the reported scores of the MSCET and DASH instruments. The inter-reliability and the content validity scores of the MSCET and the CVI are described. The data is summarized to assist with the conclusions and discussion sections of Chapter Five.

CHAPTER FOUR: DATA ANALYSIS AND RESULTS

Introduction

The first purpose of this study was to develop a simulation-based experience for nursing students to assist them to recognize and respond to patients displaying signs of deterioration related to sepsis in a safe and protected environment. To ensure the simulation experience was consistent with best practices in simulation, it was based on INACLS Standards of Best Practice (2016b). To ensure consistency with evidence-based standards, the Surviving Sepsis Campaign (SSC) Guidelines (2017) were utilized. This simulation-based experience included preparation materials, pre-briefing, a case scenario, and debriefing known as the Martinez Sepsis Competency Simulation Module (MSCSM).

The second purpose of this study was to develop and evaluate an instrument to measure the skills and behaviors of nursing students who participate in the MSCSM. The Martinez Sepsis Competency Evaluation Tool (MSCET) was used to assess nursing students' ability to competently respond to a simulation scenario involving a patient with sepsis. The areas of focus are patient safety, assessments, communication, core measures (standards of care and treatment processes), and documentation. The MSCET was sent to experts for review to establish content validity before students participated in the MSCSM, and based on their review, the instrument was adjusted. Inter-rater reliability of the content reviewers' scores in the areas of relevance, clarity and consistency were also calculated. Student scores on the MSCET for the areas of focus and total scores on the instrument were calculated to assess overall student performance.

A third purpose of the study was to evaluate students' satisfaction with the simulation-based experience and the debriefing model entitled the Promoting Excellence and

Reflective Learning in Simulation Approach to Health Care Debriefing (PEARLS). Student satisfaction was assessed using a reliable and valid instrument: The Debriefing Assessment for Simulation in Healthcare (DASH).

Following collection of all data, the principle investigator reviewed all content for completeness and consulted with a statistician to determine the statistical tests that would be used. The statistician was provided with all of the collected data. All measurements were entered into SPSS 24 to create a data file, and histograms were created in order to identify outliers due to completion errors. Statistical analyses were conducted for the content validity and inter-rater reliability of the MSCET, the students' performance in the simulation, and students' satisfaction with the PEARLS. Once the statistician completed the calculations, the results were reviewed with the principle investigator.

Description of the Sample

For the purposes of this study, three samples were necessary: a sample of students to perform in the simulation scenario and a sample of observers to rate students' performance using the MSCET. A convenience sampling method was completed for the student sample. The study took place at an accredited four-year baccalaureate nursing program located in the Northeast region of the United States. Participants were recruited in the spring 2019 from a group of senior-level nursing students enrolled in the capstone course. Simulation, education, and content experts were recruited as observers to rate students' performance during the simulation, and to evaluate the MSCET for content validity.

Fifty-five students were invited to participate in the study. Of them, none declined, resulting in a final sample of 55. All data from the demographic questionnaire were analyzed using SPSS 24. Univariate analyses were conducted of the five sociodemographic characteristics

(age, identifying with a gender, gender, prior experience in a clinical setting, and prior work in the medical field); for nominal-level data (identifying with a gender, specified gender and prior experiences), sums and percentages are reported. For age, a ratio-level variable, the mean and standard deviation were calculated. Participants were between 20 and 43 years of age, with a mean age of 23.6 (*SD=4.73*). All but two participants (n=53, 96.4%) stated that they identified with a gender; the remaining two (3.6%) did not provide a response. Of those who identified with a gender, over three quarters of the sample (n=45, 84.9%) identified as female and eight (14.5%) identified as male. Approximately sixty percent of respondents (n=32, 59.3%) did not have any prior experience in a clinical setting working with a patient who was acutely deteriorating. Twenty-two participants (40.7%) reported having had prior experience and one did not provide a response to this question. Half (n=28, 51.9%) of the sample reported having had prior experience working in the medical field, 26 (48.1%) reported no prior experience, and one participant did not provide a response.

Detailed Analysis

RQ1. What are the content validity scores of the Martinez Sepsis Competency Evaluation Tool (MSCET) as measured by a panel of experts? To answer this question, the content validity index of each item and subscale, and the total scale were calculated for its relevance, clarity, and conciseness. In each calculation, item responses were dichotomized into two categories. Specifically, items that were assigned a 3 or 4 were coded as relevant, clear, and concise and items that were assigned a 1 or 2 were coded as not relevant, unclear, or not concise. The I-CVI was calculated by dividing the number of experts who gave a rating of relevance, clarity, and conciseness by the total number of experts.

Relevance

Items. Three items had a content validity index of .50 (n=3, 6.1%), 14 items had a content validity of .75 (28.6%), and 32 (65.3%) items had a content validity index of 1.00. Each I-CVI is displayed in Table 11.

Table 11.

Relevance I-CVI

Subscale	Item	I-CVI
Patient Safety:		
	Performs hand hygiene with alcohol-based hand rub before entering room	1.00
	Checks patient ID using two patient identifiers before providing care	1.00
	Each participant identifies self before providing care	.75
Assessments:		
	Assess neurological status	1.00
	Assesses and verbalizes lung sounds	.75
	Assesses and verbalizes bowel sounds	.50
	Assesses and verbalizes cardiac sounds	1.00
	Assesses lower extremity/injury site/assess dressings	.75
	Assesses and verbalizes lower leg circulation	.75
	Assesses and verbalizes intravenous site	.75
	Assesses and verbalizes intravenous fluid	1.00
	Assesses and verbalizes skin integrity	.50
	Notes routine blood work in pt. chart shows elevated WBC of 13,000m3	1.00
	Assesses pain level	.50
	Takes and verbalizes accurate initial reading of BP	1.00
	Takes and verbalizes accurate initial reading of pulse rate	1.00
	Takes and verbalizes accurate initial reading of respiratory rate	1.00
	Looks at monitor and verbalizes accurate initial reading of pulse oximetry	1.00
	Looks at monitor and verbalizes accurate initial reading of temperature	1.00
	Needs to identify that an infection in left foot suspected	1.00
	Identify that Mr. M has sepsis	1.00
Communication:		
	Identifies self by name	1.00
	Identifies the patient being called about	1.00
	Provides brief history of patient	1.00
	Reports change in neurological status	1.00
	Reports change in blood pressure	1.00
	Reports change in pulse oximetry	1.00

Reports change in pulse rate	1.00
Reports change in respiratory rate	1.00
Reports bilateral left foot findings	1.00
Reports presence of sinus tachycardia	1.00
Reports being oriented to person and place but not time	1.00
Reports increased WBC	1.00
Reports urine output is less than 30mm/hr	1.00
Assesses situation and verbalizes conclusion to call for an RRT	1.00
Verbalizes need for assistance and makes appropriate recommendation	1.00
Writes down verbal orders	1.00
Reads back and verifies orders	1.00
Core Measure:	
Provides brief explanation to patient about need for blood work	.75
Provides brief explanation to patient about the need for IV fluids	.75
Provides brief explanation to patient about rationale for antibiotics	.75
Assesses patient understanding about sepsis/infection	.75
Provides information about sepsis	.75
Provides information about protocols and treatments	.75
Provides information about the possible need to transfer to an acute care unit	.75
Documentation:	
Documents antibiotic medication to the administration record	.75
Documents vital signs	1.00
Documents assessments	1.00
Writes descriptive narrative note related to patient situation	.75

Subscales and total score. The content validity index of the five subscales ranged from .75 (Core Measures) to 1.00 (Communication) (see Table 12). The content validity of the total scale was .88.

Table 12.

Subscale Content Validity for Relevance

Subscale	CV
Patient Safety	.92
Assessment	.86

Communication	1.00
Core Measures	.75
Documentation	.88

Clarity

Items. The content validity index of one item (n=1, 2.0%) was .25, the content validity index of 14 (28.6%) items was .50, 16 (32.7%) items had a content validity index of .75, and 18 items (36.7%) had a content validity index of 1.00. Each I-CVI is displayed in Table 13.

Table 13.

Clarity I-CVI

Subscale	Item	I-CVI
Patient Safety:		
	Performs hand hygiene with alcohol-based hand rub before entering room	1.00
	Checks patient ID using two patient identifiers before providing care	.75
	Each participant identifies self before providing care	.75
Assessments:		
	Assess neurological status	.75
	Assesses and verbalizes lung sounds	.50
	Assesses and verbalizes bowel sounds	.50
	Assesses and verbalizes cardiac sounds	.75
	Assesses lower extremity/injury site/assess dressings	.50
	Assesses and verbalizes lower leg circulation	1.00
	Assesses and verbalizes intravenous site	.75
	Assesses and verbalizes intravenous fluid	.50
	Assesses and verbalizes skin integrity	.50
	Notes routine blood work in pt chart shows elevated WBC of 13,000m3	.75
	Assesses pain level	1.00
	Takes and verbalizes accurate initial reading of BP	1.00
	Takes and verbalizes accurate initial reading of pulse rate	1.00
	Takes and verbalizes accurate initial reading of respiratory rate	1.00
	Looks at monitor and verbalizes accurate initial reading of pulse oximetry	1.00

Looks at monitor and verbalizes accurate initial reading of temperature	1.00
Needs to identify that an infection in left foot suspected	.50
Identify that Mr. M has sepsis	.50

Communication:

Identifies self by name	.75
Identifies the patient being called about	1.00
Provides brief history of patient	.75
Reports change in neurological status	.50
Reports change in blood pressure	.50
Reports change in pulse oximetry	.50
Reports change in pulse rate	.50
Reports change in respiratory rate	.50
Reports bilateral left foot findings	.25
Reports presence of sinus tachycardia	.75
Reports being oriented to person and place but not time	1.00
Reports increased WBC	.50
Reports urine output is less than 30mm/hr	1.00
Assesses situation and verbalizes conclusion to call for an RRT	.75
Verbalizes need for assistance and makes appropriate recommendation	1.00
Writes down verbal orders	1.00
Reads back and verifies orders	1.00

Core Measure**:**

Provides brief explanation to patient about need for blood work	1.00
Provides brief explanation to patient about the need for IV fluids	1.00
Provides brief explanation to patient about rationale for antibiotics	1.00
Assesses patient understanding about sepsis/infection	.75
Provides information about sepsis	.75
Provides information about protocols and treatments	.75
Provides information about the possible need to transfer to an acute care unit	.75

Documentation:

Documents antibiotic medication to the administration record	.75
Documents vital signs	1.00
Documents assessments	1.00
Writes descriptive narrative note related to pt. situation	.75

Subscales and total score. Subscales ranged from .72 (Communication) to .86 (Core Measures). See Table 14. The content validity index of the total scale regarding its clarity was .78.

Table 14.

Subscale Content Validity for Clarity

Subscale	CV
Patient Safety	.83
Assessment	.75
Communication	.72
Core Measures	.86
Documentation	.75

Conciseness

Items. Seven (7.7%) of items had a .50 content validity index, 17 (34.7%) of items had a .75 rating, and 51% (n=25) of the items had a 1.00 content validity index. Each I-CVI is displayed in Table 15.

Table 15.

Conciseness I-CVI

Subscale	Item	I-CVI
Patient Safety:		
	Performs hand hygiene with alcohol-based hand rub before entering room	1.00
	Checks patient ID using two patient identifiers before providing care	.75
	Each participant identifies self before providing care	1.00
Assessments:		
	Assess neurological status	.75
	Assesses and verbalizes lung sounds	.50

Assesses and verbalizes bowel sounds	.50
Assesses and verbalizes cardiac sounds	.75
Assesses lower extremity/injury site/assess dressings	.50
Assesses and verbalizes lower leg circulation	1.00
Assesses and verbalizes intravenous site	1.00
Assesses and verbalizes intravenous fluid	1.00
Assesses and verbalizes skin integrity	.75
Notes routine blood work in pt. chart shows elevated WBC of 13,000m3	.75
Assesses pain level	1.00
Takes and verbalizes accurate initial reading of BP	1.00
Takes and verbalizes accurate initial reading of pulse rate	1.00
Takes and verbalizes accurate initial reading of respiratory rate	1.00
Looks at monitor and verbalizes accurate initial reading of pulse oximetry	1.00
Looks at monitor and verbalizes accurate initial reading of temperature	1.00
Needs to identify that an infection in left foot suspected	.50
Identify that Mr. M has sepsis	.75

Communication**:**

Identifies self by name	1.00
Identifies the patient being called about	1.00
Provides brief history of patient	1.00
Reports change in neurological status	.75
Reports change in blood pressure	.75
Reports change in pulse oximetry	.75
Reports change in pulse rate	.75
Reports change in respiratory rate	.75
Reports bilateral left foot findings	.50
Reports presence of sinus tachycardia	.75
Reports being oriented to person and place but not time	1.00
Reports increased WBC	.75
Reports urine output is less than 30mm/hr	1.00
Assesses situation and verbalizes conclusion to call for an RRT	1.00
Verbalizes need for assistance and makes appropriate recommendation	1.00
Writes down verbal orders	1.00
Reads back and verifies orders	1.00

Core Measure:

Provides brief explanation to patient about need for blood work	1.00
Provides brief explanation to patient about the need for IV fluids	1.00
Provides brief explanation to patient about rationale for antibiotics	1.00
Assesses patient understanding about sepsis/infection	.75
Provides information about sepsis	.75
Provides information about protocols and treatments	.75
Provides information about the possible need to transfer to an	

acute care unit	.75
Documentation:	
Documents antibiotic medication to the administration record	1.00
Documents vital signs	1.00
Documents assessments	.50
Writes descriptive narrative note related to pt situation	.50

Subscales. Subscales ranged from .75 (Documentation) to .92 (Patient Safety). See Table 16. The content validity of the conciseness of the total scale was .84.

Table 16.

Subscale Content Validity for Conciseness

Subscale	CV
Patient Safety	.92
Assessment	.82
Communication	.87
Core Measures	.86
Documentation	.75

RQ 2: How do undergraduate nursing students in their senior year of nursing school manage patients who are deteriorating or at risk for deterioration during a simulation sepsis scenario as measured by scores on the MSCET in the areas of patient safety, assessments, communication, core measures, and documentation? To answer this question, percentages, means and standard deviations were calculated for the five subscales (patient safety, assessments, communication, core measures, and documentation) and the total score of the Martinez Sepsis Competency Evaluation Tool. Students who participated in the simulation were ranked as either

completed the expected behaviors or tasks or did not meet the expected behaviors or task. Student groups received one score rather than individual scores. If either student performed the behavior/task, the item was met and the group received a score of 1. If the group did not perform the behavior/task than the group received a 0. If the student made mention of a missed component(s) during the debriefing, they did not receive credit for the behavior/task.

As shown in Table 17, between 60% and 82% of behaviors were met. Across subscales, the lowest percentage of behaviors met was in core measures (60%), and the highest percentage of behaviors met was in patient safety (82%). The total percentage of behaviors met overall was 68%.

Table 17.

Martinez Sepsis Competency Evaluation Tool Subscales

Subscale	Number of Items	M, SD	Percentage
Patient safety	3	2.45, .63	82%
Assessments	18	12.75, 2.68	71%
Communication	17	11.20, 2.46	66%
Core measures	7	4.21, 1.55	60%
Documentation	5	2.45, .94	61%
Total Score	50	40.2, 2.94	68%

RQ 3: What is the inter-rater reliability of the relevance, clarity, and consistency scores of the MSCET as determined by a panel of experts? To answer this question, which involved greater than two raters and an ordinal ranking response set, a Kendall's W was calculated as it would be the appropriate coefficient to determine the inter-rater reliability for individual items of

the MSCET. The Kendall's W or Kendall's coefficient is a strength of the relationship index and can be used for assessing agreement among raters. Kendall's W ranges from 0 (no agreement) to 1 (complete agreement). If the test statistic *W* is 1, then all the raters have all assigned the same value to what they are rating. If *W* is 0, then there is no overall agreement among the raters, and their responses may be regarded as random. In-between *W* values of 0 to 1indicate a greater or lesser degree of agreement among the raters (Legendre, 2005; Green & Salkind, 2014). The Kendall's W was used to assess the inter-rater reliability for two or more raters examining the variation between total scores of the MSCET.

