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Improving Nurses' Confidence in Early Identification of Sepsis

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Improving Nurses' Confidence in Early Identification of Sepsis

by

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Abstract

Sepsis is the body's extreme response to infection, which is a life-threatening medical emergency and must be treated promptly. Emergency Department (ED) registered nurses are at the frontlines of patient treatment, requiring them to be educated on the most recent guidelines and protocols when it comes to early sepsis identification. This study implemented educational sessions on early identification and initiation of treatment in sepsis for the ED nurse population to improve their overall confidence in identifying potentially septic patients. It was found that the education sessions increased the nursing staff who participated overall confidence in early identification of sepsis patients.

Keywords: early identification of sepsis, Emergency Department, confidence scale

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CHAPTER I

Introduction

According to the Centers for Disease Control and Prevention (CDC) (2018),

sepsis is the body's extreme response to an infection. It is a life-threatening medical

emergency, requiring early identification and treatment. Sepsis happens in the body

when an infection you already have, in your lungs, skin, urinary tract, or somewhere else,

triggers a chain reaction throughout the rest of your body (CDC, 2018). Without prompt

treatment, sepsis can rapidly lead to tissue damage, organ failure, and possibly death.

Anyone can get an infection and any infection can lead to sepsis, however those who are

65 or older, have a weakened immune system, chronic medical conditions, or under one

year of age, are at a higher risk (CDC, 2018).

A growing number of Americans are aware of the definition of sepsis. However,

at only 58%, there is still a large population that are not aware of this critical illness

(Sepsis Alliance, 2019).   There are more than 1.7 million people in the United States

(US) yearly that are diagnosed with sepsis. This means there is approximately one case

of sepsis diagnosed every 20 seconds and the incidence is rising 8% every year in the US.

Approximately 270,000 people die from sepsis yearly in the US, around one every two

minutes, which is more than prostate cancer, breast cancer, and AIDS combined (Sepsis

Alliance, 2019). Sepsis is reported as the most expensive in-patient cost in the United

States' hospitals in 2014, averaging more than $18,000 per hospital stay. With over 1.5

million sepsis hospital stays in 2014, this results in a cost of $27 billion each year (Sepsis

Alliance, 2019).

It is imperative that nurses recognize the signs and symptoms of sepsis, followed by the health care provider initiating proper interventions post recognition for safety of patients. Centers for Medicare and Medicaid (CMS) and The Joint Commission (TJC) have joined together to provide new publicly reported measures that aim to reduce preventable sepsis-related mortality (Rhee, Gohil, & Klompas, 2014). In October 2015, CMS implemented the CMS Core Measure (SEP-1) Program, mandating hospitals to report process and outcome data related to the quality of care delivered for patients diagnosed with sepsis (Barbash, Rak, Kuza, & Kahn, 2017). There is remarkably little known about how front-line hospital quality administrators perceive the program and how they are responding, or not responding, to the new CMS requirements (Barbash et al., 2017). For prompt treatment, beside nursing staff must have the proper training to identify sepsis early and initiate the appropriate interventions.

Significance

In the ED, nurses were unable to recognize sepsis promptly based on key symptoms and did not alert the medical provider for early interventions, as evidenced by the yearly quality indicators. Recognition of sepsis symptoms are reliant on nursing staff being able to identify the Systemic Inflammatory Response Syndrome (SIRS) criteria, as well as the healthcare providers giving appropriate orders for intervention when alerted by nursing staff. Reich, Then, and Rankin (2018) identified internal barriers that were related to the health care provider's attitudes or knowledge behind sepsis clinical practice guidelines. These barriers include lack of interest in changing current practices, lack of perceived usefulness of the guideline, lack of knowledge of the guideline or medical condition, and inconsistent guidelines in a workplace. Moore and Moore (2012)

recognized that less than 40% of medical-surgical nurses were able to recognize sepsis in their patients. According to research by Davis, Henderson and Langmack (2016), anecdotal observation, recent media articles, and the sepsis literature, advise that while identification appears to have improved to an extent, there remains a lack of awareness and inconsistencies in delivering best practice. Currently, at a small community hospital in the south-eastern part of the US, the electronic medical record (EMR) triage form has a sepsis screening tool. Each patient in the ED has a triage form that must be completed, which includes the sepsis screening tool, by a registered nurse (RN). The triage form is completed on all patients, regardless of which avenue they arrive to the ED. The sepsis screening tool consists of a series of questions the nurse must answer regarding symptoms the patient presents with, and if they have a history of a recent infection.

A barrier that occurs with nursing staff and the inability to recognize sepsis include ineffective utilization of the sepsis screening tool at time of triage, which is the first point of patient contact for a nurse. Other barriers include alert fatigue, not implementing the appropriate suspected sepsis Advanced Nursing Intervention (ANI), delay in notification to the provider or not at all, and the provider not giving orders for appropriate intervention. Bateson and Patton (2015) recognize that identifying and addressing barriers to implementation of care bundles with early identification of sepsis was essential to optimize outcomes for patients. At a small community hospital in 2018, 145 patients entered the ED with a diagnosis of severe sepsis or septic shock. Of those 145 patients, 36 of them did not survive the hospitalization due to severe sepsis or septic shock. That means approximately 25% of patients who presented to the ED in 2018, who were diagnosed with severe sepsis or septic shock, did not live through their admission.

Purpose

The purpose of this thesis study was to educate the ED nursing staff of early identification of sepsis by improving their knowledge base. There was approximately 51 nurses educated, taking into consideration turnover and staff's outside obligations. Pre- and post- confidence scale surveys were issued to rate their confidence after receiving education on early identification of sepsis.

Theoretical or Conceptual Framework

The "Knowledge-to-Action" framework was developed in 2006 by Graham et al. to offer a conceptual framework for thinking about the process and integrate the roles of knowledge creation, and knowledge application. The framework was developed to explain the process of translation of knowledge in which evidence is translated into practice (Graham et al., 2006). Graham et al. (2006) noted in their research that despite considerable resources, the transfer of research findings into practice is often a slow and haphazard process, resulting in patients being denied treatment of proven benefit because of the time it takes for research to come to practice. Continuing education within the health profession, the importance of understanding knowledge-to-action (KTA) includes the complete KTA process, the range of stakeholders involved beyond practitioners, and conceptual frameworks that may be useful in facilitating the use of research in practice settings (Graham et al., 2006). Knowledge transfer is generally the most commonly used term within and outside of healthcare. The term knowledge transfer means the process of getting knowledge used by stakeholders (Graham et al., 2006).

There are three phases emphasized in understanding how the framework functions including, knowledge inquiry, knowledge synthesis, and knowledge tools. Knowledge

inquiry represents the unmanageable array of primary studies or information of variable

quality that is available and that may or may not be easily accessed (Graham et al., 2006).

