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Tools To Increase Compliance and Decrease Mortality Due To Sepsis

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TOOLS TO INCREASE COMPLIANCE AND DECREASE

MORTALITY DUE TO SEPSIS

by

Cody F. Carr

A Doctoral Project
Submitted to the Graduate School,
the College of Nursing and Health Professions
and the School of Leadership and Advanced Nursing Practice
at The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Nursing Practice

Approved by:

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ABSTRACT

Severe sepsis is a leading cause of death in the United States and is the most common cause of death among critically ill patients in non-coronary intensive care units (Mayr, Yende, & Angus, 2014). The incidence of severe sepsis is estimated to be 300 cases per 100,000 population and cost an estimated $14 billion in the United States (Mayr et al., 2014). This Doctor of Nursing Practice (DNP) project focused on identifying an early-assessment tool to identify sepsis and increase compliance when using the tool. Identifying sepsis early is important in starting a treatment plan to prevent morbidity and mortality.

For this project, a SWOT analysis was developed for the Modified Early Warning Score (MEWS) and the Quick Sequential Organ Failure System (QSOFA). This SWOT analysis and the research that was found was presented to staff in the Post-Anesthesia Care Unit (PACU) and Operating Room (OR). A pamphlet and in-service providing a description of QSOFA and MEWS were given to the nurses and also anesthesia providers. This in-service was presented during the monthly meeting that the staff conducts. A five-question survey was given after the in-service to the participants. This survey asked about the opinions and concerns of each tool. The participants had one week to complete the survey. The completed surveys were placed in a box located in the PACU and collected after one week. The data was then compiled and analyzed.

The sample size included six PACU nurses and six Certified Registered Nurse Anesthetists (CRNA). An overwhelming response was found in favor of the MEWS tool. The vast majority of staff stated that MEWS was more user-friendly, would increase

compliance due to sepsis, and would be most likely to decrease morbidity and mortality

due to sepsis when compared with the other tool.

ACKNOWLEDGMENTS

DEDICATION

I would like to thank God for blessing me with the ability to accomplish this

achievement. I also want to dedicate this project to my wife, Hannah Carr. There is no

way I could have done this without her love and support in times of stress.

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LIST OF ABBREVIATIONS

CRNA	Certified Registered Nurse Anesthetist
DNP	Doctor of Nursing Practice
ED	Emergency Department
HAI	Hospital Acquired Infection
ICU	Intensive Care Unit
MEWS	Modified Early Warning Score
OR	Operating Room
PACU	Post-Anesthesia Care Unit
PPPG	Policies, Procedures, Protocols, Guidelines
QSOFA	Quick Sequential Organ Failure System
SIRS	Systemic Inflammatory Response Syndrome
USM	The University of Southern Mississippi

CHAPTER I - INTRODUCTION

Problem Statement

Severe sepsis is a leading cause of death in the United States and is the most common cause of death among critically ill patients in non-coronary intensive care units (Mayr et al., 2014). Sepsis is known as a life-threatening organ dysfunction caused by a dysregulated host response to infection. This illness can occur anywhere in a hospital, from the Emergency Department (ED), Intensive Care Unit (ICU), basic nursing floor, or even the operating room (OR). The incidence of severe sepsis is estimated to be 300 cases per 100,000 population and cost an estimated $14 billion in the United States (Mayr et al., 2014). One of the most important causes of this high incidence is the fact that there is no one definitive way to diagnose sepsis. The only method is to utilize expert opinion and objective signs. Every second, people in the hospital all across the world are showing signs and symptoms of sepsis, but it is not being reported quickly enough to prevent a worsening condition or mortality. The majority of the time, the first signs of sepsis are visible in the ED. When signs first start to appear is where a plan to treat the patient for sepsis needs to be started. Most hospitals have an assessment tool to diagnose sepsis early, but it is either outdated or not applicable to the new research. The use of the correct tool is important. The goal of a hospital in Mississippi is to increase compliance on using an early-assessment tool correctly from the nurses and decrease mortality due to sepsis by determining the best tool for that specific hospital.

