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Caring for Patients with Delirium in the Intensive Care Unit

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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the review committee have been made.

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Abstract

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MS, Georgetown University, 1994

BSN, Niagara University, 1978

Project Submitted in Partial Fulfillment

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Abstract

Patients in hospital intensive care units are at increased risk to develop delirium, a condition which is characterized by a disturbance of consciousness and a change in cognition. Critical care nurses must have the knowledge to assess, recognize, and manage delirium. The purpose of this project was to develop an evidence-based policy for the assessment of delirium and a comprehensive nursing education plan which included an analysis and synthesis of the literature, a curriculum plan, and a pretest/posttest. The Johns Hopkins Evidence-Based Practice Model framed the project, which used a multidisciplinary team approach. Two nursing leaders, each with a doctor of philosophy degree, served as content experts for the educational curriculum plan and the pretest/posttest. The curriculum plan was evaluated using a dichotomous scale of 1 = not met and 2 = met. An average score of 2 was achieved showing the content met the objectives. The pretest/posttest items were validated using a Likert-type scale ranging from 1 = not relevant to 4 = very relevant. A content validation index score of 1.0 was computed, revealing that the items met the objectives and content of the curriculum. The pretest/posttest was administered before and after the educational program to determine the knowledge gained. A paired samples *t* test was conducted and found to have a statistically significant difference in the scores for the pretest ($M = 81.25$, $SD = 11.29$) and post-test ($M = 94.06$, $SD = 7.12$); $t\ (31) = -5.92$, $p = 0.01$, revealing that the critical care nurses gained significant knowledge with the delirium educational program. This project can promote positive social change because early recognition and management of the patient with delirium can facilitate positive outcomes for patients, families, and systems.

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Dedication

I would like to dedicate this project to my sister Laurie who was never able to finish her dream; this one is for you.

I would also like to dedicate this project to critical care nurses who give 100% every time they care for critically ill patients to achieve the best patient outcomes. “When you’re a nurse, you know that every day you will touch a life or a life will touch yours” (Author Unknown).

Acknowledgments

I would like to thank Dr. Joan Moon for her leadership, patience, guidance, and encouragement for this DNP project. Her understanding and recommendations throughout this long journey were very much appreciated. I will forever be grateful that our paths crossed on my educational journey. Thank you, Dr. Bailey and Dr. Conway, the other committee members who evaluated my DNP project. Your recommendations were very much appreciated.

I would also like to thank my husband who edited numerous papers and discussion posts on this journey to obtain my DNP degree. I am very grateful and appreciate his expertise on spelling and grammar. He also assumed a majority of the family duties so I could spend countless hours at the computer writing papers and meeting deadlines.

Last but not least, I would like to thank my daughter, who graduated from high school and is now enjoying her freshman year at college. You have graduated from high school and begun your journey into adulthood. I feel honored to have watched you grow into a fine young woman

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Section 1: Nature of the Project

Introduction

Patients in hospital intensive care units (ICUs) are at increased risk to develop delirium, a condition which is characterized by a disturbance of consciousness and a change in cognition **(**American Psychiatric Association, 2000; Trogrlić et al., 2015). Delirium can result in an increased length of stay (LOS) and duration of hours in receiving mechanical ventilation (Mehta et al., 2015; Salluh et al., 2015). Greve et al. (2012) estimated the frequency of delirium in the ICU is 20% to 84% of patients. Despite the frequency of ICU patients developing delirium, this condition is often neither recognized nor diagnosed (Devlin et al., 2008). Delirium impacts the patient's family, nurses, and the hospital's resources. In addition, the social impact of patients developing delirium is associated with prolonged cognitive impairments following hospitalization. Research shows that the frequency of delirium could be reduced by as much as 30% through the provision of preventative measures and the early recognition of ICU delirium, thus negating the associated social adverse outcomes (Girard et al., 2010, van den Boogaard et al., 2012).

