Delirium Screening Instrument Knowledge and Perception among Cardiovascular Intensive Care Nurses

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Final DNP Project Report

Delirium Screening Instrument Knowledge and Perception among Cardiovascular Intensive Care Nurses

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University of Kentucky
College of Nursing
Spring 2016

Carol Thompson PhD, DNP, ACNP, CCRN, FCCM, FAANP, FAAN – Committee Chair
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Dedication

I would like to dedicate my practice inquiry project to my wonderful husband, Adam. Our family and friends thought we were crazy when we told them I was going to graduate school full time, but we knew our marriage would withstand any obstacle.

Thank you for being my guinea pig during assessment class, my paper editor, and most of all, thank you for being my biggest supporter during these 3 hectic years. I am successful because of the courage you have given me. I am so proud of the individuals we have become and the relationship we continue to build. Thank you, a million times over my love, thank you.
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Project Overview

Delirium is a serious condition that affects critically ill adult patients in the intensive care unit (ICU). The American Association of Critical Care Nurses (AACN) defines delirium as an acute change in consciousness accompanied by inattention and either a change in cognition or perceptual disturbances (AACN, 2014). Delirium is present in as many as 60-80% of mechanically ventilated patients and 20-50% of non-mechanically ventilated patients (Brummel et al., 2013). Delirium presents as a change in patient’s baseline mental status that can fluctuate in severity. Characteristics of delirium include disturbances in vision, speech, orientation, perception, and memory (Reimers and Miller, 2014). ICU delirium is independently associated with higher patient mortality, prolonged ICU stay, and greater health care costs (Delvin et al., 2008). The risk for mortality while in the hospital is more than doubled in patients who develop delirium (Skwarecki, 2015). In addition, patients who experience ICU delirium are at greater risk for cognitive impairment after discharge (Skwarecki, 2015).

In the absence of a structured diagnostic screening instrument delirium goes undetected by doctors and nurses in 65% of ICU patients. (AACN, 2014). Delirium’s non-discriminatory effects on ICU patients has influenced the creation of validated screening instruments such as the Confusion Assessment Method-Intensive Care Unit (CAM-ICU) and the Intensive Care Delirium Screening Checklist (ICDSC). The ICDSC and CAM-ICU are the most commonly used and studied delirium screenings instruments in critical care (Brummel et al., 2013). One purpose of the screening instruments is to effectively communicate the patient’s cognitive status through a standardized score or result to professionals on the patient care team. Another is to modify patient
management, such as reducing administration of delirium-associated drugs or eliminating environmental risk factors associated with delirium. One of the last purposes for these instruments is to implement possible pharmacologic and non-pharmacologic treatment measures for delirium (Brummel et al., 2013).

Some common clinician perceptions of delirium assessment include perceived difficulty of performing screening in sedated or intubated patients, perceived complexity of screening instruments, and time constraints when performing screening (Brummel et al., 2013). However, few data exist about nursing perceptions and practices associated with delirium screening instruments (Devlin et al., 2008). Bedside nursing delirium measurements are considered a dependable source of information that can be used for clinical decision-making (Vasilevskis et al., 2011). Nurses are with patients 24 hours a day and are the key for delirium detection and achieving improved delirium outcomes for patients (Yuying, Ying, Li, and Zhu, 2012). Therefore, nurse education and assessment of perceptions is important when building a framework for successful delirium assessment.

This practice inquiry project, through a descriptive pre- and post-test design, will evaluate the perception and knowledge of 40 ICU nurses in the Cardiovascular Intensive Care Unit (CVICU) in an academic hospital located in central Kentucky. The overall purpose of this project is to examine nurse perceptions and knowledge about delirium and delirium screening instruments at UK Hospital’s CVICU. The aims of the project are: (i) to describe current sedation and delirium practice using a 11-item survey completed by registered nurses who practice full time in the CVICU; (ii) to compare knowledge and perception about sedation and delirium screening score before the receipt of a 20-minute education program with those obtained immediately following the program in registered
nurses who practice full time in CVICU; (iii) to describe registered nurse evaluation of 2 delirium screening instruments, the CAM-ICU and the ICDSC, using a 10-item instrument.

This practice inquiry project will provide insight and guide further research on nurse perception and knowledge concerning delirium screening instruments and screening practices in the ICU. The project includes three manuscripts that discuss pertinent topics associated with ICU delirium and ICU delirium screening practices.

• Manuscript one is a paper that presents a project outline of a nurse driven post-operative delirium prevention protocol for elderly patients. The paper also uses the Plan- Do-Study-Act cycle of change to help organize the projects implementation.

• Manuscript two is literature review that presents research studies related to nurse perceptions on delirium and delirium screening instruments. The review also discusses implications for delirium screening in future practice. Five studies were evaluated in the review.

• Manuscript three presents a study that uses an educational intervention and pre- and post-test design to evaluate nurse perception and knowledge on delirium and delirium screening instruments.
Creating a Post-Operative Delirium Prevention Project Using the Plan-Do-Study-Act Cycle

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Abstract

The purpose of this paper is to present a project outline of a nurse driven post-operative delirium prevention protocol. Elderly patients are at a very high risk for post-operative delirium. A post-operative delirium prevention protocol can help decrease the incidence of delirium in post-operative elderly patients who are at high risk for delirium. The goal of the project is to decrease the incidence of post-operative delirium in elderly patients (age 65 or older) in the Cardiovascular Intensive Care Unit (CVICU) by 20% in 6 months. The specific aims of the program include: determining the incidence of delirium in the CVICU; determining the effect of nurse driven non-pharmacologic interventions on delirium, evaluating staff adherence to the protocol, evaluating staff satisfaction with the protocol, and evaluating staff confidence in executing the protocol. The methods used for data collection include online surveys and chart audits. The project implementation changes for this project include education on performing delirium assessment, providing a designated area for supplies, and providing staff resources. Day-to-day leaders, project sponsors, technical experts, and clinical leader are chosen from nursing leadership and the critical care medicine team. Explanations and descriptions of their positions are included. This paper outline provides potential strengths and weaknesses of the program and identifies pathways for improvement. The last portion of the paper uses the Plan-Do-Study-Act cycle of change to help organize the projects implementation.
Creating a Post-Operative Delirium Prevention Project Using the Plan-Do-Study-Act Cycle

The United States elderly population (age 65 or older) is quickly growing. The United States population, expected to grow from 310 million to 439 million by 2050 and increase 42%, is expected to become older with nearly one in five United States residents aged 65 and older by 2030 (United States Census Bureau, 2010). Therefore, more patients in the hospital undergoing surgery will be elderly. Elderly patients are accompanied with an increase risk of post-operative complications including postoperative delirium.

The elderly are at a higher risk for delirium for many reasons. Age related illnesses such as dementia, or having one or more co-morbidity, increases the elderly populations risk for delirium (Robinson & Eiseman, 2008). Physiologic changes in the elderly such as impaired kidney function (elevated creatinine), hypoalbuminemia, memory loss, vision, hearing, and mobility impairment place the elderly at a higher risk for postoperative delirium (Bakker, Osse, Tulen, Kappetein, & Bogers, 2012; Veliz-Reissmuller et al., 2007; Vollmer, Rich, & Robinson, 2007). Also, elders are at an increased risk for prolonged mechanical ventilation time and over administration of opioids or benzodiazepines, placing them at an even higher risk as these factors are independently associated with delirium (Bryczkowski et al., 2014). In addition, many aspects of hospitalization naturally promote delirium in the elderly patient (Mattison, 2015). Just the change in environment from the comfort of home to a hospital room is disruptive to the elderly patient’s routine. According to Mattison, an elderly patient, particularly someone with preexisting cognitive impairment, is prone to developing
delirium with changes in environment and sensory deprivation (2015). Other hospital-related risk factors that contribute to delirium in the elderly include pain, interruption in sleep patterns, and several classes of medication (Mattison, 2015). Also, delirium can be associated with states of confusion. These moments can be worsened when sensory input is affected, such as the elderly patient lacks access to eyeglasses or hearing aids (Mattison, 2015).

Postoperative delirium occurs in 15–53% of surgical patients over the age of 65 years, and among elderly patients admitted to an intensive care unit (ICU) the delirium incidence can reach 70–87% (Fong, Tublebeav, & Inouye, 2009). Postoperative delirium can lead to lengthened hospital stay, increased patient care costs, readmission, reoperation, and increased morbidity (Brooks et al, 2013; Large et al, 2013). Effective measures to prevent delirium include orientation protocols, environmental modification, non-pharmacologic sleep aids, early mobilization, minimizing the use of restraints, and use of visual and hearing aids (Mattison, 2015). These non-pharmacological interventions are essential for the prevention of delirium (Rivosecchi et al., 2015). “These interventions can be a low-risk, low-cost strategy that have shown a benefit in most studies” (Rivosecchi et al., 2015, p. 48).

A study by Vollmer and colleagues specifically targeted four risk factors that place the elderly at risk for delirium (2007). These four factors included, age (65 years or older), vision impairment, hearing impairment, mobility impairment, and dementia. After identifying patients over 65 years or greater with one of the above risk factors, an organized set of interventions to prevent delirium were initiated by nursing staff. The simple protocol decreased the incidence of delirium in their ICU by nearly two-thirds in
patients with identified risk factors (Vollmer et al., 2007). Therefore, the purpose of this paper is to present a project outline to implement the Vollmer et al. (2007) nurse driven delirium prevention protocol in the Cardiovascular Intensive Care Unit (CVICU) with elderly post-operative patients. The project outline will use the Plan-Do-Study-Act cycle to describe implementation processes.

**Objective**

Post-operative delirium protocols that include non-pharmacologic modalities reduce the incidence of delirium in elderly patients (Brooks et al., 2014, Bryczkowski et al., 2014; Vollmer, Rich, & Robinson, 2007). The purpose of this paper is to present a project outline for implementation of a nurse driven post-operative delirium prevention protocol. The goal of the protocol is to help decrease the incidence of post-operative delirium in elderly patients (age 65 or older) in the CVICU by 20% in 6 months. The specific aims of the program include: determining the incidence of delirium in the CVICU; determining the effect of nursing driven non-pharmacologic interventions on delirium; evaluating staff adherence to the protocol; evaluating staff satisfaction with the protocol; and evaluating staff confidence in executing the protocol.

**Methods**

First, a chart audit will examine the incidence of delirium in elderly post-operative patients in the CVICU. This will assist with data comparisons and justify the protocols efforts. Nursing staff will implement the post-operative delirium prevention protocol for all patients 65 years old or greater in the CVICU. The protocol will include implementation of non-pharmacologic nursing interventions on admission to the intensive care unit. First, a baseline knowledge assessment followed by an educational
in-service will prepare the nurses for program implementation. The educational in-service will include information on delirium and properly performing the Confusion Assessment Method-Intensive Care Unit (CAM-ICU) screening instrument. The CAM-ICU delirium screening instrument will help determine if patients are experiencing delirium. In addition, the in-service will educate nursing staff on the paper checklist bedside tool. Checklists can improve quality of care for elderly patients by integrating reminders into every day care to ensure practice standards are met (Mattison, 2015). This paper checklist will list non-pharmacologic nursing driven measures to be implemented for each patient. After the in-service, the nursing staff will complete a post-knowledge assessment to evaluate retention of the education provided.

The patient will have a CAM-ICU performed on admission, once a shift, and with Glasgow Coma Scale changes. If the patient tests “CAM-positive” the patient has developed post-operative delirium. Therefore, the CAM-ICU will measure the incidence of delirium in elderly patients in the CVICU. The nursing staff will utilize the paper checklist by checking off the number of non-pharmacologic interventions implemented for each patient per shift. At the end of each shift, the checklist will be completed and given to team leaders to be filed for data analysis. The checklist will be used to track the non-pharmacologic interventions implemented by the nursing staff for patients. Correlations between CAM-ICU scores and non-pharmacologic measures can be studied to evaluate the effectiveness of these interventions in preventing delirium.

A staff survey should be performed during protocol implementation to determine staff response to the program. Questions in the survey will examine staff satisfaction,
adherence to protocol and CAM-ICU screening, and confidence of executing the protocol.

**Selecting Changes**

The first step to create change is to provide the education necessary for staff to implement the program and empower them to make the change successful. Education on performing the CAM-ICU and postoperative delirium prevention protocol will be given to all nursing staff. The education classes give nursing staff the resources they need for protocol implementation. The next step will be establishing a designated area for supplies that will assist with protocol interventions and creating system to notify team leaders of low stock. The last step is to place the protocol into poster, pamphlet, and computer form as a staff resource and reminder. Table 1 displays each step for creating change along with the associated evidential support and related change concepts.

**Organizational Context**

The implementation of the post-operative delirium prevention protocol will directly affect the nursing staff in the CVICU. In order for the program to become successful, both nursing technicians and nurses will attempt to incorporate the protocol into daily nursing routine. The CAM-ICU should be an essential part of the nursing assessment. Nurses will be trained to detect changes in mental status for CAM-ICU execution and delirium diagnosis. The nursing staff is crucial for measuring protocol success.

Because this is a nurse driven protocol, the majority of the improvement team will be nurse leaders or nursing staff. For example, team leaders (formerly known as charge nurses) should take an active role in the projects implementation. Team leaders should be
used as the day-to-day team member. For example, they can maintain the stock of the protocol supply, and encourage the use of the CAM-ICU tool and protocol interventions. Before the intensive care unit receives a patient from the operating room, report is given from the operating room nurse. This includes age, past medical history, and co-morbidities. Therefore before the patient is even admitted, the team leader could be preparing for protocol implementation. The cardiovascular clinical nurse specialist could also act at the day-to-day team leader ensuring the protocol is being implemented and also assisting with data collection. The clinical nurse specialist and team leader will work closely together to make sure the day-to-day tasks are being accomplished.