The process can be compared to moving through a funnel, the knowledge becomes more

distilled and refined, and presumably more useful as it moves through the funnel

(Graham et al., 2006). The next phase, knowledge synthesis, represents the aggregation

of existing knowledge. This process includes applying explicit and reproducible methods

to the identification, appraisal, and synthesis of studies or information relevant to specific

questions (Graham et al., 2006). Knowledge inquiry can be considered first generation

knowledge meaning it is in its natural state and unrefined, while knowledge synthesis is

considered second generation knowledge. The third phase considered the third-

generation knowledge, consists of knowledge tools or products. The purpose of the tools

is to present knowledge in a clear, succinct, and user-friendly format and ideally to

provide clear recommendations with the intent of influencing what stakeholders do and

meet their knowledge needs. Throughout each phase of knowledge creation, the

knowledge producer can tailor their activities to the needs of the potential end users. The

best-quality research and knowledge are then further formed into a decision-making tool

through action phases (Graham et al., 2006).

　　　　The conceptual framework of Graham et al. (2006) knowledge-to-action process

will guide the thesis study by identifying the best evidence-based-practice guidelines

used to educate the ED nursing staff on early sepsis identification. By identifying the

patients presenting with sepsis criteria, the nurse can initiate the measures within the ANI

order set that will improve the patients' outcomes, along with alerting the medical

provider as soon as the sepsis criteria has been recognized. For this to be successful, it

was critical for the care team to engage during the educational experiences, in order to produce positive patient outcomes.
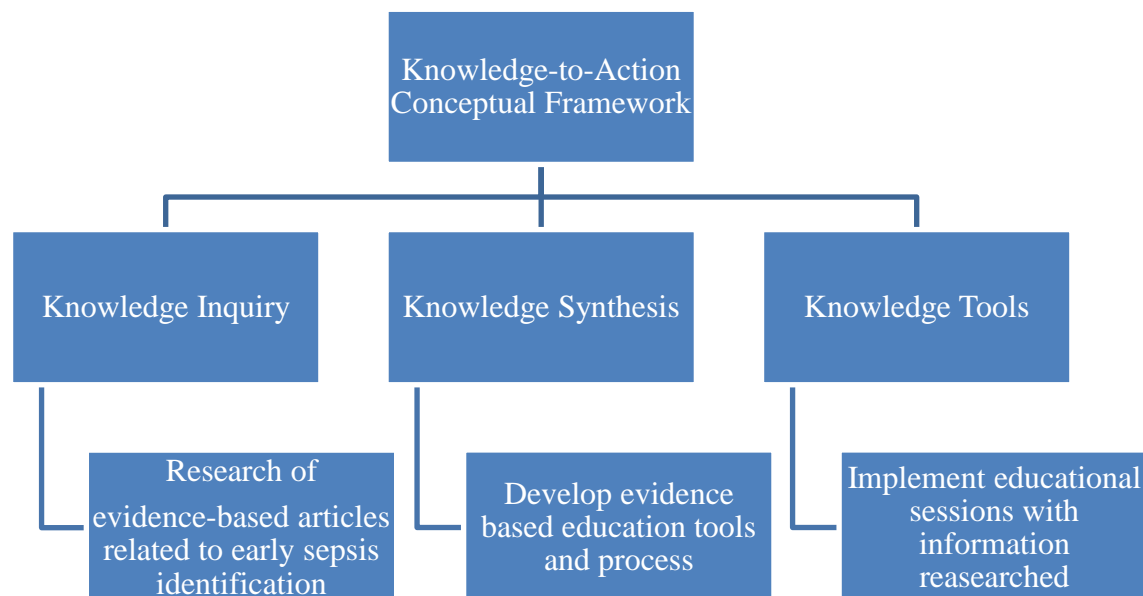
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                    ┌─────────────────────┐
                    │ Knowledge-to-Action │
                    │ Conceptual Framework│
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| Knowledge Inquiry | Knowledge Synthesis | Knowledge Tools |

| Research of evidence-based articles related to early sepsis identification | Develop evidence based education tools and process | Implement educational sessions with information reasearched |

Figure 1. Conceptual – Theoretical – Empirical Diagram (CTE)

Thesis Question or Hypothesis

The educational sessions for the ED nursing staff will increase the confidence level of the registered nurse to identify the patients meeting sepsis criteria and initiation of Advanced Nursing Interventions.

Definition of Terms

- *Advanced Nursing Interventions (ANI)* order sets were found within the electronic medical record (EMR). Nurses' in the ED have a limited number of nursing order sets, or group of orders, that can be implemented based off the patients presenting signs and symptoms. The order sets are placed after triage and before a provider performs a medical exam on the patient. The purpose of an ANI is expediting

patient care by providing a basic set of lab values or diagnostics while the patient waits for a provider's medical assessment.

- *Systemic Inflammatory Response Syndrome (SIRS)* references the criteria that must be present in order to suspect or diagnose sepsis. The criteria include: fever of more than 38 degrees Celsius (100.4 F) or less than 36 degrees (96.8 F), heart rate of more than 90 beats per minute, respiratory rate of more than 20 breaths per minute or arterial carbon dioxide tension (PaCO2) of less than 32 mmHG, and abnormal white blood cell count of >12,000/uL or <4,000/uL or >10% immature (band) forms (Kaplan, 2018).

Summary

Sepsis is a life-threatening medical emergency, requiring early identification and prompt treatment. Sepsis happens when an infection you already have triggers a worsening chain reaction throughout the rest of your body, therefore everyone is at risk for developing sepsis at some point throughout their life. Without prompt treatment, sepsis can rapidly lead to tissue damage, organ failure, and possibly death. It is imperative that nursing staff can identify sepsis early and provide lifesaving treatment measures to prevent or stop infection progression. The purpose of this thesis study was to increase the ED nursing staff's awareness of early identification of sepsis by improving their knowledge base. Along with improving nurses' knowledge, the purpose aims to increase their confidence level in utilizing the ANI's already in place for patients meeting SIRS criteria, based off the triage sepsis screening tool. By utilizing the knowledge-to-action conceptual framework, the thesis study will look to implement educational

sessions directed at ED nursing personnel to increase their confidence in early sepsis, severe sepsis and septic shock identification, and the use of the ANI.

CHAPTER II

Literature Review

The purpose of the Improving Nurses' Confidence in Early Identification of Sepsis study was to explore if the implementation of educational sessions for ED nurses increases their self-confidence in identifying sepsis early. Sepsis occurs in the body when an infection you already have, in your lungs, skin, urinary tract or somewhere else, triggers a chain reaction throughout the rest of your body (CDC, 2018). It has been identified that the ED nurses lacks early recognition of sepsis in patients and the immediate follow through, once identified. It was imperative that the frontline of nurses in the ED are well prepared for how to recognize the signs and symptoms of sepsis, followed by the health care provider initiating proper interventions post recognition for safety of patients.

The sources used to conduct this literature review include Elsevier, Science Direct, Cumulative Index for Nursing and Allied Health Literature [CINAHL], Pub Med, Ebsco Host, Clinical Key, Wiley Online Library, and Directory of Open Access Journals. The researcher examined the literature within the past five years using the University's online library. The phrase used to conduct this review included sepsis nursing education.