In relationship to this question, the inter-rater reliability of both the scale's relevance and clarity was unable to be determined, as in both cases the null hypothesis could not be rejected ($p \geq .05$) and thus there was not enough evidence to conclude that any agreement in ratings was not due to chance. The inter-rater reliability of the scale's conciseness as determined by Kendall's W was .47 (X=67.508, df=48, $p \leq .05$), indicating that 47% of the agreement between raters was due to the actual agreement between raters, and unlikely to be due to chance. This result (47%) is considered to be less desirable. A possibility of this finding might be due to the fact that each rater was from a different discipline, such as academics, clinical, or simulation setting. Having raters from different disciplines may lead to less than desirable results which will be discussed later. Table 18 displays the rankings of each task by all four raters. The table are the specific items across sub scales that 2+ rating deviations (e.g., two or more raters did not agree. The remaining items (50%) deviated by one rater. The variable labels are interpreted as follows: Subscale: InitPt, Assess, Comm, CoreM (Core Measure) and Doc (Documentation), Item number: 1, 2, 3 etc.., Construct: Rel=Relevance, Clarity=Clarity, Conc=Conciseness. For example, CoreM1Rel = Core Measure, item #1, Relevance construct.

Table 18.

Rankings of Each Task by Raters

Concept	Item	Rater 1	Rater 2	Rater 3	Rater 4
Relevance:	InitPt3Rel	2	3	3	4
	Assess4Rel	2	2	4	4
	Assess8Rel	3	2	4	4
	Assess9Rel	3	3	4	4
	Assess10Rel	2	2	4	4
	Assess12Rel	2	2	4	4
Clarity:	Assess1Clar	4	3	4	1
	Assess3Clar	2	4	4	2
	Assess4Clar	2	4	4	2
	Assess6Clar	2	3	4	2
	Assess9Clar	2	4	4	3
	Assess18Clar	1	4	4	1
	Comm4Clar	2	4	4	2
	Comm5Clar	2	4	4	2
	Comm6Clar	2	4	4	2
	Comm7Clar	2	4	4	2
	Comm8Clar	2	4	4	2
	Comm9Clar	1	1	4	2
	Comm10Clar	1	4	4	3
	Comm12Clar	2	4	4	2
	Comm14Clar	2	4	4	3
	Doc1Clar	4	1	4	3
	Doc4Clar	1	4	4	2
Conciseness:	InitPt2Conc	2	4	4	4

Assess1Conc	4	3	3	1
Assess3Conc	2	4	4	2
Assess4Conc	2	3	4	2
Assess6Conc	2	4	4	2
Assess13Conc	3	4	4	3
Assess18Conc	2	4	4	2
Comm9Conc	1	4	4	2
Comm10Conc	1	4	4	3
CoreM1Conc	3	4	4	3
CoreM3Conc	3	4	4	3
CoreM4Conc	3	4	4	2
CoreM5Conc	3	4	4	2
CoreM6Conc	3	4	4	2
CoreM7Conc	3	4	4	2
Doc4Conc	1	4	4	2
Doc5Conc	1	4	4	2

Total Items: N=147

1. Two raters deviated (n=40, 27%)
2. One rater deviated: 77 (52%)
3. Consensus met; n=30 (20%)

RQ 4: How satisfied are senior-level nursing students with the Promoting Excellence and Reflective Learning in Simulation (PEARLS) debriefing method in improving their performance during the simulation as measured by the debriefing assessment for simulation in health care (DASH) student survey? There are a total of six elements in the DASH instrument to be rated: (1) sets the stage for an engaging learning environment; (2) maintains an engaging context for learning; (3) structures debriefing in an organized way; (4) provokes interesting and engaging

discussions and fosters reflective practice; (5) identifies performance gaps; and (6) helps close performance gaps (Simon, Raemer, & Rudolph, 2017). The rating scale is 7 to 1, with 7 indicating extremely effective (outstanding) and 1 extremely ineffective (abysmal). The highest overall score that can be earned is a 42 and the lowest possible score erred would be a score of 7 (Simon, Raemer, & Rudolph, 2017). In order to answer this question, the mean and standard deviation of the total score were calculated. Of the 55 participants, three did not complete the DASH measure, leaving a total of 52 responses. Of them, the mean total DASH score was 40.2 (*SD=2.94)*, indicating a high level of satisfaction with the PEARLS debriefing methodology. Individual elements ranged from a low of M=6.33 *(SD=.68)* which corresponds to the element *"The instructor identified what I did well or poorly and why,"* and a high of M=6.77 *(SD=.43)*, which corresponds to the element *"The instructor structured the debriefing in an organized way***.**" Means and standard deviations for each element are presented in Table 19.

Table 19.

DASH Elements

Element	M, SD
1. The instructor set the stage for an engaging learning experience.	6.69, *.54*
2. The instructor maintained an engaging context for learning.	6.67, *.51*
3. The instructor structured the debriefing in an organized way.	6.77, *.43*
4. The instructor provoked an in-depth discussion that led me to reflect on my performance.	6.60, *.57*
5. The instructor identified what I did well or poorly, and why.	6.33, *.68*
6. The instructor helped me see how to improve or how to sustain good performance.	6.67, *.47*

Summary

The data displayed in chapter four address each of the research questions of this study. When examining the content validity scores of the MSCET as measured by a panel of experts for relevance, clarity, and conciseness, all three had a total scale .78 or greater. However, there were items within each section that received a .78 or below. This finding strongly indicated that revisions were needed. Polit and Beck (2017) stated that a CVI value of .80 is considered an acceptable value. A CVI below .78 should be carefully scrutinized and either revised or discarded. All items within relevance, clarity, and conciseness that received a CVI .78 or below were reviewed against the raters' suggestions and compared to the current literature and SSC guidelines for modifications. Modifications are seen in Appendix F.

This study also asked how the undergraduate nursing students managed the patient who was deteriorating during a simulation sepsis scenario as measured by scores on the MSCET. From these findings we can infer that the students did well with task involving patient safety but were not able to fully meet the task involving assessment, communication, core measures, and documentation. However, the students were highly satisfied with the PEARLS debriefing method in improving their performance during the simulation as measured by DASH student survey.

The inter-rater reliability of the MSCET, as determined by a panel of experts for both relevance and clarity was unable to be determined. There was not enough evidence to conclude that any agreement in ratings was not due to chance. The inter-rater reliability of the scale's conciseness as determined by Kendall's W indicated that 47% of the agreement between raters was due to the actual agreement between raters, and unlikely to be due to chance. Table 18 displays the specific items across the sub scales where two or more raters did not agree and many

items scores were deviated by one rater. These finding raise the question if the raters should all be from the same disciplines to ensure consistency in in determining the inter-rater reliability the MSCET.

Chapter Five comprises a discussion of the results in relation to relevant literature. Limitations of the study, modifications to the MSCET, plans for improving inter-rater reliability, and potential implications to the education of nursing students will be also be discussed. Chapter Five will also identify possible areas of future research.

CHAPTER FIVE: DISCUSSION AND CONCLUSIONS

Introduction

The results of this research have important implications related to the education of student nurses. These outcomes will aid in development of student's ability to identify and properly respond to patients who are deteriorating from sepsis through simulation-based learning experience. Nursing students do not have the necessary skills and knowledge to recognize and appropriately respond to deteriorating patients. This is due to lack of exposure to experiences related to deteriorating patients while students are in their nursing program. To date, there is little research focused on nursing students' and this topic. This study addressed this concern by exposing nursing students to what they will experience once they are functioning in the nursing role. This study also provides preliminary data on the reliability and validity of an instrument (MSCET) that may be used to accurately assess students' competency in responding to subtle signs of early deterioration in patients with sepsis.

In this chapter, the findings of this study will be discussed concerning current research for each of the four research questions. Implications of the study will be identified for nursing practice and nursing education. Suggestions for future research and limitations of the study will also be highlighted.

Discussion

The concern that nursing students are not prepared to recognize and appropriately respond to patients who are deteriorating from sepsis upon graduation is alarming. This study extensively reviewed the literature and the issues surrounding this problem. From there a learning experience was created that encompassed a well thought-out and designed simulation including preparation materials, pre-briefing, a case scenario, a debriefing, a tool to assess the

students while in the simulation, and a method for evaluating student satisfaction. To date, the current literature has not offered a study that has embraced all of these items. The lessons learned in this simulation can be applied to other situations where patients are deteriorating from issues other than sepsis. This study can also be used as a template for future studies, all of which can lead to a decrease in patient morbidity and mortality. This study contributed to the body of knowledge of sepsis, patient deterioration, simulation, and nursing education.

Subjects

The participants in this study were senior-level nursing students who were in their last semester of their nursing program. Fifty-five students were invited to participate in the study and none declined. The age of participants were between 20 and 43 years of age, with a mean age of 23.6 (*SD=4.73*). Of those who identified with a gender, *n*=45 (84.9%) identified as female, eight (14.5%) identified as male, and two participants did not indicate their gender. Approximately sixty percent of respondents (*n*=32, 59.3%) did not have any prior experience in a clinical setting working with a patient who was acutely deteriorating. Twenty-two of respondents (40.7%) reported having had prior clinical experience with patient with sepsis and or with a deteriorating patient. Twenty-eight (51.9%) of the sample reported having prior experience working in the medical field, followed by 26 (48.1%) who reported having no prior experience.

Reliability and Validity of the MSCET

The MSCET was determined to be useful in evaluating student behavior in the MSCSM. An analysis of the MSCET revealed that the content validity for relevance, clarity and conciseness as a whole scored a CVI equal to or greater than .78; however, some individual items within each category (relevance, clarity and conciseness) received a I-CVI below .78. Polit and Beck (2017) stated that a I-CVI value of .80 is considered an acceptable value. A I-CVI

below .78 should be carefully scrutinized and either revised or discarded. The I-CVI results appeared to be affected due to the fact that each reviewer came from a different discipline (e.g. classroom academics, simulation instructor, or clinical practice). There were items within each category of the MSCET, for which the I-CVIs scores were carefully scrutinized as suggested by Polit and Beck (2017). Because these items were components of the SCC guidelines they were not removed, however, they were revised and clarified.

Discussion of the Results

RQ1: What are the content validity scores of the Martinez Sepsis Competency Evaluation Tool (MSCET) as measured by a panel of experts?

The content validity index of each item and subscale and the total scale were calculated for each of the three constructs (conciseness, clarity, relevance), the five subscales within each construct (e.g., patient safety, assessment, etc...), and then for the construct total. The content validity scores were calculated for each section (relevance, clarity, and conciseness) rather than a total score for the whole tool. Because the MSCET is a dichotomous rating scale, and each area evaluated a different behavior or skill, the overall global score is not appropriate.

The content validity of the total scale was .88. When reviewing the calculated results for each item within relevance, some items did not score the desired I-CVI of .78 as suggested by Polit and Beck (2017). However, because these items are considered best practices based on the current literature, evidence-based practice guidelines, the Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3) (Singer et al., 2016) and the Surviving Sepsis Campaign (2015) they were left as part of the MSCET. For example, in the section on patient safety, the items, “each participant identifies self before providing care” scored a I-CVI of 0.75. When caring for patients, it is expected that the nurses introduce themselves and provide

information on the intervention or task they will be performing. The items in the assessment category that scored a I-CVI below a .78 are all considered an essential component of a complete nursing assessment except for a wound assessment, which would only be done if the patient had a wound. For example, the item "Participants must assess the patient's current level of pain by using an appropriate pain score chart, using an analog scale of 0-10" scored a I-CVI of .50. Pain assessment is also an essential part of a nursing assessment and therefore these items remained as part of the MSCET.

The content validity index of the total scale regarding clarity was .78. When reviewing the calculated results for each item within clarity, some items scored a I-CVI of .78 or less. However, much like the items found in relevance, these items are considered best practices based upon the current literature. After a careful review of each item against the reviewers scores and the current literature, it was discovered that each item was not clear on exactly what the tool was asking. For example, the original tool contained the item "assesses and verbalizes bowel sounds." To make this item clearer, it was revised to "assess bowel sounds in all four quadrants" and participants should state "hypoactive bowel sounds in all four quadrants." Each item listed under clarity is essential for nursing practice and therefore was not removed from the tool. Each item was reviewed and clarified.

The content validity of the total scale regarding conciseness was a CVI of .84. Items within this section also had individual I-CVI scores less than .78; however, each item listed under conciseness is necessary when caring for patients. Once again the believed caused for the low individual I-CVI scores is thought to be an issue with the wording and the actual content. Each item that received a I-CVI less than .78 was revised.

The reviewers' comments and rankings were reviewed individually and compared among all the reviewers. It was noted that there were some inconsistencies with individuals' scoring. Some reviewers marked items as quite highly while others marked them as low. One thought on why there is a lack of consistency may be due to the different backgrounds of the reviewers. For this study, the expert panel included two nursing educators who are highly involved in simulation, a professor at a four-year baccalaureate program, and a nursing educator in a hospital who has researched sepsis. The original idea of having a panel of experts from different disciplines was to create a well-rounded panel. However, having a panel from different disciplines may lead to inconsistencies related to the appropriateness of the items. Table 18 displays how each reviewer ranked each task in the MSCET. Lack of consistency has contributed to the ratings contributed to lower CVIs. This inconsistency led to the inability to calculate the inter-rater reliability, which will be discussed later in this chapter. This researcher evaluated each item and revised it to provide more clarity for future reviewers. Appendix F shows the revised MSCET.

RQ 2: How do undergraduate nursing students, in their senior year of nursing school manage patients who are deteriorating or at risk for deterioration during a simulation sepsis scenario as measured by scores on the MSCET in the areas of patient safety, assessments, communication, core measures, and documentation? As discussed previously, the student groups received one score rather than individual scores. If either student performed the behavior/skill, the item was met and the group received a score of 1. If the group did not perform the behavior/skill than the group received a 0. Between 60% and 82% of behaviors on the MSCET were met with a total score of 68% (40.2 *M*, 2.94SD) (Table 18). The highest percentage of behaviors met was in the Patient Safety area at 82% (2.45*M*, 63 *SD*). One potential

reason why students performed best in this area, is that safety measures are a set of skills that all nursing students should be able to practice in every clinical and simulation setting. Patient safety education has become an important tool to shape the future safety behavior of healthcare professionals (Mansour, 2013). Despite efforts to increase knowledge of patient safety in nursing curriculum, research has shown that students have misconceptions when it comes to proving safety measures to patients. Research suggests or has demonstrated that in some cases patient safety topics as suggested by the WHO Patient Safety Curriculum Guide (2011) are not fully addressed in the nursing curriculum. In other situations, safety measures are being taught but not necessarily linked to patient safety (Mansour, 2013; World Alliance for Patient Safety, 2013). With this in mind, the students in this simulation performed these tasks well, with scores of 71% in the assessment portion. Although nursing students are taught and able to practice assessment skills in the classroom and clinical settings, this doesn't necessarily mean that that the students had the opportunity to practice assessment skills on a patient who is displaying signs of deterioration.

When evaluating students' assessment abilities, studies have shown to have less than desirable scores but have displayed improvement following simulation experience (Tuzer, Dinc, & Elcin, 2016). One study examined the effects of using high-fidelity simulators and standardized patients on assessment examination skills in undergraduate nursing students (Tuzer, Dinc, & Elcin, 2016). They specifically examined student nurses' abilities to perform thorax, lung, and cardiac assessments utilizing simulation mannequins and/or live standardized patients. In both groups, the students had tested poorly in these skills before participating in the simulations. In both groups, the students had significant improvements in their assessment skills following the simulation experience (Tuzer, Dinc, & Elcin, 2016).

In reviewing the student's demographic data, over half of participants (*n*=32, 59.3%) did not have any prior experience in a clinical setting working with a patient who was acutely deteriorating. Only 22 (40.7%) participants reported having had prior experience and half (*n*=28, 51.9%) of the sample reported having prior experience working in the medical field. The three areas that students scored the lowest in were communication, core measures, and documentation. Communication in this study refers to the ability to report patient findings. In this case the students in this simulation were to call the overseeing doctor, nurse practitioner or physician assistant once the patient started to show signs of deterioration. Kameg et al. (2010) discussed how nursing students have a limited experience in communication with members of the health care team which may explain the why the students received low scores in this area. However, Kameg et al. (2010) also discussed how the use of simulation can enhance student self-efficacy in relation to communication skills.

Core measures were referred to in this study as relaying information to the patient regarding their health, the course of actions the health team is going to perform, and the delivery of patient education (Schorr & Barnes-Daly, 2017; Dellinger et al., 2012). As discussed above, students lack the experience of caring for a deteriorating patient. Therefore, they cannot be expected to provide patient education on medical diagnoses, plans of care, and potential outcomes. In short, providing student nurses with an educational experience, as this study did, could save the life of patients. Not providing these experiences to students while in school is highly detrimental not only to the student in their future role as a nurse but also the patients they will care for in their nursing practice.