The clinical leader for the improvement team should be Critical Care Medicine Intensivists who exclusively manage the care of postoperative patients while in the intensive care unit. These physicians are a reliable resource that understand patient clinical changes, postoperative delirium complications, and realize the necessity of the program. They also have strong relationships with the surgeons and can effectively promote the program. They understand the hospital organizational system at a macro level and can help anticipate any problems that may arise because of the program.

The technical experts should be the patient care manager and assistant patient care manager. Both would serve as excellent technical experts as their primary role is to maintain patient safety and ensure quality patient care. They thoroughly understand the nursing process in the unit and work on improvement projects daily. They can provide excellent insight on project design and data collection. An excellent project sponsor could be the Director of Cardiovascular Nursing. The director understands the hospital organization and has many connections within the nursing executive department and
physicians. Also, the director would be able to provide information on external resources if needed.

The project plan has many advantages that can lead to strong, successful program implementation. For example, the program will promote prevention of post-operative delirium in elderly patients. It will also identify the number of elderly who experience delirium in the CVICU. The program is supported by evidence, easy to implement, inflicts no patient harm, and uses the CAM-ICU, a quick assessment tool. Also, the culture of the CVICU is supportive of education and innovative projects. The CVICU is staffed with smart, adaptable health care providers who are interested in patient quality improvements. This project addresses mobility impairment in delirious patients and promotes activity, ambulating, and physical therapy. The protocols prospective success could be compared to advantages of early mobility in post-operative patients such as reduction of respiratory decompensation, deep vein thrombosis, infection, urinary tract infections, and average length of stay (Epstein, 2014). Patient and family satisfaction scores could also be examined after protocol implementation.

Although there are many advantages for patient quality improvement associated with project implementation, there are potential weaknesses and threats to the project’s success. The project will need an established budget for a delirium prevention supply cabinet and educational classes for staff. Also, all nursing staff will need education on the protocol and performing the CAM-ICU. Clear and focused education materials will need to be created. The nursing staffs’ perception on the importance of the protocol is vital for its success and there is a chance some nursing staff may find it as extra, unnecessary work. Documenting the interventions as they occur may be difficult as well.
Trying to incorporate the new protocol in the sunrise clinical manager next to the CAM-ICU tool would be ideal for nursing documentation. Because of the unknown success of the program this change may not occur.

**Testing Changes**

The Plan-Do-Study-Act (PDSA) cycle will help establish the steps to be accomplished for successful program implementation and outcome measurement. The first step in the PDSA Cycle is Plan. The objective of the improvement project is to implement a post-operative delirium protocol for all post-operative elderly patients in the CVICU. In order to make a data comparison, a chart audit examining the incidence of delirium in elderly post-operative patients should be conducted to determine the incidence of delirium in the CVICU prior to implementation. During this time nursing staff educational classes will be conducted to address performing the CAM-ICU and post-operative delirium prevention protocol. Also, posters, pamphlets, and supplies will become available for nursing staff. The methods for measurement include performing a CAM-ICU on admission, once a shift, and with Glasgow Coma Scale changes. If the patient tests positive, the patient has developed post-operative delirium. Therefore, the CAM-ICU will measure the incidence of delirium in elderly patients in the CVICU. As indicated above, nursing staff involvement in the protocol is vital for protocol adherence and success. All nursing staff will be asked to answer questions via an online survey to determine staff response to the program. Questions in the survey will examine staff satisfaction, adherence to protocol and CAM-ICU, and confidence of executing the protocol. The goal of the post-operative delirium prevention protocol is to decrease the incidence of post-operative delirium in elderly patients.
The second step of the PDSA cycle is Do. Each week of program implementation, the day-to-day team leaders will examine the incidence of delirium in elderly post-operative patients through CAM-ICU chart audits. Using the paper bedside checklist tool created by the project team, the team leaders will also examine the interventions implemented via the protocol. Because nursing charting is on sunrise clinical manager, a computer based system, a paper bedside tool may be forgotten or underutilized. Without the day-to-day team leaders encouraging the documentation of the bedside tool, we may not know if the protocol is being implemented or what interventions are being utilized. Each shift, the team leaders will collect the paper bedside tool and place it in a designated folder for data collection.

Step 3 of PDSA cycle is Study. After one month of program implementation, members of the improvement team will come together and perform data analysis. The team will compare the CAM-ICU chart audit data to the pre-protocol implementation data and will compare the data to the teams predictions established in Step 1 of the PDSA cycle. The team will also examine adherence to the protocol through the paper bedside tool. This ensures that all post-operative patients over the age of 65 experienced the protocol. Lastly, the staff survey will be sent to all nursing staff evaluating the program. After each month of program implementation, the results of the all data will be examined and conclusions will be made.

Step 4 of the PDSA cycle is Act. During this phase, the data will show if changes need to be made to any part the protocol or program implementation process. For example, staff survey results may unveil potential changes to the paper bedside tool or recommendations for continued program success. In addition, any barriers to screening
for delirium encountered by nurses may be recognized. To continue proper data collection and protocol implementation, any documentation errors or inconsistencies by nursing staff can be addressed during this phase as well.

Conclusion

Using the PDSA is a great organizational tool for creating a program outline and initiating implementation. It helped clearly present the plan for the improvement project at hand and continuously looked for potential improvements. Each phase of the cycle is reliant on the next and therefore the cycle provides accountability for implementation steps. A post-operative prevention protocol is an improvement project that can be successfully implemented with the help of PDSA cycle and processes.
Table 1 Changes Implemented for Post-operative Delirium Prevention Protocol

<table>
<thead>
<tr>
<th>Change to be Made</th>
<th>Evidential Support</th>
<th>Change Concept Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff Education</td>
<td>• Vollmer, Rich, &amp; Robinson (2007) nursing driven delirium prevention protocol included nursing staff education on the CAM-ICU and protocol use. Before perform implementation 37.5% of patients in their intensive care unit developed delirium. After program implementation, only 13.8% developed delirium (Vollmer, Rich &amp; Robinson, 2007). • Phase 1 of Bryczkowski et al. (2014) postoperative delirium prevention protocol was to provide education to the SICU nursing staff. Topics in the class covered identification of risk factors, diagnosis, and treatment of delirium. The program successfully decreased the duration of delirium for older adults in the SICU, decreased ventilator time, and decreased opioid and benzodiazepine use. (Bryczkowski et al., 2014).</td>
<td>• Change Environment • Improve Work Flow • Producer/Consumer Interface • Manage Time</td>
</tr>
<tr>
<td>Changes to be Made</td>
<td>Evidential Support</td>
<td>Change Concept Used</td>
</tr>
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<td>-----------------------------</td>
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<td>-------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Supply Resource</td>
<td>• Vollmer, Rich, &amp; Robinson (2007) stocked a cabinet of supplies needed for protocol implementation such as yarn skeins, washcloths, large-print magazines, puzzles, music, magnifiers and much more. These supplies were used for patient activities to stimulate thought process and critical thinking. These activities can involve patient caregivers and family. These measures are important when preventing delirium.</td>
<td>• Eliminate Waste</td>
</tr>
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<td></td>
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<td>• Improve Work Flow</td>
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<tr>
<td></td>
<td></td>
<td>• Optimize Inventory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Change the Work Environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Manage Time</td>
</tr>
<tr>
<td>Making the Protocol</td>
<td>• Bryczkowski et al. (2014) placed their protocol into pamphlet form. No other evidence from literature details the use of poster or computer resource forms.</td>
<td>• Error Proofing</td>
</tr>
<tr>
<td>Accessible</td>
<td></td>
<td>• Improve Work Flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Manage Time</td>
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</tbody>
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Mattison, M. (2015). Hospital Management of older adults. In UpToDate, Post TW (Ed), UptoDate, Waltham, MA. (Assessed on February 26, 2016).


Nurse Perception of Delirium Screening Instruments:
A Review of Literature

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Abstract

**Background:** Delirium is a serious condition that affects critically ill adult patients in the intensive care unit (ICU). Nurses are with patients 24 hours a day and are the key for delirium detection and achieving improved delirium outcomes for patients. Bedside nursing delirium measurements are considered a dependable source of information that can be used for clinical decision-making. Nurse education and evaluation of perceptions is important when building a framework for successful delirium assessment.

**Objectives:** The objectives of this review are to present research studies related to nurse perceptions on delirium and delirium screening instruments and to discuss implications for delirium screening in future practice.

**Methods:** A literature search was conducted in PubMed and CINAHL for original research studies with available full text published between 2008 to May 2015. Keywords searched included the following: nurse perception, delirium, nurse perception, delirium screening, nurse opinion, delirium instruments, and delirium tools.

**Findings:** Nurse education is a major factor that may influence nurse perception and knowledge of delirium screening in the ICU setting. More research of nurse perception, screening practice, education, and perceived barriers is needed.
Nurse Perception and Knowledge of Delirium Screening Instruments:

A Review of Literature

Delirium is a serious condition that affects critically ill adult patients in the intensive care unit (ICU). The American Association of Critical Care Nurses (AACN) defines delirium as an acute change in consciousness accompanied by inattention and either a change in cognition or perceptual disturbances (AACN, 2015). “Delirium is present in as many as 60-80% of mechanically ventilated patients and 20-50% of non-mechanically ventilated patients” (Brummel et al., 2013). ICU delirium is independently associated with higher patient mortality, prolonged ICU stay, and greater health care costs (Devlin et al., 2008). The risk for mortality while in the hospital is more than doubled in patients who develop delirium (Skwarecki, 2015). In addition, patients who experience ICU delirium are at greater risk for cognitive impairment after discharge (Skwarecki, 2015).

Delirium presents as a change in patient’s mental status baseline that can fluctuate in severity. Characteristics of delirium include disturbances in vision, speech, orientation, perception, and memory (Reimers and Miller, 2014). The pathophysiology of delirium is not well understood and the many causal theories are multi-factorial (Yuying, Ying, Li, and Zhu, 2012). Although the risk factors for delirium have been understudied, there are many possible identified modifiable and non-modifiable risk factors for delirium in the ICU. These include age, smoking history, alcohol abuse, malnutrition, visual impairment, hearing impairment, sedatives, kidney disease, hypertension, liver disease, heart failure, baseline cognitive impairment, sedatives and factors of acute illness such as acute respiratory distress syndrome, sepsis, hypoxemia,
and metabolic disturbances (AACN, 2014; Reimers and Miller, 2014; Yuying et al., 2012). This very broad list of risk factors that place most all patients admitted into the ICU at risk for delirium.

In the absence of a validated screening instrument, delirium goes undetected by doctors and nurses in 65% of ICU patients (AACN, 2015). Delirium’s non-discriminatory effects on ICU patients has influenced the creation of validated screening instrument such as the Confusion Assessment Method-Intensive Care Unit (CAM-ICU) and the Intensive Care Delirium Screening Checklist (ICDSC). These two instruments are the most studied and have adapted into 20 languages for worldwide implementation (Brummel et al., 2013). One purpose of the screening instrument is to effectively communicate the patient’s cognitive status through a standardized score or result to professionals on the patient care team. Another is to modify patient management, such as reducing administration of delirium-associated drugs or eliminating environmental risk factors associated with delirium. One of the last purposes for these instruments is to implement possible pharmacologic treatment measures for delirium (Brummel et al., 2013).

The evidence on the differences between the two instruments is limited and conflicting. Although both are validated and widely used for the same purposes, their structure and process for delirium screening is very different. Studies available that directly compare the two instruments sensitivity deem CAM-ICU superior (Maarten et al., 2009; Tomasi, 2012). In two recent systematic reviews and meta-analyses on the sensitivity and specificity, CAM-ICU tool’s pooled sensitivity was 76% and 80% and specificity of 96%, and the ICDSC tool’s pooled sensitivity was 74% and 80% and specificity was 75% and 82% (Brummel et al., 2013). Despite the differences in
sensitivity and specificity both are equally recommended by the evidenced based Pain, Agitation, and Delirium (PAD) guidelines expertly created by the American College of Critical Care Medicine and endorsed by The Society of Critical Care Medicine (Barr et al., 2013).

Some common clinician perceptions of delirium include perceived difficulty of performing screening in sedated or intubated patients, perceived complexity of screening instruments, and time constraints when performing screening (Brummel et al., 2013). However, few data exist about nursing perceptions and practices associated with delirium screening instruments (Devlin et al., 2008). Bedside nursing delirium measurements are considered a dependable source of information that can be used for clinical decision-making (Vasilevskis et al., 2011). Nurses are with patients 24 hours a day and are the key for delirium detection and achieving improved delirium outcomes for patients (Yuying, Ying, Li, and Zhu, 2012). Therefore, nurse education and assessment of perceptions is important when building a framework for successful delirium assessment. Evaluating nurse perceptions about both instruments addresses feasibility of delirium screening instruments into nursing practice. In addition, perceived barriers may be overcome through education about delirium and training on how to perform delirium screening instruments (Brummel et al., 2013).

This review will present research studies related to nurse perceptions on delirium and delirium screening instruments. Also, this paper will discuss implications for delirium screening in future practice.
**Population and Setting**

A total of five studies addressed nurse perceptions of delirium and delirium screening instruments. In researching articles, search terms “nurse perception” and “delirium” were used in addition to “nurse perception” and “delirium screening” in PubMed and CINAHL. Additional search terms included, “nurse opinion”, “delirium instruments”, and “delirium tools”. All results from the years of 2008 to May 2015 were included for review.

ICU nurses were the population of interest for all five studies with a total of 655 nurse participants. The geographic setting for one study was the United States (Devlin et al., 2008), while the other settings were Australia, Canada, Egypt, and Turkey (Eastwood, Peck, Bellomo, Baldwin, Reade, 2012; Law et al., 2012; Elfekely & Ali, 2013; Oszaban & Acaroglu, 2015). Of these settings two were academic hospitals (Devlin et al., 2008; Elfekely & Ali, 2013) and three were described as public hospitals (Eastwood et al., 2012; Law et al., 2012; Oszaban & Acaroglu, 2015). Four out of five studies included participants who worked in medical or surgical ICUs and one study included participants who specifically worked in an oncology critical care unit (Law et al., 2012). As evidenced by the diverse list of geographical settings, delirium is evidently non-discriminatory and effects ICU patients all over the world. The articles include diverse populations and settings possibly leading to globally generalizable results.