Assessment and Management of the Sepsis Patient

The first aspect of ED patient care involves arrival. Half of all ED patients with severe sepsis are transported by emergency medical services (EMS) (Wang, Weaver, Shapiro, & Yealy, 2010). According to Bohm, Kurland, Bartholdson, and Castrèn (2015), an increased understanding of how sepsis calls are expressed during the emergency medical communication could lead to earlier identification of patients with

sepsis. The results of this study determined that sepsis was described in three key terms that could lead to the identification, however further research was required to incorporate key words into the decision tool utilized by the emergency medical dispatcher to increase sepsis identification.

Also, concerning early assessment and management of the septic patient, Vaughan and Parry (2016a), part one of their research, discussed how since sepsis has increased in popularity over the past few years and it is now a strong focus of clinical education and training. The two-part series explores the assessment and management of a septic patient, with part one highlighting the need to early identify sepsis signs and symptoms for positive patient outcomes (Vaughan & Parry, 2016a). Part two, explores the sepsis care bundles, and the underlying research behind each of the interventions (Vaughan & Parry, 2016b). Part one covers the ABCDE approach to patient assessments in relation to sepsis, with part two covering prioritizing care and early effective patient interventions (Vaughan & Parry, 2016b).

The American Journal of Critical-Care Nurses published an article in 2013 regarding the updated Surviving Sepsis Campaign guidelines. The goal of the article was to update nurses on the guidelines and emphasize the implications for nursing care of adult patients with sepsis (Kleinpell, Aitken, & Schorr, 2013). The article reviewed important relevant recommendations from the sepsis guidelines and was recommended to be read in conjunction with the updated Surviving Sepsis Campaign Guidelines (Kleinpell et al., 2013).

Barriers to Sepsis Care

The cost of health care, access, and population health outcomes have been a top priority for policy makers and regulators for years (Danna, 2018). Healthcare spending is a large component of the US gross domestic product with hospital care expenses being the largest component. Sepsis has caught the attention of the healthcare industry and become a major focus for hospitals. Danna (2018) compared hospital costs for patients with sepsis and with other medical conditions, and found that sepsis is among the costliest conditions that affects the US healthcare system each year.

According to an article by Bateson and Patton (2015), the definition of sepsis continues to evolve and be debated. The guidelines surrounding SIRS do not provide a clear-cut definition, lacking the sensitivity and specificity required to correctly identify sepsis (Bateson & Patton, 2015). Challenges noted include reliable implementation of care bundles which are reported in rates of compliance at organizations. Other challenges noted include focusing on mortality as an endpoint, however not considering the long-term effects sepsis may cause a patient, and readmission rates following a sepsis diagnosis (Bateson & Patton, 2015). Long-term considerations for sepsis care, which persist long past the original hospital admission, are recommended (Bateson & Patton, 2015).

Challenges regarding successful implementation and compliance with clinical practice guidelines (CPGs) remain for the management of patients in the ED with sepsis (Reich et al., 2018). Following clinical practice guidelines has been shown to decrease in-hospital mortality and improve patient outcomes. One study suggested utilizing the "Knowledge-to-Action" framework to facilitate change regarding implementation of

CPGs (Reich et al., 2018). The study confirmed that more research was necessary to identify what the common barriers were for implementation of sepsis CPGs and which tactics were the most effective to address these issues (Reich et al., 2018).

Jones (2017) noticed a barrier to sepsis care within the community, with the failure to identify or suspect sepsis. Depending on the frequency of visits that home health patients may receive, the nurse may not be able to identify an infection prior to it escalating to sepsis. Patients are largely responsible for their own health; however they are not asking for help early enough in the progression of sepsis (Jones, 2017). The study found that the use of scoring and screening tools in the community health setting would be helpful and could allow nurses to consider sepsis in their assessments, however they are not currently in place (Jones, 2017).

Early Identification of Sepsis

Glasper (2016) detailed in a research article the background information and guidelines which were put forth after review of literature by the National Institute for Health and Care Excellent (NICE) detailing lack of early recognition of sepsis. NICE has published its own guidelines for healthcare workers to better detect and manage sepsis in vulnerable patient populations (Glasper, 2016). The NICE guidelines give specific management guides based off the different age groups of patients who meet high risk criteria or have suspected sepsis. The article suggests that frontline nursing staff, such as triage or early management of patients, be given regular clinical updates on the assessment and management of sepsis (Glasper, 2016). This includes local protocols, education pathways, and guidelines.

Sepsis is a medical emergency, where early recognition and treatment initiation is imperative to patient outcomes and survival (Walters, 2018). Screening patients for sepsis at the point of first contact, or triage for ED nurses, is crucial for early identification, which occurs during every patient encounter. Early screening and recognition led to expedited initiation of standard orders and protocols which included laboratory work, fluid resuscitation, and antibiotic therapy (Walters, 2018). This research article suggested that triage nurses examine the screening tools and treatment bundles at their facility to ensure proper use, efficiency and accuracy, as outlined by the Surviving Sepsis Campaign. Many lives can be saved through the work of triage and ED nurses, with screening, early intervention, and treatment (Walters, 2018).

The role of nursing staff in improving the quality of sepsis care is substantial, as they spend the majority of their time with the patient (Kleinpell, 2017). According to a research article it was found that nurse-based early recognition and response programs integrated into the electronic health record were associated with reductions of inpatient sepsis-associated death rates (Kleinpell, 2017). By nurses targeting early recognition of sepsis with the use of multilayered performance improvement initiatives, there has been an improvement in compliance with sepsis performance measures, with associated reduction in hospital mortality. The article suggested the focus on ward-based nurse screenings for sepsis has demonstrated a benefit in early identification of sepsis (Kleinpell, 2017).

One study performed on a medical-surgical unit, implemented a sepsis screening tool, which led to earlier identification of sepsis and quicker initiation of treatment (O'Shaughnessy, Grzelak, Dontsova, & Braun-Alfano, 2017). The study utilized the

seven-phase Knowledge-to-Action cycle framework, across two hospital settings with objectives to decrease time from sepsis presentation to provider notification and compare paper-based screening tools to electronic medical record based screening tools. It was found that although implementation of standardized screening tools can help nurses identify sepsis, that step alone is not sufficient in improving sepsis outcomes. It was noted that improvements can be made in identification and provider notification when the staff have the adequate tools and support. However, overall the routine sepsis screening and nursing education related to sepsis did lead to an improvement in early identification of sepsis (O'Shaughnessy et al., 2017).

Methods of Implementation

Sepsis occurs rapidly, however can have improved outcomes when it is diagnosed early and treated quickly. One study implemented interprofessional education and collaboration, resulted in a statistically significant improvement for lactate completion after three phases of studied (Palleschi, Sirianni, O'Connor, Dunn, & Hasenau, 2014). The frequency of blood cultures being obtained before antibiotic administration neared statistical significance and there was an improvement in time to antibiotic administration between phase two and phase three (Palleschi et al., 2014). The study concluded that changing clinical practice to improve compliance and timeliness of interventions by providing organizational structure using the sepsis alert and education to arm staff with the tools and knowledge to act in a timely and appropriate manner (Palleschi et al., 2014).