Available Knowledge

Process

For this project, the evidence and research was found by using searches for peer-reviewed journal articles. The databases utilized were EBSCO-host, MEDLINE, CINAHL, and Google Scholar. Keywords for each search were: modified early warning score, MEWS, Sepsis, quick sequential organ failure system, qSOFA, early assessment, and tools for identifying sepsis.

Sepsis Defined

In 1991, sepsis was defined using three terms depending on the stage of the process. The first stage was known as systemic inflammatory response syndrome (SIRS). SIRS was diagnosed by a patient having two or more of the following: Temperature greater than 38 degrees Celsius or less than 36 degrees, heart rate greater than 90 beats per minute, respiratory rate greater than 20 per minute, and white blood cell count greater than 12,000 cells per cubic millimeter of blood. The process was then described as severe sepsis when organ dysfunction began. Lastly, septic shock was defined as sepsis-induced hypotension persisting despite adequate fluid resuscitation. The current definition of sepsis that has been adopted states that sepsis is a life-threatening organ dysfunction caused by a dysregulated host response to infection (Singer et al., 2016).

Risk Factors

Risk factors for sepsis have been based on risk factors for infection, since the two go hand in hand. Some of the most important risk factors for sepsis are age, male gender, African-American race, and increased burden of chronic health conditions (Mayr et al., 2014). Extremes of age, both young and old, coupled with chronic health problems, make

them more susceptible to infection. The infection that develops has a probability of becoming sepsis, especially when admitted to the hospital. This scenario explains why hospital-acquired infections can lead to sepsis and increase the rate of mortality. The majority of people coming to the hospital or being admitted have comorbidities, such as diabetes, chronic renal failure, human immunodeficiency virus (HIV), and alcohol abuse, that put them at risk. These comorbidities also mean people coming in for surgery are at risk.

The ED plays a key role in diagnosing patients early who are showing signs of sepsis. The ED is the first line of defense and requires diligent care to identify negative outcomes before they progress. Sepsis is not only diagnosed in the ED with new patients, as hospital-acquired infections (HAI) has been found to be a significant risk factor for sepsis. HAI is defined as an infection that is not present and without evidence of incubation at the time of admission to a healthcare setting (Fishman & Calfee, 2012). Sepsis is unable to be narrowed down to just the ED due to this risk, it must also be assessed throughout the stay of the patients.

The operating room and the post-anesthesia care unit (PACU) are two other areas that sepsis can occur. For example, a patient could come to the hospital for an elective surgery and could develop early signs of sepsis after the surgery is complete. If sepsis is not caught early enough, poor outcomes are more likely to occur for the patient who was otherwise healthy prior to surgery. The patient, who was transferred to an area with little supervision after an elective procedure, should have probably been evaluated for a more intensive care unit for early-onset sepsis. The use of an early-assessment tool for sepsis in

the PACU could potentially identify an at-risk surgical patient early and transfer them to a more acute care setting.

Early-Assessment Tools

Even with continuing studies and growing knowledge on the topic of sepsis, the prevalence of sepsis has continued to be a problem in acute care settings. The incidence of hospital admissions with primary or secondary diagnoses of sepsis doubled from 2000 to 2009 (O'Shaughnessy, 2017). The Surviving Sepsis Campaign created in 2013 by R. P. Dellinger and others created a set of guidelines to help decrease mortality from sepsis. One of the guidelines states that the early identification of sepsis and the implementation of early evidence-based therapies significantly improves outcomes and decreases sepsis-related mortality (Dellinger et al., 2013). These guidelines also state that creating an improvement program for sepsis includes increasing compliance with sepsis quality indicators. The utilization of a valid assessment tool has the potential to increase compliance and afford healthcare providers a resource for sepsis identification (Dellinger et al., 2013).

Before the current definition of sepsis that was mentioned earlier was created, the early diagnosis of sepsis was based on the criteria for SIRS. Two out of the four SIRS criteria had to be met for a sepsis protocol to be implemented. This criteria reflects inflammation but does not indicate a dysregulated, life-threatening response (Singer et al., 2016). The historical definition was far too broad to be specific just for sepsis (Singer et al., 2016). Since new advancements in the knowledge of sepsis, new screening tools for sepsis have followed. Types of screening tools include quick sequential organ failure assessment (qSOFA), modified mortality in emergency department sepsis (MEDS) score,

modified early warning score (MEWS), and the Charlson comorbidity index (CCI).
These are just a few of the screening tools used to diagnose sepsis early and decrease the
mortality from sepsis. The most important aspect of treating sepsis is diagnosing it early,
and the use of an effective screening tool is vital to aid in this massive healthcare problem
(Dellinger et al., 2013).