**Design and Methods**

Four out of five studies were observational studies that used surveys for data collection (Devlin et al., 2008; Law et al., 2012; Elfekely & Ali, 2013; Oszaban & Acaroglu, 2015). One of the five studies was a prospective cohort that also used a survey
for data collection (Eastwood et al., 2012). Two studies used the same survey instrument developed by investigators with the Devlin et al. study (Delvin et al., 2008; Elfekely & Ali, 2013). However, the use of evidenced based or validated data collection instruments was non-existent in all five studies. Due to the limited amount of research conducted in this area, this was an expected finding.

Three studies used online surveys (Eastwood et al., 2012; Law et al., 2012; Ozsaban & Acaroglu, 2015), one study used both paper and online surveys (Devlin et al., 2008), and one study used only paper surveys (Elfekely & Ali, 2013). Response rates for the paper survey was 100% (Elfekely & Ali, 2014), while response rates varied with online surveys, with rates of 37%, 44%, and 95.8% respectively (Eastwood et al., 2012; Law et al., 2012; Ozsaban & Acaroglu, 2015). The mixed online and paper survey had a response rate of 51.7% of participants (Devlin et al., 2008). These results may argue that electronic responses are least likely to receive high response rates, with paper surveys achieving the highest response rates. Surveys are self reported measures of data with no validation of true bedside practice. Therefore, response bias was mentioned as a potential limitation in all studies.

**Results**

**Nurse Perception**

The results of nurse perceptions on delirium and delirium screening instruments in the articles greatly vary due to different study methods. Nurse perception is a very broad variable to examine and each study interpreted nurse perception differently. The first nurse perception to be discussed is the perceived value or importance of delirium or delirium screening instruments to nurses. In two studies, more than half of the
participants felt delirium was a serious problem (Law et al., 2012; Ozsaban & Acaroglu, 2015). In the Australian study, 73% of participants thought delirium assessment important and 93% felt delirium assessments were worth the time they required (Eastwood et al., 2012). Two studies reported nurses felt delirium is an under diagnosed problem in the ICU (Devlin et al., 2008; Elfekely & Ali, 2013). In the American study, nurses agreed delirium is associated with a higher patient mortality (Devlin et al., 2008). However, when asked to rank the importance of conditions in the ICU, nurses ranked delirium last. The comparable conditions were altered level of consciousness, presence of pain, and improper placement of invasive device (Devlin et al., 2008; Elfekely & Ali, 2013). Although the purpose of the comparison was to discover delirium’s priority to nurses, it is hard to choose fair conditions to compare delirium. Altered level of consciousness can be hallmark sign of delirium and therefore, this comparison should be interpreted cautiously. Presence of pain is a very broad condition that can be interpreted in different ways. For example, nurses who work in surgical intensive care units with patients who have just undergone painful procedures may prioritize pain higher due their experience and daily routine. Another example is a nurse who works in a cardiac ICU that knows chest pain is a serious symptom that could indicate patient complication or decline. Furthermore, the broad term ‘presence of pain’ as a comparable condition to delirium may be confusing and create conflicting prioritization among the nurse population. The same can be said to improper placement of invasive device. This comparison can be interpreted in a variety of ways depending on the nurse’s specialty.
Perceived Barriers

There were many perceived barriers expressed by the nurses in regards to performing delirium assessment. The most frequently reported barriers were patient intubation, patients receiving sedation, and difficulty performing the screening instrument (Devlin et al., 2008; Eastwood et al., 2012; Law et al., 2012; Ozsaban & Acaroglu, 2015). Although nurses reported patient intubation as a barrier, both validated screening instruments have included screening alternatives to assist with screening in non-verbal patients. In addition, both instruments use a sedation scale prior to screening to determine if patients are too sedated to screen. Therefore, perhaps this barrier involves further investigation on nurse education regarding performing delirium screening instruments.

Both instruments use the RASS scale for assessing patient level of consciousness and sedation prior to delirium screening (Brummel et al., 2013). Completing the RASS categorization instrument is required for all patient delirium screening, not just patients receiving sedation (Brummel et al., 2013). The CAM-ICU should be performed with changes in level of consciousness, and therefore fluctuations in patient RASS score could involve performing additional CAM-ICU screening. Frequent and serial delirium screening addresses a type of delirium called “reversible sedation-related delirium”. This type of delirium is present while patients are receiving sedation but resolves within two hours after stopping sedatives (ICU Delirium and Cognitive Impairment Study Group, 2011). Therefore, frequent CAM-ICU delirium screening should guide health care providers in identifying patients with true ICU delirium. Conversely, the ICDSC directly addresses “reversible sedation-related delirium” and does not give patients a point towards their delirium score if they have received sedatives. If a patient has not received
sedatives and has a RASS score of any number but 0, a point is given towards their delirium score.

The last perceived barrier was difficulty performing the screening instrument regarding a lack of time to perform the instrument or performance of the instrument is too difficult. According to the creators of CAM-ICU, 90% of CAM-ICU assessments take less than 1 minute, with 10% taking a few minutes (ICU Delirium and Cognitive Impairment Study Group, 2011). CAM-ICU should be performed once a shift or with any changes in the patient’s level of consciousness or sedation level. In contrast, the ICDSC is conducted over the entire nursing shift and uses nursing observations to determine if delirium is present. Therefore, depending on the screening instrument being performed, time consumption or lack of time to perform delirium screening assessment can occur in many instances. Patient population, work environments, and nursing experience could influence this perceived barrier. Perhaps more research on patient acuity and nursing to patient ratios is needed to further evaluate this barrier.

In the American study, 34% of nurses found delirium screening instruments in general were too complex when assessing delirium (Devlin et al., 2008). Another study that examined only the CAM-ICU found that 33% of nurses found the CAM-ICU ‘quite’ or ‘very hard’ to perform (Eastwood et al., 2012). In addition, the study that only examined the ICDSC discovered nurses felt they lacked the time to perform the ICDSC instrument (Law et al., 2012). In the study performed by Eastwood et al., despite the evidence of barriers, 82% of nurses wanted to continue to use the CAM-ICU (2012). Also, nurses in the Law et al. study felt the ICDSC was useful and had confidence in the instrument (2012). In conclusion, although nurses may feel delirium screening is
associated with performance related barriers they understand and agree delirium screening is important to conduct in the ICU setting.

**Screening Practice**

All five studies examined current delirium instrument practice. The participants in two studies preferred the CAM-ICU to the ICDSC. The percent of participants who preferred CAM-ICU was 36% and 11%, versus 4.4% and 4% respectively, who preferred the ICDSC (Devlin et al., 2008; Ozsaban & Acaroglu, 2015). One study solely examined current practice of the ICDSC and nurses reported high scores of confidence and ease when performing the instrument (Law et al., 2012). However, in this particular study, the ICDSC had been successfully implemented into the hospital setting for greater than five years. Therefore, perhaps long term integration of delirium screening leads to significantly increased nurse confidence and ease in performing delirium screening. On the latter, a study reported 54.2% of participants had never assessed delirium (Elfekely & Ali, 2013). Another showed only 20% of participants knew of a formal delirium screening instrument, and only 7% used one in bedside practice (Eastwood et al., 2012).

In conclusion, one study focused on CAM-ICU and nursing perceptions (Eastwood et al. 2012), one study focused on ICDSC and nursing perceptions (Law et al., 2012), and one did not address a validated tool (Elfekely & Ali, 2013). Two studies reported the most frequently used assessment methods of delirium by nurses were observed agitation or the inability to follow commands (Devlin et al, 2008; Ozsaban & Acaroglu, 2015). Although the CAM-ICU and ICDSC were included as answer options, a total of 47% (Devlin et al, 2008) and 8.4% (Ozsaban & Acaroglu, 2015) of participants chose a validated tool as a preferred delirium screening method. As mentioned before, in
the absence of validated tool delirium goes undetected by doctors and nurses in 65% of ICU patients (AACN, 2015). Therefore, education and implementation of validated screening instruments is needed for successful assessments.

**Education**

One study incorporated education into the study design (Eastwood et al., 2012). After a pre-education survey, Eastwood et al. made a CAM-ICU online education forum available for the nurses (2012). In the other four studies, no formal education was incorporated into study design. However, two studies addressed the presence of previous nurse education on delirium in hopes of focusing future research efforts on knowledge deficits discovered in the survey. One study reported 12% of participants had received education on delirium (Devlin et al., 2008). In another study, 100% of participants never received education on delirium (Elfekely & Ali, 2013). In result, it may be difficult to adequately assess perceptions of delirium topics if a large percent of nurses haven’t received education on delirium and validated screening instruments. Although the objectives of these studies were to assess perceptions and identity current practices, they also highlight and expose the lack of education focus on delirium around the world.

**Implications for Nursing Practice**

After reviewing the literature, several recommendations are evident. The lack of nurse education is a major factor that may influence nurse perception and knowledge of delirium screening in the ICU setting. Education on the identified perceived barriers and screening practice could improve screening through the influence of nurse perception. “Education of the nurses is an essential component of the success of any new intervention or initiative” (Rivosecchi, Smithburger, Svec, Campbell, Kane-Gill, 2015). Nurses
should be educated on delirium and delirium screening instruments to detect delirium as early as possible for intervention. In addition, an education intervention and evaluation of education methods should be included in future studies. For example, delirium education could include information on: the definition of delirium, incidence of delirium, delirium risk factors, screening importance, and screening performance. Research on the frequency of education and re-education of nurses should also be determined. The development of standardized education as well as standardized techniques for evaluating the success of teaching should be considered in future research.

Further research is needed on the variety of topics discussed in this review. Only five studies from all over the world were discovered for this review. Future research on delirium screening is warranted because of the detrimental effects ICU delirium exhibits on patients. Therefore, more general research on nurse perception and knowledge on delirium screening and screening instruments is needed. All future studies should include evaluation of nurse perception, screening practice, education, and perceived barriers. Perceived barriers should be examined more thoroughly in order to discover root cause and work towards to creating collaborate solutions.
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<th>Purpose</th>
<th>Findings and Key Points</th>
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<tr>
<td>Devlin et al., 2008</td>
<td>Descriptive Survey</td>
<td>331 staff nurses working in 16 ICU at 5 acute care hospitals with sedation guidelines specifying delirium assessment</td>
<td>To identify current practices and perceptions of intensive care nurses regarding delirium assessment and to compare practices for assessing delirium with practices for assessing sedation.</td>
<td>Preferred methods for assessing delirium included assessing ability to follow commands (78%), checking for agitation-related events (71%), the Confusion Assessment Method for the Intensive Care Unit (36%), the Intensive Care Delirium Screening Checklist (11%), and psychiatric consultation (9%). Barriers to assessment included intubation (38%), complexity of the tool for assessing delirium (34%), and sedation level (13%).</td>
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<td>Eastwood, G., Peck, L., Bellomo, R., Baldwin, I., Reade, M., 2012</td>
<td>Non-randomized trial and descriptive study</td>
<td>174 nurses in Australian ICU</td>
<td>To assess the attitudes of Australian critical care nurses after a hospital introduced the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) for delirium instrument screening.</td>
<td>The first survey response rate was 65/174 (37%). Most nurses (73%) thought active delirium assessment was important, and 93% thought their assessments were worth the time required. These assessments were largely unstructured, as only 20% knew a formal delirium test, and only 7% sometimes used one. The second survey response rate was 45/174</td>
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(26%). Most (89%) still thought delirium assessment was important, but only 75% thought the CAM-ICU worth the time required (p=0.01 compared to unstructured assessments). Similar proportions (75% and 73%) were confident in the accuracy of their assessments. Many (33%) found the CAM-ICU 'quite' or 'very' hard to perform, but despite this, 82% wanted to continue to use it.

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<td>Law et al., 2012</td>
<td>Descriptive survey</td>
<td>189 critical care-trained nurses working on four oncology inpatient units in Canada</td>
<td>To evaluate nurse perceptions of using ICDSC, and to identify barriers to delirium assessment and treatment.</td>
<td>Eighty-four nurses (44%) responded to the survey. Respondents indicated that they had knowledge of delirium, confidence in the ICDSC, and that the ICDSC was useful. Respondents perceived that physicians did not value the ICDSC results. Similar to prior nurse surveys for other delirium screening tools, physicians were the most frequently identified barrier to both delirium assessment and treatment, with other frequent barriers being lack of time,</td>
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<td>Elfekely &amp; Ali, 2013</td>
<td>Descriptive</td>
<td>120 nurses at different critical care departments in Egypt</td>
<td>To determine the current nurses’ practice of delirium assessment in critical care units and to determine how critical care nurses perceive delirium among critically ill patients.</td>
<td>All ICU nurses (100%) ranked delirium assessment as the fourth priority after level of conscious, pain assessment, handling agitation, and caring for devices. More than half of the studied nurses (54.2%) never assessed delirium, and 100% of nurses never received training about assessing and handling delirium.</td>
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<td>Ozsaban &amp; Acaroglu, 2015</td>
<td>Descriptive</td>
<td>301 nurses from five Turkish public hospitals</td>
<td>To identify current practices and perceptions of intensive care nurses regarding delirium assessment and to examine the factors that affect these practices and perceptions.</td>
<td>More than half of the nurses performed delirium assessments. Almost all of the nurses perceived delirium as a problem and serious problem for ICU patients. Statistically significant differences were found in the proportion of nurses who assessed delirium symptoms and whose care delivery system was patient-centered and perceived delirium as a serious problem.</td>
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References


Delirium Screening Instrument Knowledge and Perception among Cardiovascular Intensive Care Nurses

Brittany Dahl, RN, BSN, CCRN

University of Kentucky
Abstract

**Background:** Delirium is a serious condition that affects critically ill adult patients in the intensive care unit. Bedside nursing delirium measurements are considered a dependable source of information that can be used for clinical decision-making. Nurse education and assessment of perceptions is important when building a framework for successful delirium assessment. However, few data exist about nursing perceptions and practices associated with delirium screening instruments. The overall purpose of this project is to examine nurse perceptions and knowledge about delirium and delirium screening instruments at the University of Kentucky (UK) Hospital’s Cardiovascular Intensive Care Unit (CVICU).