Emergency nurses are the frontline staff who play a crucial role in the initial triage and care of patients with life-threatening illnesses. A study was performed to evaluate the impact of nurse-initiated ED sepsis protocol on time to initial antibiotic

administration, to ascertain compliance with three-hour Surviving Sepsis Campaign targets, and to identify predictors of in-hospital sepsis mortality (Bruce, Maiden, Fedullo, & Kim, 2015). The study involved a retrospective chart review that investigated all adult patients that were admitted through either of two academic tertiary medical center ED, and who were discharged with a diagnosis of severe sepsis or septic shock. The researchers examined pre-and-post protocol implementation data that reviewed both compliance with three-hour bundle targets and patient outcomes (Bruce et al., 2015). The study improved the serum lactate measurement and median time to initial antibiotic administration after protocol implementation, however one quarter of antibiotic times still exceeded the three-hour target. It was noted that compliance with medical interventions requiring multiple health care provider involvement were substandard (Bruce et al., 2015).

The researchers studied data from the University of Alabama at Birmingham and developed an automated sepsis detection system to trigger a "sepsis alert" if the EMR identified two or more SIRS criteria and at least one sign of shock (Nguyen et al., 2014). Researchers tested the EMR-based system at a major academic ED, along with reviewing random selections of ED cases that did not trigger the sepsis alerts, to evaluate the diagnostic accuracy of the sepsis identification tool. The study found that the ED EMR-based automated sepsis identification system was able to accurately detect cases with sepsis, providing a worthwhile strategy for identifying sepsis in the ED (Nguyen et al., 2014).

Romero, Fry, and Roche (2017) completed a study to explore the number of patients with sepsis before and after guideline implementation in an ED, along with the

impact of sepsis guidelines on triage assessment, ED management, and time to antibiotics. The study pulled a one-year pre-post randomized audit of medical records of adult patients with a sepsis diagnosis. The researchers implemented sepsis guidelines, which ultimately demonstrated a significant 230-minute reduction in time to antibiotics (Romero et al., 2017). Also shown was an improvement in collection of lactate levels, intravenous fluid delivery time, and more urgent triage categories. The study findings highlight the impact that implementing guidelines on clinical decision making and behavior in the ED with improving sepsis care.

A research group within a tertiary care ED conducted a collaborative, interprofessional approach to create a screening and management algorithm to early identify ED patients with sepsis (Tedesco, Whiteman, Heuston, Swanson-Biearman, & Stephens, 2017). Education was provided to staff about the symptoms and treatment of patients with sepsis, along with implementing the screening and management algorithm tool, and how to intervene. The study resulted in 240 patients being screened, assessed, and treated during the first four months of implementation. The outcome of the project resulted in increased knowledge of the staff, a decrease in length of stay by three hours, and a significant decrease in mortality when compared to the previous year's data (Tedesco et al., 2017). The study demonstrates interprofessional, collaborative approaches could be implemented at other organizations to aid in improvement of sepsis outcomes.

Davis and Hayes (2018) put together a research article regarding simulation to aid in management of the septic patient in the intensive care unit. The article outlined how nurses were directly involved with patient care and must have the knowledge of

evidence-based guidelines for the septic patient (Davis & Hayes, 2018). High-fidelity human patient simulation (HF-HPSim) aids in increasing the quality and quantity student learning experiences, all while providing an experiential and safe learning environment. By utilizing HF-HPSim, nurses can practice patient care in a safe environment. The article suggests implementing HF-HPSim will improve confidence, critical thinking, and build on knowledge currently surrounding care of the septic patient (Davis & Hayes, 2018).

Davis et al. (2016) collaboratively developed and implemented an interactive online learning package to improve sepsis outcomes. The education utilized case studies to address the knowledge required in recognizing sepsis, understanding the process that occurs, and the ongoing care and treatment required. The package was designed for senior nursing students, newly registered nurses in preceptorship, and other health professionals involved in assessing and treating patients who may be developing sepsis. The researchers deduced that the development of the online learning package aided in providing foundational knowledge required to understand how sepsis affects patients (Davis et al., 2016). One benefit found during this study was that the accessibility of the learning module was straightforward and users could access the material repeatedly, along with the module being adapted as the guidelines adjust (Davis et al., 2016).

Drahnak, Hravnak, Ren, Haines, and Tuite (2016) conducted a research study regarding scripting nurse communication to improve sepsis care. The study found that nurses were not completing the sepsis screen consistently of once per day, along with inconsistent adherence to the three and six-hour sepsis bundles. A survey was administered regarding the perception and attitudes before and after participating in the

educational process, the results were favorable (Drahnak et al., 2016). After the education sessions were completed, the nurses rated themselves as significantly more knowledgeable about sepsis and an increased comfort of their ability to recognize sepsis and report it to a provider. An audit was conducted post education to ensure continuing of completing of the sepsis screening tool, which showed a decrease in the percentage of patients whom sepsis screening never occurred (Drahnak et al., 2016). The study suggests that ongoing education, support, and quality improvement processes will provide optimal patient outcomes in the sepsis population.

Summary

It is imperative that ED nursing staff be trained in early recognition of sepsis, and the immediate interventions thereafter to improve patient outcomes. According to the literature, there were many methods to implement sepsis quality improvement projects, however all methods concentrate on ensuring the guidelines were followed. The process that works best depends on the department, staff, and leadership follow through, to ensure the best outcomes for septic patients. Providing staff with easy access to learning tools has proven to be effective and efficient for staff.

CHAPTER III

Methodology

Introduction

Sepsis is the body's extreme response to an infection. It is a life-threatening medical emergency requiring early identification and treatment (CDC, 2018). Annually, sepsis affects over one million Americans, which results in significant morbidity, mortality, and costs for hospitalized patients (Barbash et al., 2017). In order to deliver prompt treatment in the hospital, nursing staff must be able to quickly identify and alert medical providers to prevent the escalation of sepsis. Nurses' inability to recognize sepsis, along with failing to initiate the most up-to-date, evidence-based treatment, has been a direct link to increased mortality rates among patients. The problem, identified in the ED, was a lack of early recognition of sepsis in patients and the immediate follow through. This was contributed to a need for an education on early recognition and a committed process to ensure providers were alerted quickly and inputting the appropriate sepsis order sets in the EMR. Leading to the question, will the implementation of educational sessions in the ED increase the confidence level of the registered nurse to identify the patients meeting sepsis criteria and initiation of the ANI orders? By utilizing the incident reporting system, it was identified that at the small community hospital in 2018, 145 patients entered the ED with a diagnosis of severe sepsis or septic shock. Of those 145 patients, 36 of them did not survive the hospitalization due to severe sepsis or septic shock. Approximately 25% of patients who presented to the ED in 2018, who were diagnosed with severe sepsis or septic shock, did not live through their admission. This data does not include patients who were transferred out of the facility.

Study Design

A quantitative study, with a descriptive design was conducted with the registered nurses in the ED. The tool utilized was a confidence scale pre and post survey, given to all nurses attending the education session.