Critical care nurses, with comprehensive education, are the key healthcare providers to assist in the prevention, assessment, and early diagnosis of delirium in the critically ill patient. (Gesin, 2012; Girard et al., 2010; Jackson, Mitchell, & Hopkins, 2009; Phillips, 2013; van den Boogaard et al., 2012). This Doctorate of Nursing Practice (DNP) project occurred in the ICU of a non-profit 300-bed community hospital. The project was developed because there was an educational deficit and no evidence-based policy for critical care nurses to properly assess and manage delirium. While the hospital

ICU's length of stay (LOS) target is 2.5 days and the ventilator hour use target is 48 hours, the LOS for fiscal year 2014-2015 was 4.08 days and the baseline ventilator hours for the same time period was 66.15 hours (J. Kramer, personal communication, March, 10, 2015). Leadership determined that the lack of a policy and need for evidence-based management of delirium by nursing staff may contribute to the poor outcomes.

Background

The impact for ICU patients developing delirium continues to be examined through research and clinical practice. Healthcare costs associated with acquiring ICU delirium are approximately $2,500 higher per hospital admission and $6.9 billion per year for Medicare (van den Boogaard et al., 2012). Greve et al. (2012) discuss the many adverse outcomes associated with ICU patients developing delirium, such as: prolonged mechanical ventilation, increased hospital and ICU stay, increased mortality, self-extubation, and self-removal of catheters.

The social impact of patients developing delirium is associated with prolonged cognitive impairments post hospitalization. Current research documents the consequences from patients experiencing ICU delirium and cognitive impairments such as memory, attention, concentration, and motor functions (Girard et al., 2010; van den Boogaard et al., 2012). A significant research finding is the correlation between duration of acute delirium episodes and the extent of post-hospitalization chronic cognitive impairment. In addition to the increased utilization of community resources when patients are discharged from acute care facilities, chronic cognitive impairments impact patients' abilities to return to their employment, return home upon discharge from the acute care

facility, and demonstrate any improvement over time (Girard et al., 2010; Inouye & Ferrucci, 2006; Jackson et al., 2009).

Another important social impact of patients acquiring ICU delirium is the effect the condition has on their family or support systems. The disruptive and aggressive behaviors associated with hyperactive delirium can increase family stress. In addition, the increased LOS in the ICU and hospital, the long-term consequences associated with delirium result in financial and psychosocial stress on patients' families (Balas et al., 2012; Olson, 2012, Pun & Boehm, 2011).

Nurses are the health care providers most affected by the consequences associated with patients developing delirium. Critical care nurses are essential for assessing and preventing patients from developing the condition (Bowen et al., 2012; Speed, 2015). Nurses' failures to understand delirium are caused by lack of knowledge about assessment, risk factors, and preventative measures of delirium (Gesin et al., 2012).

In 2012, the American College of Critical Care Medicine revised the 2002 guidelines for pain, sedation, and delirium management. Some of the revised evidence-based recommendations that are relevant to this DNP project regarding the assessment and management of ICU delirium include:

Assessment:

- Routine monitoring of delirium in adult ICU patients;
- Use of the Confusion Assessment Method for the ICU ([CAM-ICU]; see Appendix A) and the Richmond Agitation Sedation Scale ([RASS]; see Appendix B), which are valid and reliable delirium monitoring tools in adult ICU patients; and

- Provide routine delirium monitoring in adult ICU patients in clinical practice, and;

Management:

- Perform early mobilization of adult ICU patients to decrease the prevalence and duration of delirium, and;
- Provide non-pharmacological interventions (Barr et al., 2013).

The recommendations from these evidenced-based guidelines illustrated the importance of implementing an evidence-based protocol to reduce the negative effects of delirium in the ICU.

Problem Statement

The practice problem addressed in this DNP project was the lack of an evidenced-based policy and nursing assessment and nursing management of delirium in the ICU. Providing proper education and training to critical care nurses is the most important factor for the successful assessment and management of ICU delirium (Harroche, St-Louis, & Gagnon, 2014). Research studies have documented improved patient outcomes when critical care nurses receive comprehensive education on the assessment, prevention, and treatment of ICU delirium (Bowen**,** Stanton, & Manno, 2012; Greve et al., 2012). Other research studies support these results and reinforce the benefits that accrue when critical care nurses receive comprehensive delirium education to improve the assessment and management of delirium (Akechi et al., 2010; Wand et al., 2014).