**Objectives:** The aims of the project were: (i) to describe current sedation and delirium practice using a 11-item survey completed by registered nurses who practice full time in the CVICU; (ii) to compare knowledge and perception about sedation and delirium screening score before the receipt of a 20-minute education program with those obtained immediately following the program in registered nurses who practice full time in CVICU; (iii) to describe registered nurse evaluation of 2 delirium screening instruments, the Confusion Assessment Methods-Intensive Care Unit (CAM-ICU) and the Intensive Care Delirium Screening Checklist (ICDSC) , using a 10-item instrument.

**Methods:** A descriptive pre- and post- design was used for this study. The data was analyzed using descriptive statistics. Paired t-tests were conducted to compare the differences in mean pre- and post-test scores.

**Findings:** Overall, there were 40 nurse participants. All nurses in the study assessed sedation and delirium more than once per shift with 97.5% of nurses used the CAM-ICU
validated screening instrument. Perceived barriers of delirium screening included (i) difficult to interpret intubated patients; (ii) nurses do not feel confident in their ability to use delirium assessment instruments; and (iii) inability to complete assessment in sedated patient. Overall, education on delirium screening can change nurse perception and improve nursing knowledge. After receiving education on both instruments, nurse participants preferred the ICDSC to the CAM-ICU regarding performance confidence and time consumption. The nurses also chose the ICDSC to be implemented into bedside practice.
Introduction

The American Association of Critical Care Nurses (AACN) defines delirium as an acute change in consciousness accompanied by inattention and either a change in cognition or perceptual disturbances (AACN, 2014). It is a serious condition that affects critically ill adult patients in the intensive care unit (ICU). Delirium is present in as many as 60-80% of mechanically ventilated patients and 20-50% of non-mechanically ventilated patients (Brummel et al., 2013). ICU delirium is independently associated with higher patient mortality, prolonged ICU stay, and greater health care costs (Devlin et al., 2008). The risk for mortality while in the hospital is more than doubled in patients who develop delirium (Skwarecki, 2015). In addition, patients who experience ICU delirium are at greater risk for cognitive impairment after discharge (Skwarecki, 2015).

Delirium presents as a change in patient’s baseline mental status that can fluctuate in severity. Characteristics of delirium include disturbances in vision, speech, orientation, perception, and memory (Reimers and Miller, 2014). The pathophysiology of delirium is not well understood and the many causal theories are multi-factorial (Yuying, Ying, Li, and Zhu, 2012). Although the risk factors for delirium have been understudied, there are many identified modifiable and non-modifiable risk factors for delirium in ICU patients. These include old age, smoking history, current alcohol abuse, malnutrition, visual impairment, hearing impairment, sedatives, kidney disease, hypertension, liver disease, heart failure, baseline cognitive impairment, sedatives and factors of acute illness such as acute respiratory distress syndrome, sepsis, hypoxemia,
and metabolic disturbances (AACN, 2014; Reimers and Miller, 2014; Yuying et al., 2012). Delirium’s non-discriminatory effects on ICU patients has influenced the creation of validated screening instruments such as the Confusion Assessment Method-Intensive Care Unit (CAM-ICU) and the Intensive Care Delirium Screening Checklist (ICDSC). In the absence of a structured diagnostic screening instrument delirium goes undetected by doctors and nurses in 65% of ICU patients. (AACN, 2014). Using validated screening instruments promotes prompt recognition and facilitates the initiation of prevention, management, and treatment measures.

The ICDSC and CAM-ICU are the most commonly used and studied delirium screenings instruments in critical care (Brummel et al., 2013). Yet their structure and process of screening delirium is very different. The two major clinical differences include duration over which symptoms are assessed and methods for identifying delirium symptoms (Brummel et al., 2013). CAM-ICU can be completed in less than one minute and requires specifically defined measures with patient testing to determine the presence or absence of delirium features. Delirium is characterized by fluctuating course, and therefore the “spot” testing of CAM-ICU may miss an episode of delirium at time of the assessment (Brummel et al., 2013). In contrast, the ICDSC gathers information over 8-24 hours and relies on observational methods to detect delirium features. In result, the detection of delirium features in nonverbal mechanically ventilated patients may be more difficult. Also, the longer assessment period may lead to increased false-positive screens for delirium. In two recent systematic reviews and meta-analyses on the sensitivity and specificity, CAM-ICU’s pooled sensitivity was 76% and 80% and specificity of 96%, and ICDSC’s pooled sensitivity was 74% and 80% and specificity was 75% and 82%.
(Brummel et al., 2013). Despite the psychometric differences both are equally recommended by the evidenced based pain, agitation, and delirium guidelines expertly created by The Society of Critical Care Medicine (Barr et al., 2013).

Both instruments use the Richmond Assessment and Agitation Scale (RASS) for assessing patient level of consciousness and sedation-agitation prior to delirium screening (Brummel et al., 2013). Completing the RASS categorization instrument is required for all patient delirium screening, not just patents receiving sedation (Brummel et al., 2013). For example, if a patient has a RASS of -3 or greater, one can proceed with CAM-ICU assessment. However, if the RASS score is less than -3 (e.g. -4 or -5, too sedated), one cannot proceed with CAM-ICU. Conversely, the ICDSC uses the RASS score as a section of points towards a positive delirium screening. For example, a RASS of 1-4 at any point during the nurse’s shift the patient receives 1. If the patient was a RASS of 0, the patient receives no point. Like CAM-ICU, ICDSC is not assessable with a RASS score less than -3 (e.g. -4 or -5, too sedated). Therefore, education about sedation screening is necessary for delirium screening performance.

Although the CAM-ICU instrument is present on the University of Kentucky (UK) Hospital nursing electronic medical record documentation flow sheet, a large majority of critical care nurses in the Cardiovascular Intensive Care Unit (CVICU) have not received formal education (e.g., in hospital lectures, presentations, case studies) about the instrument. According to Brummel et al., using case based scenarios along with didactic teaching increases nursing knowledge, confidence, and performance of delirium screening (2013). In addition, it is imperative for nurses to understand the instrument’s importance to encourage regular screening, and to assist in early detection, continued
monitoring, and prompt management of delirium (Gesin et al., 2012). “Education of the nurses is an essential component of the success of any new intervention or initiative” (Rivosecchi, Smithburger, Svec, Campbell, Kane-Gill, 2015). Education promotes further individual investment in delirium screening and encourages habitual instrument performance. Also, UK Hospital does not have a delirium screening and management protocol. Delirium screening education is the first step in creating a successful delirium screening and management protocol, as properly screening for delirium is crucial for protocol initiation (Brummel et al., 2013).

Some common clinician perceptions of delirium assessment include perceived difficulty of performing screening in sedated or intubated patients, perceived complexity of screening instruments, and time constraints when performing screening (Brummel et al., 2013). Perceived barriers to screening may be overcome through education about delirium and training on how to perform delirium screening instruments (Brummel et al., 2013). Therefore, nurse education and assessment of perceptions are important when building a framework for successful delirium assessment. However, few data exist about nursing perceptions and practices associated with delirium screening instruments (Devlin et al., 2008). Nurses are with patients 24 hours a day and are the key for delirium detection and achieving improved delirium outcomes for patients (Yuying, Ying, Li, and Zhu, 2012). Bedside nursing delirium measurements are considered a dependable source of information that can be used for clinical decision-making (Vasilevskis et al., 2011). Therefore, evaluating nurse perceptions about both instruments feasibility of delirium screening instruments into nursing practice. The overall purpose of this project is to
examine nurse perceptions and knowledge about delirium and delirium screening instruments at UK Hospital’s CVICU.

**Aims**

The aims of the project were: (i) to describe current sedation and delirium practice using a 11-item survey completed by registered nurses who practice full time in the CVICU (Appendix H); (ii) to compare knowledge and perception about sedation and delirium screening score before the receipt of a 20-minute education program with those obtained immediately following the program in registered nurses who practice full time in CVICU; (iii) to describe registered nurse evaluation of 2 delirium screening instruments, the CAM-ICU and the ICDSC, using a 10-item instrument (Appendix I).

**Study Design**

The overall purpose of this project is to examine nurse perceptions and knowledge about delirium and delirium screening instruments at UK Hospital’s CVICU. A descriptive pre- and post-test analysis was used to determine the impact of education on nursing perception and knowledge of delirium and delirium screening instruments.

**Setting**

The project took place at a 569 bed Level 1 Trauma, and multi-organ transplant center located in central Kentucky. The project’s interventions were performed in the hospital’s 32-bed CVICU.
Study Population

The study population included registered nurses employed full time (36 hours or more/week) in the CVICU (n=40). Nurses were excluded if they held an administrative position.

Informed Consent

Approval from Director of Cardiovascular Service Line was obtained to complete the project in the CVICU (Appendix A). Nurses received an email 2 weeks before the first project program implementation date to invite them to participate in the study (Appendix B). The email was initially sent to the patient care manager who then sent the email to all nursing staff. The primary investigator did not have access to the email addresses. The email had an attached invitation letter that introduced the project and provided information about the project purpose and objectives (Appendix B). Participants were recruited through the monthly staff meetings. After the staff meetings were over, nurses chose to stay after and participate in the project. There were multiple project implementation dates to reach the largest and most diverse sample of participants.

Methods

After IRB approval, the subject recruitment methods began by contacting the patient care manager for monthly staff meetings dates. Two weeks before the first identified project program date, an invitation email was sent to registered nurses in CVICU (Appendix B). After the scheduled monthly staff meeting, the project program began. First, the inclusion criteria were explained to the participants. The participants were notified the project would take a total of 30 minutes. The participants received a paper packet that included a cover letter, a copy of the CAM-ICU instrument (Appendix
D), copy of the Richmond Agitation and Assessment Score (RASS) (Appendix E), copy of the ICDSC instrument (Appendix F), four case studies (Appendix G), and pre- and post-survey (Appendix I). The paper packet cover letter notified the participants that informed consent was implied by completion and submission of data. After reviewing the cover letter, the participants were asked to complete the paper pre-survey using pen or pencil. The pre-survey was an 11-question instrument that contained 6 demographic questions. The pre-survey assessed nurse knowledge and perceptions of delirium, delirium screening instruments, and sedation screening instruments. After completion of the pre-survey, there was a 20-minute education intervention. First, the primary investigator presented a recorded 10-minute power point presentation created by the primary investigator. The outline for educational presentation is located in Appendix J. Also, the education included step-by-step instructions about how to use the CAM-ICU and ICDSC screening instruments. The last part of the education intervention, included group instruction with 2 case studies using the CAM-ICU instrument and 2 case studies using the ICDSC instrument. The case studies demonstrated the use of these instruments in bedside practice. During the educational intervention, participants were asked to listen to the information presented. Questions or comments to the primary investigator about any of the information presented were welcome, however not required.

After the education intervention, the participants were asked to complete the paper post education survey instrument found in the survey packet using pencil or pen. The post-survey was 10-question instrument. The post-survey examined the nurse’s perception of CAM-ICU and ICDSC instruments. The post-survey determined which instrument, the CAM-ICU or ICDSC, nurses perceive as most easily integrated into
CVICU nursing practice. It also examined nurse knowledge and perception of delirium and delirium screening post education intervention. Completion and submission of the pre- and post-survey ended the participant’s involvement in the project.

**Measures**

The data collection instruments used for this study included a pre-survey (Appendix H) and a post-survey (Appendix I). The pre-survey assessed nurse knowledge and perception of delirium, delirium screening instruments, and sedation screening instruments. Pre-survey questions 1 through 7 were taken from a study by Devlin et al. that evaluated nurse perception, knowledge, and practice about delirium screening (2008). The questions were designed in a variety of formats. Some questions used nominal levels of measurement and addressed the frequency of performing delirium and sedation screening (questions 2, 3, and 4). The pre-survey questions also included ordinal levels of measurement and asked participants to rank the importance of delirium, and rank the top three barriers associated with delirium screening (questions 1 and 5). Another ordinal question asked participants to check all education received on sedation and delirium screening (question 6). Lastly, question 7 used a Likert opinion scale to evaluate participant response to true or false statements regarding delirium. All Likert scales included in the study used an opinion scale of strongly disagree (1) to strongly agree (5). The primary investigator created pre-survey questions 8 through 10 to evaluate confidence, ease, time consumption, and satisfaction of the currently used delirium instrument. The pre-survey contained 6 demographic questions. The demographic questions (Appendix H) did not ask direct identifying information such as name, date of birth, employee identification number, or nursing license number. The post-survey
examined nurse perception of the CAM-ICU and ICDSC instruments after educational intervention (Appendix I). Questions 1 through 6 were created by the primary investigator and used a Likert opinion scale to evaluate confidence, ease, and time consumption of both screening instruments. Question 7 used a dichotomous question with four answer options to determine screening instrument preference among nurse participants. Question 7 used a Likert opinion scale to evaluate the participant’s intent to screen for delirium after educational intervention. Question 8 also used a Likert opinion scale to determine nurse interest in receiving more education about delirium and delirium screening practices. Post-survey question 10 is the same question found in question 7 on the pre-survey. This question uses a Likert scale to evaluate participant response to true or false statements regarding delirium. The purpose of duplicating this question was to compare answers to the pre-survey and determine if educational intervention impacts nurse knowledge.