During the simulation, students were expected to document administered antibiotics, vital signs, and patient assessment and provide a narrative note related to the patient’s condition. This

was another area in which students tended to struggle. For the most part, students were able to document the patient's vital signs but struggled when it came time to documenting the administered medication and the patient assessment, and completing the narrative note. This finding was similar to the work of Bowling (2016), who stressed the importance of nursing students being able to practice proper documentation but are unable to as this is lacking in nursing education. "Students must have the opportunity to practice and develop the informatics and electronic documentation skills that they will use in practice" (p. 204). Bowling (2016) went on to discuss how many nursing programs do not have access to the patient's medical record while in the clinical setting and that nursing educators have incorporated the use of academic health records for practice purposes for the students while in the classroom setting. The findings of this dissertation coupled with the existing research suggest that students have a learning deficit in the area of documentation. Results also add to the claim that simulation is an excellent opportunity to provide students with clinical opportunities that they would not receive in the clinical setting as well as sharpen already learned skills.

RQ 3: What is the inter-rater reliability of the relevance, clarity, and consistency scores of the MSCET as determined by a panel of experts? The Kendall's W was calculated to determine the inter-rater reliability of the MSCET when there were more than two raters. The Kendall's W is a non-parametric statistic that is used to assess agreement between different raters. The range of scores for this test is between 0 (no agreement) to 1 (complete agreement) (Green & Salkind, 2014).

The inter-rater reliability for relevance and clarity was unable to be determine in this study as there was not enough evidence to conclude that any agreement in ratings was not due to chance. The inter-rater reliability of the scale's conciseness as determined by Kendall's W was

.47 (X=67.508, df=48, p<.05). This indicated that 47% of the agreement between raters was due to the actual agreement.

The level of how clear each item was written may have impacted the inter-rater reliability as displayed by the clarity scores. Due to the level of clarity, raters may have misunderstood the task or what was involved in completing the task. The concept that the observers were from different disciplines may have possibly played a role in these findings, but it is impossible to know for sure. As argued earlier when discussing the CVIs of the MSCET, different disciplines may have held different tasks at different values, and therefore when ranking the items on the MSCET there were inconsistencies between the reviewers. The combination of content validity reviewers from different disciplines may have also contributed to inconsistencies in ranking content validity scores. Research to date has demonstrated that using raters within the same discipline, and using revisions and training for reviewers and raters can have a positive impact when concluding the inter-rater reliability and the CVI of a study (Tan et al., 2016; Shin, Shim, Lee, & Quinn, 2014).

RQ 4: How satisfied are senior-level nursing students with the Promoting Excellence and Reflective Learning in Simulation (PEARLS) debriefing method in improving their performance during the simulation as measured by the debriefing assessment for simulation in health care (DASH) student survey? Following the simulation, the students participated in the debriefing process. The scripted PEARLS debriefing method was used followed by the DASH survey to measure the student's satisfaction. In completing the DASH, 52 of the 55 participants completed the survey. The mean total DASH score was 40.2 (SD=2.94), indicating a high level of satisfaction with the PEARLS debriefing methodology. The highest scored item received a high of M=6.77 *(SD=.43)*, which corresponds to the element *"The instructor structured the debriefing*

in an organized way" followed by "*the instructor set the stage for an engaging learning experience*" which had a *M*=6.69 (*SD=54).* Through this debriefing process, the study had ensured the best possible learning outcomes through enhancing self-efficacy, self-awareness, transfer of knowledge, skills, and attitudes, enhancement of clinical skills, and increased situational awareness through role development (INACSL, 2016a). Not only were these goals met in this study, but these goals also translate into promoting patient safety and correlate with the values of the Social Learning Theory (Bandura, 1977).

Discussion of the Results in Relation to the Literature

Theoretical Framework

Social Learning Theory (Bandura, 1977) and the NLN Jeffries Simulation Theory (Jeffries, 2016) served as the base for which the Martinez Sepsis Competency Simulation Module (MSCSM) was created. The concepts of this study are strongly supported by the underpinnings of these two theories. Social Learning Theory values the influence of the environment on learning and sees learning as a social process in which the individual can learn by watching others (Utley, 2011). Social Learning Theory utilizes the concept of self-efficacy, referring to an individual's perception of how well prepared they are to perform a task (Ngo & Murphy, 2005). Through modeling desired behaviors for the students, participants were able to replicate behaviors in this simulation hopefully caring over into practice. As discussed by Rutherford-Hemming (2012), students are often expected to model behaviors as this is the foundation of apprenticeship training, which takes place in the clinical setting. However, changes in patterns of health care and decreased exposure to patients are giving students less opportunity for real life experiences. Practical experience is vital to the student nurses' education.

Through the application of the Social Learning Theory, this study has created an education model for nurses regarding deterioration related to sepsis education. This study suggests that by increasing nurses' knowledge and self-efficacy related to sepsis, the participants now have a better understanding of their roles and a better understanding of the care of patients who are experiencing a change in status due to sepsis. Theoretically, this will lead to more positive outcomes with patients when students enter the practice arena. These results are similar to the results from the study performed by Monagle and Doherty (2014) in which faculty made videos modeling desired behaviors of nursing care for students and showed these videos in a classroom setting followed by a structured debriefing session. The study aimed to learn about nursing students' perceptions of modeling behaviors. Bandura, A. (1977) stated that the students highly supported this method of instruction to enhance their learning needs and that that the videos reinforced student learning. Monagle and Doherty (2014) went on to explain that the participants' comments discussing the use of videotaped modeled behaviors were positive. Students stated, "it helped it click," "drove the point home," "helped connect the dots" and "correlate the lecture from class with the scenarios in the video" and that while taking an exam they were able to recall what was seen on the videotaped modeled behaviors and then apply them in answering questions on the exam (p. 176).

The NLN Jeffries Simulation Theory (Jeffries, 2016) was utilized as a guideline in designing and implementing the simulation experience as it provides a strong foundation for simulation design and education. The simulation scenario in this study followed clear guidelines and contained concise learning objectives and appropriate program and educational level problem-solving components that meet the learning objectives as suggested by the NLN Jeffries Simulation Theory. The application of this theory to this study yielded positive results. Students

expressed a higher level of understanding and knowledge of sepsis and recognizing and responding to patient with sepsis appropriately. These findings were much like those of by Jarvill, et al. (2018) who examined the effect of a simulation experience focused on medication administration competency with nursing students using the NLN Jeffries Simulation Theory to assist in guiding the simulation development. The study was done as a two-group pre-post-test study with undergraduate nursing students (*n*=85) enrolled in their first semester of nursing courses. The results determined that the students in the simulation guided by the NLN Jeffries Simulation Theory had improvement in their medication administration competence.

The NLN Jeffries Simulation Theory (Jeffries, 2016) and INACSL Standards of Best Practice: Simulation SM (2016b) both stressed the importance of debriefing as it allows for feedback and reflection on the simulation performance. However, Jeffries (2016) stressed the importance of debriefing as a student-centered learning experience as opposed to an educator-centered learning experience. Learning should take place in collaboration with fellow students through the experience and discussion as well as reflection. Simulation facilitators need to create a "guide on the side" approach. This allows participants to do most of the discussion during debriefing and suggests that not all "facilitation" must be led by the "facilitator" (Jefferies, 2016, p. 25). The debriefing session of this study was guided by PEARLS which uses scripted approach with a series of open-ended questions as a guide to a student-led debriefing experience where students can express their interpretation of what occurred in the simulation. A strong aspect of this debriefing process is the self-assessment strategies where students can discuss their thoughts on what they perceived went well and what did not go well, what they would change, what was easy, and what was challenging for them (Cheng et al., 2016).

Results in Relation to the Research Questions and to the Literature

RQ1: What are the content validity scores of the Martinez Sepsis Competency Evaluation Tool (MSCET) as measured by a panel of experts? Although these results as a whole reflect acceptable CVIs per section, there were several items within each section that received CVIs that were considered low. Gilbert and Prion (2016) discussed that items to be included in a scale should reflect the material to be assessed. Much like what was done in this study, a panel of experts was formed to evaluate the MSCET tool. Gilbert and Prion (2016) suggested a panel of three experts as acceptable, but five to ten is preferred. For the evaluation of the MSCET, a panel of four was used. As mentioned previously, the combination of panel experts raised questions regarding the consistency in the evaluation of the MSCET. However, Gilbert and Prion (2016) suggested that there should be a range of experts at various professional levels and different disciplines. Although this is suggested in the literature, the question arises as to the levels of inconstancies as different disciplines may hold task at different values, creating inconsistencies in the ranking of each item. They also suggest that when all reviewers say that the tested knowledge or skill is "essential" or when no one says it is "essential," the researcher can be confident to include or delete the item. Conversely, it is when there is not a consensus among reviewers, that the item issue arises, as was the case in this study. When this occurs, Gilbert and Prion (2016) stated that two different assumptions can be inferred. The first is if any item is perceived to be "essential" by more than half of the reviewers, it does have some degree of content validity. The reviewers must consider if the skill (or knowledge) measured by this item is essential versus useful but not essential and why or why not (p. 530). The second assumption is that the more reviewers perceive an item as "essential," the greater the extent or degree of the

content validity (p. 531). Having raters from different disciplines were thought to result in inconsistencies among the raters.

To support the claim that experts in the same discipline may produce a higher CVI score, Fey, Gloe, and Mariani (2015) conducted a study using a panel of eight experts, all of which were from the same discipline, five nursing simulation researchers and three authors of the simulation. Furthermore, all experts were doctoral prepared, with both quantitative and qualitative research experience and expertise in simulation and simulation research. All individual items on the tool they were using in their study received an individual relevance score of 85.7% or better, and the overall CVI for the instrument was 0.96 (p. 499).

RQ2: How do undergraduate nursing students, in their senior year of nursing school manage patients who are deteriorating or at risk for deterioration during a simulation sepsis scenario as measured by scores on the MSCET in the areas of patient safety, assessments, communication, core measures, and documentation? As mentioned previously, when the student nurses were placed in the simulation, between 60% and 82% of behaviors were met, and 68% of the total percentage of behaviors were met. Research has shown that there are areas in nursing education that are lacking. Along with these gaps, students have difficulty making that mental connection from theory to clinical practice. Kermansaravi, Navidian, and Yaghoubinia, (2015) sought to understand the nursing students' viewpoints and experiences concerning the trials and shortcomings of nursing education. The researchers conducted a qualitative content analysis using senior nursing students (n=40) who participated in eight focus group discussions. Three themes emerged from this study. They are theoretical education, clinical skills, and the gap between theoretical education and clinical skills. They discovered that the students' views and experiences of nursing education quality should be reviewed. Also, there were concerns about

the selection and recruitment of clinical teachers and the assessment and control of their educational performance and clinical skills, as well as the determination of standards and validation of education quality.

For this study, one of the desired outcomes following the simulation was that students would have a greater understanding of the importance of recognizing subtle signs of early deterioration, desired behaviors, and expectations once they are working as registered nurses. Findings highly support the use of simulation to strengthen the skills of nursing students to fill these educational and mental gaps. As discussed by Roh, Lim, and Issenberg (2016), simulation exercises in teaching necessary nursing skills are highly recommended and beneficial. These researchers evaluated the effectiveness of integrated simulation-based resuscitation skills training along with a clinical practicum where they assessed nursing students' knowledge, psychomotor skills, and self-efficacy related to resuscitation. A pre-post-test design study was conducted with a sample of 255 second-year nursing students. The researchers concluded that integrated simulation-based skills training combined with a clinical practicum provided a beneficial opportunity for enhancing mastery learning and self-efficacy in nursing students due to learner engagement and feedback. The outcomes of the Roh, Lim, and Issenberg (2016) study were similar to this study. At the end of the simulation, students were able to correctly identify the early signs of deterioration related to sepsis and respond appropriately using established guidelines set by the SSC (2017). Having acquired these new skills, students now have a better understanding of sepsis and patient deterioration. This ability to recognize deterioration in patients can be applied in a multitude of situations where patients may be deteriorating. Once these students become nurses, they will be better prepared to recognize and appropriately respond to the deterioration and potentially decrease morbidity and mortality of patients.

RQ 3: What is the inter-rater reliability of the relevance, clarity, and consistency scores of the MSCET as determined by a panel of experts? As previously discussed, there are several considerations that may have played a role in the results of the inter-rater reliability. These considerations are: reviewers being from different disciplines and receiving no formal training on the MSCET and the need for tool revisions. Research has demonstrated that when testing the inter-rater reliability of a new tool that critiques students in a simulation exercise, it is beneficial to train the raters. This process can assist in understanding what is expected of the content reviewers, provide clarification, and ensure accuracy and consistency in ranking instruments. To further support the use of training sessions for reviewers, Shin, Shim, Lee, and Quinn (2014) conducted a study with the aims of developing and validating a scenario-specific simulation tool for pediatric nurses. The researchers held several training sessions to teach faculty how to use the tool. After completing the simulation practicum, each faculty member and the instructor were asked to assess the content validity of the tool. Results of this study revealed that the percent of agreement between evaluators was calculated for each item of the new assessment tool. Internal consistency reliability of the 11item total was 0.863.

RQ 4: How satisfied are senior-level nursing students with the Promoting Excellence and Reflective Learning in Simulation (PEARLS) debriefing method in improving their performance during the simulation as measured by the debriefing assessment for simulation in health care (DASH) student survey? The simulation experience in this study was well received by the participating students as indicated by results of the DASH student survey. While debriefing is a key component to simulation-based education, and PEARLS is widely used, few studies exist that evaluated students' opinions on the usefulness of this debriefing method. The existing literature mainly speaks of the debriefing process itself, how to implement the method following

a simulation, and overcoming pitfalls. For example, Jones and Potter (2017) wrote about a secondary care hospital that received funding to pilot a nurse-led Critical Care Response Team simulation using the PEARLS debriefing method. The participants were allowed to voice their opinions on how they felt the simulation went in regard to being realistic and applicable to real life situations; however, students did not evaluate PEARLS. This finding was a common theme when reviewing the literature.

Limitations

One limitation of this study is that it was conducted at one site in the Northeast region of the United States; therefore, the results cannot be generalized to other settings and different student populations. However, this study was conducted as a feasibility study, and the purpose of a feasibility study is to determine how well the components of a study work together and to identify if the design proposed for a larger study is realistic and feasible (Morris & Rosenblood, 2017). This study, like other feasibility studies, contained a small sample size and included the development of study procedures, the evaluation of instruments, and the assessment of the acceptability of the intervention as perceived by the participants (Morris & Rosenblood, 2017). A replication study using a larger and more diverse sample from multiple academic sites is suggested.

Another limitation was the results of the MSCET content validity. It is recommended that content reviewers be given more specific instructions of how to rate an instrument for relevance, clarity and consistency. The author should have considered meeting with the group after content validity scores have been submitted to better understand the thinking process behind the rater's scores. The instrument author may wish to consider choosing reviewers from disciplines that are familiar with simulation and role of the appropriate health care provider in the simulation

The strengths of this study are that this is one of the first simulation-based research studies designed to prepare nursing students to recognize and respond to deteriorating patients with early signs of sepsis. This dissertation has developed a tool to help assess the clinical skills and behaviors of senior-level nursing students which will hopefully carry over into their future practice as registered nurses. In addition, the study provided an opportunity for the researcher to test all of the components of the study and to problem-solve any limitations of the study that did arise. The opportunity to gather data, make modifications, and repeat this study will allow for improved outcomes in a larger study.

Implications of the Results for Practice

The primary purpose of this study was to develop a simulation-based experience for nursing students to assist them to recognize and respond to patients displaying signs of deterioration related to sepsis in a safe and protected environment. This is crucial to their learning, as student nurses may not have the opportunity to participate in a response to rescue event during their clinical rotations. Typically, an experienced nurse often takes control of the situation, or a rapid response team is called, depriving the student nurse of the learning opportunity. The combination of a short timeframe of clinical experiences and the unpredictability of patient deterioration events creates a challenge for nurse educators to adequately prepare students for these types of emergencies. Once students become novice nurses, they are expected to identify and respond to deteriorating patients appropriately (Purling & King, 2012; Kelly et al., 2014). Creating a learning opportunity for students to practice these skills and behaviors while in school can increase knowledge and critical thinking which, in turn, may potentially decrease patient morbidity and mortality and improve patient outcomes in their practice after graduation.