Setting

The education took place in the ED setting of a 247-bed non-profit, community hospital. The hospital is located at the crossroads of two major interstates within two miles of the campus. Locally owned and managed, the hospital profits remain in the community to maintain and upgrade technology. There are 18 acute-care beds within the ED, with a three bay, private triage area. There were 51 registered nurses employed in the ED, consisting of full-time, part-time, and pro re nata (prn) employees.

Sample/Participants

For the pre- and post- survey of the confidence scale tool, the sample consisted of 17 registered nurses in a convenience sample. All registered nurses employed within the ED were able to participate in the sample, except for newly graduated nurses within the past six months. Staffing and personal obligations may affect the number of nurses able to attend the sessions.

Intervention and Materials

The researcher was responsible for creating a sepsis educational session for the registered nurses to attend. There was one-hour sessions held over a two week span, on four different days, meeting the needs of all shifts in the ED. The researcher requested that the nurse director of the ED support the education and label the education as

mandatory. However, there still may be staff that would not be able to attend due to scheduling and personal obligations.

The session started out with an approximately 15-minute Power Point presentation with evidence-based information regarding identification of sepsis, severe sepsis, and septic shock, followed by guidelines from Surviving Sepsis, the CDC, and CMS. The information was then transitioned into; once you have identified a septic patient, how do you proceed? The information covered provider follow up after identification, along with initiation of the nurse driven protocols at triage in the triage area, or after accepting the patient from transport via EMS. The information briefly covered the three- and six-hour bundle in alignment with the Surviving Sepsis Campaign. The Power Point covered electronic medical record documentation, including the sepsis screening tool from the triage power form and usage of the hand off tool (HOT) that the researcher created previously for the ED nurses to utilize when a sepsis patient was identified. Once the Power Point portion was completed, the staff participated in a scenario-based exercise. There were three scenarios covered during this exercise. The staff broke into groups depending on the number attending each session, was given a worksheet, and worked through the scenario included. Scenarios chosen were sepsis, severe sepsis, septic shock, or a borderline sepsis. Once the groups worked through the scenario, they came back as a group and discussed their care and rationale. This took approximately 30 minutes for them to complete the exercise and the follow up discussion.

Measurement Methods

The purpose of the educational sessions in the ED was to improve the nurse's confidence in identifying and caring for the septic patient. Therefore, a confidence scale

tool was utilized in a pre- and post- survey design. The confidence scale (c-scale) that was utilized was created by Susan Grundy, Ed. D, RN, originally in 1992 for a research study on confidence of first semester baccalaureate nursing program students. The study measured confidence of completing a physical assessment on client throughout the nursing program. Grundy (1993) believes that confidence is considered an important aspect of delivering nursing care to others. To assess the nurse's confidence in physical assessment, Dr. Grundy provides the c-scale survey, to test the tools reliability and validity. Due to the level of importance within the nursing profession, physical assessment skills were chosen. The scores on the c-scale were correlated with a 100-mm confidence visual analogue scale (C-VAS) and a confidence verbal descriptor scale (C-VDS) for Dr. Grundy's study. The c-scale was one page in length which contained five statements that could be answered on a Likert-type scale, before and after attending the education session. The statements on the tool were as followed: I am certain that my performance is correct, I feel that I perform the task without hesitation, my performance would convince an observer that I'm competent at this task, I feel sure of myself as I perform the task, and I feel satisfied with my performance. Based off the instructions, the response to each statement was made by circling a number on the one-to-five scale indicating a higher score on the item pertaining to confidence (Grundy, 1993). By adding each of the circled numbers together resulted in a total score for the level of confidence, which could range from 5 (low confidence) to 25 (high confidence) (Grundy, 1993). Dr. Grundy (1993) stated "the c-scale consistently demonstrated high internal consistency reliability throughout all periods of administration to both students and nurse" (pg. 8). Staff nurses with at least one-year experience working in a medical-surgical unit at a

local hospital completed the instrument, to establish the construct validity of the c-scale (Grundy, 1993).

Data Collection Procedures

The ED registered nurses varied in experience from newly hired new graduates to seasoned nurses of 20 plus years' experience. The primary investigator of the study collected data throughout. The only data that was collected throughout the study includes the c-scale. The five components of the c-scale that were evaluated include: performance certainty, hesitation, competence, sureness, and satisfaction. The ED nurses were exposed to a one-hour educational session with scenarios, all receiving the same content. The participants completed the c-scale tool upon entering the classroom prior to receiving content and then once the session was completed. The data was be collected during the implementation period. Data was collected by the researcher only and stored in a Microsoft Excel electronic folder that required two levels of password protection.

Protection of Human Subjects

Measures were taken to ensure the participants remained anonymous during data collection and the data analysis process. The researcher has completed the CITI training covering Health Information Privacy and Security (HIPS) courses and the Social and Behavioral Research courses. The study posed minimal risk to the subjects and the primary investigator was prepared to address any adverse events which could have occurred. Different colored paper was utilized for the pre- and post- c-scale administered. The primary investigator stepped out of the room while the participants completed the survey, leaving a box in the room to turn in the c-scale. The participants were not identifiable. After all data was collected, the completed data analysis was stored

by the University for three years and then destroyed. The completed surveys were kept in a locked filing cabinet in the researcher's office. The researcher was the only person who had a key. Approval from both the University and hospital level IRB was obtained prior to completing any research or implementation. The study did not provide benefit to the participants, other than a possible increase in knowledge and confidence. There were no penalties for those staff members who chose not to participate in the survey and no incentive for those who did participate. During the post scale survey, participants were provided with a time to reflect on their learnings and their confidence level going forward.

Data Analysis

The primary investigator was the collector of data and responsible for inputting and analyzing it, utilizing Microsoft Excel software. Descriptive statistics were utilized in data analysis including the averages, standard deviation, and medians. The statistical test utilized was a two-sample t-test comparing the averages of each. It was assumed that the study results would show an overall increase in self-confidence of the nursing staff in identifying septic patients utilizing further education and scenarios.

CHAPTER IV

Results

In the US, more than one million patients are affected each year by sepsis. It is recognized as a leading cause of death around the world (Schorr, 2018). Sepsis occurs in the body when an infection you already have, in your lungs, skin, urinary tract, or somewhere else, triggers a chain reaction throughout the rest of your body (CDC, 2018). Research has shown that improving frontline nursing knowledge of early recognition and initiation of treatment in septic patients improves their outcomes. The purpose of the Improving Nurses' Confidence in Early Identification of Sepsis study was to explore if the implementation of educational sessions for ED nurses increases their self-confidence in identifying sepsis early.

Sample Characteristics

At the completion of the study, the final sample size utilized consisted of 17 ED registered nurses. Every person in attendance responded to the survey, and all participants answered all five questions on the Likert scale of the pre-and post-survey. There were no withdrawals from the study or losses to report.