Financial Impact for Hospitals/Quality of Care

An increasing topic of conversation in hospitals right now is the topic of
reimbursement. In 2012, the Centers for Medicare and Medicaid Services (CMS) added a
section in the Affordable Care Act that increased penalties for hospitals with excess
readmissions (Baltimore & Usa, 2018). This change forced hospitals to start looking at
why patients are being readmitted to the hospital and how much money they are losing
from this. A study done in 2017 using data from the 2013 Nationwide Readmissions
Database looked at unplanned 30-day readmissions due to sepsis, acute myocardial
infarctions (AMI), heart failure, chronic obstructive pulmonary disease (COPD), and
pneumonia. Out of 14,325,172 hospitalizations, 12% were readmitted for sepsis. This
percent was significantly more than any of the other diagnoses. The study also found that
the mean length of stay for unplanned readmissions following sepsis was longer than
readmissions from the other four diagnoses (Mayr et al., 2017). This study is important to
this project as it demonstrates the significance of diagnosing sepsis and treating it before
the patient is discharged. The right early assessment tool will also help keep track of the
patient's status throughout their stay, so the patient is not discharged before all symptoms
of sepsis are resolved.

Rationale

The policy framework that was used to guide this project was a modified version of the National Framework for developing Policies, Procedures, Protocols, and Guidelines (PPPGs) (Steering & Groups, 2016). This framework is essential to improve the quality of health care provided by the Health and Safety Executive (HSE) and to enhance organizational effectiveness. This framework is directly related to this project and the implementation of an early-assessment tool. The framework helps guide this project by facilitating research on the impact the tool directly has on improving quality of care by increasing compliance and early detection of sepsis. There are seven steps when developing PPPGs—initiation, development, governance and approval, communication and dissemination, implementation, monitoring and evaluation, and revision and update (Steering & Groups, 2016). This project specifically deals with step 2 of developing PPPGs, which is development. The specific questions have been developed and the evidence has been clearly defined, which will be explained in the following paragraphs.

In a retrospective study by Chen and others, an assessment tool called Quick Sepsis-related Organ Failure Assessment (qSOFA) was known to significantly decrease mortality and ICU admission (Chen, Wang, & Guo, 2016). The criteria for qSOFA involved a respiratory rate greater than 22 breaths per minute, altered mentation, and a systolic blood pressure of less than 100 mmHg. In another study which included 177 hospitals, qSOFA had a significantly higher validity rate compared to the historical tool known as SIRS (Singer et al., 2016). Singer also found that a score of 2 points or more on the qSOFA tool was associated with an in-hospital mortality rate greater than 10%. The qSOFA tool can be found in Appendix A.

The second tool that will be explained is known as the Modified Early Warning

System tool (MEWS). This tool is currently available in a vast majority of hospitals

within their electronic charting systems but is still not being utilized. The MEWS tool is

not specific to just sepsis though. This tool can be used for identifying patients at risk for

any negative outcome based on the criteria used. In a retrospective study done by

Ludikhuize, 81% of the deteriorating patients could have been identified using the

MEWS tool (Ludikhuize, Smorenburg, de Rooij, & de Jonge, n.d.). Criteria for MEWS

included heart rate, systolic blood pressure, respiratory rate, temperature, AVPU score

(mentation), urine production, and O_2 saturation. The biggest problem with MEWS is that

it requires more information within the system compared to others. The increased criteria

created problems with underreporting from the nurses. Respiratory rate, diuresis, and

oxygen saturation were the most incomplete vital signs based on a study involving 240

patients (Ludikhuize et al., n.d.). Another study by Sanders with a sample size of 523

patients, indicated that the use of MEWS resulted in a 17% decrease in mortality which

translated to 5.4 fewer deaths per month (Sanders et al., 2013). An example of the

MEWS tool can be found in Appendix B.