This study provides data that allowed the researcher to improve the MSCET and to prepare for modification and retesting of the revised tool. Once the MSCET has been reevaluated for content validity and inter-rater reliability, this researcher will, in turn, be able to utilize the tool in different simulation learning experiences.

Quick recognition and implementation of sepsis protocols have shown to have a profound effect on patient morbidity and mortality (Dellinger et al., 2013). Nurses need to be adequately prepared to care for this population and must gain this knowledge as student nurses. Simulation has been strongly suggested by a multitude of studies which are supported by the landmark study conducted by the National Council of State Boards of Nursing (NCSBN) (Hayden et al., 2014). Simulation also meets the educational competencies set by the American Association of Colleges of Nursing (AACN), the Nurse of the Future (NOF) Nursing Core Competencies, and the Quality and Safety Education in Nursing (QSEN).

Hayden et al. (2014) strongly suggested that academic nurse educators can safely replace a portion of the traditional clinical setting with simulation. Nursing educators now have the ability to develop specific patient case scenarios that students may not be exposed to during traditional clinical experiences. This study has added to the existing research that seeks to explore student nurses' preparedness when faced with a deteriorating patient by creating a new tool to assess students in simulation-based experiences. Developing a tool such as this will allow for assessment of students' skills and level of competency prior to graduation. Accurate assessment of student performance may be used to implement curricular changes in course content and to identify skills that require further practice in skills laboratories. This researcher plans to share the results of this study through publication in hopes of adding to the existing literature. This researcher also intends to repeat this study following revisions to the MSCET in

hopes of strengthening the tool for the nursing education community to use in simulation student assessment.

Suggestions for Further Research

This dissertation was conducted as a feasibility study and should be duplicated using the same process with larger and more diverse student populations following revisions and modifications. Retention of the skills and behaviors learned should be re-evaluated after graduation. This study developed and evaluated an instrument in hopes of creating a reliable and useful tool for nursing education. The development of this instrument was rigorous and utilized established instrument development guidelines (DeVeillis, 1991). When retesting the revised MSCET, content validity will be reviewed again by a panel of experts but this time from the same discipline. Following this review, the rating and comments will be reviewed, and revisions will be made again if necessary. Following revisions, the gathered data will be sent to a statistician to be analyzed. The hopes are to gain a CVI of at least 0.8 for each item in, to strengthen the tool's validity. Once the tool receives the goal CVI, observers from the same discipline will be trained on how to use this tool. Future studies may focus on testing the inter-rater reliability of the raters who are viewing the video tapes of student performance. The process of the development and evaluation of this simulation-based experience will serve as a template for future initiatives in simulation by this researcher.

References

Adam, S, & Odell, M. (2005). An acute problem? A report of the National Confidential Enquiry into Patient Outcome and Death. *Nursing in Critical Care, 10*, 225–227. doi:10.1111/j.1362-1017.2005.0135b.x.

Adamson, K., Kardong-Edgren, S., & Willhaus, J. (2013). An updated review of published simulation evaluation instruments. *Clinical simulation in nursing, 9*, e393-3400. Retrieved from https://doi.org/10.1016/j.ecns.2012.09.004

Agency for Healthcare Research and Quality (2017). Failure to rescue. Retrieved from https://psnet.ahrq.gov/primers/primer/38/failure-to-rescue

Aitken, L.M., Williams, G., Harvey, M., Blot, S., Kleinpell, R., Labeau, S.,… & Ahrens, T (2011). Nursing considerations to complement the Surviving Sepsis Campaign. *Critical Care Medicine 39*(7), 1800–1818.

American Association of Colleges of Nursing (AACN). (2008). The essentials of baccalaureate education for professional nursing practice. Retrieved from http://www. aacn.nche.edu/Education/essentials.

Aronson, B., Glynn, B., & Squires, T. (2012). Competency assessment in simulated response to rescue events. *Clinical Simulation in Nursing*, *8*(7), e289-e295. doi: http://dx.doi.org/10.1016/j.ecns.2010.11.006

Bajaj, K., Meguerdichian, M., Thoma, B., Huang, S., Eppich, W., & Cheng A. (2017). The PEARLS Healthcare Debriefing Tool Academic Mededicine (Post Author Corrections). Academic Medicine. Retrieved from http://journals.lww.com/academicmedicine/Citation/publishahead/The_PEARLS_Healthcare_Debriefing_Tool.98069.aspx. doi: 10.1097/ACM.0000000000002035

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A., & Walters, R.H. (1963). *Social learning and personality development*. New York: Holt, Rinehart and Winston.

Beaubien, J.M., & Baker, D.P. (2004). The use of simulation for training teamwork skills in health care: How low can you go? *Quality and Safety in Health Care, 13*(suppl 1), i51-i56. doi: 10.1136/qshc.2004.009845

Benner, P. (1983). *From novice to expert: Promoting excellence and career development in clinical nursing practice*. Englewood Cliffs: Prentice Hall.

Benner, P., Sutphen, M., Leonard, V., & Day, L. (2010). *Educating nurses: A call for radical transformation.* San Francisco: Jossey-Bass.

Bleich, S. (2005). Medical errors: Five years after the IOM report. *Issue Brief The Commonwealth Fund, Issue Brief, 830,* 1-15.

Bloos, F., Thomas-Rüddel, D., Rüddel, H., Engel, C., Schwarzkopf, D., Marshall, J. C. ... & Dey, K. (2014). Impact of compliance with infection management guidelines on outcome in patients with severe sepsis: A prospective observational multi-center study. *Critical Care*, *18*(2), R42, 1-10. doi: 10.1186/cc13755.

Bogossian, F., Cooper, S., Cant, R., Beauchamp, A., Porter, J., Kain, V., ... & FIRST2ACT™ Research Team. (2014). Undergraduate nursing students' performance in recognizing and responding to sudden patient deterioration in high psychological fidelity simulated environments: An Australian multi-center study. *Nurse Education Today*, *34*(5), 691-696. doi: 10.1016/j.nedt2013.09015

Bowling, A.M. (2016). Incorporating electronic documentation into beginning nursing courses facilitates safe nursing practice. *Teaching and Learning in Nursing*, *11*(4), 204-208. Retrieved from: https://doi.org/10.1016/j.teln.2016.06.00.

Brady, P.W., Wheeler, D.S., Muething, S.E., & Kotagal, U.R. (2014). Situation awareness: A new model for predicting and preventing patient deterioration. *Hospital Pediatrics*, *4*(3), 143-146. doi:10.1542/hpeds.2013-0119

Brett-Fleegler, M., Rudolph, J., Eppich, W., Monuteaux, M., Fleegler, E., Cheng, A., & Simon, R. (2012). Debriefing assessment for simulation in healthcare: development and psychometric properties. *Simulation in Healthcare*, *7*(5), 288-294. doi: 10.1097/SIH.0b013e3182620228

Bucknall, T.K., Forbes, H., Phillips, N.M., Hewitt, N.A., Cooper, S., & Bogossian, F. (2016). An analysis of nursing students' decision-making in teams during simulations of acute patient deterioration. *Journal of Advanced Nursing*, *72*(10), 2482-2494. doi: 10.1111/jan.13009

Burger, J.L., Parker, K., Cason, L., Hauck, S., Kaetzel, D., O'nan, C., & White, A. (2010). Responses to work complexity: The novice to expert effect. *Western Journal of Nursing Research*, *32*(4), 497-510. doi: 10.1177/0193945909355149

Burney, M., Underwood, J., McEvoy, S., Nelson, G., Dzierba, A., Kauari, V., & Chong, D. (2012). Early detection and treatment of severe sepsis in the emergency department: Identifying barriers to implementation of a protocol-based approach. *Journal of Emergency Nursing*, *38*(6),512–517. doi https://doi.org/10.1016/j.jen.2011.08.011

Buykx, P., Kinsman, L., Cooper, S., McConnell-Henry, T., Cant, R., Endacott, R., & Scholes, J. (2011). FIRST 2 ACT: educating nurses to identify patient deterioration—a theory-based model for best practice simulation education. *Nurse Education Today*, *31*(7), 687-693. doi:10.1016/j.nedt.2011.03.006

Capuzzo, M., Rambaldi, M., Pinelli, G., Campesato, M., Pigna, A., Zanello, M., …& Toschi, E. (2012). Hospital staff education on severe sepsis/septic shock and hospital mortality: An original hypothesis. *BioMed Central Anesthesiology*, *12*(1), 28. doi: 10.1186/1471-2253-12-28.

Carson, P.P., & Harder, N. (2016). Simulation use within the classroom: Recommendations from the literature. *Clinical Simulation in Nursing*, *12*(10), 429-437. doi; http://dx.doi.org/10.1016/j.ecns.2016.03.009

Centers for Disease Control and Prevention (2014). Data reports. Sepsis in older Americans: Saving lives through early recognition. Retrieved from http://www.cdc.gov/sepsis/datareports/index.html.

Centers for Disease Control and Prevention (2016). Sepsis data and reports. Retrieved from https://www.cdc.gov/sepsis/datareports/index.html

Center for Medical Simulation Debriefing Assessment for Simulation in Healthcare (2009). Retrieved from https://harvardmedsim.org/debriefing-assessment-for-simulation-in-healthcare-dash/

Cheng, A., Grantt, V., Robinson, T., Catena, H., Lachapelle, K., Kim, J., & . . . Eppich, W. (2016). The promoting excellence and reflective learning in simulation (PEARLS) approach to health care debriefing: A faculty development guide. *Clinical Simulation in Nursing*, *12*(10), 419-428. doi:10.1016/j.ecns.2016.05.002

Cioffi, J., Salter, C., Wilkes, L., Vonu-Boriceanu, O., & Scott, J. (2006). Clinicians' responses to abnormal vital signs in an emergency department. *Australian Critical Care*, *19*(2), 66-72. Retrieved from http://dx.doi.org/10.1016/S1036-7314(06)80011-1

Clarke, S.P., & Aiken, L.H. (2003). Failure to Rescue: Needless deaths are prime examples of the need for more nurses at the bedside. *The American Journal of Nursing*, *103*(1), 42-47. Retrieved from http://dx.doi.org/10.1097/00000446-200301000-0020.

Clapper, T.C., & Kardong-Edgren, S. (2012). Using deliberate practice and simulation to improve nursing skills. *Clinical Simulation in Nursing*, *8*(3), e109-e113. Retrieved from: https://doi.org/10.1016/j.ecns.2010.12.001

Classen, D.C., Resar, R., Griffin, F., Federico, F., Frankel, T., Kimmel, N., ... & James, B.C. (2011). 'Global trigger tool' shows that adverse events in hospitals may be ten times greater than previously measured. *Health Affairs*, *30*(4), 581-589. doi: 10.1377/hlthaff.2011.0190

Cooper, S., Kinsman, L., Buykx, P., McConnell-Henry, T., Endacott, R., & Scholes, J. (2010). Managing the deteriorating patient in a simulated environment: Nursing students' knowledge, skill and situation awareness. *Journal of Clinical Nursing*, *19*(15-16), 2309-2318. doi: 10.111/j.1365-2702.2009.03164.x

Cooper, S., McConnell-Henry, T., Cant, R., Porter, J., Missen, K., Kinsman, L., ... & Scholes, J. (2011). Managing deteriorating patients: Registered nurses' performance in a simulated setting. *The Open Nursing Journal*, *5*(1), 120-126. doi: 10.2174/1874434601105010012O

DeBourgh, G.A., & Prion, S.K. (2011). Using simulation to teach prelicensure nursing students to minimize patient risk and harm. *Clinical Simulation in Nursing*, *7*(2), e47-e56. Retrieved from http://dx.doi.org/10.1016/j.ecns.2009.12.009.

Debrief 2 Learn (2017). The PEARLS Healthcare Debriefing Tool. Retrieved from: https://debrief2learn.org/pearls-debriefing-tool/

Dellinger, R., Levy, M., Rhodes, A., Annane, D., Gerlach, H., Opal, S., … & Moreno, R. (2013). Surviving sepsis campaign: International Guidelines for management of severe sepsis and septic shock. *Intensive Care Medicine, 39*, 165-228. doi: 10.1007/s00134-012-2769-8.

Department of Health and Human Services. (2010). Adverse events in hospitals: National incidence among Medicare beneficiaries. Retrieved from 2010. http://oig.hhs.gov/oei/reports/oei-06-09-00090.pdf

DeVellis, R. (1991). *Scale development: Theory and applications*. Los Angeles: Sage Publishing.

Dodge, Y. (2003) *The Oxford Dictionary of Statistical Terms*, OUP. ISBN 0-19-920613-9

Dreifuerst, K.T. (2009). The essentials of debriefing in simulation learning: A concept analysis. *Nursing Education Perspectives*, *30*(2), 109-115.

Dym, A.A., Venegas-Borsellino, C., Bangar, M., Lisenenkov, D., Keene, A., & Eisen, L. (2014). Teaching situational awareness during cardiac arrest and rapid response: A simulation study. *Critical Care Medicine*, *42*(12), A1372. Retrieved from http://dx.doi.org/10.1097/0..ccm.0000457546.56888.20

Endacott, R., Bogossian, F.E., Cooper, S.J., Forbes, H., Kain, V.J., Young, S.C., & Porter, J. E.

(2014). Leadership and teamwork in medical emergencies: Performance of nursing students and registered nurses in simulated patient scenarios. *Journal of Clinical Nursing*, *24*(1-2), 90-100. doi: 10.1111/jocn.12611.

Endacott, R., Scholes, J., Cooper, S., McConnell-Henry, T., Porter, J., Missen, K., ... & Champion, R. (2012). Identifying patient deterioration: Using simulation and reflective interviewing to examine decision making skills in a rural hospital. *International Journal of Nursing Studies*, *49*(6), 710-717. doi: http://doi.org/10.1016/j.ijnurstu.2011.11.018.

Endacott, R., & Westley, M. (2006). Managing patients at risk of deterioration in rural hospitals: A qualitative study. *Australian Journal of Rural Health 14*, 275–279. doi: 10.1111/j.1440-1584.2006.00829.x

Endsley, R. (1988). Situation awareness global assessment technique (SAGAT) National Aerospace and Electronics Conference (NAECON); New York.

Eppich, W., & Cheng, A. (2015). Promoting excellence and reflective learning in simulation (PEARLS): Development and rationale for a blended approach to health care simulation debriefing. *Simulation in Healthcare, 10*(2), 106-115. doi: 10.1097/SIH.0000000000000072

Fanning, R.M., & Gaba, D.M. (2007). The role of debriefing in simulation-based learning. *Simulation in Healthcare*, *2*(2), 115-125. doi: 10.1097/SIH.0b013e3180315539

Fey, M.K., Gloe, D., & Mariani, B. (2015). Assessing the quality of simulation-based research articles: A rating rubric. *Clinical Simulation in Nursing*, *11*(12), 496-504. Retrieved from: https://doi.org/10.1016/j.ecns.2015.10.005

Fowler-Durham, C. & Alden, K. (2007). Enhancing patient safety in nursing education through

patient simulation. In: Hughes, R.G. (Ed.) *Patient safety and quality: An evidence-based handbook for nurses*, US Department of Health and Human Services Agency for Healthcare Research and Quality, Rockville, MD. Retrieved from http://www.nhrq.gov/qual/nurses

Freeth, D., Ayida, G., Berridge, E. J., Macintosh, N., Norris, B., Sadler, C., & Strachan, A. (2009). Multidisciplinary obstetric simulated emergency scenarios (MOSES): Promoting patient safety in obstetrics with teamwork-focused interprofessional simulations. *Journal of Continuing Education in the Health Professions, 29*(2), 98-104. doi:10.1002/chp.20018

Green, S. B., & Salkind, N. J. (2014). *Using SPSS for Windows and Macintosh: Analyzing and understanding data*. Boston, MA: Pearson.

Gilbert, G.E., & Prion, S. (2016). Making sense of methods and measurement: Lawshe's Content Validity Index. *Clinical Simulation in Nursing*, *12*(12), 530-531. Retrieved from: http://dx.doi.org/10.1016/j.eens.2016.08.002

Griffiths, P., Jones, S., & Bottle, A. (2013). Is “failure to rescue” derived from administrative data in England a nurse sensitive patient safety indicator for surgical care? Observational study. *International Journal of Nursing Studies*, *50*(2) 292–300.