Gesin et al. (2012) examined the effectiveness of training nurses to improve their ability to diagnose delirium and found that a multifaceted education that included lectures, bedside demonstration, and a Webcast education module on the correct use of a

validated assessment tool improved nurses' assessment and knowledge about delirium. Other researchers studying the effects of comprehensive education for delirium have found similar results (Akechi et al., 2010; Harroche et al., 2014; Speed, 2015; Wand et al, 2014).

Purpose

The purpose of this DNP project was to develop an evidence-based policy and a comprehensive nursing education plan for the assessment and management of delirium in the ICU. The education plan included an analysis and synthesis of the literature, a curriculum plan, and a pretest/posttest. Critical care nurses in this target ICU did not use evidence-based measures nor did they have a policy to follow to prevent and manage delirium. A gap existed between what the evidence showed and patient care practices in the target ICU that leadership felt might have contributed to ICU patients increased lengths of stay and mechanical ventilation hours. This project is meant to fill the gap between the evidence and current practice. A comprehensive delirium educational plan and policy was developed for the critical care nurses to close the gap between research and clinical practice.

Project Goal and Outcomes

Goal

The long-term goal of this DNP project was to decrease length of stay for ICU patients and decrease in duration of mechanical ventilation hours which will be determined after my graduation.

Outcomes

Outcome products developed for the comprehensive educational project were:

- Outcome 1. Literature Review Matrix (see Appendix C),
- Outcome 2. Evidence-Based Policy (see Appendix D)
- Outcome 3. Educational Curriculum Plan (see Appendix E),
- Outcome 4. Pretest and Posttest (see Appendix F),
- Outcome 5. Summative Evaluation Stakeholders/ Committee Members (see Appendix H).

Framework/Model for the Project

The Johns Hopkins Evidence-Based Practice Model ([JHEBPM]; see Appendix I) was used for the design of this project. Compared to other models, the JHEBPM places high importance on identifying the practice question, evaluating the evidence, and creating an action plan (Newhouse, Dearholt, Poe, Pugh, & White, 2007). The JHEBPM is divided into three phases: practice questions, evidence, and translation. The model recommends that clinicians use both research and non-research evidence for decision making. Internal and external factors should be considered by clinicians before clinical practice can be changed. The JHEBPM offers the best framework and tools to assist with practice problems because the model is an understandable and comprehensive model which addresses all the important components of the evidenced-based practice (EBP) process (Schaffer, Sandau, & Diedrick, 2013).

Following the completion of the comprehensive educational plan and the evidenced based policy, the delirium assessment tools, the RASS, CAM-ICU, and the nursing management measures were implemented into clinical practice. The QI tool, the Plan, Do, Study and Act Model (PDSA), was used to implement the delirium assessment

tools and the nursing management measures into clinical practice. Johnson and Raterink, (2009) describe the PDSA model as one that changes processes rather than people, because processes are a greater influence on achieving success in a program. Delirium assessment and the implementation of the nursing management measures involve changes in patient care and clinical practice for the ICU nurses. See Appendix J for the figure of the PDSA cycles showing continuous improvement over time through repetition of the cycle and implementation of the changed process strategy (Girder, Glezos, Link, & Sharan, 2016).

Nature of the Project

The purpose of this DNP project was to develop an evidence-based policy and a comprehensive nursing education plan for the assessment and management of delirium in the ICU. To accomplish this purpose, an extensive review of literature was completed and a multidisciplinary team of key stakeholders was formed. The multidisciplinary team with myself as leader, reviewed my analysis and synthesis of the literature, supported the development of the curriculum plan, the pretest/posttest, and an evidenced based-policy. A PhD with expertise in assessment reviewed and made recommendations related to item construction. Two PhD content experts on the committee evaluated the curriculum plan and conducted a content validation index of each item on the pretest and posttest. Finally, the committee completed a summary evaluation of the project and myself as the leader. The project implemented and administered the pretest/posttest. Results of these methods are presented in Section 4.