<center>Specific Aims</center>

The purpose of this project was to determine which early-assessment tool would

be adequate in solving the problem of sepsis and compliance in a level 3 hospital with

over 400 beds in Mississippi. A study conducted in England looked at the compliance

rates for using a sepsis bundle at the 6-hour mark and the 24-hour mark and the impact it

had on patient outcomes (Gao, Melody, Daniels, Giles, & Fox, 2005). The study

concluded that there was a two-fold increase in mortality if the bundle was not used in the

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first 6 hours, and there was a 76% increase in hospital mortality with non-compliance in 24-hours. This project was not meant to look at the bundle that was being used currently. This project was meant to find an early-assessment tool that would alarm the health-care provider when a patient was at risk so that the bundle could be implemented early enough to produce a positive outcome for the patient.

<center>Doctor of Nursing Practice Essentials</center>

This doctoral project meets the eight Doctor of Nursing Practice (DNP) Essentials. This project specifically meets three of the essentials: II, III, and VI. Essential II: Systems thinking, Healthcare Organizations, and the Advanced Practice Nurse Leader guides DNP nurses to assess current healthcare policies and create policies that improve health care outcomes at an organizational level (Zaccagnini & White, 2017). This project aims to improve outcomes by implementing a new tool that changes the procedure currently in place. Although this project does not directly implement the new tool, it will aid in the decision in the future. Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice involves research and the dissemination and implementation of new knowledge (American Association of Colleges of Nursing, 2006). This project's main goal addresses this essential. The goal is to research and compare two early assessment tools to determine the best one to decrease mortality and negative outcomes. A review of the literature on the two tools, as well as sepsis in general, has helped to determine the best tool for practice. Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes involves the use of teamwork and communication to better outcomes in the hospital. This essential was met

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by collaborating with management and health care providers to determine the best tool for that specific hospital. See Appendix C.

Summary

Severe sepsis is a leading cause of death in the United States and is the most common cause of death among critically ill patients in non-coronary intensive care units (Mayr et al., 2014). The use of a valid assessment tool has the potential to increase compliance and afford healthcare providers a resource for sepsis identification (Dellinger et al., 2013). The two tools that were looked at are qSOFA and MEWS. QSOFA is a quick assessment that utilizes only three criteria: Respiratory rate, mentation, and systolic blood pressure (Chen et al., 2016). The second tool is MEWS. MEWS is know for its high sensitivity and uses multiple criteria including: heart rate, systolic blood pressure, respiratory rate, temperature, AVPU score (mentation), urine production, and O_2 saturation (Ludikhuize et al., n.d.). The purpose of this project was to determine which early-assessment tool would be adequate in solving the problem of sepsis and compliance in a level 3 hospital with over 400 beds in Mississippi.

CHAPTER II - METHODS

SWOT Analysis

SWOT analysis is an acronym for strengths, weaknesses, opportunities, and threats. This tool is used to determine and identify the internal and external factors of something to help make a decision (Pickton & Wright, 1998). For this project, a SWOT analysis was used to compare and contrast the two tools used for diagnosing sepsis early, qSOFA and MEWS. The results of the SWOT analysis will be explained later. Use of the SWOT analysis helped make an educated decision based on the research that showed the differences in the two early-assessment tools and which was best for a hospital in Mississippi.

Study of the Intervention

After selecting one tool that had the best fit for the hospital, certain steps were implemented to disseminate the evidence. After approval or waiver from the University of Southern Mississippi (USM) Institutional Review Board (IRB), a letter of approval from the risk management team was requested. When approval or waiver from USM was received, a pamphlet and in-service providing a description of QSOFA and MEWS was given to the nurses in the post-anesthesia care unit (PACU) and also anesthesia providers. This in-service was presented during the monthly meeting that the staff conducts. A five-question survey was given after the in-service to the participants. This survey asked about the opinions and concerns of each tool. The survey that was given can be found in Appendix C. The participants had one week to complete the survey. The completed surveys were placed in a box located in the PACU and were collected after one week. The data was then compiled and analyzed. The data, including the survey results and

personal opinions on each tool developed from the research, were placed in an executive summary. This executive summary was then presented in a SWOT analysis form to a panel of experts in the hospital that had a direct influence on the implementation of the tool. This panel included the PACU charge nurse, other nurses working in the PACU, and anesthesia providers. After the presentation, a survey was given to the panel of experts to evaluate thoroughness, application, and quality of the project. An example of this survey is located in Appendix D. All data collected was stored in a locked drawer for the duration of the project. After completion of the project, the data was shredded and destroyed per The University of Southern Mississippi protocol.