Hall, K., & Tori, K. (2016). Best practice recommendations for debriefing in simulation-based education for Australian undergraduate nursing students: An integrative review. *Clinical Simulation in Nursing*, *13*(1), 39-50. Retrieved from http://dx.doi.org/10.1016/j.ecns.2016.10.006

Hallmark, B.F., Thomas, C.M., & Gantt, L. (2014). The educational practices construct of the NLN/Jeffries simulation framework: ate of the science. *Clinical Simulation in Nursing, 10*(7), 345-352. Retrieved from http://dx.doi.org/10.1016/j.ecns.2013.04.006.

Hamstra, S.J., Brydges, R., Hatala, R., Zendejas, B., & Cook, D.A. (2014). Reconsidering fidelity in simulation-based training. *Academic Medicine, 89*(3), 387-392. doi: 10.1097/ACM.0000000000000130

Harrison, G.A., Jacques, T.C., Kilborn, G., McLaws, M.L. (2005). The prevalence of recordings of the signs of critical conditions and emergency responses in hospital wards – the SOCCER study. *Resuscitation, 65,* 149–157. doi:10.1016/j.resuscitation.2004.11.017

Hayden, J., Smiley, R., Alexander, M., Kardong-Edgren, S., & Jeffries, P. (2014). The NCSBN National Simulation Study: A longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. *Journal of Nursing Regulation, 5,* 1-66.

Herrán-Monge, R., Muriel-Bombín, A., García-García, M.M., Merino-García, P.A., Cítores-González, R., Fernández-Ratero, J.A., ... & Macías, S. (2016). Mortality reduction and long-term compliance with Surviving Sepsis Campaign: A nationwide multicenter study. *Shock, 45*(6), 598-606. doi: 10.1097/SHK.0000000000000555

Institute of Medicine (1999). *To Err is Human: Building a Safer Health System*. Washington, DC; National Academies Press.

Institute of Medicine. (2010) *The future of nursing: Leading change, advancing health.* Washington, DC: National Academies Press.

International Nursing Association for Clinical Simulation and Learning (INACSL) (2016a). Standards of best practice: Simulation. *Clinical Simulation in Nursing, 12,* S5-S50

International Nursing Association for Clinical Simulation and Learning (INACSL) Standards Committee. (2016b). INACSL Standards of Best Practice: Simulation SM Simulation Design. *Clinical Simulation in Nursing*, *12*, S5-S12. Retrieved from http://dx.doi.org/10.1016/j.ecns.2016.09.005

Issenberg, S.B., & Scalese, R.J. (2014). Five Tips for a Successful Submission on Simulation-Based Medical Education. *Journal of Graduate Medical Education*, *6*(4), 623-625. Retrieved from http://dx.doi.org/10.4300/JGME-D-14-00490.1

Jarvill, M., Jenkins, S., Akman, O., Astroth, K. S., Pohl, C., & Jacobs, P.J. (2018). Effect of simulation on nursing students' medication administration competence. *Clinical simulation in Nursing*, *14*, 3-7. Retrieved from: 10.7860/JCDR/2016/18925.8402: https://doi.org/10.1016/j.ecns.2017.08.001

Jarzemsky, P. (2012). Advancing the science of human patient simulation in nursing education. *Nursing Clinics of North America*, *47*(3), 355-364. Retrieved from http://dx.doi.org/10.1016/j.cnur.2012.05.004

Jeffries, P.R. (2005). A framework for designing, implementing, and evaluating simulations used as teaching strategies in nursing. *Nursing Education Perspectives*, *26*, 96–10.

Jeffries, P.R. (2007). *Simulation in nursing education: From conceptualization to evaluation*. New York: National League for Nursing.

Jeffries, P.R. (Ed.) (2016). *The NLN Jeffries simulation theory*. Philadelphia PA: Wolters Kluwer. ISBN-10: 1934758248

Jeffries, P.R., Dreifuerst, K.T., Kardong-Edgren, S., & Hayden, J. (2015). Faculty development when initiating simulation programs: Lessons learned from the national simulation study. *Journal of Nursing Regulation*, *5*(4), 17-23. Retrieved from http://dx.doi.org/10.1016/S2155-8256(15)30037-5

Joint Commission (2007). 2008 National patient safety goals. Retrieved from http://jointcommission.org/PatientSaftey/NationalPatientSafteyGoals/08_npsgs.htm.

Jones, A., & Johnstone, M.J. (2017). Intentional blindness and failures to rescue the deteriorating patient in critical care, emergency and perioperative settings: Four case scenarios. *Australian Critical Care, 30*(4), 219-223. Retrieved from http://www.sciencedirect.com/science/article/pii/S1036731416301126. doi: http://dx.doi.org/10.1016/j.aucc.2016.09.005

Jones, B., & Potter, C. (2017). Applying Best Practice in Simulation: Critical care response team training. *Clinical Simulation in Nursing*, *13*(9), 442-445. Retrieved from: https://doi.org/10.1016/j.ecns.2017.05.009

Kameg, K., Howard, V.M., Clochesy, J., Mitchell, AM., & Suresky, J. M. (2010). The impact of high fidelity human simulation on self-efficacy of communication skills. *Issues in mental health nursing*, *31*(5), 315-323. Retrieved from: https://doi.org/10.3109/01612840903420331

Kaukonen, K.M., Bailey, M.,Pilcher, D., Cooper, D.J., & Bellomo, R. (2015). Systemic inflammatory response syndrome criteria in defining severe sepsis. *New England Journal of Medicine*, *372*(17), 1629-1638. doi:10.1056/NEJMoa1415236

Kelly, M.A., Forber, J., Conlon, L., Roche, M., & Stasa, H. (2014). Empowering the registered nurses of tomorrow: Students' perspectives of a simulation experience for recognizing and managing a deteriorating patient. *Nurse Education Today*, *34*(5), 724-729. doi: 10.1016/j.nedt.2013.08.014

Kelly, M., & Fry, M. (2013). Master's nursing students' perceptions of an innovative simulation education experience. *Clinical Simulation in Nursing*, *9*, 327-e133. doi: 10.1016.jecns.2011.11.004

Kelly, M.A., Hopwood, N., Rooney, D., & Boud, D. (2016). Enhancing students' learning through simulation: Dealing with diverse, large cohorts. *Clinical Simulation in Nursing*, *12*(5), 171-176. doi: http://dx.doi.org/10.1016/j.2016.01.010.

Kermansaravi, F., Navidian, A., & Yaghoubinia, F. (2015). Nursing students' views of nursing education quality: A qualitative study. *Global Journal of Health Science*, *7*(2), 351. doi: 10.5539/gjhs.v7n2p351

King, A.E.A., Conrad, M., & Ahmed, R.A. (2013). Improving collaboration among medical, nursing and respiratory therapy students through interprofessional simulation. *Journal of Interprofessional Care*, *27*(3), 269-271. doi: http://dx.doi.org/10.3109/13109/13561820.2012.730076.

Kleinpell, R., Aitken, L., & Schorr, C.A. (2013). Implications of the new international sepsis guidelines for nursing care. *American Journal of Critical Care*, *22*(3), 212-222. doi: 10.4037/ajcc2013158

Landrigan, C.P., Parry, G.J., Bones, C.B., Hackbarth, A.D., Goldmann, D.A., & Sharek, P.J. (2010). Temporal trends in rates of patient harm resulting from medical care. *New England Journal of Medicine*, *363*(22), 2124-2134. doi: 10.1056/NEJMsa1004404

Lavoie, P., Cossette, S., & Pepin, J. (2016). Testing nursing students' clinical judgment in a patient deterioration simulation scenario: Development of a situation awareness instrument. *Nurse Education Today*, *38*, 61-67. Retrieved from http://dx.doi.org/10.1016/j.nedt.2015.12.015

Lea, J., & Cruickshank, M.T. (2007). The experience of new graduate nurses in rural practice in New South Wales. *Rural and Remote Health*, *7*(814), 1-11.

Lederman, L.C. (1992). Debriefing: Toward a systematic assessment of theory and practice. *Simulation & Gaming*, *23*(2), 145-160. doi: http://dx.doi.org/10.0077/1046878192232003.

Legendre, P. (2005). Species associations: the Kendall coefficient of concordance revisited. *Journal of agricultural, biological, and environmental statistics*, *10*(2), 226. DOI: 10.1198/108571105X46642.

Levy, M.M., Dellinger, R.P., Townsend, S.R., Linde-Zwirble, W.T., Marshall, J.C., Bion, J., & ... Parker, M.M. (2010). The Surviving Sepsis Campaign: Results of an international guideline-based performance improvement program targeting severe sepsis. *Intensive Care Medicine*, *36*(2), 222-231. doi:10.1007/s00134-009-1738-3

Li, S., & Kenward, K. (2006). *A national survey on elements of nursing education.* National Council of State Boards of Nursing Brief. Retrieved from https://www.ncsbn.org/vol_24_web.pdf

Mansour, M. (2013). Examining patient safety education in pre-registration nursing curriculum: Qualitative study. *Journal of Nursing Education and Practice*, *3*(12), 157. DOI: 10.5430/jnep.v3n12p157

Massachusetts Department of Higher Education Nursing Initiative (DHE) & Massachusetts Organization of Nurse Executives (MONE). (2010). Creativity and connections. Building the framework for the future of nursing education and practice: Nurse of the future nursing core competencies. Retrieved from http://www.mass.edu/currentinit/documents/nursingcorecompetencies.pdf

McEwen, M. & Wills, E. (2011). *Theoretical basis for nursing* (3rd ed.). Philadelphia, PA: Wolters Kluwer Health.

McKenna, L., Missen, K., Cooper, S., Bogossian, F., Bucknall, T., & Cant, R. (2014). Situation awareness in undergraduate nursing students managing simulated patient deterioration. *Nurse Education Today*, *34*(6), e27-e31. Retrieved from http://dx.doi.org/10.1016/j.nedt.2013.12.013

Merriam-Webster (2018). Retrieved from https://www.merriam-webster.com/

Miller, J. (2014). Surviving sepsis: A review of the latest guidelines. *Nursing*, *44*(4), 24-30. doi: 10.1097/01.NURSE.0000444530.66327.de

Mitchell, J.T., & Everly, G.S. (1996). *Critical Incident Stress Debriefing--CISD: An operations manual for the prevention of traumatic stress among emergency service and disaster workers*. Chevron Pub. doi: 10.1002/jts.2490080217

Monagle, J.L., & Doherty, K.Q. (2014). Modeling salient nursing care to bridge classroom to clinical. *Journal of Nursing Education and Practice*, *4*(8), 173. doi: 10.5430/jnep.v4n8p173

Morris, N.S., & Rosenbloom, D.A. (2017). Defining and understanding pilot and other feasibility studies. *The American Journal of Nursing*, *117*(3), 38-45. Retrieved from http://.doi.org/10.1097/0..NAJ.0000513261.75366.37

Moser, H. (2014). Early recognition and rapid intervention of sepsis: Implementation of a focused educational initiative emphasizing early goal-directed therapy in the emergency department. *Journal of Nursing Education and Practice, 14*(6), *23-29.* doi:10.5430/jnep.v4n6p23

National League for Nursing (2015a). Simulation design template. Retrieved from http://sirc.nln.org

National League for Nursing (2015b). A vision for teaching with simulation: A living document from the National League for Nursing NLN Board of Governors. Retrieved from http://www.nln.org/docs/default-source/about/nln-vision-series-(position-statements)/vision-statement-a-vision-for-teaching-with-simulation.pdf?sfvrsn=2

National League of Nursing. (2015c). NLN Vision Series: Debriefing across the curriculum. Retrieved from http://www.nln.org/docs/default-source/about/nln-visionseries-%28position-statements%29/nln-vision-debriefing-across-thecurriculum.pdf?sfvrsn=0

Ngo, A., & Murphy, S. (2005). A theory-based intervention to improve nurses' knowledge, self-efficacy, and skills to reduce PICC occlusion. *Journal of Infusion Nursing*, *28*(3), 173-181. doi: http://dx.org/10.1097/00129804-200505000-00005

Pattison, N., & Eastham, E. (2012). Critical care outreach referrals: A mixed-method investigative study of outcomes and experiences. *Nursing in Critical Care*, *17*(2), 71-82. doi: 10.1111/j.1478-5153.2011.00464.x

Petranek, C.F., Corey, S., & Black, R. (1992). Three levels of learning in simulations: Participating, debriefing, and journal writing. *Simulation & Gaming*, *23*(2), 174-185. doi: http://dx.doi.org/10.1177/1046878192232005.

Pike, T., & O'Donnell, V. (2010). The impact of clinical simulation on learner self-efficacy in pre-registration nursing education. *Nurse Education Today, 30,* 405-410. doi:10.1016/j.nedt.2009.09.013

Poeze, M., Solberg, B.C., Greve, J.W.M., & Ramsay, G. (2005). Monitoring global volume-related hemodynamic or regional variables after initial resuscitation: What is a better predictor of outcome in critically ill septic patients? *Critical Care Medicine*, *33*(11), 2494-2500. Retrieved from http://dx.doi.org/10.1097/01.CCM.0000185642.33586.9D

Polit, D., & Beck, C. (2017). *Nursing research: Generating and assessing evidence for nursing practice*. Philadelphia: Wolters Kluwer. ISBN: 978-1-4963-1335-5

Purling, A., & King, L. (2012). A literature review: Graduate nurses' preparedness for recognizing and responding to the deteriorating patient. *Journal of Clinical Nursing*, *21*(23-24), 3451-3465. doi: 10.1111/j.1365-2702.2012.04348.x

Quality and Safety Education in Nursing (QSEN). (2014). QSEN competencies. Retrieved from http://qsen.org/competencies/

Raemer, D., Anderson, M., Cheng, A., Fanning, R., Nadkarni, V., & Savoldelli, G. (2011). Research regarding debriefing as part of the learning process. *Simulation in Healthcare*, *6*(7), S52-S57. doi: 10.1097/SIH.0b013e31822724d0

Reilly, A., & Spratt, C. (2007). The perceptions of undergraduate student nurses of high-fidelity simulation-based learning: A case report from the University of Tasmania. *Nurse Education Today*, *27*(6), 542-550. Retrieved from http://dx.doi.org/10.1016/j.nedt.2006.08.015

Rhodes, A., Evans, L.E., Alhazzani, W., Levy, M.M., Antonelli, M., Ferrer, R., ... & Rochwerg, B. (2017). Surviving Sepsis Campaign: International guidelines for management of sepsis and septic shock: 2016. *Intensive Care Medicine, 43*(3), 304-377. doi https://doi.org/10.1007/s00134-017-4683-6

Robson, W., Beavis, S., & Spittle, N. (2007). An audit of ward nurses' knowledge of sepsis. *Nursing in Critical Care, 12*(2), 86-92. doi: 10.1111/j.1478-5153.2007.00210.x

Roh, Y.S., Lim, E.J., & Issenberg, S.B. (2016). Effects of an integrated simulation-based resuscitation skills training with clinical practicum on mastery learning and self-efficacy in nursing students. *Collegian*, *23*(1), 53-59. Retrieved from: https://doi.org/10.1016/j.colegn.2014.10.002

Rudolph, J.W., Simon, R., Raemer, D.B., & Eppich, W.J. (2008). Debriefing as formative assessment: Closing performance gaps in medical education. *Academic Emergency Medicine*, *15*(11), 1010-1016. doi: 10.1111/j.1553-2712.2008.00248.x

Rutheford-Hemming, T. (2012). Simulation methodology in nursing education and adult learning theory. *Adult Learning, 23*(3), 129-137. doi:10.1177/1045159512452848

Schorr, C.A. & Barnes-Daly, M.A. (2017). Nurses: Screen for sepsis--every patient, every shift. *Medscape Nurses.* Retrieved: http://www.medscape.com/viewarticle/874844

Schulz, C.M., Endsley, M.R., Kochs, E.F., Gelb, A.W., & Wagner, K.J. (2013). Situation awareness in anesthesia concept and research. *The Journal of the American Society of Anesthesiologists*, *118*(3), 729-742. doi:10.1097/ALN.0b013e318280a40f

Shearer, B., Marshall, S., Buist, M.D., Finnigan, M., Kitto, S., Hore, T., et al. … (2012). What stops hospital clinical staff from following protocols? An analysis of the incidence and factors behind the failure of bedside clinical staff to activate the rapid response system in

a multi-campus Australian metropolitan healthcare service. *British Medical Journal of Quality Safety*, *21*, 569-75. doi: 10.1136/bmjqs-2011-000692.