Definitions

Delirium “Characterized by a disturbance of consciousness and a change in

cognition that develops over a short period of time" (American Psychiatric Association, 2000, p. 123). Appendix L lists the American Psychiatric Association (2013) criteria for delirium. Delirium is classified into three psychomotor subtypes: hyperactive, hypoactive, and mixed (Balas et al, 2012, p.17).

Intensivist. A board-certified physician in critical care medicine who manages the care of the critically ill patients in the intensive care unit (Marchan, Jallo, Rincon, & Vibbert, 2010, para 1).

Quality Improvement. Focused on improving defective processes to improve the quality of outputs (Kelly, 2013, p. 8).

Assumptions

Assumptions in studies are statements considered true even though they have not been scientifically proven (Grove, Burns, & Gray, 2013). The assumptions regarding the development and evidence-based policy and comprehensive delirium educational plan for the critical care nurses in this target ICU were:

1. Critical care nurses working in this target ICU desired to provide evidence-based quality patient care.
2. The physicians and nursing leadership of this target ICU supported the change in clinical practice for nurses to assess and manage for delirium.
3. Factors contributing to patients developing delirium in this target ICU were due to a lack of knowledge and the absence of delirium assessment and management.

Scope

This DNP project was chosen based on the need to educate prior to an important change in clinical practice. The populations for this project were two-fold. For the design and evaluation of the project, the multidisciplinary team members were the population because they were evaluating. The critical care nurses in the ICU who received the comprehensive delirium education were the population for determining the effectiveness of the education.

Significance of Project

ICU-acquired delirium is a life-threatening condition with short and long-term negative physical and social outcomes. Nursing management has been shown to reduce patient risks, improve management of delirium, and facilitate optimal patient and family outcomes. Providing an evidence-based policy and education to critical care nurses is important for the successful nursing assessment and nursing management of ICU delirium

Summary

In Section 1, I presented an overview of the DNP project and the vital role that critical care nurses play in the assessment and management of delirium in critically ill patient. The provision of education for nurses and the implementation of an evidence-based policy will lead to better outcomes for patients and families. The new change in practice will allow the critical care nurses in this target ICU to assess and manage the patient for delirium and close the gap between research and clinical practice. In Section 2, I will present a review of the literature on the frameworks being used in the project as well as examine the impact of delirium including risk factors, assessment for, and nursing

management measures of the condition. Finally, delirium education for nurses will be reviewed.

Section 2: Review of Literature and Theoretical and Conceptual Framework

Introduction

The practice problem addressed in this DNP project was the lack of an evidenced-based policy and nursing assessment and nursing management of delirium in the ICU. The purpose of this DNP project was to develop an evidence-based policy and a comprehensive nursing education plan for the assessment and management of delirium in the ICU.

Patients in the ICU are at increased risk of developing delirium. Between 20% - 84% of patients develop delirium (Greve et al., 2012). Factors for the wide variation have been identified as different patient populations, inconsistent assessment and monitoring of delirium in the ICUs, lack of a standardized tool when delirium is assessed, lack of education and training of ICU staff on delirium, and lack of evidenced based protocol or standards for ICU delirium management (Allen & Alexander, 2012; Zaal, Devlin, Peelen, & Slooter, 2012).

Despite the high frequency of ICU patients developing delirium, this condition is not recognized nor diagnosed by health care professionals (Balas, et. al., 2012; Olson, 2012). Researchers have found that critical care nurses are very important in the prevention, assessment, and early diagnosis of delirium in ICU patients (Akechi et al., 2010; Fan, Guo, & Zhu, 2012; Olson, 2012). Although numerous researchers have documented the short and long term adverse effects associated with patients acquiring delirium in the ICUs, few ICU staff use consistent assessment and preventative measures (Gesin et al., 2012; Greve et al., 2012).

In Section 2, I will review the literature on ICU delirium, including the literature search strategy and the frameworks used for this project. Lastly, I will provide an extensive review of delirium that includes: social and clinical impact of delirium, risk factors, validated delirium assessment tools, non-pharmacological interventions, recognition of delirium, and delirium education.