Major Findings

The question posed for this thesis study was, will the educational sessions for the ED nursing staff increase the confidence level of the registered nurse in identifying the patients meeting sepsis criteria and initiation of ANI? The findings were based on the total scores received from the five-point Likert confidence scale that was given to participants before the education session and at completion. The data was then compared and analyzed using Microsoft Excel software. To begin evaluating the data, the mean

scores of both the pre- and post- surveys were evaluated. Prior to the education session, the participants were given the five-point Likert confidence scale. The average for the pre-survey was 18.76. Once the education session was concluded, the participants completed the same survey. The average for the post-survey was 22.41.

The standard deviation of the pre-survey confidence scale was 3.31. Meaning, each individual score on the pre-survey confidence scale was around 3.31 from the overall average of 18.76. The standard deviation of the post-survey confidence scale was 2.92. This means that the individual score on the post-survey confidence scale was around 2.91 from the overall average of 22.41. The post-survey had a smaller range of standard deviation from the average, which showed the data was not as spread out as the pre-scale survey. There were less variance in the data for the post-survey results.

The pre-survey results generated a median of 20, with the post-survey results generating a median of 23. The median was considered the data point that divides the data in half, if all numbers were ranked from highest to lowest. In this case, the post-survey results showed a median or "middle" number of three points higher, post education session. This again, led the researcher to conclude that the education sessions were successful in increasing the ED nurses' confidence in identifying sepsis. (Table 1)

Table 1

Pre- and Post- Survey Scores

	Pre Survey Scores	Post Survey Scores
Average	18.76470588	22.41176471
Standard Deviation	3.307744922	2.916736694
Mode	20	25
Median	20	23

Looking at the ED Department nurses were more confident post education. A paired t-test was used to establish whether the mean of a dependent variable was the same in two related groups. The results of 12.24 shows that there was a significant difference between the pre and post-survey confidence scale results. (Figure 2, 3, and 4)
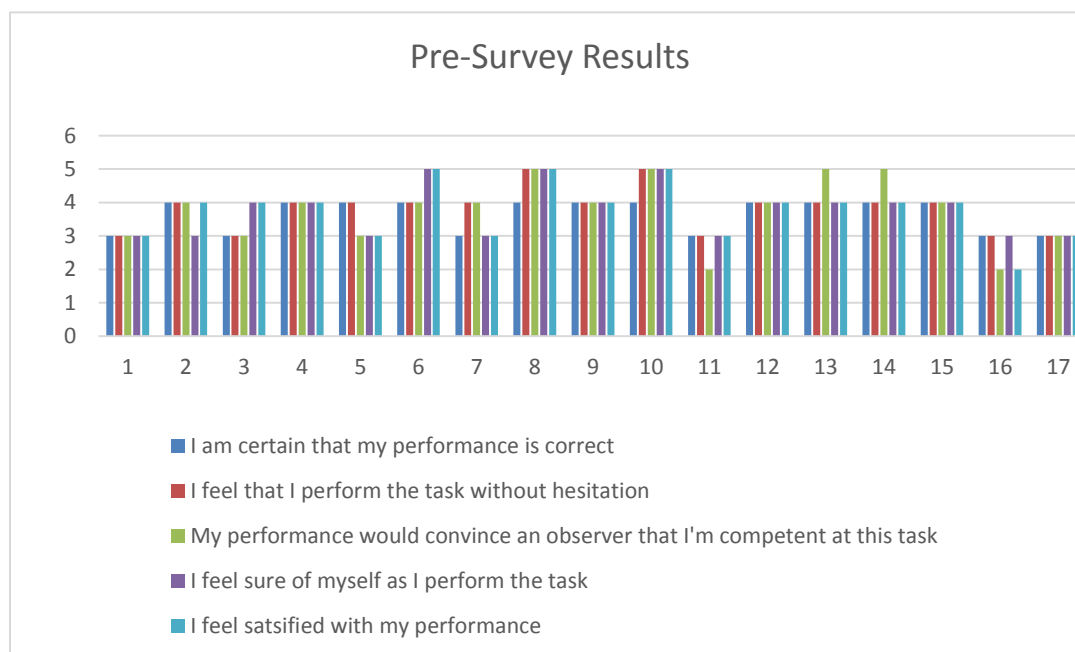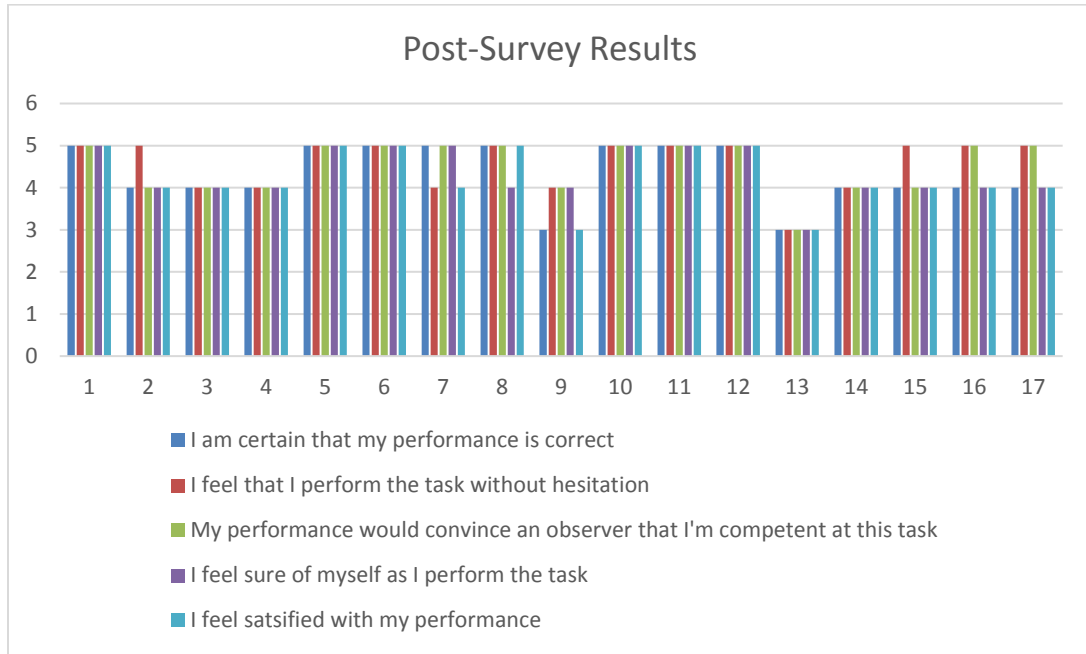