Ethical Considerations

As stated, this project was only meant to define a proper tool that could produce positive outcomes in the acute care setting in a hospital in Mississippi. An ethical consideration for this project depended on which tool was selected. If QSOFA was selected due to its ease of use, there would be a significant risk that patients who are at great risk for sepsis would not set off the alarm for further work-up. There is evidence that some patients do not show classic signs of infection when they are developing sepsis. This absence would cause the tool to miss these patients and result in negative outcomes.

Summary

As stated before, a SWOT analysis was used to examine the differences between each tool. The strengths of qSOFA are specificity and quick assessment (Singer et al., 2016). The strengths of MEWS are the sensitivity and continuity throughout a patients stay. The biggest weakness of qSOFA is the decreased sensitivity due to the broad criteria. The biggest weakness of MEWS is the extensive criteria which can lead to

decreased compliance. QSOFA creates an opportunity to increase compliance due to the simple assessment. MEWS creates an opportunity to increase the documentation of all vital signs by requiring this for diagnosing sepsis also. The threat of using the qSOFA tool is that some patients might slip through the cracks due to the patient presenting with signs that do not fall within the three criteria for this tool. The threat of using MEWS is a chance the staff will form a negative view due to the increased workload produced from the numerous criteria. The SWOT analysis was used to assess the good and bad of each tool. This tool had a direct impact on which tool should be chosen for a hospital in Mississippi.

CHAPTER III - RESULTS

Overview

The purpose of this project was to complete a SWOT analysis on two early-assessment tools to identify patients at risk for sepsis. The results of the SWOT analysis follows. Another aim of this project was to determine which tool would fit best at a hospital in Mississippi based on research and feedback from the hospital employees. After the SWOT analysis was complete, a day was spent at the hospital meeting with hospital staff in the PACU and CRNA's. First, there was a meeting held with all PACU nurses working that day. This meeting allowed me to provide all information on the two early-assessment tools and the importance of using each tool. Next, a survey was given to each participant (Appendix C). Then, throughout the day, CRNA's were given the information on each tool as they passed by the PACU area. The same survey was also given to them. There were no incentives to participate in this project and all participation was voluntary. All completed surveys were placed in a closed folder until the end of the day.

SWOT Results

Strengths

There are some specific strengths of each tool that give them reasons to be implemented in the hospital. QSOFA is an abbreviated tool that makes it useful for quick assessment of at-risk individuals and this quick assessment also makes it easy to use (Singer et al., 2016). The criteria for qSOFA are respiratory rate, mentation, and systolic blood pressure. Each criterion is worth one point. When assessing the patient, the points are added for each criteria that describes the patient. A study for the Third International

Consensus Task Force found that qSOFA scores of 2 or higher had a 3- to 14- fold

increase in-hospital mortality (Seymour et al., 2016). After looking at the research, most

of the hospitals that use this tool are using it in the ED mainly. The high specificity

makes it better for hospitals that have had problems with false positives in the past, which

the target hospital has.

MEWS has some strengths of its own that makes it more desirable over qSOFA

depending on the situation. MEWS has much more criteria for scoring, which increases

the sensitivity and allows the provider to catch signs of early sepsis before detrimental

effects happen (Sanders et al., 2013). MEWS has also been used throughout a patient's

stay to compare previous scores with current scores to guide the care plan for that patient.

Epic, an electronic charting system, is already being used in a majority of hospitals in

Mississippi, and Epic already has the capabilities of implementing MEWS without

increasing the workload on the staff.