Literature Search Strategy

The following databases were used for this literature review: The Walden Library, EBSCO, Cochran Review, Cumulative Index to Nursing and Allied Health (CINAHL), MEDLINE, Google Scholar, and Ovid. Keywords and phrases included: delirium, acute confusion ICU psychosis, ICU, critical care unit, nurse recognition, nurse, patient, critically ill patient, delirium assessment, delirium intervention, delirium protocols, cognitive impairment, CAM-ICU, delirium assessment tools, delirium validated tools, delirium prevention, non-pharmacological measures, delirium therapy, delirium outcomes, delirium social impact, delirium clinical impact, and the Johns Hopkins Evidence-Based Model (JHEBM) and Plan Do Study Act (PDSA). Numerous studies were found by using Boolean "and" or "or" between keywords such as: Delirium and ICU and nurse, delirium prevention and assessment and critical care nurse, ICU psychosis and recognition and nurse, delirium and systematic review, acute Confusion and ICU and nurse assessment, non-pharmacological intervention or therapy or delirium protocol; mobility and delirium and non-pharmacological interventions. The search was limited to articles from 2009-2015. The sources used for this literature review were peer-reviewed.

Models

Johns Hopkins Evidence -Based Practice Model (JHEBPM)

One essential element for transferring the best evidence into clinical practice is the selection of an EBP model. The JHEBPM (see Appendix I) offers the best framework for this DNP project because of the comprehensive, yet understandable structure, which addresses the important components of the EBP process (Schaffer et al., 2013). The JHEBPM is proven to be an effective method to integrate evidence-based guidelines into the hospital's clinical practice.

Application of the JHEBPM. The JHEBPM provides an organized method for incorporating evidenced based practice guidelines into clinical practice. The goal of this model is to ensure a method for research findings to appropriately be incorporated into clinical practice (Newhouse et al., 2007). Specific examples of the JHEBPM used to implement practice changes include support surfaces and pressure ulcers, placing patients taking oral antiplatelet medication on bleeding precautions, venous thromboembolism prevention for same-day postoperative surgery patients, registered nurse interventions to prevent readmission of adults related to health literacy, and EBP protocols for opiate drug withdrawal of chemically dependent adult patients (Cvach & Munchei, 2012; Moseley et al., 2012; Missal, Schafer, Halm, & Schaffer, 2010; Schaffer et al., 2013).

The Plan Do Study Act Cycle

The Plan, Do, Study, Act (PDSA) cycle (see Appendix J) was used during the implementation and evaluation phase of this DNP project. The PDSA cycle is a systematic series of steps for gaining important knowledge for the repetitive improvement of a process (The Deming Institute, 2014).

The PDSA cycle is a four- step process:

Step One: Plan- Identifying a goal, developing a theory, and identifying metrics;

Step Two: Do- Implementation;

Step Three: Study- Monitoring outcomes, testing for the validity of the plan, progress, success, or issues; and

Step Four: Act Closing the cycle, incorporating the learning generated by the entire process, which is used to adjust goals, to change methods or even to redevelop the process.

These four steps are repeated again and again as part of the cycle of continual improvement (The Deming Institute, 2014, para 2). The PDSA cycle is a continual improvement tool that centers on changing processes, which are the greatest determining factor in achieving success (The Deming Institute, 2014). The PDSA cycle is an effective approach to ensuring changes are appropriately tested before committing to full implementation.

Delirium

Delirium is classified into three psychomotor subtypes: hyperactive, hypoactive, and mixed (Balas et al, 2012). Hyperactive patients are restless, agitated, and may have hallucinations (Olson, 2012). Hypoactive patients appear lethargic and drowsy, respond slowly to questions, do not initiate movement, and are prone to be misdiagnosed as depressed (Olson, 2012). Hypoactive is the most prevalent subtype of delirium. Mixed subtypes can be a combination of hypoactive and hyperactive psychomotor behavior (Olson, 2012).