Shin, H., Shim, K., Lee, Y., & Quinn, L. (2014). Validation of a new assessment tool for a pediatric nursing simulation module. *Journal of Nursing Education*, *53*(11), 623-629. https://doi.org/10.3928/01484834-20141023-04

Simon, R., Raemer, D.B., & Rudolph, J.W. (2017). Debriefing assessment for simulation in Healthcare (DASH)© Rater's Handbook. Center for Medical Simulation, Boston, Massachusetts. Retrieved from https://harvardmedsim.org/wp-content/uploads/2017/01/DASH.handbook.2010.Final.Rev.2.pdf. 2010.

Singer, M., Deutschman, C.S., Seymour, C.W., Shankar-Hari, M., Annane, D., Bauer, M., … & Angus, D.C. (2016). The third international consensus definitions for sepsis and septic shock (Sepsis-3). *Journal of the American Medical Association*, *315*(8), 801-810. doi:10.1001/jama.2016.0287.

Sneddon, A., Mearns, K., & Flin, R. (2013). Stress, fatigue, situation awareness and safety in offshore drilling crews. *Safety Science*, *56*, 80-88. Retrieved from http://dx.doi.org/10.1016/i.ssci.2012.05.027

Stokowski, L.A. (2016). Who believes that medical error is the third leading cause of hospital deaths? *Medscape Nurse.* Retrieved from http://www.medscape.com/viewarticle/863788

Subbe, C.P., & Welch, J.R. (2013). Failure to rescue: Using rapid response systems to improve care of the deteriorating patient in hospital. *Clinical Risk*, *19*(1), 6-11. Retrieved from http://dx.doi.org/10.1177/1356262213486451

Surviving Sepsis Campaign (2016). Sepsis guidelines and bundles. Retrieved from http://www.survivingsepsis.org

Swenty, C.F., & Eggleston, B.M. (2011). The evaluation of simulation in a baccalaureate nursing program. *Clinical Simulation in Nursing*, *7*(5), e181-e187. Retrieved from https://doi.org/10.1016/j.ecns.2010.02.006

Tan, K.K., Palham, S., Ignacio, J., Dawood, R., Mackey, S., Lim, F.P., & Liaw, S.Y. (2016). The evaluation of nursing competency in a simulation-based assessment: Tool development and students' experiences. *Asian Journal of the Scholarship of Teaching and Learning*, *6*(2), 222-245.

Tardan, V., Bourgeon, L., & Darses, F. (2016). How do team leaders communicate to develop situation awareness?: An exploratory study in a nuclear submarine simulator. *Proceedings of the European Conference on Cognitive Ergonomics*. doi: 10.1145/2970930.2970952

Tromp M., Hulscher M., Bleeker-Rovers C.P., Peters, L., van den Berg, D., Borm, G.F., Kullberg, B.J., Achterberg, T., & Pickker, P. (2010). The role of nurses in the recognition and treatment of patients with sepsis in the emergency department: A prospective before-and-after intervention study. *International Journal of Nursing Studies 47*(12), 1464-1473. Retrieved from https://doi.org/10.1016/j.ijnurstu.2010.04.007

Tuzer, H., Dinc, L., & Elcin, M. The effects of using high-fidelity simulators and standardized patients on the thorax, lung, and cardiac examination skills of undergraduate nursing students. *Nurse Education Today, 45* (2016): 120-125. Retrieved from: https://doi.org/10.1016/j.nedt.2016.07.002

Utley, R. (2011). *Theory and research for academic nurse educators: Application to practice*. Sudbury, MA: Jones & Bartlett Publishers.

Van den Bruel, A., Thompson, M., Buntinx, F., & Mant, D. (2012). Clinicians' gut feeling about serious infections in children: Observational study. *British Medical Journal, 345*, e6144. Retrieved from https://doi.org/10.1136/bmj.e6144

World Alliance for Patient Safety (2011). Patient Safety Curriculum Guide: Multi-professional edition. Retrieved from: http://whqlibdoc.who.int/publications/2011/9789241501958_eng.pdf.

Williams, D. J., Newman, A., Jones, C., & Woodard, B. (2011). Nurses' perceptions of how rapid response teams affect the nurse, team, and system. *Journal of Nursing Care Quality*, *26*(3), 265-272. doi: 10.1097/NCQ.0b013e318209f135

Zhang, Y., & Brown, D.E. (2013). Police patrol districting method and simulation evaluation using agent-based model & GIS. *Security Informatics*, *2*(1), 1. doi: 10.1186/2190-8532-2-7

Appendix A

NLN Simulation Design Template

Date: TBD	**File Name:** Sepsis Competency Evaluation
Discipline: Nursing **Expected Simulation**	**Student Level:** Senior
Run Time: 30 minutes	**Guided Reflection Time:** 30 minutes
Location: TBD	**Location for Reflection:** TBD

Admission Date: 10/30/2018 2018 | **Today's Date:** 10/31/2018

****You are the nurse getting a patient who arrived for the emergency room overnight. You are the next nurse starting your shift at 8:00am. You just received report. The patient is in the medical unit. You are seeing the patient for the first time.**

Brief Description of Client

Name: Mr. M

Gender: Male **Age**: 42 **Race**: White **Weight**: 220 lb [100 kg] **Height**: 5'8"

Religion: Catholic

Major Support: Wife **Support Phone:** 203-555-0338

Allergies: NKA **Immunizations:** Up to date

Primary Care Provider/Team: Pro Health Madison Ct.

Past Medical History:
Hypertension which has resolved with weight loss and exercise.
Stress related to work, attempting relaxation techniques.

History of Present Illness: Mr. M, 42, was doing some home repairs at his home two days ago. During this time he stepped on an old nail that went through his work boot and punctured the left foot. The puncture was small and he was able to remove the nail. Mr. M did not think he needed medical attention at that time. Today Mr. M feels like he should be seen in the emergency room. Since injury Mr. M states "he is not feeling like himself lately" and has a general feeling of feeling "ill". The left foot is tender and sore. It is decided that the patient be admitted for further evaluation and treatment. In the emergency room Mr. M was awake, alert, and orientated to

person, place and situation. His vital signs were: oral temperature 99 [degrees] F (37.2[degrees] C); heart rate 90; respirations 20; and BP 110/70 (MAP 83) O2 Stat 94%. All blood is pending. He will be coming to the medical unit with a bandage on his left foot and you were told on report the area around the left foot looks red but there is +2 pulses in both lower extremities and both lower extremities are warm and dry. The patient has no foley catheter and is unsure of his last void. At this time the patient has intravenous fluids infusing at 50ml/hr and his pain is a 0 on a scale of 0-10.

Social History: Denies nicotine and drug use, drinks alcohol occasionally (an 8 oz glass of wine about once a month). Is married with two school age children, works in education, partakes in regular exercise and attempts to eat a well-rounded, health diet.

Primary Medical Diagnosis: nail puncture to the left foot
Secondary Medical Diagnosis: Sepsis

Surgeries/Procedures & Dates: Birthmark removed on face at the age of 2.

Psychomotor Skills Required Prior to Simulation:

Has undergone three years of nursing school
Medical-surgical clinical and laboratory experience
Communication skills/developmentally appropriate
Experience / understanding of normal and abnormal vital signs
Experience with / have an understanding of normal and abnormal urine put.
Experience with / have an understanding of normal and abnormal blood work values
Experience with / have an understanding of basic concepts of patient deterioration
Experience with / have an understanding basic concepts of sepsis and associated treatments.

Cognitive Activities Required Prior to Simulation:

[i.e. independent reading (R), video review (V), computer simulations (CS), lecture (L)]

Complete the on-line preparation materials: PowerPoint presentation with embedded videos.

Simulation Learning Objectives

General Objectives:

By the end of the simulation the participants will:

- Demonstrate an understanding of the pathophysiology, clinical manifestations, and appropriate treatment of sepsis as outlines by the SCC guidelines.

- Recognizes deterioration by identifying early signs of sepsis in simulated response to rescue patient scenario during simulation and debriefing.
- Respond appropriately to deterioration by activating a team response.
- Verbalize SCC guidelines by appropriate management of patient with sepsis in a simulated response to rescue patient scenario during simulation and debriefing.
- Demonstrates effective communication skills during simulated response to rescue scenario.
- Preforms accurate documentation of assessment findings and orders given by the rapid response team during the simulation.

References, Evidence-Based Practice Guidelines, Protocols, or Algorithms Used for This Scenario:

Aronson, B., Glynn, B., & Squires, T. (2012). Competency assessment in simulated response to rescue events. *Clinical Simulation in Nursing*, *8*(7), e289-e295. doi: http://dx.doi.org/10.1016/j.ecns.2010.11.006

Dellinger, R., Levy, M., Rhodes, A., Annane, D., Gerlach, H., Opal, S., …Moreno, R. (2013). Surviving sepsis campaign: International Guidelines for management of severe sepsis and septic shock. *Intensive Care Medicine, 39*, 165-228. doi: 10.1007/s00134-012-2769-8.

Miller, J. (2014). Surviving sepsis: A review of the latest guidelines. *Nursing*, *44*(4), 24-30. doi: 10.1097/01.NURSE.0000444530.66327.de

National League for Nursing. (2005a). Student Satisfaction and Self-Confidence in Learning Instrument. Retrieved from: http://www.nln.org

National League for Nursing. (2005b). Simulation Design Scale (student version). Retrieved from: http://www.nln.org

National League for Nursing (2015). A vision for teaching with simulation: A living document from the National League for Nursing NLN Board of Governors. Retrieved: http://www.nln.org/docs/default-source/about/nln-vision-series-(position-statements)/vision-statement-a-vision-for-teaching-with-simulation.pdf?sfvrsn=2

Rhodes, A., Evans, L. E., Alhazzani, W., Levy, M. M., Antonelli, M., Ferrer, R., ... Rochwerg, B. (2017). Surviving Sepsis Campaign: International guidelines for management of sepsis

and septic shock: 2016. *Intensive Care Medicine*, 1-74. doi: 10.1097/CCM.0000000000002255

Fidelity (choose all that apply to this simulation)

Setting/Environment:
- ☐ ER
- ☒ Med-Surg
- ☐ Peds
- ☐ ICU
- ☐ OR / PACU
- ☐ Women's Center
- ☐ Behavioral Health
- ☐ Home Health
- ☐ Pre-Hospital
- ☐ Other:

Simulator Manikin/s Needed:
High fidelity

Props:

Equipment Attached to Manikin:
- ☒ IV tubing with primary line fluids running at 50 mL/hr
- ☐ Secondary IV line running at mL/hr
- ☒ IV pump
- ☐ Foley catheter ☐mL output
- ☐ PCA pump running
- ☐ IVPB for medications
- ☐ 02 ☐
- ☒ Monitor attached
- ☒ ID band
- ☐ Other:

Equipment Available in Room:
- ☐ Bedpan/Urinal
- ☐ Foley kit
- ☐ Straight Catheter Kit
- ☐ Incentive Spirometer
- ☒ Fluids
- ☐ IV start kit

Medications and Fluids: (see chart)
- ☒ IV Fluids
- ☐ Oral Meds
- ☐ IVPB
- ☐ IV Push
- ☐ IM or SC

Diagnostics Available: (see chart)
- ☒ Labs
- ☐ X-rays (Images)
- ☐ 12-Lead EKG
- ☐ Other:

Documentation Forms:
- ☒ Provider Orders
- ☐ Admit Orders
- ☒ Flow sheet
- ☒ Medication Administration Record
- ☒ Graphic Record
- ☒ Shift Assessment
- ☐ Triage Forms
- ☐ Code Record
- ☐ Anesthesia / PACU Record
- ☐ Standing (Protocol) Orders
- ☐ Transfer Orders
- ☐ Other:

Recommended Mode for Simulation:
(i.e. manual, programmed, etc.)

Student Information Needed Prior to Scenario:
- ☒ Has been oriented to simulator
- ☒ Understands guidelines /expectations for scenario

☒ IV tubing ☐ IVPB Tubing ☒ IV Pump ☐ Feeding Pump ☐ Pressure Bag ☒ 02 delivery device (NC) ☐ Crash cart with airway devices and emergency medications ☐ Defibrillator/Pacer ☐ Suction ☒ Other: Telephone to call for assistance and for communication	☒ Has accomplished all pre-simulation requirements ☒ All participants understand their assigned roles ☒ Has been given time frame expectations ☒ Other: Video recording equipment
Roles/Guidelines for Roles: ☒ Primary Nurse ☒ Secondary Nurse ☐ Clinical Instructor ☐ Family Member #1 ☐ Family Member #2 ☐ Observer/s ☐ Recorder/resource ☐ Physician/Advanced Practice Nurse ☐ Respiratory Therapy ☐ Anesthesia ☐ Pharmacy ☐ Lab ☐ Imaging ☐ Social Services ☐ Clergy ☐ Unlicensed Assistive Personnel ☐ Code Team ☐ Other:	**Important Information Related to Roles:**

Report Students Will Receive Before Simulation

HPI will be the given report.

Significant Lab Values: refer to chart/HPI

Provider Orders: refer to chart/ HPI

Home Medications: refer to chart/HPI

Scenario Progression Outline

Preparation materials: On participants own time.

Simulation Experience (Total time: 2 hour)

Student Responsibilities

1. Day of simulation (30 minutes PowerPoint presentation (preparation materials) / 10 minutes – orientation/ 10 minutes - scenario presentation/ 30 minutes – simulation / 30 minutes debriefing / 10 minutes completion of DASH)

    - PowerPoint presentation (preparation materials)
    - Orientation to Simulation Laboratory
    - Read the case scenario which will be provided on simulation day
    - Enter the patient room when called
    - Attempt to treat the scenario as a real clinical experience including following orders, documentation, looking up needed information, treating the mannequin as if it were a real patient.
    - May use all resources provided
    - Should work as a team and should help each other through effective communication.
    - State understanding of assigned roles in the simulation
    - Ask for assistance if needed

Faculty Responsibilities

3. Preparation
    - Supplies: please refer to check list above.
    - Assign roles for the participants (primary nurse and secondary nurse)
    - Staffing
        - High fidelity manikin operator
        - Camera person
        - Faculty responsible for the simulation and debriefing
        - Faculty to assess videotaped simulations at a later date

4. Simulation Room Setup
    - The patient room will mimic a standard medical-surgical unit that is capable of having telemetry.
    - The manikin will be placed in a hospital gown, in a standard hospital bed with ID bracelet.
    - Patient chart will be made accessible
    - All equipment to take vital signs will be in the room
    - Telephone to call for assistance and for communication will be in the room

5. Sequence of Simulation (total time will be 30minutes).
   - Simulation room is prepared
   - Student is given the simulation scenario to read
   - Student enters the room when called.
   - Participants should conduct the assessment:
     - Performs hand hygiene with alcohol based hand rub before entering room
     - Checks patient identification using two patient identifiers before providing care
     - Identifies self before providing care
     - Assesses neurological status (Patient is orientated to person, place and time but not situation.
     - Assesses and verbalizes lung sounds (identify clear lung sounds)
     - Assesses and verbalizes positive bowel sounds
     - Assess and verbalizes S1 and S2 heart sounds
     - Assesses lower extremity/injury site/ assess dressings. Must state left foot is warm and pink. Left foot is warm, with patches of erythema on the foot and ankle (presence of bilateral +2 pedal pulses)
     - Assesses and verbalizes sinus tachycardia.
     - Assesses and verbalizes intravenous site (must identify date and integrity)
     - Assesses and verbalizes intravenous fluid of 0.9%NS at 50 ml/hr, compare to order and check IV tubing date
     - Assesses and verbalizes skin integrity
     - Notes urine output in the patients chart is less than 30ml/hr (200 ml/).
     - Notes routine blood work in patient chart shows elevated WBC of 13,000mmˆ3
     - Assesses pain level
     - Takes and verbalizes accurate initial reading of blood pressure (must be within 4 mmHg of systolic and diastolic reading = 88/42
     - Takes and verbalizes accurate initial reading of pulse rate (must be within 2 points to receive credit- may use monitor value or take manually= 102/ minute)
     - Takes and verbalizes accurate initial reading of respiratory rate (must be within 2 points to receive credit = 24/ minute)
     - verbalizes accurate initial reading of pulse oximetry (must look at monitor and verbalize reading= 96% on RA)
     - verbalizes accurate initial reading of temperature (must look at monitor and verbalize reading = 101°F/38.3°C)
     - Identify that an infection in his left foot is suspected and he has signs and symptoms of systemic inflammation (tachycardia, fever, tachypnea, mottling, altered mental status, hypotension, and probable oliguria).
     - Identify that Mr. M has sepsis.
   - Participant should communicate the following
     - Calls RR, once arrived, report using SBAR format, identifies self by name and title and report background and findings.