Figure 2. Pre-Survey Results
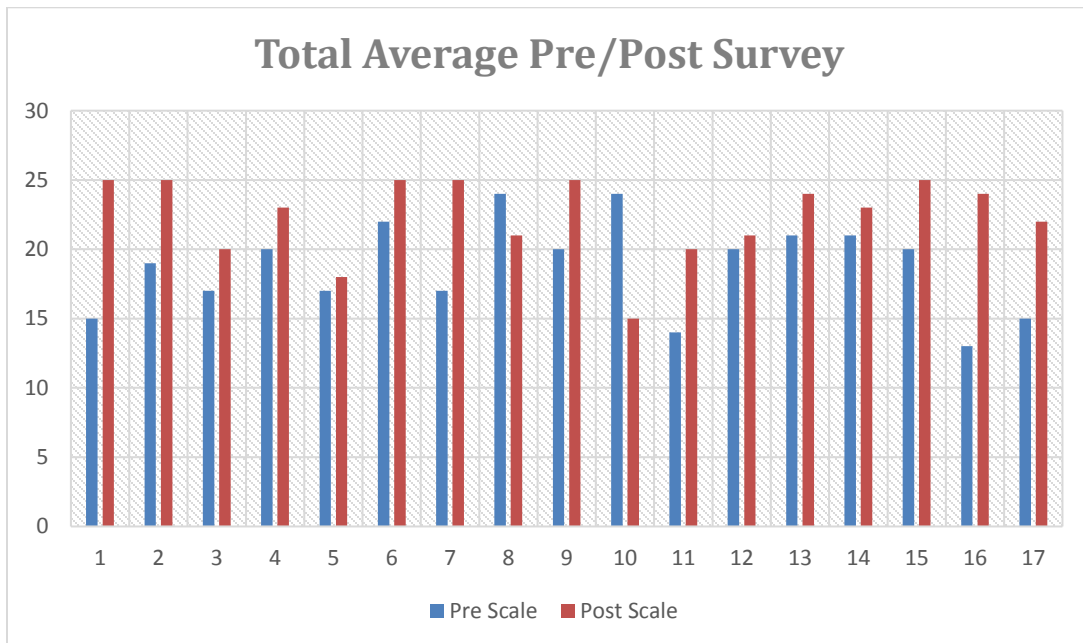
Figure 3. Post-Survey Results

Figure 4. Total Average Pre- and Post-Survey

Each of the five questions answered on the five-point confidence scale showed an overall average increase after the education session. The directions on the scale state to circle the number which best describes how you perceive your current ability to identify sepsis early in an adult in the hospital. Question one, I am certain that my performance is correct, resulted in a pre-education average of 3.65 and a post-education average of 4.35 (Figure 5). Question two, I feel that I perform the task without hesitation, resulted in a pre-education average of 3.82 and a post-education average of 4.59 (Figure 6). Question three, my performance would convince an observer that I'm competent at this task, resulted in a pre-education average of 3.76 and a post-education average of 4.53. (Figure 7). Question four, I feel sure of myself as I perform the task, resulted in a pre-education average of 3.76 and a post-education average of 4.35 (Figure 8). Question number five, I feel satisfied with my performance, resulted in a pre-education average of 3.76 and a post-education average of 4.29 (Figure 9).
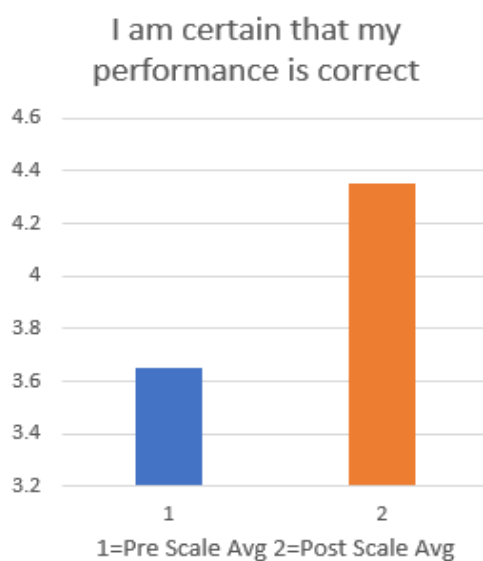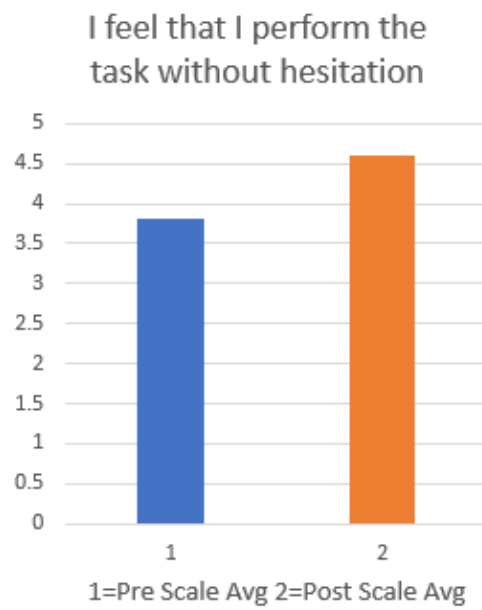

Figure 5. Question One Average
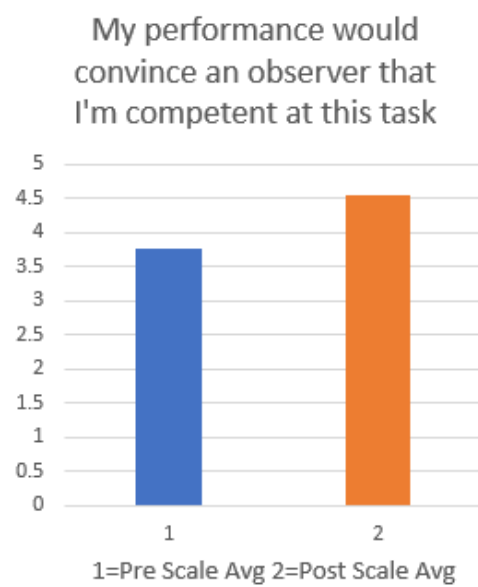
Figure 6. Question Two Average

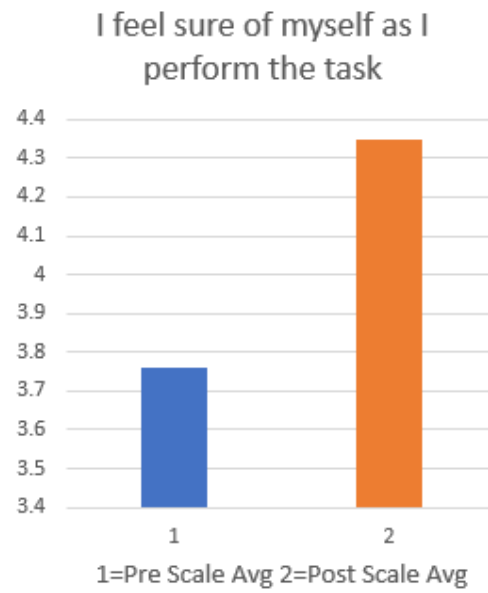*Figure 7*. Question Three Average

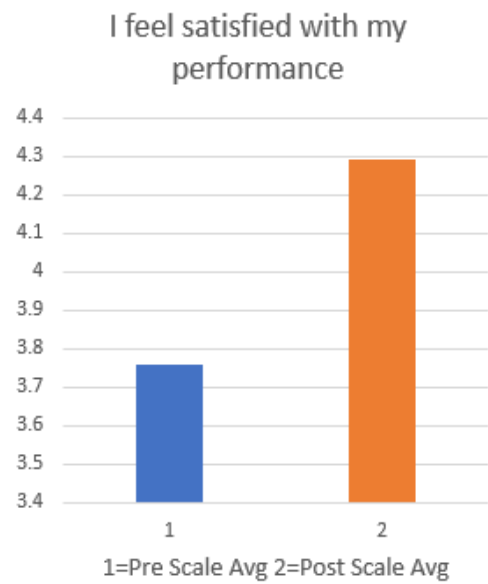*Figure 8.* Question Four Average

Figure 9. Question Five Average

Summary

Improving frontline ED registered nurses' knowledge on early recognition of sepsis and intervention has been proven to improve patient outcomes and decrease patient mortality. By providing the ED nurses with the knowledge and resources needed to recognize and begin to treat sepsis, they will directly affect patient outcomes. The research performed in this study has shown ED nurses were more confident in their knowledge and ability to recognize sepsis early and begin treatment right away. By providing the ED registered nurses with the knowledge, it will translate to the bedside and improve the nurses' direct patient care.