Weaknesses

With each tool, there are weaknesses that come with them. There is one main

weakness of qSOFA that needs to be mentioned. Even though the abbreviated tool is

considered a strength, it can also be a weakness. The broad criteria decrease the

sensitivity of the tool and can result in missed diagnoses. There are a couple of

weaknesses of MEWS that need to be addressed. The criteria for MEWS is thorough and

can lead to a greater amount of false positives and undocumented records. The false

positives can result in decreased compliance down the road. As stated earlier, respiratory

rate, diuresis, and oxygen saturation were only documented in 30-60% of the assessments

(Ludikhuize et al., n.d.). These undocumented records can obscure the scores produced

by MEWS. Also, immediate notification to physicians is crucial for adequate results using MEWS (Sanders et al., 2013). Producing adequate results would require more teaching to staff which cost more money.

Opportunities

For qSOFA, there is a greater opportunity for increased compliance than MEWS due to the ease of use and a quick assessment method (Singer et al., 2016). Since this method is used more often in the ED, there is an opportunity for increased teaching in this department to decrease mortality and morbidity in the ED. For MEWS, there are opportunities to not only increase compliance with diagnosing sepsis early but also to increase compliance with charting all vital signs and having more complete records for each patient. Since MEWS requires more criteria, it would be a second reminder to document certain vital signs that have been shown to be missed during a patients stay (Ludikhuize et al., n.d.). Another great opportunity of MEWS is using this tool throughout a patients stay to hopefully decrease mortality from HAI's that develop after a patient is admitted. The last opportunity that comes with MEWS is the opportunity to not only look for early sepsis but also to identify patients at risk for negative outcomes due to other problems.

Threats

Since qSOFA has such broad criteria, there is the threat that patients will slip through the early-assessment tool and remain undiagnosed. This threat has the potential to actually increase morbidity and mortality from sepsis while still increasing compliance for the tool. This problem would obscure the data and suggest that the hospital is producing positive results when, in fact, the mortality rate is increasing. The biggest

threat of MEWS is a negative view of the tool from the staff. The negative view would be

due to the increased work that comes from the tool and the very specific and in-depth

criteria. There would be less missed diagnoses from the tool, but the chance of decreased

compliance and increased false-positives would go up.

Analysis of the Data

All data was collected at the end of the day and analyzed. In all, there were twelve

participants in this study. Six of the participants were PACU nurses working that day.

The other six were CRNAs. Question one asked the participants which tool would be the

most user-friendly. Eighty-four percent of the participants believed the MEWS tool was

the most user-friendly. The next question asked which tool appeared to be best suited for

the PACU area. Fifty-eight percent of the participants chose MEWS as the best tool if

implemented in the PACU. The third question asked which tool the participants believed

would have the highest compliance rate. Sixty-seven percent of the participants chose

MEWS. The fourth question asked which tool would decrease morbidity and mortality

due to sepsis. Seventy-five percent of the participants thought that MEWS would be best

for this purpose. Obviously, based on the evidence, the staff that participated in the study

believed that the MEWS tool would be the best tool for their area and in that hospital.

The last question in the survey asked the participants if they had any comments,

questions, or concerns. This question will be explained in the discussion chapter of this

paper.

Summary

The purpose of this project was to determine which early-assessment tool would

be best for a hospital in Mississippi. The data from the surveys and the SWOT analysis

was crucial in making a decision on which tool would be the best fit. Based on the survey

results, there was an overwhelming percent of the staff that would rather use the MEWS

tool over the qSOFA tool. This is surprising given that the qSOFA tool is known as a

more user friendly tool. Even after this information was provided, the staff still believed

that the MEWS tool would be more effective in diagnosing sepsis early.