    - Assesses situation and verbalizes conclusion to physician (sepsis related to infection).
    - Verbalizes need for assistance and makes appropriate recommendations for care.
    - Receives orders. Writes them down and reads back
- Simulation over
- Continue to debriefing
- Completion of DASH evaluations

Appendix B

Martinez Simulation Competency Evaluation Tool

(Martinez, K. 2017).

Student Group Number _____

Initial Patient Safety Activities- check if observed

1.	**Performs hand hygiene with alcohol based hand rub before entering room (both participants must perform hand hygiene to receive credit)**
2.	**Checks patient identification using two patient identifiers before providing care (must use two identifiers to receive credit)**
3.	**Each participant identifies self before providing care (both participants must use own name to receive credit)**

_____Total

Assessments

1.	**Assesses neurological status (must include assessment of orientation to person, place and time to receive credit) (Patient is orientated to person and place but not time.**
2.	**Assesses and verbalizes lung sounds (must place stethoscope on chest and identify clear to receive credit)**
3	**Assesses and verbalizes bowel sounds (must place stethoscope on abdomen and identify active bowel sounds to receive credit)**
4.	**Assess and verbalizes cardiac sounds (must place stethoscope on chest and identify the presence of tachycardia to receive credit)**
5.	**Assesses lower extremity/injury site/ assess dressings. Must state right foot is warm and pink. Left foot is warm, with patches of erythema on the foot and ankle. (Must identify warm with patches of erythema to receive credit)**
6.	**Assesses and verbalizes lower leg circulation (must identify the presence of bilateral +2 pedal pulses to receive credit)**
7.	**Assesses and verbalizes intravenous site (must identify date of insertion, integrity of dressing, and lack of swelling, edema and pain to receive credit)**
8.	**Assesses and verbalizes intravenous fluid (must identify type of fluid {.09%} and compare with order, pump rate {50 ml/hr}, and tubing date to receive credit)**
9.	**Assesses and verbalizes skin integrity (must assess anterior and posterior pressure points and verbalize the finding of intact skin)**
10.	**Notes routine blood work in patient chart shows elevated WBC of**
11.	**Assesses pain level (must ask about level of pain using analog scale of 1-10 to receive credit)**
12.	**Takes and verbalizes accurate initial reading of blood pressure (must be within 4 mmHg of systolic and diastolic reading =88/42 (MAP 57)**

13.	**Takes and verbalizes accurate initial reading of pulse rate (must be within 2 points to receive credit- may use monitor value or take manually= 102/ minute)**
14.	**Takes and verbalizes accurate initial reading of respiratory rate (must be within 2 points to receive credit = 24/ minute)**
15.	**Looks at monitor and verbalizes accurate initial reading of pulse oximetry (must look at monitor and verbalize reading= 96% on RA)**
16.	**Looks at monitor and verbalizes accurate initial reading of temperature (must look at monitor and verbalize reading = 101°F/38.3°C)**
17.	**Needs to identify that an infection in his left foot is suspected and he has signs and symptoms of systemic inflammation (tachycardia, fever, tachypnea, mottling, altered mental status, hypotension, and probable oliguria).**
18.	**Identify that Mr. M has sepsis.**

_____ Total

Communication

1.	**Calls RRT.** **Once arrive the nurse reports using SBAR format** **Situation** **Identifies self by name (must include name and designation of title = RN, nurse or student nurse to receive credit)**
2.	**Identifies the patient being called about - must state Mr. M to receive credit)**
3.	**Provides brief history of patient (must include date of admission and admission diagnosis of sepsis to receive credit)**
4.	**Report change in neurological status**
5.	**Reports change in blood pressure**
6.	**Reports change in pulse oximetry**
7.	**Reports change in pulse rate**
8.	**Reports change in respiratory rate**
9.	**Reports bilateral left foot findings**
10.	**Reports presence of sinus tachycardia**
11.	**Reports being orientated to person and place but not time.**
12.	**Reports increased WBC**
13.	**Reports urine output is less than 30mm/hr as shown in the patients chart**
14.	**Assessment** **Assesses situation and verbalizes conclusion to call for an RRT (sepsis related to infection)**
15.	**Recommendation** **Verbalizes need for assistance and makes appropriate recommendations for care. Makes the suggestion for sepsis treatment and possible transfer to ICU**

16.	**Writes down verbal orders**
17.	**Reads back and verifies orders (must read back orders accurately to receive credit)**

_____Total

Core Measure Education about Sepsis

1.	**Provides brief explanation to patient about the need for blood work**
2.	**Provides brief explanation to patient about the need for IV fluids**
3.	**Provides brief explanation to patient about the rational for administering the antibiotics.**
4.	**Assesses patient understanding about sepsis / infection**
5.	**Provides information about sepsis**
6.	**Provide information about protocols and treatments**
7.	**Provide information about the possible need to transfer to an acute care unit**

_____Total

Documentation

1.	**Documents antibiotic medication to be administration record (must include date, time and initials in correct place to receive credit)**
3.	**Documents vital signs (must document initial vital signs and vital signs taken after patient deteriorates, must include BP, P, RR and pulse ox)**
4.	**Documents assessments (must record results of documentation assessments completed to receive credit)**
5.	**Writes descriptive narrative note related to patient situation**

_____Total

Appendix C

Sample of Evaluating the MSCET Itself and for Content Validity

The purpose of this form is for validating the Martinez Sepsis Competency Evaluation Tool to evaluate individual items on the tool as well as the tool itself for content validity. This tool contains specific task that the participant should meet during a simulation where a high fidelity mannequin has shown signs of deterioration due to sepsis. Below each task is a four-point scale to rank relevance, clarity, and conciseness. Please rank each one accordingly and provide comments if needed.

Martinez Sepsis Simulation Competency Evaluation Tool
(Martinez, K. 2017).

Student Group Number _____

1.	**Performs hand hygiene with alcohol based hand rub before entering room (both participants must perform hand hygiene to receive credit)** Relevance: 1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, 4 = highly relevant. Comments: Clarity: 1 = not clear, 2 = somewhat clear, 3 = quite clear, 4 = highly clear. Comments: Conciseness: 1 = not consistent, 2 = somewhat consistent, 3 = quite consistent, 4 = highly consistent. Comments:
2.	**Checks patient identification using two patient identifiers before providing care (must use two identifiers to receive credit)** Relevance: 1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, 4 = highly relevant. Comments: Clarity: 1 = not clear, 2 = somewhat clear, 3 = quite clear, 4 = highly clear. Comments:

	Conciseness: 1 = not consistent, 2 = somewhat consistent, 3 = quite consistent, 4 = highly consistent. Comments:
3.	**Each participant identifies self before providing care (both participants must use own name to receive credit)** Relevance: 1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, 4 = highly relevant. Comments: Clarity: 1 = not clear, 2 = somewhat clear, 3 = quite clear, 4 = highly clear. Comments: Conciseness: 1 = not consistent, 2 = somewhat consistent, 3 = quite consistent, 4 = highly consistent. Comments:

Initial Patient Safety Activities- check if observed
_____Total

Appendix D

Debriefing Assessment for Simulation in Healthcare (DASH) Student Version©

Directions: Please summarize your impression of the introduction and debriefing in this simulation-based exercise. Use the following scale to rate each of six "Elements." Each Element comprises specific instructor behaviors, described below. If a listed behavior is impossible to assess (e.g., how the instructor(s) handled upset people if no one got upset), don't let that influence your evaluation. The instructor(s) may do some things well and some things not so well within each Element. Do your best to rate the ***overall effectiveness* for the whole Element** guided by your observation of the individual behaviors that define it.

Rating Scale

Rating	1	2	3	4	5	6	7
Descriptor	**Extremely Ineffective / Detrimental**	Consistently Ineffective / Very Poor	Mostly Ineffective / Poor	Somewhat Effective / Average	Mostly Effective / Good	Consistently Effective / Very Good	**Extremely Effective / Outstanding**

Element 1 assesses the introduction at the beginning of a simulation-based exercise.

Skip this element if you did not participate in the introduction.

If there was no introduction and you felt one was needed to orient you, your rating should reflect this.

Element 1 **The instructor set the stage for an engaging learning experience.**	**Overall Rating Element 1** _____

- The instructor introduced him/herself, described the simulation environment, what would be expected during the activity, and introduced the learning objectives.
- The instructor explained the strengths and weaknesses of the simulation and what I could do to get the most out of simulated clinical experiences.
- The instructor attended to logistical details as necessary such as toilet location, food availability, schedule.
- The instructor made me feel stimulated to share my thoughts and questions about the upcoming simulation and debriefing and reassured me that I wouldn't be shamed or humiliated in the process.

Elements 2 through 6 assess a debriefing.

Element 2 **The instructor maintained an engaging context for learning.**	**Overall Rating Element 2** _____

- The instructor clarified the purpose of the debriefing, what was expected of me, and the instructor's role in the debriefing.
- The instructor acknowledged concerns about realism and helped me learn even though the case(s) were simulated.
- I felt that the instructor respected participants.
- The focus was on learning and not on making people feel bad about making mistakes.
- Participants could share thoughts and emotions without fear of being shamed or humiliated.

Element 3 **The instructor structured the debriefing in an organized way.**	**Overall Rating Element 3** _____

- The conversation progressed logically rather than jumping around from point to point.
- Near the beginning of the debriefing, I was encouraged to share my genuine reactions to the case(s) and the instructor seemed to take my remarks seriously.
- In the middle, the instructor helped me analyze actions and thought processes as we reviewed the case(s).
- At the end of the debriefing, there was a summary phase where the instructor helped tie observations together and relate the case(s) to ways I can improve my future clinical practice.

Element 4 **The instructor provoked in-depth discussions that led me to reflect on my performance.**	**Overall Rating Element 4** _____

- The instructor used concrete examples—not just abstract or generalized comments—to get me to think about my performance.
- The instructor's point of view was clear; I didn't have to guess what the instructor was thinking.

- The instructor listened and made people feel heard by trying to include everyone, paraphrasing, and using non verbal actions like eye contact and nodding, etc.
- The instructor used video or recorded data to support analysis and learning.
- If someone got upset during the debriefing, the instructor was respectful and constructive in trying to help them deal with it.

Element 5 **The instructor identified what I did well or poorly – and why.**	**Overall Rating Element 5** _____

- I received concrete feedback on my performance or that of my team based on the instructor's honest and accurate view.
- The instructor helped explore what I was thinking or trying to accomplish at key moments.

Element 6 **The instructor helped me see how to improve or how to sustain good performance**	**Overall Rating Element 6** _____

- The instructor helped me learn how to improve weak areas or how to repeat good performance.
- The instructor was knowledgeable and used that knowledge to help me see how to perform well in the future.
- The instructor made sure we covered important topics.

Appendix E

EVALUATION OF THE IDENTIFICATION OF PATIENT DETERIORATION WITH UNDERGRADUATE NURSING STUDENTS USING HIGH FIDELITY SIMULATION

Demographic Information Questionnaire

Please answer the following questions to the best of your ability.

1. Please indicate if you identify yourself with a gender: Yes or No
2. If you do identify yourself with a gender please circle which gender you identify yourself as: Male or Female
3. Please provide you age:_____
4. Have you ever had an experience in the clinical setting where the patient you were caring for was acutely deteriorating and or needed prompt medical attention? Please explain:

   _____

   _____

   _____

5. Do you know or have you in the past worked in the medical field? Please explain:

   _____

   _____

   _____

Martinez Simulation Competency Evaluation Tool
(Martinez, K. 2017).

Student Group Number _____

Initial Patient Safety Activities- check if observed

1.	**Performs hand hygiene with alcohol based hand rub before entering room.** **(Both participants must perform hand hygiene to receive credit)**
2.	**Checks patient identification using two patient identifiers, such as the patient identification bracelet and patient verbally confirmed, before providing care.** **(Participants must use two identifiers to receive credit)**
3.	**Each participant identifies self before providing care.** **(Each participant must state their name and their job title to receive credit)**

_____Total

Assessments

1.	**Participants must assess neurological status to determine if the patient is oriented to person, place, time, and situation,** **(Participants must assess and state the patients orientation to person, place, time, and situation to receive credit.)**
2.	**Participants must assess lung sounds by placing the stethoscope on chest, auscultate, and listening for lung sounds. Participants must verbalize the lung sound finding they believe they heard while listening** **(To receive credit the participants must do all of the following: must place stethoscope on the chest and verbalize findings. For this simulation, the lung sounds are clear to auscultation).**
3.	**Participants must assess bowel sounds by placing the stethoscope on abdomen, auscultate in all four quadrants, and listening for bowel sounds. Participants must verbalize the bowel sound finding they believe they heard while listening** **(To receive credit the participants must do all of the following: must place stethoscope on the abdomen and verbalize findings. For the simulation, there are active bowel sounds).**
4.	**Participants must assess cardiac sounds by placing the stethoscope on chest in all five landmarks and listening for cardiac sounds. Participants must verbalize the cardiac sound finding they believe they heard while listening**

	(To receive credit the participants must do all of the following: must place stethoscope on all five cardiac assessment landmarks and verbalize findings. For the simulation, there is a presence of tachycardia.)
5.	**Participants must assess both of the patient's lower extremities for color and temperature. Participants must assess the area of injury (left foot) by assessing the wound and wound dressing.** **(To receive credit the participants must do all of the following:** **For left foot and ankle, participants must assess and verbalize that the left foot and ankle is warm, erythematous, with no drainage at the wound site, describe the wound, and state that the dressing is clean, dry and intact.** **For the right foot and ankle, participants must assess and verbalize that the patient's right foot and ankle is warm and pink.)**
6.	**Participants must assess and verbalizes lower leg circulation** **(Participants must identify and verbalize the presence of bilateral +2 pedal pulses to receive credit)**
7.	**Participants must assess intravenous site to ensure the intravenous site is clean, dry, and intact. Participant must assess the intravenous dressing to ensure that the dressing is clean, dry and intact with the proper label on it including date of insertion.** **(Participants must identify and verbalize all of the following to receive credit: the intravenous site is clean, dry, intact, and patient. The date of insertion has not expired, and that the integrity of dressing is clean, dry and intact)**
8.	**Participants must assess intravenous fluids that are currently infusing and the rate that the intravenous fluid is infusing. Participants must compare what is infusing and the rate to what is ordered in the patients written orders. Participants must assess the date on the intravenous tubing to confirm that the tubing is not expired.** **(Participants must identify and verbalize all of the following to receive credit: Assesses and verbalizes the correct intravenous fluid is infusing and is infusing at the correct rate. The intravenous tubing is not expired. For this simulation the intravenous fluid that needs to be identified is .09% normal saline at 50 ml/hr).**
9.	**Participants must assess the skin integrity of the patient. Participants must assess the anterior and posterior pressure points on the patient's body for presents of skin breakdown.**

	(Participants must identify and verbalize that the patient skin is clean, dry and intact with no signs of skin breakdown to receive credit)
10.	**Participants must acknowledge and verbalize that the patient routine blood work results shows an elevated WBC of 13,000m3**
11.	**Participants must assess the patients current level of pain by using an appropriate pain score chart, using analog scale of 0-10.** **(Participants must identify and verbalize the patients current level of pain to receive credit.** **For this simulation the patients current level of pain is a 4 on a scale of 0-10)**
12.	**Participants must take and verbalize accurate initial reading of blood pressure** **(must be within 4 mmHg of systolic and diastolic reading to receive credit** **For this simulation the blood pressure is 88/42 (MAP 57).**
13.	**Participants must take and verbalize accurate initial reading of pulse rate.** **(Participants must be within 2 points to receive credit- may use monitor value or take manually** **For this simulation the pulse rate is 102 bpm/ minute).**
14.	**Participants must take and verbalize accurate initial reading of respiratory rate.** **(must be within 2 points to receive credit)** **For this simulation the respiratory rate is 24 bpm/ minute)**
15.	**Participants must look at monitor and verbalize accurate initial reading of pulse oximetry** **(must look at monitor and verbalize reading to receive credit. For this simulation the pulse oximetry is 96% on RA).**
16.	**Participants must look at monitor and verbalize accurate initial reading of temperature to receive credit).** **(For this simulation the temperature is 101°F/38.3°C)**
17.	**Participants need to verbally identify that the patient has a probable infection in his left foot. Participants must verbally identify that the patient is displaying signs and symptoms of systemic inflammation.** **(To receive credit participant must verbally these signs of sepsis:**

	tachycardia, fever, tachypnea, altered mental status, hypotension, and probable oliguria).
18.	**Participant must verbally identify that Mr. M meets sepsis criteria.**