**Data Analysis**

Descriptive analysis, including means and standard deviation or frequency distributions, were used to summarize study variables of interest. To examine changes in knowledge and perception scores before and after the intervention, paired t-tests were used. Data analysis was performed using SPSS version 23 (SPSS, Inc., Chicago, IL). The study considered p-values <.05 to be statistically significant for the analysis.
Results

Sample Characteristics

A total of 40 participants completed the pre- and post-test. During the duration of the project, October 2015 to December 2015, there were approximately 78-92 full time nurses working in the CVICU. The mean age of the participants was 30.74 years (SD = 8.20) with a range of 22-54. Eighty percent of the nurses had a bachelor’s degree, while the other 20% had an associate’s degree. Seventy-five percent of the nurses had 0-5 years of nursing experience, and 77% of the nurses had 0-5 years of ICU nursing experience (see Table 1).

Current Practice

The pre-survey asked the nurses how frequently they assess for level of sedation and presence of delirium assessments. The largest percent of nurses (42.5%) assess level of sedation 4-6 times per 12-hour shift, while, 15% of nurses assess delirium once a shift, 47.5% of nurses assess 2-3 times a shift, and 37.5% of nurses screen four or more times a shift (Table 2). In addition, the pre-survey assessed the frequency of screening using specific methods, such as the CAM-ICU and ICDSC. Almost all of the nurses (97.5%) use the CAM-ICU at least once or more a shift to screen for delirium. When examining the ICDSC, 45% of nurses had never heard of the instrument and 30% of nurses had never used the instrument (Table 3).

Perception

The most frequently ranked barriers to evaluating patients for the presence of delirium included; (i) difficult to interpret intubated patients; (ii) nurses do not feel confident in their ability to use delirium assessment instruments; and (iii) inability to
complete assessment in sedated patient (Figure 1). In addition, nurses were asked to rank their overall happiness with the CAM-ICU currently used in the ICU. Forty-two point five percent of the nurses disagreed with the statement, while 35% neither agreed nor disagreed and 22.5% agreed or strongly agreed.

Knowledge

The pre-test also included questions on previous education received by the nurses on sedation assessment and delirium assessment (Table 4). Most nurse participants received sedation and delirium assessment through teaching at the bedside by a nursing preceptor or other health professional, 75% and 57.5% respectively. In addition, only 37.5% and 32.5% received sedation and delirium assessment education in live, in hospital lectures.

Pre and post-test knowledge comparison

Overall, there were three significant findings from the 8-question knowledge assessment administered to the nurses before and after educational intervention. This question, found in both the pre- and post-survey (question 7 and 10) used a Likert opinion scale. All Likert scales included in the study used an opinion scale of strongly disagree (1) to strongly agree (5). The mean score of nurses who agreed with the (true) statement, “Delirium is an under diagnosed problem”, went from 4.36 to 4.77 ($p$-value 0.002). In addition, the mean scores of nurses who agreed with the (true) statement, “Delirium is problem that requires active interventions on part of caregivers”, went from 4.41 to 4.49 ($p$-value 0.017). Lastly, the mean scores of nurses who disagreed with the (false) statement, “Initiation of antipsychotic therapy should be initial intervention for all patients with delirium”, decreased from 2.54 to 2.26 ($p$-value 0.026) (Table 5).
Pre and post-test perception comparison

After educational intervention, there were significant findings concerning CAM-ICU perception. The nurses perceived confidence in performing the CAM-ICU mean score increased, 2.90 to 3.75 (p-value of 0.00), with nurses reporting more perceived confidence. The nurses perceived ease in using the CAM-ICU instrument mean score increased, 2.58 to 3.50 (p-value of 0.00), with more nurses perceiving CAM-ICU easier to perform post intervention. Lastly, the perceived time consumption of the CAM-ICU instrument mean score decreased from 3.15 to 2.78 (p-value of .045), with more nurses disagreeing with statement, “I feel using the CAM-ICU is time consuming” (Table 6).

Pre and post test CAM-ICU and ICDSC comparison

In the post-survey, nurses were asked to compare the confidence, ease, and time consumption of the CAM-ICU and ICDSC. Nurses were felt both instruments equally easy to use after educational intervention. Although not a significant finding, nurses found the ICDSC less time consuming with a mean score of 2.60, compared to CAM-ICU mean score of 2.78. The significant value is noted when nurses report their perceived confidence in performing the screening instruments. The nurses felt more confident in performing the ICDSC, mean score of 4.03, than the CAM-ICU, mean score of 3.50 (p-value .0.019) (Table 7). In addition, when asked which screening instrument, CAM-ICU or ICDSC, should be integrated in the CVICU nursing practice, 82.5% of nurses preferred the ICDSC rather than the CAM-ICU, 15% (Table 8).
Discussion

Practice

When evaluating current practice, the largest percent of nurses assessed level of sedation 4-6 times per 12-hour shift. Ninety-two percent of nurses assess level of sedation 2 or more times per 12-hour shift. This result reflects the hospital’s policy on assessing RASS scores in patients every 2 hours who are receiving any sedating medications. All nurses in the study assessed delirium at least once a shift or greater with 85% of nurses screening 2 times or more a shift. In a similar study by Devlin et al. substantially more nurses routinely screened for sedation than presence of delirium (2008). They attribute this discrepancy to the lack of sedation protocol specificity to assess delirium. Also, in the Devlin et al. study, the largest percent of nursing staff screen for delirium 2-3 times per 12-hour shift (2008). Our study also reflected this result with 42.5% of nurses screening 2-3 times per 12-hour shift.

All nurses in our study used the ‘ability to follow commands’ as a method to evaluate for delirium at least once a shift or more. Also, 82.5% of nurses use ‘agitation related events’ to evaluate for delirium at least once a shift or more. In the similar study by Devlin et al., the ‘ability to follow commands’ and ‘agitation related events’ were the two most commonly reported methods for detecting delirium (2008). The Devlin et al. study reported fewer than half of nurses used a validated screening instrument as the primary means for assessing delirium (2008). In contrast, in our study 97.5% of nurses used the validated screening instrument CAM-ICU at least once or more a shift to evaluate patients for delirium. However, in both studies the number of nurses who use ‘ability to follow commands’ and ‘agitation related events’ as delirium evaluation
methods is concerning. According to Devlin et al., relying on these methods to detect delirium will cause nurses to miss many cases of delirium, particularly in patients who have hallucinations, disorganized thinking, and who are hypoactive (2008).

**Perception**

When examining perception, the three most commonly ranked barriers to assessment in our study were (i) difficult to interpret intubated patients; (ii) nurses do not feel confident in their ability to use delirium assessment instruments; and (iii) inability to complete assessment in sedated patients. In the Devlin et al. study, the three most ranked barriers by nurses including (i) difficult to interpret intubated patients; (ii) the inability to complete assessment in sedated patient; and (iii) the use of delirium assessment tools that are too complex (2008). Both studies found that nurses perceive patient intubation and sedation as barriers to screening to delirium. Validated screening instruments have included screening alternatives to assist with screening in non-verbal patients. In addition, both instruments use a sedation scale prior to screening to determine if patients are too sedated to screen. Therefore, perhaps these barriers warrant further investigation concerning nurse education and delirium screening instruments.

Both instruments use the RASS scale for assessing patient level of consciousness and sedation prior to delirium screening (Brummel et al., 2013). Completing the RASS categorization instrument is required for all patient delirium screening, not just patients receiving sedation (Brummel et al., 2013). The CAM-ICU should be performed with changes in level of consciousness, and therefore fluctuations in patient RASS score could involve performing additional CAM-ICU screening. Frequent and serial delirium screening addresses a type of delirium called “reversible sedation-related delirium”. This
type of delirium is present while patients are receiving sedation but resolves within two hours after sedatives are stopped (ICU Delirium and Cognitive Impairment Study Group, 2011). Therefore, frequent CAM-ICU delirium screening should guide health care providers in identifying patients with true ICU delirium. Conversely, the ICDS C directly addresses “reversible sedation-related delirium” and does not give patients a point towards their delirium score if they have received sedatives. If a patient has not received sedatives and has a RASS score of any number but 0, a point is given towards their delirium score.

Considering less than half of nurses in the Devlin et al. study used a validated screening instrument to assess delirium, the perceived barriers could be explained by lack of knowledge on validated screening instruments. Although, in our study 97.5% of nurses use the CAM-ICU at least once a shift or more to assess for delirium. However, our pre-survey did discover over half of the nurse participants were unhappy or felt indifferent about the CAM-ICU currently practiced in the CVICU. Perhaps this factor, along with additional CAM-ICU screening required in sedated patients, influenced the nurses’ choice of top ranked barriers. In conclusion, these reported barriers require further investigation concerning nursing bedside practice and education about instrument performance.

Education

In regards to education, over half of the nurses in the study received bedside teaching by a nursing preceptor or other health professional and less than half received education in live, in hospital lectures. In the study by Devlin et al., more than one third of nurses reported receiving no training about delirium (2008). Nurses who did receive
training in their study were more likely to have received the training in a live, out of hospital event rather than a live, in hospital training or at the bedside (Devlin et al., 2008). In our study, the large percentage of nurses who received bedside teaching by a nurse preceptor is most likely due to the presence of the CAM-ICU screening instrument on electronic medical record nursing flow sheet. CAM-ICU teaching is most likely included in the education provided by the preceptor when instructing new nurses on charting practices. According to Devlin et al. the lack of institutional teaching about assessment of delirium is most likely due in part to a lack of clarity about the optimal way to educate nurses about assessment of delirium (2008).

Furthermore, the findings from previous studies relate the importance of increasing educational efforts focused on delirium assessment. In result, our study included education and evaluated nurse perception and knowledge before and after educational intervention. When examining the pre- and post-mean scores in regards to education, there were three statistically significant results that showed education improved mean knowledge scores among ICU nurses. The three true and false statements that resulted statistically significant results addressed the rationale for delirium screening and delirium treatment interventions (Table 5). Also, our study discovered that after educational intervention, nurses reported significantly higher confidence in CAM-ICU instrument performance. Nurses also thought the CAM-ICU was easier to perform and less time consuming after education. Therefore, education not only affects knowledge but perception of screening instruments.
Pre and Post-test Comparisons

Nurse participants received education and case studies on both the CAM-ICU and ICDSC delirium screening instruments. The educational presentation presented non-biased evidenced based information on the advantages and disadvantages of each screening instrument. The frequency of screening and time consumption of each instrument was thoroughly explained. The complete education overview is located in Appendix J. Our results found that nurses perceived the CAM-ICU and ICDSC equally easy to perform. However, nurses perceived the ICDSC as less time consuming and reported more perceived confidence with the ICDSC. In addition, 82.5% of nurses preferred the ICDSC rather than the CAM-ICU, 15% of nurses (Table 8). Therefore, nurses in the CVICU felt the ICDSC was the best instrument to integrate in their bedside nursing practice.

Other than an a reported increase in perceived confidence and less time consumption, further investigation to the reasons for this choice is warranted. The ICDSC score solely relies on nurse observation and interaction with the patient over a 12 hr shift. On the other hand, the CAM-ICU is a ‘spot check’ step-by-step testing instrument performed once a shift or with changes in level of consciousness or RASS. The ICDSC uses nurse judgment as an integrated assessment technique and perhaps nurses prefer this feature. In addition, a numerical score, score of 1-3, is given to subsyndromal delirium on the ICDSC scoring rubric. This alerts the nurse that delirium prevention efforts are most effective at this score and the multidisciplinary team should initiate pro-active interventions. The CVICU nursing staff also work with post-surgical patients who receive large amounts of sedation medications. The ICDSC scoring accounts for possible
“reversible sedation-related delirium” and further screenings are not necessary. On the other hand, the CAM-ICU is most accurate with more frequent screenings post sedation and with changes in RASS. Therefore, perhaps nurse participants felt this variable was a time saving measure only offered by the ICDSC.

It is also important to remember that our pre-survey discovered over half of the nurse participants were unhappy or felt indifferent about the currently practiced CAM-ICU. In result, did education truly affect nurse perception? The results reported that CAM-ICU education did influence post-survey results concerning nurse confidence, ease, and time consumption. However, the ICDSC was the preferred instrument to integrate into bedside practice. Therefore, personal bias could have played a factor in the nurse participant’s decision. Perhaps further concentrated research on perceived barriers regarding CAM-ICU should be examined to justify the ICDSC as the instrument of choice. In addition, CVICU multidisciplinary team member’s perceptions could be examined to support the nurses’ decision. Delirium screening and prevention practices are a team effort and this input could be beneficial when creating organizational change.

In the pre-survey, 45% of nurses had never heard of the ICDSC and 30% of nurses had never used the ICDSC in practice. However, 20% of nurses reported they screen with ICDSC once or more a shift. This result is difficult to explain as the ICDSC is not exclusively used at the hospital and neither education nor charting is available to nursing staff on this instrument. Although it is not differentiated in the demographic data, there is a large number of travel nurses contracted in the CVICU. Perhaps in their previous nursing experience they used this instrument for delirium screening and continue to use it in practice.
Limitations

Several limitations deserve mention in our study. The number of nurses (N=40) who participated in the study may not reflect the entire CVICU nursing population. During the time of this study, October 2015 to December 2015, 78-92 full time nurses were employed in the CVICU. Therefore, a range of 43.4% to 51.2% of CVICU nurses participated in the study leading to possible response bias. Also, the patient care manager of the project setting stated the ICU had a high nursing turnover rate during the time of this study. However, numerical data on the rate was not available. Further differentiation of the demographic data to identify the number of travel nurses in the population sample was not performed. This data could have helped explain possible result inconsistencies such as the current use of the ICDSC. Also, it could have assisted in further justifying the ICDSC as the preferred instrument to be integrated into practice. The study setting was a large academic hospital and therefore may not be generalizable for all ICU settings. Also, the project had a limited time frame of three months.