The American College of Critical Care Medicine (2012) and the American Association of Critical Care Nurses (AACN) (2011) released evidenced based guidelines recommending the prevention and monitoring of delirium in the ICU. These guidelines establish evidence-based practice (EBP) measures for the critical care nurse to monitor and prevent delirium for the critically ill patient. However, despite the growing recognition and importance of EBP, implementing and maintaining EBP is challenging and inconsistent (Wallen et al., 2010).

Impact of ICU Delirium

Delirium is a frequent sign of acute brain dysfunction in the critically ill patient. Extensive research in the medical and nursing literature examines the impact delirium has on different outcomes. In addition to the clinical outcomes, there are significant long-term social consequences associated with the development of ICU delirium.

Clinical outcomes. Zhang, Pan, and Ni (2013) completed a systematic review and meta-analysis of studies that examined the correlation between delirium and clinical outcomes of mortality, discharge placement, duration of mechanical ventilation, and hospital length of stay. Of the 14 studies reviewed that involved 5891 patients' data measures, the analysis found delirious patients had a higher mortality rate than that for non-delirious patients (odds ratio [*OR*]: 3.22; 95% confidence interval [*CI*]: 2.30–4.52). Patients with delirium had a higher rate of complications (*OR*: 6.5; 95% *CI*: 2.7–15.6), were more likely to be discharged to skilled placement (*OR*: 2.59; 95% *CI*: 1.59–4.21), and spent more time on mechanical ventilation (*WMD*: 7.22 days; 95% *CI*: 5.15–9.29). Patients with delirium had longer lengths of stay in both the ICU (*WMD*: 7.32 days; 95% *CI*: 4.63–10.01) and the hospital (*WMD*: 6.53 days; 95% *CI*: 3.03–10.03). Other studies

have documented similar results (Greve et al., 2012; Mehta et al., 2015; Salluh et al., 2015).The results from these research studies validate the profound impact delirium has on clinical outcomes.

Social outcomes. Pandharipande et al. (2013) studied 821 patients admitted to an ICU with respiratory failure or shock and were positive for delirium who survived, and then assessed cognition function 3 and 12 months after discharge. The evaluation was completed by psychologists using standardized cognition tests. The results found, that at three months, 56% of the patients examined had global cognition scores that were 1.5 - 2 standard deviations (*SD*s) below the population means. At the 12-month assessment, 54% of all patients were found to have similar scores to patients with moderate traumatic brain injury and mild Alzheimer's disease. A longer duration of delirium was independently associated with worse global cognition at 3 and 12 months ($p = .01$ and $p = 0.04$, respectively) and worse executive function at 3 and 12 months ($p = .04$ and $p = .07$, respectively). The authors concluded that ICU patients who develop delirium in the ICU are a high risk for long-term cognitive impairment.

Other studies have examined the social impact of delirium's long-standing cognitive impairments in memory, attention, concentration, executive and motor functions. These research findings also found a correlation of the length of time that patients experience ICU delirium with the amount of cognitive impairment. In addition, these cognitive impairments were constant, could influence employment, and, for some ICU patients, demonstrated no substantial improvements over time (Girard et al., 2010; Jackson et al., 2009; van den Boogaard et al., 2012; Wilcox et al., 2013).

Another aspect of the social impact of ICU delirium is the effect it has on the patient's family. Research findings have documented high rates of post-traumatic stress disorder (PTSD) depression, and anxiety in families of patients in the intensive care unit (Jones, 2013; Schmidt & Azoulay, 2012). Carbone and Gugliucci (2014) completed a systematic literature review that focused on studies that explored the impact on family members who cared for a relative with delirium. From the review of the studies, some common themes were identified: fear, fatigue, frustration, depression, illness, financial burden, and overall stress for the family caregivers. These studies' findings demonstrate the multifaceted and long-standing social impact of ICU patients who develop delirium, and the challenges they face upon discharge from the acute care setting.