_____ Total

Communication

1.	**Participants must do all of the following to receive credit:** **Must call Calls RRT or cover MD, NP, or PA.** **Once arrive the nurse reports using SBAR format** **Situation** **Identifies self by name (must include name and designation of title = RN, nurse or student nurse)**
2.	**While communicating to the MD, NP, or PA the participant must identify the patient being called about to receive credit)**
3.	**While communicating to the MD, NP, or PA the participant must provide a brief history of patient (must include date of admission and admission diagnosis of sepsis to receive credit)**
4.	**While communicating to the MD, NP, or PA the participant must report change in neurological status from awake, alert and orientated x4 to awake, alert, orientated to person, place, situation but not time to receive credit.**
5.	**While communicating to the MD, NP, or PA the participant must reports a change in the patients temperature from 99F (37.2C) to 101°F (38.3°C) to receive credit**
6.	**While communicating to the MD, NP, PA the participant must reports a change in pulse rate from 90 bpm to 102 bpm to receive credit**
7.	**While communicating to the MD, NP, or PA the participant must reports a change in respiratory rate of 20bpm to 24 bpm to receive credit.**
8.	**While communicating to the MD, NP, or PA the participant must reports a change in blood pressure from 110/70 (MAP 83) to 88/42 (MAP 57) to receive credit.**
9.	**While communicating to the MD, NP, or PA the participant must report no a change in pulse oximetry as pulse oximetry is 94%- 96% on RA to receive credit**
10.	**While communicating to the MD, NP, or PA the participant must reports both of the patient's lower extremities findings to receive credit:** **For left foot and ankle, participants must assess and verbalize that the left foot and ankle is warm, erythematous, with no drainage at the wound site, describe the wound, and state that the dressing is clean, dry and intact.** **For the right foot and ankle, participants must assess and verbalize that the patient's right foot and ankle is warm and pink**
11.	**While communicating to the MD, NP, or PA the participant must reports a presence of sinus tachycardia to receive credit**

12.	**While communicating to the MD, NP, or PA the participant must report an increased WBC of 13,000m3 to receive credit**
13.	**While communicating to the MD, NP, or PA the participant must report a urine output less than 30mm/hr as shown in the patients chart to receive credit**
14.	**While communicating to the MD, NP, or PA the participant must reports the patient is meeting sepsis criteria to receive credit.**
15.	**While communicating to the MD, NP, or PA the participant must verbalize the need for assistance and makes appropriate recommendations for starting the sepsis protocol or sepsis guideline to receive credit**
16.	**write down all verbal orders to receive credit**
17.	**Participants must reads back order to verify to receive credit.**

_____Total

Core Measure Education about Sepsis

1.	**Participants must provide a brief explanation to patient about the need for blood work to receive credit**
2.	**Participants must provide a brief explanation to patient about the need for IV fluids to receive credit**
3.	**Participants must provide brief explanation to patient about the rational for administering the antibiotics. to receive credit**
4.	**Participants must assess the patient understanding about sepsis / infection to receive credit**
5.	**Participants must provide information about sepsis to receive credit**
6.	**Participants must provide information about protocols and treatments that will be used on the patient to receive credit**
7.	**Participants must provide information about the possible need to transfer to an acute care unit if the patients' health status does not improve to receive credit**

_____Total

Documentation

1.	**Participants must document antibiotic medication to be administration record (must include date, time and initials in correct place) to receive credit**
3.	**Participants must documents all vital signs to receive credit**
4.	**Participants must documents patient assessments findings to receive credit**
5.	**Participants must write a descriptive narrative note related to patient situation to receive credit**

_____Total

Appendix G

Southern Connecticut State University

SCSU

School of Graduate Studies, Research, and Innovation

Date: 6/20/18 Re: Expedited Protocol and Consent Approval

Attn: Ms. Kelly Martinez
63 Lake Road
North Branford, CT 06471

CC: Dr. Barbara Aronson, Nursing

Protocol Title: Development and evaluation of a sepsis simulation with undergraduate nursing students

Protocol Number: 18-090 Approval period: 6/20/18 – 5/19/19

Department: Nursing

Dear Ms. Martinez,

On behalf of the Southern Connecticut State University Institutional Review Board (IRB), I am pleased to inform you that the protocol listed above, has been reviewed and approved as submitted for the period indicated. Please be aware that the IRB approval expires on the date noted above.

The SCSU HRPP IRB operates under the Code of Federal Regulations CFR: Title 45, part 46. As a result, this approval is granted with the understanding of continuing investigator responsibilities. Initiation of the research covered by this approval will be considered acceptance of the following responsibilities:

1. The attached consent forms must be used as is unless a subsequent modification is approved by the IRB (copies may be made). The approved consent form has been stamped with an expiration date and initialed by the IRB chair.
2. If data collection is to continue beyond the expiration date indicated in this letter, and stamped on your consent form, the IRB must be informed using the ***Continuing Review Form***, prior to the expiration date, otherwise, you must cease data collection as your research will no longer be approved.
3. Changes in procedures which in any way influence the research participants, study methodology, consent or protocol, must be submitted in writing **in advance** to the IRB for approval using the ***Request for Revision Form.***
4. A final progress report must be submitted to the IRB by the Principal Investigator(s) within 90 days of study termination using the ***Research Completed Form***.
5. If, during the conduct of your research, any adverse events occur involving the research participants, an ***Adverse Event Form*** must be completed and submitted to the IRB immediately.
6. **All forms named above can be found on the SCSU IRB website.**
7. In the completed presentation of your research project, please be sure to maintain all privacy and confidentiality components promised to participants in your consent/assent document(s).

The IRB welcomes your research project into the list of approved protocols. Your compliance with the above conditions will help protect your research for the approval period and permit final allowance of your research activity.

Sincerely,

Dr. W. Jerome Hauselt, IRB Chair
School of Graduate Studies
Voice: 203 392-5243, FAX 203 392 5221
Email: hauseltw1@southernct.edu

Research Protection
Southern Connecticut State University

(Revised 7/27/15)

Informed Consent Student

Evaluation of the Valuation of the Identification of Patient Deterioration with Undergraduate Nursing Students Using High Fidelity Simulation

BY

Kelly Martinez

Southern Connecticut State University

Introduction:

A Southern Connecticut State University student who is enrolled in the Doctorate (Ed.D.) in Nursing Education Program is conducting a study with undergraduate SCCSU nursing students in their senior year. This study will be focused on the evaluation of the student nurses' ability to identification patient deterioration using high fidelity simulation. In order to decide whether or not you wish to be a part of this research study, you should be informed of all aspects of this study. This includes the purpose, the procedures to be used and the risks or benefits of participating. This consent form provides you with detailed information about the research study. Any unclear areas or aspects of the study that you may not understand or have questions about can and should be discussed. Once you understand the study, you will be asked if you wish to participate. If you wish to participate you will be asked to sign this form.

Purpose:

The purpose of this study is to evaluate undergraduate nursing students' ability to identify patient deterioration using high fidelity simulation. Participation in the simulation is voluntary and not a part of any university course nor is it part of any course grade or course expectation. Over the past two decades, there has been an increase in the use of simulation in health care education in all areas of medical training and practice. Simulation provides an educational experience where students are presented with a simulated patient care situation or case scenario in a realistic atmosphere. Here student nurses can practice and strengthen their skills in a safe, controlled environment to prepare their future role as nurses. Research has shown how simulation has positively impacted nursing education and student learning.

Procedures:

Nursing students enrolled in the 432 course for the 2018 fall semester will be invited to participate in this study. Students can be full-time or part-time. The researcher will visit all of the course sections one at a time to discuss this study. At that time questions will be answered. Willing participants will be asked to fill out a demographic sheet and to complete this informed consent document. At this time student will also be asked to sign up in pairs of two for a day

*Participant's Initials*_____ 1

and time to partake in the simulation that is convenient for them and outside of any class time. Students will work together in groups of two during the simulation. Students will be oriented to content though a dyadic component which will be a PowerPoint presentation made available on Black Board. This much be watched before coming to the simulation experience. All students will be asked to sign a form on the day of the simulation stating that they have watched the PowerPoint presentation. On the day of simulation all students will receive an orientation to the simulation laboratory. At this time all needed equipment and skills can be reviewed. The students will be informed of the roles with will be the primary nurse and the secondary nurse which will be assigned randomly. Students will be informed of the role expectations while in the simulation. Following this, the students will receive a copy of the case scenario for the simulation and will be given time to review the case and ask questions.

Students will participate in the simulation exercise in groups of two and will work as a team. The simulation will be videotaped. Following the simulation students will be debriefed after participation in the scenario and learn about their performance in the debriefing. Students will be asked to complete an evaluation form after the scenario.

Didactic/ pre-briefing teaching tool	Allow participants to view on own via the internet and will allow participant to view for 1 week
Orientation to the simulation room	10 minutes
Case scenario presentation	10 minutes
Simulation	30 minutes
Debriefing	30 minutes
Completing of the DASII instrument	10 minutes

The data collected will not be used to evaluate students and will have **no impact** on your course grades. The instructors of these courses will not know anything about your performance during the simulation.

Risks and Inconveniences:

Risks in this study are highly unlikely, however, there is the possibility that participating in a simulated clinical experience may produce symptoms of stress or anxiety. This study contains a debriefing process which provides an opportunity for students to express their feelings. Additional support is available through student counseling services and participants may

withdraw from the study at any time. Participation in the simulation will take about 90 minutes.

Benefits:

Simulation involves the replicating a condition or case scenario in a realistic atmosphere that is safe and controlled. It is anticipated that nursing students who participate in this simulation exercise will benefit from participation by practicing and strengthen their skills, increasing their confidence and competence when caring for a decompensating patient. Students will also collaborate together on planning and providing patient care. It is also anticipated that this study will increase knowledge on patient decompensation.

Costs/Compensations:

There will be no direct costs to you for participating in this simulation other than the time it will take to participate in the study. There will be no compensation if you participate in this study with the exception of gained knowledge.

Voluntary Participation:

Your participation in this research is entirely voluntary. You may withdraw or refuse to participate in this study free of any negative consequences. If you begin to participate in this study, you may at any time and for any reason, discontinue your participation without any negative consequences. Simply let the researcher know. It is very important to the researcher that students do not feel pressure or coercion to participate in the study.

Confidentiality:

Any and all information obtained during this study from you will be kept confidential and your privacy will be protected at all times. Numerical identifiers will be used in this study and no personal information will be documented on the data collection instruments or the video recordings. Data will be stored in a locked location. Electronic data, such as video-recordings, will be stored in a secure software program and encrypted. Paper and pencil surveys will be stored in a locked drawer within the researcher's locked office. The data collected may be used as part of publications and papers, however no student identifiers will be included in the data. The only persons who will have access to the video recordings are the researcher, advisor and outside reviewers who are not connected to the university in any way. The video-taped recordings will not include any personal identification.

Participant's Initials _____ 3

Signature Section:

Before you sign this form, please ask any questions on any aspect of this study that is unclear to you. You may take as much time as necessary to decide if you wish to participate. If you have further questions, you may contact Kelly Martinez (203)232-0928 or [redacted] or her study advisor Dr. Barbara Aronson ([redacted]). If you have questions regarding your rights as a research participant you may contact the SCSU Institutional Review Board at (203) 392-5243.

Investigator Signature: I have explained to_____the purpose of this research, the procedures required, and the possible risks and benefits to the best of my ability. To the best of my knowledge, the information contained in this consent form is true and accurate.

_____*Date:*_____

Participant Signature: I confirm that_____has explained to me the purpose of this research, the study procedures that I will undergo and the possible risks as well as benefits that I may experience. I have read this consent form and I understand it. Therefore, I give my consent to be engaged as a participant in this research project.

_____ *Date:*_____

Participant's Initials____.____

4

APPROVED
Southern CT State University
Institutional Review Board
Protocol No. 18-090
Approval Date 6/20/18
Expiration Date 6/19/19
IRB Chair Initials

Appendix H

Southern Connecticut State University
501 Crescent Street
New Haven, CT 06515 -1355

Date: 2/1/19

Investigator: Ms. Kelly Martinez
63 Lake Rd.
North Branford, CT 06471

CC: Dr. Barbara Aronson, Nursing

Period: 2/1/19 – 6/19/19

IRB #: 18-090

Title: Development and evaluation of a sepsis simulation with undergraduate nursing students

Re: Protocol Revision Approval

Dear Ms. Martinez,

Thank you for submitting a request for revision form for your investigation. Your study was originally approved under the regulations in force prior to 1/21/19 and remains governed by those regulations. Your amendment, to access data collected as part of an existing course, has been approved according to those regulations.

This approval is subject to the conditions stated in your initial approval letter plus any approved revisions or continuations, and holds the most current expiration date (see above). If your research design or consent form is further revised in any way during the conduct of this research please contact the IRB immediately. If you have any questions, please contact me directly.

Sincerely,

Dr. W. Jerome Hauselt, Chair
School of Graduate Studies

Research Protection
Southern Connecticut State University

Revised: 7/27/15

Informed Consent Student

Evaluation of the Valuation of the Identification of Patient Deterioration with

Undergraduate Nursing Students Using High Fidelity Simulation

Kelly Martinez (doctoral student)

Southern Connecticut State University

Introduction:

Senior-level SCSU nursing students enrolled in the NUR 443 Nursing Capstone course (section one and two) spring semester 2019 are requirement to participate in a day of simulation, equaling eight hours, as part of their clinical course requirements. A portion of the simulation day will include a sepsis simulation based experience. Data from this sepsis simulation based experience is part of a dissertation study conducted by Kelly Martinez, a SCSU doctoral student. Although the sepsis simulation-based learning experience will be a course requirement, participation in the actual study will be optional and students can elect not to share their data.

Purpose:

The purpose of this study is to evaluate undergraduate nursing students' ability to identify patient deterioration using high fidelity simulation. Simulation provides an educational experience where students are presented with a replicated particular medical condition or case scenario in a realistic atmosphere. Here student nurses can practice and strengthen their skills in a safe, controlled environment to prepare their future role as nurses. Research has shown how simulation has positively impacted nursing education.

Procedures:

Students will be approached during the beginning of simulation day and the requirements of the study will be explained. Students will be told that participation in the sepsis simulation-based experience is a requirement of the course, however they may elect not to have their data shared. Students who wish to participate in the study will be asked to sign the informed consent document.

Risks and Inconveniences:

There are minimal risks to participating in the sepsis simulation based experience, although some students may experience some anxiety. This simulation contains a debriefing process which provides an opportunity for students to express their feelings. Students are very familiar with participating in simulations throughout their coursework at SCSU.

Benefits:

Simulation involves the replicating of a case scenario in a realistic atmosphere that is safe and controlled. It is anticipated that nursing students who participate in the sepsis simulation based experience will benefit from participation by practicing and strengthen their skills. Increasing their competence.

Costs/Compensations:

There will be no costs to you for participating in this study. Students are required to participate in an eight hour simulation day as part of their clinical capstone hours.

Participant's Initials_____ 1

[Type here]

Voluntary Participation:
Your participation in this research study is voluntary. You may elect not to have the data collected during this sepsis simulation based experienced utilized in the study.

Confidentiality:
Any and all information obtained during this study from you will be kept confidential and your privacy will be protected at all times. Numerical identifiers will be used in this study and no personal information will be documented on the data collection instruments or will be included in any publications or presentations of the study results. Data will be stored a locked location. Electronic data, such as video-recordings, will be stored in a secure software program and encrypted. Paper and pencil surveys will be stored in a locked drawer within the researcher's locked office. The data collected may be used as part of publications and presentations.

Signature Section:
Before you sign this form, please ask any questions on any aspect of this study that is unclear to you. If you have further questions, you may contact Kelly Martinez ([redacted] or [redacted] If you have questions regarding your rights as a research participant you may contact the SCSU Institutional Review Board at (203) 392-5243.

Investigator Signature: *I have explained to_____ the purpose of this research, and the study procedures. To the best of my knowledge, the information contained in this consent form is true and accurate.*

_____ Date_____

Participant Signature: *I confirm that_____has explained to me the purpose of this research and the study procedures. I have read this consent form and I understand it. Therefore, I give my consent to share the data obtained from the sepsis based simulation experience in the researcher's dissertation.*

_____ *Date:*_____

APPROVED
Southern CT State University
Institutional Review Board
Protocol No. 21 19
Approval Date 18-090
Expiration Date 6/19/19
IRB Chair Initials_

Participant's Initials __

2