Although most CVICU nurses had not received formal training on the CAM-ICU instrument, the CAM-ICU is present on the sunrise clinical manager computer charting system used at the setting facility. It could be assumed that the CVICU nurses were accustomed to the CAM-ICU before the study and therefore, responses could be influenced by familiarity. However, our evaluation of current practice, confidence, ease, and time consumption of the currently used instrument was a preemptive effort to reduce bias and achieve the original goals and objectives of the study.

The instruments used in this study were taken from one peer-reviewed study published in the American Journal of Critical Care, and were created by the primary
investigator. There is no evidence on associated psychometrics or reliability of these instruments. The questions created by the primary investigator and the project committee were built on common themes pulled from a literature review that evaluated nurse perception. These themes were confidence, ease, time consumption, and satisfaction. The answers to pre- and post-education surveys were self-reported with no validation for actual bedside practice. However, the study focus was not to only assess current practice, but to increase knowledge through evidenced based education, and to provide nurses the information to establish informed perceptions about screening instruments. Also, some of the answer choices were not mutually exclusive in all instances (Devlin et al., 2008). For example, both agitation and altered level of consciousness are hallmark signs of delirium, but both were used as example alternative delirium screening methods in a pre-survey question.

Implications and Conclusion

All nurses in the study agreed (80%) or strongly agreed (20%) after receiving education about delirium, they are more likely to screen for delirium in the future. In addition, 67.5% of nurses agreed and 15% strongly agreed they are interested in more education about delirium and delirium screening instruments. These results address the culture and environment of UK Hospital and the CVICU. The nurses accept new information and have intent to integrate new concepts into their practice to benefit patients. Because they are interested in more education, they are concerned with providing patients evidenced based practice that influences high quality patient care and positive patient outcomes. Therefore, the organization’s environment is one that supports quality improvement initiatives, and there is a high probability of a quality improvement
initiative becoming successful (Health Resources and Services, 2015). Quality improvement consists of systematic and continuous actions that lead to measureable improvement in health care services of targeted patient groups (Health Resources and Services, 2015). One quality improvement principle states the initiative should focus on the patient population in need. This project had an overall goal to examine nurse perceptions and knowledge about delirium and delirium screening instruments.

Delirium’s harmful effect on ICU patients and the benefits associated with performing delirium screening has been discussed at length. Therefore, although our study’s target population was nurses, the project will provide patient benefits that should be implemented to the fullest extent.

In result, this leads to the next principle of quality improvement, which is using systems and processes to organize implementation steps using the ‘Plan, Do, Study, Act’ (PDSA) cycle (Health Resources and Services, 2015). Each phase of the PDSA cycle is reliant on the next and therefore the cycle provides accountability for implementation steps. The ‘Plan, Do, and Study’ parts of the cycle have been discussed in the methods, measures, data analysis, and results sections. However, the ‘Act’ part of the cycle uses the data obtained from the study to implement changes. The first change will be honoring nurse preference and including the ICDSC in the electronic medical record for bedside practice. This change includes providing classes to educate all CVICU nurses on the ICDSC instrument and working with the information technology department to ensure proper documentation parameters. After implementation, the ‘Study’ part of the PDSA cycle is revisited, as evaluation of instrument adherence through chart audits and bedside ‘spot checks’ should be performed. In addition, nursing staff and patient care team
members’ satisfaction with the new instrument should be evaluated to continually address the instruments feasibility in nursing practice. As mentioned in the introduction, UK Hospital does not have a delirium screening and management protocol. Another use of the ‘Study’ part of PDSA cycle post ICDSC implementation should be to examine the incidence of delirium and associated patient mortality and morbidity. This will provide health care professionals with the data to evaluate the need for a delirium screening and management protocol at UK Hospital.

As evidenced by our study, nurse education is a major factor that can influence nurse perception and knowledge of delirium screening in the ICU setting. “Education of the nurses is an essential component of the success of any new intervention or initiative” (Rivosecchi, Smithburger, Svec, Campbell, Kane-Gill, 2015). Nurses should be educated on delirium and delirium screening instruments to detect delirium as early as possible for intervention. As evidenced by our study and others, using the didactic combination of in-class presentations and case studies has been shown to influence and improve nursing knowledge (Brummel et al., 2013; Eastwood et al., 2012). Although, perhaps the development of standardized education and techniques for evaluating the success of teaching should be considered for future research. Also, research on the frequency of nurse education and re-education should be determined. To encourage delirium and delirium screening education continuity, these topics should be incorporated in all high acuity, critical care education provided by undergraduate nursing colleges. In addition, hospitals with ICU settings should work to adopt a standardized delirium screening protocol or practice with accompanied education and follow up education to support
integration of standardized screening instruments in bedside practice (AACN, 2015; Barr et al., 2013).

This study was unique in the sense that it let the nurse participants chose the delirium screening instrument to be integrated into practice. The CVICU nurses are experts in their patient population and understand the unit’s workflow and processes. The power to choose the screening instrument could have many benefits. Although further research is needed to support these assumptions nurse choice could increase nurse satisfaction with delirium screening, improve screening adherence, and relay more accurate screening results. In addition, the effect of routine delirium assessment on patient outcomes, such as duration of ICU stay or severity of cognitive abnormalities, could be examined (Devlin et al., 2008).

Our results are the beginning of many potential quality improvement initiatives at UK Hospital and highlight many areas of continued global quality improvement. Delirium is serious condition that affects vulnerable ICU patients. Nurses play a major role on the multidisciplinary team to recognize delirium. Nurse education and perception should be prioritized to move delirium research forward.
### Table 1: Summary of demographic characteristic of sample ICU nurses ($N=40$)

<table>
<thead>
<tr>
<th>Demographic characteristic</th>
<th>Mean (SD); range or n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>30.74 (8.20); 22-54</td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>ADN</td>
<td>8 (20.0%)</td>
</tr>
<tr>
<td>BSN</td>
<td>32 (80.0%)</td>
</tr>
<tr>
<td>Years RN Experience</td>
<td></td>
</tr>
<tr>
<td>0-5 Years</td>
<td>30 (75.0%)</td>
</tr>
<tr>
<td>6-10 Years</td>
<td>3 (7.5%)</td>
</tr>
<tr>
<td>11-20 Years</td>
<td>5 (12.5%)</td>
</tr>
<tr>
<td>&gt;21 Years</td>
<td>2 (5.0%)</td>
</tr>
<tr>
<td>Years ICU Experience</td>
<td></td>
</tr>
<tr>
<td>0-5 Years</td>
<td>31 (77.5%)</td>
</tr>
<tr>
<td>6-10 Years</td>
<td>3 (7.5%)</td>
</tr>
<tr>
<td>11-20 Years</td>
<td>4 (10%)</td>
</tr>
<tr>
<td>&gt;21 Years</td>
<td>2 (5.0%)</td>
</tr>
<tr>
<td>Certifications</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>27 (67.5%)</td>
</tr>
<tr>
<td>CCRN</td>
<td>13 (32.5%)</td>
</tr>
</tbody>
</table>
Table 2: Screening practice of ICU nurses: frequency of assessment \( N = 40 \)

<table>
<thead>
<tr>
<th>Frequency per 12 hour shift</th>
<th>Level of sedation (RASS)</th>
<th>Presence of delirium</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( n ) (%)</td>
<td>( n ) (%)</td>
</tr>
<tr>
<td>Once</td>
<td>2 (5.0%)</td>
<td>6 (15.0%)</td>
</tr>
<tr>
<td>2-3 times</td>
<td>11 (27.5%)</td>
<td>19 (47.5%)</td>
</tr>
<tr>
<td>4-6 times</td>
<td>17 (42.5%)</td>
<td>9 (22.5%)</td>
</tr>
<tr>
<td>&gt; 6 times</td>
<td>9 (22.5%)</td>
<td>6 (15.0%)</td>
</tr>
</tbody>
</table>
Table 3: Screening practice of ICU nurses: frequency of methods (N=40)

<table>
<thead>
<tr>
<th>Frequency per 12 hour shift</th>
<th>Ability to follow commands n (%)</th>
<th>Agitation related events n (%)</th>
<th>CAM-ICU n (%)</th>
<th>ICDSC n (%)</th>
<th>Psychiatry n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never heard of</td>
<td>0 (0.0%)</td>
<td>1 (2.5%)</td>
<td>0 (0.0%)</td>
<td>18 (45.0%)</td>
<td>2 (5%)</td>
</tr>
<tr>
<td>Never use</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>12 (30.0%)</td>
<td>15 (37.5%)</td>
</tr>
<tr>
<td>Rarely</td>
<td>0 (0.0%)</td>
<td>6 (15.0%)</td>
<td>1 (2.5%)</td>
<td>2 (5.0%)</td>
<td>20 (50%)</td>
</tr>
<tr>
<td>X1</td>
<td>3 (7.5%)</td>
<td>8 (20.0%)</td>
<td>7 (17.5%)</td>
<td>3 (7.5%)</td>
<td>2 (5.0%)</td>
</tr>
<tr>
<td>X2-3</td>
<td>12 (30.0%)</td>
<td>12 (30.0%)</td>
<td>20 (50.0%)</td>
<td>4 (10.0%)</td>
<td>1 (2.5%)</td>
</tr>
<tr>
<td>X 4-6</td>
<td>17 (42.5%)</td>
<td>10 (25.0%)</td>
<td>10 (25.0%)</td>
<td>1 (2.5%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>X &gt; 6</td>
<td>8 (20.0%)</td>
<td>3 (7.5%)</td>
<td>2 (5.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
</tr>
</tbody>
</table>
Table 4: Summary of previous education received by sample ICU nurses (N=40)

<table>
<thead>
<tr>
<th>Education Methods</th>
<th>Sedation Assessment</th>
<th>Delirium Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Have never received education</td>
<td>2 (5.0%)</td>
<td>4 (10%)</td>
</tr>
<tr>
<td>Live, out of hospital lecture</td>
<td>9 (22.5%)</td>
<td>9 (22.5%)</td>
</tr>
<tr>
<td>Live, in hospital lecture</td>
<td>15 (37.5%)</td>
<td>13 (32.5%)</td>
</tr>
<tr>
<td>Teaching at the bedside by nursing preceptor, other health care professional</td>
<td>30 (75.0%)</td>
<td>23 (57.5%)</td>
</tr>
<tr>
<td>Email Attachments</td>
<td>12 (30.0%)</td>
<td>12 (30%)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (2.5%)</td>
<td>2 (5.0%)</td>
</tr>
</tbody>
</table>

*Note: Participants were asked to check all categories that apply to previous education received. Totals per assessment technique will not total to 100%.*
Table 5: Delirium knowledge nurse assessment: pre and post-intervention (N=40)

<table>
<thead>
<tr>
<th></th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
<th>*p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td></td>
</tr>
<tr>
<td>Delirium is an under diagnosed problem</td>
<td>4.36 (.778)</td>
<td>4.77 (.427)</td>
<td>.002</td>
</tr>
<tr>
<td>Delirium is common response to the ICU environment</td>
<td>4.15 (.988)</td>
<td>4.33 (.701)</td>
<td>.280</td>
</tr>
<tr>
<td>Delirium is a problem that requires active interventions on part of caregivers.</td>
<td>4.41 (.966)</td>
<td>4.79 (.409)</td>
<td>.017</td>
</tr>
<tr>
<td>Delirium is associated with higher patient mortality.</td>
<td>4.08 (1.010)</td>
<td>4.26 (.938)</td>
<td>.228</td>
</tr>
<tr>
<td>ICU patients with delirium are rarely agitated.</td>
<td>2.03 (1.112)</td>
<td>1.92 (1.133)</td>
<td>.685</td>
</tr>
<tr>
<td>Initiation of antipsychotic therapy should be initial intervention for all patients with delirium.</td>
<td>2.54 (1.097)</td>
<td>2.26 (1.163)</td>
<td>.026</td>
</tr>
<tr>
<td>Delirium is challenging to assess in ICU patients.</td>
<td>3.85 (1.014)</td>
<td>3.69 (1.030)</td>
<td>.438</td>
</tr>
<tr>
<td>Patients with delirium usually have symptoms that are consistent over the entire nursing shift.</td>
<td>2.23 (1.135)</td>
<td>2.36 (1.347)</td>
<td>.625</td>
</tr>
</tbody>
</table>

*p from paired t-test

Note: Participants responded to a Likert opinion scale. All Likert scales included in the study used an opinion scale of strongly disagree (1) to strongly agree (5).
Table 6. Nurse perception of CAM-ICU: pre and post-intervention (N=40)

<table>
<thead>
<tr>
<th></th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
<th><em>p</em>-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td></td>
</tr>
<tr>
<td>Confidence</td>
<td>2.90 (.982)</td>
<td>3.75 (.776)</td>
<td>.000</td>
</tr>
<tr>
<td>Ease</td>
<td>2.58 (.712)</td>
<td>3.50 (1.062)</td>
<td>.000</td>
</tr>
<tr>
<td>Time Consumption</td>
<td>3.15 (.864)</td>
<td>2.78 (1.025)</td>
<td>.045</td>
</tr>
</tbody>
</table>

*p* from paired t-test

*Note:* Participants responded to a Likert opinion scale. All Likert scales included in the study used an opinion scale of strongly disagree (1) to strongly agree (5).
Table 7. Nurse perception of CAM-ICU and ICDSC post intervention (N=40)

<table>
<thead>
<tr>
<th></th>
<th>CAM-ICU Mean (SD)</th>
<th>ICDSC Mean (SD)</th>
<th>*p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease</td>
<td>3.75 (.776)</td>
<td>3.75 (.954)</td>
<td>1.00</td>
</tr>
<tr>
<td>Confidence</td>
<td>3.50 (1.062)</td>
<td>4.03 (.698)</td>
<td>0.019</td>
</tr>
<tr>
<td>Time</td>
<td>2.78 (1.025)</td>
<td>2.60 (.955)</td>
<td>0.444</td>
</tr>
</tbody>
</table>

*p from paired t-test

Note: Participants responded to a Likert opinion scale. All Likert scales included in the study used an opinion scale of strongly disagree (1) to strongly agree (5).
Table 8: Post intervention delirium screening instrument nurse preference (N=40)

<table>
<thead>
<tr>
<th>Screening Method</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAM-ICU</td>
<td>6 (15%)</td>
</tr>
<tr>
<td>ICDSC</td>
<td>33 (82.5%)</td>
</tr>
<tr>
<td>Neither</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Education provided on instruments was inadequate. More information is needed to make a decision.</td>
<td>1 (2.5%)</td>
</tr>
</tbody>
</table>
Figures

Figure 1: Barriers in evaluating patients for the presence of delirium (N=40)

Note: Participants ranked the five barriers in the chart most often. Totals per barrier will not total to 100%.
References

American Association of Critical Care Nurse. (2015). Evidenced-Based Resources:

Delirium Assessment and Management. Retrieved from
http://www.aacn.org/wd/practice/content/practicealerts/delirium-practice-alert.pcms?menu=practice

Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium

delirium screening in the ICU: secrets to success. *Critical Care Medicine, 41* (9),
2196 - 2208.