CHAPTER IV – DISCUSSION

Summary

Based on the opinions of the staff derived from the survey results, the conclusion has been made that their belief is that the MEWS tool would be the ideal tool for use in the PACU area. Based on the survey, the staff has an overwhelming opinion that MEWS is more user-friendly, best suited for the PACU, would have the highest rate of compliance, and would decrease morbidity and mortality due to sepsis. One would think that qSOFA would have have been picked as the most user-friendly tool due to research explained early in the paper. After speaking with the participants and receiving feedback, the idea of having more criteria to come up with a score actually seemed more straightforward and made more sense to the staff. As stated before, the purpose of this project was to determine which early-assessment tool would be adequate in solving the problem of sepsis and compliance in a level 3 hospital with over 400 beds in Mississippi. Using the information collected from the survey combined with the extensive research on each tool has helped provide a more complete outlook on each tool. It has also helped make a decision on which tool would be best for the hospital. Based on both the research and data collected, the conclusion has been made that the MEWS tool would be the best for this hospital if implemented in the PACU area. An executive summary has been created based on this conclusion and given to the CRNA who is the clinical coordinator at the hospital. Interest was shown towards this conclusion and future changes will be considered based on this project.

Interpretation

To recap, the intervention for this project included making a trip to the PACU at a hospital in Mississippi. While at this hospital, a presentation was given to the PACU nurses and CRNAs on the purpose of the project and the SWOT analysis of each tool. A survey was given after the presentation which asked five questions on the opinions of each tool. There was an overwhelming opinion that the MEWS tool would be best for that area. It was strange that the MEWS tool was chosen on each aspect of the survey though. In all the research that was collected, QSOFA was considered the best for a quick assessment and ease of use (Singer et al., 2016). I believe the reason for this unexpected outcome is due to the opinions of the CRNAs in comparison to the PACU nurses. All the CRNAs who were interviewed had the belief that MEWS was the superior tool. After speaking with them, the reason for this opinion is due to the experience the CRNAs have in the OR. The addition of more criteria and the use of a more organized chart appealed to all the CRNAs.

This project and the results have a major impact on the way sepsis is identified and the systems that are used in the hospital. Before the research was presented to the hospital, the nurses did not realize the importance of diagnosing sepsis early and had no tool to help them in the process. The hospital has shown interest in possibly implementing the MEWS tool in the hospital at some point in the near future due to the research and data provided by this survey. After the importance of sepsis was presented to the staff, the chances of increasing compliance if a new tool is implemented could occur.

Limitations

One limitation to the project that has been identified is the fact that the presentation was only presented to the PACU nurses and CRNAs. This limitation has the possibility of providing a biased opinion and can hinder the results from being inferred for the rest of the hospital. Another limitation is the potential for a biased presentation due to the extensive research conducted prior to the presentation for the staff. The last limitation deals with the implementation of the tools. In the comments section of the survey that was provided to the staff, there was a reoccurring comment about the need to use judgment when using each tool. Due to the effects of anesthesia, each tool could provide false-positive results if not used with common sense and expert judgment.

Future Implications

While at the hospital presenting this research, a new topic was introduced by a CRNA. He reported having issues with staff not placing central lines in the OR rooms for people who were critically ill. This problem was first recognized and presented to the staff by upper management. After the presentation on the early-assessment tools of QSOFA and MEWS, interest was shown towards the use of MEWS. With the criteria that are used and the score that can be created by the use of this tool, an interest from the hospital is shown towards implementing this tool in the OR. The understanding is that a specific score can be defined using MEWS to justify the insertion of a central line. This understanding creates an opportunity that can be based on this project's research and expanded to meet the needs of this hospital in the OR setting.

Conclusions

Severe sepsis is a leading cause of death in the United States and is the most common cause of death among critically ill patients in non-coronary intensive care units (Mayr et al., 2014). One of the guidelines in the Surviving Sepsis Campaign states that the early identification of sepsis and the implementation of early evidence-based therapies significantly improves outcomes and decreases sepsis-related mortality (Dellinger et al., 2013). The purpose of this project was to compare two early-assessment tools and do extensive research on each tool. The use of this research and the use of data collected from surveys from members of staff in a hospital in Mississippi were utilized to determine which tool could help increase compliance and decrease morbidity and mortality due to sepsis. The first tool that was examined is known as the Quick Sequential Organ Failure Assessment (QSOFA). This tool is known to be very easy to use and uses three criteria including respiratory rate, systolic blood pressure, and altered mentation (Singer et al., 2016). The next tool is called the Modified Early-Warning Score (MEWS). This tool is known to be sensitive and includes much more criteria including heart rate, systolic blood pressure, respiratory rate, temperature, AVPU score (mentation), urine production, and O_2 saturations (Sanders et al., 2013). Based on the research and the opinion of staff from the survey, the MEWS score seems to be a better fit to be implemented in the PACU area in a hospital in Mississippi.