CHAPTER V

Discussion

The purpose of the thesis study was to educate the ED registered nursing staff on early identification of sepsis, by improving their knowledge base. ED nurses should be able to recognize sepsis early and promptly, based on key symptoms, along with alerting the provider for early interventions. Patients are reliant on frontline nursing staff being able to identify SIRS criteria along with acting in a timely and appropriate manner. Without prompt treatment, sepsis can rapidly lead to tissue damage, organ failure, and possibly death. Yearly, there are more than 1.7 million people in the US that are diagnosed with sepsis, meaning approximately one every 20 seconds (Sepsis Alliance, 2019).

Implication of Findings

There were five, one-hour, educational sessions held specific for the ED registered nurses over the course of two weeks. Of 50 registered nurses currently employed in the department, 17 attended the sessions. A five-point Likert confidence scale was administered pre-education session, along with the same five-point confidence scale administered after the session was completed. Each participant completed both scales in their entirety, and no participants withdrew from the research. According to the results of the pre-scale and post-scale, it was concluded that the educational sessions did increase the ED nurse's confidence in identifying sepsis and initiating prompt treatment. This would lead the researcher to conclude that the course did moderately increase the ED registered nurses' overall confidence level in identifying the patients that meet sepsis criteria and early interventions. The average score on the post-Likert scale was 22.41,

which was moderately higher than the pre-Likert scale average of 18.76. Each individual question on the five-point Likert scale showed an overall increase in confidence, post-education session.

The research presented in chapter two shows the gap with knowledge of not only healthcare providers, but also the community to recognize sepsis early. The lack of clear guidelines to follow within the healthcare setting were identified more than once within the research. Early screening and treatment were identified as life saving measures for patients fitting sepsis criteria in all articles. While training nurses on early screening, identification, and treatment are imperative in improving outcomes, it is also necessary to educate the general population. By teaching the community about sepsis and what it could look like, patients can get to the hospital quicker for prompt intervention. The findings in this thesis study correlated with the information found in the literature.

Application to Theoretical/Conceptual Framework

The "Knowledge-to-Action" framework was utilized to guide the thesis study. This conceptual framework was developed to explain the process of translating knowledge creation into knowledge application. There are three phases emphasized in understanding how the framework functions including knowledge inquiry, knowledge synthesis, and knowledge tools. Knowledge inquiry represents the unmanageable array of primary studies or information of variable quality that was available and that may or may not be easily accessed (Graham et al., 2006). The next phase, knowledge synthesis, represents the aggregation of existing knowledge. This process includes applying explicit and reproducible methods to the identification, appraisal, and synthesis of studies or information relevant to specific questions (Graham et al., 2006). The third phase

considered the third-generation knowledge, consists of knowledge tools or products. The purpose of the tools was to present knowledge in a clear, succinct, and user-friendly format, and ideally to provide clear recommendations with the intent of influencing what stakeholders do and meet their knowledge needs. Throughout each phase of knowledge creation, the knowledge producer can tailor their activities to the needs of the potential end users. The best-quality research and knowledge are then further formed into a decision-making tool through action phases (Graham et al., 2006).

The KTA conceptual framework was appropriate for this thesis study in many ways. The researcher started with phase one, knowledge inquiry, and delved deep into the literature at hand regarding early sepsis identification. During the initial phase, other resources were utilized to produce a background of knowledge including the quality specialist leaders within the hospital and colleagues. For phase two of the research process, knowledge synthesis, the researcher put together all knowledge obtained in phase one to create an educational session for the ED nursing staff. During phase three, knowledge tools, the researcher utilized the literature review, discussions, and previous knowledge and experience, to present a one-hour presentation with case studies and group work. The education session provided clear and succinct guidelines for the staff to take with them outside of the classroom setting.

Limitations

Limitations were noted during the thesis study implementation period. The most obvious limitation was in relation to the number of participants in the thesis study. The education was not deemed mandatory at the time of this study. Other limitations included the season when staff members could be taking vacations. Also, the end of the

education year had just finished, with staff completing their mandatory yearly requirements. Other limitations noted with the thesis study included the education was limited to one unit, at one hospital versus expanding throughout multiple units within the hospital, or including other hospitals in the area. The ED nurses were familiar with the researcher, which may have resulted in giving a better score to affect the results of the thesis study.

Implications for Nursing

The education sessions proved to be of benefit to the ED registered nursing staff who attended. The overall average of confidence in identifying sepsis patients increased from pre-education to post-education session. This is significant for the nursing profession when looking at ways to educate the nursing staff on process, guidelines, or skills. By offering face-to-face education, with creative methods including working through case scenarios, the staff can translate the knowledge attained to action in their field. By improving the frontline nursing staff's confidence in identification of sepsis, and early initiation of treatment, their confidence should directly impact improved outcomes for septic patients.

Recommendations

One recommendation for other researchers looking to further the thesis study of early sepsis identification would be to seek backing from the stakeholders within the department up front. By having support from the stakeholders, a larger impact could be made on patient outcomes, with increased nursing confidence in identifying those patients. Another recommendation would be timing of the study and not holding the sessions during high times of vacation or holidays. It was also recommended to utilize

the quality department, to aid in pulling data for the organization, and ensuring the correct guidelines were being presented. Another recommendation was to ensure staff were staying engaged throughout the education session, by promoting healthy conversation and implementing teaching methods outside of reading of a Power Point, such as on-line scenarios or simulation scenarios as educational tools. Implementing similar education sessions tailored to other specific units would also provide beneficial for patients in early sepsis identification.

Conclusion

To conclude, it was imperative that frontline nursing staff in the ED be trained to recognize and initiate treatment in patients presenting meeting sepsis criteria. The nurses need to be equipped with the correct knowledge, tools, and action plan to intervene swiftly to improve the patient's outcome. By providing the staff with education, including case scenarios and interactive experiences, they can improve their overall confidence in identifying and caring for sepsis patients. The researcher identified with a pre-and-post five-point Likert scale that providing education to the nursing staff will moderately increase their confidence in directly identifying, caring for, and initiation of prompt treatment for septic patients.

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