Assessment of Delirium in the Intensive Care Unit: Nursing Practices and


Nonpharmacological Interventions to Prevent Delirium: An Evidenced Based

Nurse Specialist, 24* (8), 224 – 230.

Conclusion to Final Practice Inquiry Project

Delirium is a serious condition that affects critically ill adult patients in the ICU. Delirium is present in as many as 60-80% of mechanically ventilated patients and 20-50% of non-mechanically ventilated patients (Brummel et al., 2013). ICU delirium is independently associated with higher patient mortality, prolonged ICU stay, and greater health care costs (Delvin et al., 2008). The risk for mortality while in the hospital is more than doubled in patients who develop delirium (Skwarecki, 2015). The use of validated delirium screening instruments ensures prompt recognition of delirious patients and facilitates the initiation of prevention and treatment measures (Devlin et al., 2008).

Nurses play a pivotal role in identifying and managing delirious patients with screening instruments, however this topic of research is vastly understudied. Therefore, this practice inquiry project examined ICU nurse perceptions and knowledge of delirium and delirium screening instruments. The project included three manuscripts that discussed pertinent topics associated with ICU delirium and ICU delirium screening practices.

In manuscript one, a project outline of nurse drive post-operative delirium prevention protocol for elderly patients was presented using the Plan-Do-Study-Act cycle of change. The manuscript thoroughly explained how a post-operative delirium prevention protocol can help decrease the incidence of delirium in post-operative elderly patients who are at high risk for delirium. The manuscript detailed the responsibilities of involved individuals to clarify how important a multidisciplinary team is to any project or initiative. Manuscript one demonstrated that using the Plan-Do-Study-Act cycle of change is an organized, conceptual instrument to develop a protocol in the ICU.
In manuscript two, a literature review presented research studies related to nurse perceptions on delirium and delirium screening instruments, and discussed implications for delirium screening in future practice. Manuscript two found that nurse education is a major factor that can influence nurse perception and knowledge of delirium screening in the ICU setting. More research of nurse perception, screening practice, education, and perceived barriers is needed.

In manuscript three, a pre- and post-survey was performed to compare knowledge and perception about sedation and delirium screening before the receipt of an education program with those obtained immediately following the program. This project also described ICU nurses’ evaluation of two validated screening instruments, the CAM-ICU and ICDSC. All nurses in the study assessed sedation and delirium more than once shift with 97.5% of nurses’ using the CAM-ICU validated screening instrument. Perceived barriers of delirium screening included (i) difficult to interpret intubated patients; (ii) nurses do not feel confident in their ability to use delirium assessment instruments; and (iii) inability to complete assessment in sedated patient. Overall, education on delirium screening can change nurse perception and improve nursing knowledge. After receiving education on both instruments, nurse participants preferred the ICDSC to the CAM-ICU in regards to performance confidence and time consumption. The nurses also chose the ICDSC to be implemented into bedside practice.
Appendices

Appendix A: Letter of Approval

July 22, 2015

RE: Brittany Dahl, DNP-ACNP Student Practice Inquiry

Institutional Review Board:

As an authorized representative of University of Kentucky, I grant approval for Brittany Dahl, DNP student to conduct research for her practice inquiry project involving human subjects at my organization. I understand that the purpose of this research is to examine nurse perceptions on delirium and delirium screening instruments in the UK Hospital’s Cardiovascular Intensive Care Unit (CVICU).

I grant permission for this project to involve interaction with the nursing staff of the cardiovascular service line and I have determined these individuals to be appropriate subjects for this research. I understand that they will be asked to complete a survey prior to an educational offering, and to complete a survey following the educational intervention.

To support this research, I agree to assist with the promotion of this educational endeavor as well as permit Ms. Dahl to review and analyze data that pertains to nurse perceptions on delirium and delirium screening instruments. The nursing staff will be permitted to attend the educational sessions during their assigned tours of duty.

Sincerely,

[Signature]

Lacey Troutman Buckler DNP, RN, ACNP-BC, NE-BC
Cardiovascular Nursing Services Director
Co-Director Office of Advanced Practice
University of Kentucky
Gill Heart Institute
320 CTW Building
859-323-4605
Appendix B: Invitation/Cover Letter

To CVICU Nurses:

We would like to formally invite you to participate in a program that evaluates nurse knowledge and perceptions about delirium and delirium assessment in your unit. Nurses are with patients 24 hours a day and are the key for delirium detection and achieving improved patient outcomes. It is imperative for nurses to understand delirium instrument’s importance in early detection, continued monitoring, and prompt management of delirium. This program is part of a practice inquiry project for Doctorate of Nursing Practice Degree at the University of Kentucky’s College of Nursing. The team of individuals assisting with this project includes: Brittany Dahl-Primary Investigator (PI), Dr. Melanie Hardin-Pierce, Dr. Carol Thompson, and Dr. Kumal Pandya.

The program will take place after your scheduled staff meetings. The program will take approximately 30 minutes to complete. If you choose to participate, you will first be asked to complete an anonymous pre-survey that will address your knowledge and perceptions about delirium, delirium screening, and sedation screening. Also, the pre-survey consists of general demographic questions regarding your level of nursing education, years of nursing experience, years of ICU experience, advanced nursing specialty certification, age, gender, ethnicity, and shift worked. Then through power point presentation the PI will present information about delirium, delirium screening, sedation screening, and how to perform both screening instruments using case studies for instructional guides. During the educational intervention, you are simply asked to listen to the information presented. Questions or comments to the principal investigator about any of the information presented are welcome, however not required. You will receive paper copies of the case studies and screening instruments. After the presentation, you will be asked to complete the anonymous post survey. The post survey will address your perceptions on two delirium screening instruments. The post survey will identify which screening instrument you prefer. Also, it will test if educational intervention impacts your perceptions and knowledge on delirium and delirium assessment.

Although you will only get the personal benefit of new nursing education, your responses may help us understand more about nursing knowledge and perceptions about delirium and delirium screening practices. We hope to receive completed questionnaires from 120 people, so your answers are important to us. Although there are measures in place to avoid potential risks, some potential participation risks include breach of confidentiality and psychological distress. Your response to the survey is anonymous which means no names will appear or be used on research documents, or be used in presentations or publications. The research team will not know that any information you provided came from you.

Your participation in this project is completely voluntary. You have a choice about whether or not to complete the survey, but if you do participate, you are free to skip any questions or discontinue at any time.

If you have questions about the study, please feel free to ask; my contact information along with Dr. Thompson’s is given below. If you have complaints, suggestions, or questions about your rights as a research volunteer, contact the staff in the
University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 1-866-400-9428. Thank you in advance for your participation in this project.

Sincerely,

Brittany Dahl, RN, BSN, CCRN
University of Kentucky College of Nursing
270-779-1123
brittany.dahl@uky.edu

Advisor: Carol Thompson, PhD, DNP, ACNP, CCRN, FCCM, FAANP, FAAN
Professor College of Nursing
University of Kentucky
751 Rose Street
Lexington, KY 40536-0232
carol.thompson1@uky.edu
(859) 447-5436
Fax (859) 323-1057
Appendix C: Cover Letter

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270-779-1123
brittany.dahl@uky.edu

Advisor: Carol Thompson, PhD, DNP, ACNP, CCRN, FCCM, FAANP, FAAN
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Fax (859) 323-1057
Appendix D: CAM-ICU Instrument
Appendix E: RASS Instrument

Assessing Consciousness: Linking Level of Consciousness & Delirium Monitoring

**Step 1 Level of Consciousness: RASS**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+4</td>
<td>COMBATIVE</td>
<td>Combative, violent, immediate danger to staff</td>
</tr>
<tr>
<td>+3</td>
<td>VERY AGITATED</td>
<td>Pulls to remove tubes or catheters; aggressive</td>
</tr>
<tr>
<td>+2</td>
<td>AGITATED</td>
<td>Frequent non-purposeful movement, fights ventilator</td>
</tr>
<tr>
<td>+1</td>
<td>RESTLESS</td>
<td>Anxious, apprehensive, movements not aggressive</td>
</tr>
<tr>
<td>0</td>
<td>ALERT &amp; CALM</td>
<td>Spontaneously pays attention to caregiver</td>
</tr>
<tr>
<td>-1</td>
<td>DROWSY</td>
<td>Not fully alert, but has sustained awakening to voice (eye opening &amp; contact &gt;10 sec)</td>
</tr>
<tr>
<td>-2</td>
<td>LIGHT SEDATION</td>
<td>Briefly awakens to voice (eyes open &amp; contact &lt;10 sec)</td>
</tr>
<tr>
<td>-3</td>
<td>MODERATE SEDATION</td>
<td>Movement or eye opening to voice (no eye contact)</td>
</tr>
</tbody>
</table>

If RASS is ≥ -3 proceed to CAM-ICU (Is patient CAM-ICU positive or negative?)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4</td>
<td>DEEP SEDATION</td>
<td>No response to voice, but movement or eye opening to physical stimulation</td>
</tr>
<tr>
<td>-5</td>
<td>UNAROUSABLE</td>
<td>No response to voice or physical stimulation</td>
</tr>
</tbody>
</table>

If RASS is -4 or -5 → STOP (patient unconscious), RECHECK later

---

*For RASS equivalents to other sedation-agitation scales see FAQs page 20-21.
Appendix F: ICDSC Instrument

Intensive Care Delirium Screening Checklist (ICDSC)

- Score your patient over the entire shift. Components don’t all need to be present at the same time.
- Components #1 through #4 require a focused bedside patient assessment. This cannot be completed when the patient is deeply sedated or comatose (i.e., SAS = 1 or 2; RASS = -4 or -5).
- Components #5 through #8 are based on observations throughout the entire shift. Information from the prior 24 hours (i.e., from prior 1-2 nursing shifts) should be obtained for components #7 and #8.

1. Altered level of consciousness
   - Deep sedation/coma over entire shift [SAS= 1, 2; RASS = -4,-5] = Not accessible
   - Agitation [SAS = 5, 6, or 7; RASS= 1-4] at any point = 1 point
   - Normal wakefulness [SAS = 0; RASS= 0] over the entire shift = 0 points if no recent sedatives = 1 point if recent sedatives

2. Inattention
   - Difficulty following instructions or conversation; easily distracted by external stimuli. Will not reliably squeeze hands to spoken letter “A”: S A V E A H A R T

3. Disorientation
   - In addition to name, place, and date, does the patient recognize ICU caregivers?
   - Does patient know what kind of place they are in? (List examples such as dentist’s office, home, work, hospital.)

4. Hallucination, delusion, or psychosis
   - Ask the patient if they are having hallucinations or delusions (e.g., trying to catch an object that isn’t there).
   - Are they afraid of the people or things around them?

5. Psychomotor agitation or retardation
   - EITHER: Hyperactivity requiring the use of sedative drugs or restraints to control potentially dangerous behavior (e.g., pulling IV lines out or hitting staff).
   - OR: Hypoactive or clinically noticeable psychomotor slowing or retardation.

6. Inappropriate speech or mood
   - Patient displays inappropriate emotion, disorganized or incoherent speech, sexual or inappropriate interactions, or is apathetic or overly demanding.

7. Sleep-wake cycle disturbance
   - EITHER: Frequent awakening/4 hours sleep at night.
   - OR: Sleeping during much of the day.

8. Symptom fluctuation
   - Fluctuation of any of the above symptoms over a 24-hour period.

TOTAL SHIFT SCORE (Min 0 – Max 8)

Score Greater than or equal to 4 = Delirium
Score 1-3 = Subdyndromal
0= No delirium
Appendix G: Case Studies

Case Study # 1:
Mrs. G is a 65 y/o admitted for acute respiratory failure. She lives independently in her own home, is active in her church, and still drives herself everywhere. You walk into the room and she looks at you immediately. She appears anxious as she is being ventilated with BIPAP. Her arms are restrained, and she is pulling at them to get her BIPAP mask off. Her lowest RASS in the previous 24 hours was –2, and highest RASS was +2. She made 5 errors on the Letter test for Feature 2. She answers 2 questions correctly and completes the full command of Feature 4.