RR > 22 bpm	0 = mortality < 1%
SBP < 100 mmHg	1 = mortality 2-3%
Altered Mentation	>2 = mortality > 10%

APPENDIX B – MEWS Tool

	3	2	1	0	1	2	3
Systolic blood pressure (mmHg)	<70	70–80	81–100	101–199		≥200	
Heart rate (bpm)		<40	40–50	51–100	101–110	111–129	≥130
Respiratory rate (bpm)		<9		9–14	15–20	21–29	≥30
Temperature (°C)		<35		35–38.4		≥38.5	
AVPU score				Alert	Reacting to **V**oice	Reacting to **P**ain	**U**nresponsive

Each component of MEWS has an associated score ranging from 0 to 3, based on the degree of derangement of the parameter. The total score is the sum of each component: the maximum possible score is 14.

APPENDIX C – DNP Essentials

DNP Essentials	How the Essential is Achieved
II. Organizational and Systems Leadership for Quality Improvement	This project aims to improve outcomes by implementing a new tool that changes the procedure currently in place.
III. Clinical Scholarship and Analytical Methods for Evidence-Based Practice	The goal of this project is to research and compare two early assessment tools to determine the best one to decrease mortality and negative outcomes.
VI. Interprofessional Collaboration for Improving Patient and Population Health Outcomes	This essential was met by collaborating with management and health care providers to determine the best tool for that specific hospital.

APPENDIX D – Initial Survey

1. Which tool do you believe is the most user-friendly?

Modified Early Warning Score

Quick Sequential Organ Failure Assessment

2. Which tool would be best if implemented in the Post Anesthesia Care Unit?

Modified Early Warning Score

Quick Sequential Organ Failure Assessment

3. Which tool do you think would have the highest rate of compliance from the nurses?

Modified Early Warning Score

Quick Sequential Organ Failure System

4. Which tool do you believe would result in a decreased morbidity and mortality due to

sepsis?

Modified Early Warning Score

Quick Sequential Organ Failure System

5. Do you have any other comments, questions, or concerns?

APPENDIX E – Panel Survey

1. The presenter clearly stated the objectives of the presentation.

- o Strongly agree
- o Agree
- o Neither agree nor disagree
- o Disagree
- o Strongly disagree

2. The presentation, as a whole, met those objectives.

- o Strongly agree
- o Agree
- o Neither agree nor disagree
- o Disagree
- o Strongly disagree

3. The presentation was thorough and clear.

- o Strongly agree
- o Agree
- o Neither agree nor disagree
- o Disagree
- o Strongly disagree

4. This project will be applicable to this hospital.

- o Strongly agree
- o Agree
- o Neither agree nor disagree
- o Disagree
- o Strongly disagree

5. Overall, the presentation was helpful in making a decision on which early assessment tool would be best.

- o Strongly agree
- o Agree
- o Neither agree nor disagree
- o Disagree
- o Strongly disagree

6. Which tool, based on the presented data, would be best for this hospital?

    A. Modified Early Warning Score
    B. Quick Sequential Organ Failure System

7. Do you have any other comments, questions, or concerns?

APPENDIX F – IRB Approval Letter

THE UNIVERSITY OF SOUTHERN MISSISSIPPI.

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
  Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 18070603
PROJECT TITLE: Comparison of Two Early-assessment Tools to Increase Compliance and Decrease Mortality Due to Sepsis
PROJECT TYPE: Graduate Project
RESEARCHER(S): Cody Franklin Carr
COLLEGE/DIVISION: College of Nursing
DEPARTMENT: School of Leadership and Advanced Nursing Practice
FUNDING AGENCY/SPONSOR: N/A
IRB COMMITTEE ACTION: Exempt Review Approval
PERIOD OF APPROVAL: 07/19/2018 to 07/18/2019
Edward L. Goshorn, Ph.D.
Institutional Review Board

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