STEP 1 - RASS
What is her current RASS Score? ____
Proceed with Step 2 – CAM-ICU assessment?
☐ Yes (it is possible to assess delirium at this level)
☐ No (the patient is comatose and cannot be assessed for delirium)

STEP 2 - CAM-ICU
Feature 1: Acute Change or Fluctuating Course of Mental Status
Is there an acute change from mental status baseline? ☐ Yes ☐ No
Has mental status fluctuated during the past 24 hours? ☐ Yes ☐ No

Feature 1: Present ☐ Absent ☐
Proceed with Feature 2? Yes ☐ No ☐

Feature 2: Inattention
Letters > 2 Errors: ☐ Yes ☐ No
Pictures > 2 Errors: ☐ Yes ☐ No ☐ Not needed

Feature 2: Present ☐ Absent ☐
Proceed with Feature 3? Yes ☐ No ☐

Feature 3: Altered Level of Consciousness
Current RASS (Think back to level of consciousness assessment in Step 1)

Feature 3: Present ☐ Absent ☐
Proceed with Feature 4? Yes ☐ No ☐

Feature 4: Disorganized Thinking
Combined number of Errors > 1 ☐ Yes ☐ No

Feature 4: Present ☐ Absent ☐
Overall CAM-ICU:
☐ Positive (Feature 1 and 2 and either 3 or 4 present)
☐ Negative
Case Study # 2:

Your 80 y/o patient was successfully weaned from the ventilator and extubated at 0800 after abdominal surgery. He is alert and calm since all sedatives and analgesic medications had been stopped earlier in the morning. Yesterday evening and last night he had periods of agitation with a documented RASS of -1 to +3. He lives with family due to physical limitations with mobility but is still cognitively intact. He correctly answers all the questions and performs the complete command. He squeezes correctly on all the letters.

**STEP 1 - RASS**

What is her current RASS Score? ______

Proceed with Step 2 - CAM-ICU assessment?

- Yes (it is possible to assess delirium at this level)
- No (the patient is comatose and cannot be assessed for delirium)

**STEP 2 - CAM - ICU**

<table>
<thead>
<tr>
<th>Feature 1: Acute Change or Fluctuating Course of Mental Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there an acute change from mental status baseline?</td>
</tr>
<tr>
<td>Yes □ No □</td>
</tr>
<tr>
<td>Has mental status fluctuated during the past 24 hours?</td>
</tr>
<tr>
<td>Yes □ No □</td>
</tr>
</tbody>
</table>

Feature 1: Present □ Absent □

Proceed with Feature 2? Yes □ No □

<table>
<thead>
<tr>
<th>Feature 2: Inattention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letters &gt; 2 Errors:</td>
</tr>
<tr>
<td>Yes □ No □</td>
</tr>
<tr>
<td>Pictures &gt; 2 Errors:</td>
</tr>
<tr>
<td>Yes □ No □ Not needed □</td>
</tr>
</tbody>
</table>

Feature 2: Present □ Absent □

Proceed with Feature 3? Yes □ No □

<table>
<thead>
<tr>
<th>Feature 3: Altered Level of Consciousness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current RASS (Think back to level of consciousness assessment in Step 1)</td>
</tr>
<tr>
<td>Feature 3: Present □ Absent □</td>
</tr>
</tbody>
</table>

Proceed with Feature 4? Yes □ No □

<table>
<thead>
<tr>
<th>Feature 4: Disorganized Thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined number of Errors &gt; 1</td>
</tr>
<tr>
<td>Yes □ No □</td>
</tr>
</tbody>
</table>

Feature 4: Present □ Absent □

**Overall CAM-ICU:**

- Positive (Feature 1 and 2 and either 3 or 4 present)
- Negative
Case Study 1

A 60-year-old man is admitted to the coronary unit after a myocardial infarction. The patient has significant visual impairment and can see only shadows.

The previous nurse noted that the patient is spitting up his pills and reacts negatively when he is approached (e.g. to collect vitals). He is very verbally aggressive. He slept for only part of the night.

When I enter the room, I introduce myself while remaining far from his bed. I explain that I will be his nurse today and that I have to give him his medication. Initially he refuses. I ask why; he is capable of reasoning and is not confused, and finally lets me approach and he takes his medication. I note that he startles easily and holds his arm out to defend himself when notices someone approaching him. He is agitated and aggressive but is not pulling on his tubes or attempting to get up.

He is not confused, but is easily angered. He lashes out at the air with his arms, and resists being touched particularly if he is not warned beforehand. When he becomes angry, his attention becomes altered and he stops listening when spoken to. He is calm when alone in the room.

As time passes, I realize that the patient is afraid because he cannot see well. When he is told what is being done to him, he is much less aggressive, and even becomes cooperative. He quickly recognizes my voice and calms down when I speak to him. If another person approaches, he shows the same pattern as before – he is fearful but can be calmed down once the person greets him.
Case Study 2

Mr. G., 47 years old, is schizophrenic and has been living in an institution for over 20 years.

He was admitted to intensive care two days ago, for respiratory decompensation due to pneumonia. Upon arrival, Mr. G. was calm, slightly slow to react, and unable to name the hospital where he had been transferred or the date. He was not intubated. Around 6:00 PM, the nurse charted the patient as being drowsy but easily awakened, and documented that he did not always answer questions. The nurse also noted that Mr. G. did not seem to be suffering, as he shook his head "no" when she asked him if he was in pain. She recorded that his state of consciousness and attentiveness were altered, and that he showed psychomotor retardation and space-time disorientation.

Upon his arrival, the day nurse had described Mr. G. as calm and alert, not in pain, slow to react, and disoriented in space and time. She reported that it was difficult to keep his attention and that he repeated the same questions over and over. Around 9:00 AM, a desaturation episode required the application of a positive pressure mask, which Mr. G. tolerated with great difficulty. He became more and more agitated, constantly moving around in his bed, trying to remove the mask, and not listening when spoken to. The nurse also noted that he startled every time someone approached the bed. The physician was called; when he arrived 30 minutes later, he noted that the patient was somewhat agitated but was cooperative and answered questions appropriately, though he remained disoriented in time and space. Mr. G. said that he was thirsty and he wanted to smoke. The physician prescribed Ativan p.r.n., and said to remove the mask five minutes per hour if saturation remained above 90%.
Appendix H: Pre Survey

1. Of the following potential conditions that may occur in the ICU patient, please RANK (1-5) the order of importance in which you feel these should be evaluated by the nurses over the average shift by placing “1” by the factor that you feel is most important to evaluate and a “5” beside the factor that you is LEAST important to evaluate.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Altered level of consciousness</th>
<th>Improper placement of invasive devices</th>
<th>Presence of agitation</th>
<th>Presence of delirium</th>
<th>Presence of pain</th>
</tr>
</thead>
</table>

2. For the ICU patients for whom you evaluate, how often do you evaluate patients for level of sedation and presence of delirium? For example, if you evaluate for the presence of delirium frequently then place a “check mark” beside presence of delirium in the frequently column.

<table>
<thead>
<tr>
<th>Level of sedation</th>
<th>Never</th>
<th>Rarely</th>
<th>Frequently</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of delirium</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. For the ICU patient for whom you do evaluate level of sedation and/or for the presence of delirium, please indicate the frequency per every 12 hour shift that you conduct each evaluation. For example, if you usually evaluate for the presence of delirium twice per shift then place a check mark beside “x2-3” in the Presence of Delirium column.

<table>
<thead>
<tr>
<th>Per 12 hour shift</th>
<th>Level of sedation</th>
<th>Presence of delirium</th>
</tr>
</thead>
<tbody>
<tr>
<td>X 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X 2-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X 4-6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>x&gt;6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. For the ICU patient for whom you evaluate the presence of delirium, please indicate how frequently you use each of the following in your delirium assessment. If you do not assess for delirium in your ICU patients, please indicate never use under each column.

<table>
<thead>
<tr>
<th>Per 12 hr shift</th>
<th>Ability to Follow Commands</th>
<th>Agitation related events</th>
<th>Confusion Assessment Method-ICU (CAM-ICU)</th>
<th>Intensive Care Delirium Screening Check List (ICDSC)</th>
<th>Psychiatry Consult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never heard of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rarely</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X 2-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X 4-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X &gt;6</td>
<td></td>
<td></td>
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</tbody>
</table>

5. From the following list of factors that might prevent you from evaluating your patient for the presence of delirium, please RANK the TOP 3 in order of importance by placing a “1” bedside the factor you think is MOST important and a “3” bedside the factor that is the THIRD most important.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delirium assessment instruments are too complex to use</td>
<td></td>
</tr>
<tr>
<td>Difficult to interpret in intubated patients</td>
<td></td>
</tr>
<tr>
<td>Do not feel confident in my ability to use delirium assessment instruments</td>
<td></td>
</tr>
<tr>
<td>Do not feel that using delirium assessment instrument improves outcomes</td>
<td></td>
</tr>
<tr>
<td>Inability to adequately document delirium assessments</td>
<td></td>
</tr>
<tr>
<td>Inability to complete assessment in sedated patient</td>
<td></td>
</tr>
<tr>
<td>Not enough time to perform assessment (too time consuming)</td>
<td></td>
</tr>
<tr>
<td>Nurses are not required to screen for delirium in my ICU</td>
<td></td>
</tr>
<tr>
<td>Physicians already complete delirium assessments</td>
<td></td>
</tr>
<tr>
<td>Physicians do not use my assessment in their decision making</td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
</tbody>
</table>
6. I have received education about ICU sedation assessment and ICU delirium assessment by the following means: (Please place check mark in ALL applicable boxes below)

<table>
<thead>
<tr>
<th>Have never received education</th>
<th>Sedation assessment</th>
<th>Delirium assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live, out of hospital CE lecture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Live, in hospital lecture or in-service delirium assessment strategies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching at the bedside by nursing preceptor, other health care professional</td>
<td></td>
<td></td>
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<tr>
<td>Email attachments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:_______________________</td>
<td></td>
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</tr>
</tbody>
</table>

7. Please indicate your agreement with the following statements that pertain to delirium in ICU by placing a check in the column that most closely aligns with your agreement.

<table>
<thead>
<tr>
<th>A. Delirium is an under-diagnosed</th>
<th>Strongly agree</th>
<th>Moderately agree</th>
<th>Strongly disagree</th>
<th>Moderately disagree</th>
<th>Neither agree nor disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Delirium is a common response to the ICU environment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Delirium is problem that requires active interventions on the part of caregivers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Delirium is associated with higher patient mortality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. ICU patients with delirium are rarely agitated.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. Initiation of antipsychotic therapy (e.g., Haldol) should be the initial intervention for all patients with delirium.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. Delirium is challenging to assessment in ICU patients.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>H. Patients with delirium usually have symptoms that are consistent over the entire nursing shift.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8. I am confident using delirium screening instruments to evaluate patients for delirium. (Please check one response below)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

9. I feel delirium screening instruments are easy to use. (Please check one response below)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

10. I feel delirium screening evaluations are time consuming. (Please check one response below)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

11. Overall, I am happy with the CAM-ICU instrument currently used in the ICU. (Please check one response below)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
1. Level of Nursing Education: Please indicate the highest level achieved:
   a. Associate Degree, Nursing
   b. Bachelor of Science in Nursing (BSN)
   c. Master of Science in Nursing (MSN)
   d. Doctorate in Nursing (DNP/PhD)

2. How many years have you been a nurse?

3. How many years have you worked in the ICU setting?

4. Advanced nursing specialty certification (i.e: CCRN, CEN)
   a. Yes (Please list:)__________
   b. No

5. How old are you?
   a. ______

6. What shift do you work?
   a. 7am – 7pm
   b. 7pm – 7am
   c. 11am – 11pm
   d. 11pm – 7am
   e. None of the above
Appendix I: Post Survey

1. I would feel confident using the CAM-ICU instrument for delirium assessment. (Please check one response below)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

2. I feel CAM-ICU instrument is easy to use. (Please check one response below)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

3. I feel using the CAM-ICU instrument is time consuming (Please check one response below)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

4. I would feel confident using the ICDSC instrument. (Please check one response below)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
5. I feel the ICDSC instrument is easy to use. (Please check one response below)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<tbody>
<tr>
<td></td>
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6. I feel using the ICDSC instrument is time consuming. (Please check one response below)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<td></td>
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</table>

7. After receiving education about both validated screening instruments, I believe the instrument that should be integrated into CVICU nursing practice is: (Please circle one response)
   a. CAM-ICU
   b. ICDSC
   c. Neither
   d. Education provided on instruments was inadequate. More information is needed to make a decision.

8. After receiving education about delirium, I am more likely to screen for delirium in the future. (Please check one response below)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>
9. I am interested in more education about delirium and delirium screening instruments. (Please check one response below)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<tbody>
<tr>
<td></td>
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10. Now that you have received education about delirium and delirium screening, please indicate your agreement with the following statements that pertain to delirium in the ICU by placing a check mark in the column that most closely aligns with your agreement.

<table>
<thead>
<tr>
<th>A. Delirium is an under diagnosed problem</th>
<th>Strongly agree</th>
<th>Moderately agree</th>
<th>Strongly disagree</th>
<th>Moderately disagree</th>
<th>Neither agree nor disagree</th>
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<th>B. Delirium is a common response to the ICU environment</th>
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<table>
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<th>D. Delirium is associated with higher patient mortality</th>
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<th>E. ICU patients with delirium are rarely agitated.</th>
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<table>
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<tr>
<th>F. Initiation of antipsychotic therapy (e.g., Haldol) should be the initial intervention for all patients with delirium.</th>
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<th>G. Delirium is challenging to assessment in ICU patients.</th>
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<th></th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>H. Patients with delirium usually have symptoms that are consistent over the entire nursing shift.</th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

Please feel free to list any additional comments about this project or educational materials below. Thank you again for your participation!
Appendix J: Overview of Education Power Point Presentation

<table>
<thead>
<tr>
<th></th>
<th>Definition of Delirium</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Incidence of Delirium in ICU</td>
</tr>
<tr>
<td>3</td>
<td>Risk factors for delirium</td>
</tr>
</tbody>
</table>
| 4 | Nursing Screening Importance  
   Delirium Screening at UK Hospital |
| 5 | CAM-ICU Description |
| 6 | ICDSC Description |


Assessment of Delirium in the Intensive Care Unit: Nursing Practices and

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Fong, T., Tulebaev, S., & Inouye, S. (2009). Delirium in elderly adults: diagnosis,
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