Risk Factors of ICU Delirium

Research studies have tried to identify various risk factors for patients developing delirium in various healthcare settings. These risk factors are divided into two categories, predisposing and precipitating. Predisposing risk factors are difficult to control, but can assist the healthcare providers to identify patients at higher risk for developing delirium. Precipitating risk factors can be modified and are correlated to the healthcare environment or to the acute illness. The precipitating risk factors are the bases from which the non-pharmacological interventions were developed to assist in the prevention of delirium (Desai, Chau, & George, 2013; Olson, 2012, Patel, Balwin, Bunting, & Laha, 2014).

Zaal et al. (2015) conducted a systematic review of the research that examined predisposing and precipitating risk factors for delirium in the ICU environment. The authors classified as high quality studies 70% of the 33 studies they examined. The risk

factors identified for patients to develop ICU delirium include: age, dementia, pre-ICU emergency surgery or trauma, mechanical ventilation, alcohol abuse, severity of illness, sepsis, fever, electrolyte disturbances, metabolic acidosis, delirium on the prior day of admission to ICU, and coma.

One of the precipitating risk factors that has been associated with the development of delirium is immobility. One specific ICU patient population that is at higher risk for the development of delirium is the mechanically ventilated patient. The mechanically ventilated patients are at increased risk to develop delirium because of the need for benzodiazepines for sedation, and the prolonged immobility associated with this treatment modality. Therefore, two precipitating risk factors identified for the mechanically ventilated patient are the use of benzodiazepines and immobility (Ahmed, Laurent, & Sampson, 2014; Schweickert et al., 2009; Tsuruta et al., 2010). Additional non-pharmacologic precipitating risk factors include: lack of access to daylight, physical restraints, and sleep deprivation (Allen & Alexander, 2012; Olson, 2012; Vasilevskis et al., 2010).

In the ICU setting, the increased number of precipitating and predisposing risk factors that are present increase each patient's chance of developing delirium. There is agreement among experts that ICU delirium's etiology is multifactorial, and they recommend implementing preventive measures. Critical care nurses have the necessary knowledge to recognize and manage ICU delirium. Therefore, knowing the risk factors associated with the development of ICU delirium will assist critical care nurses with the appropriate non-pharmacological interventions (Morandi, Jackson, & Eli, 2009).

Assessment of ICU Delirium

Developing of delirium in the ICU is a frequent occurrence that is not often recognized by critical care nurses. Barriers identified for recognition of ICU delirium included: delirium's atypical presentation, lack of education about delirium, unfamiliarity with using the assessment tool(s), and lack of a standardized assessment tool (Olson, 2012; Yanamadala, Wieland, & Heflin, 2013). These barriers cause a delay in delirium recognition, predisposing the vulnerable ICU patients developing this condition and the associated adverse outcomes (McCrow, Sullivan, & Beattie, 2014).

Research studies found the prevalence of patients developing ICU delirium to be high, yet critical care staff, consistently do not monitor for delirium (Greve et al., 2012; Olson , 2102). In one study, Rice et al. (2011), examined 167 staff nurses' recognition of delirium in 170 hospitalized older adults. The authors compared the assessments of staff nurses' and expert researchers' results with each group assessing for delirium using the Confusion Assessment Method (CAM). Compared to the expert researchers' results, nurses failed to recognize delirium 75% of time, with poor agreement between nurse and expert researcher for all observations with the CAM assessment ($\kappa = 0.34$).

Hamdan-Mansour, Farhan, Othman, and Yacoub, (2010) studied over 200 nurses' knowledge and practices regarding ICU delirium in Jordan. Using a self-reported questionnaire, the findings revealed that critical care nurses have a moderate to low level of knowledge about ICU delirium. In a different study, Elliott (2014) surveyed 76 healthcare professionals, 52 nurses and 24 physicians, in three different ICUs in the United Kingdom. The data indicated that 44% of those surveyed had never received any education on delirium, and only one of the ICUs was using the CAM-ICU to monitor

their patients for delirium. Although these two studies were low quality studies, the lack of delirium education of critical care nurses was a consistent theme.

El Hussein, Hirst, and Salyers (2015) completed a systematic review of literature to identify the factors that contribute to under-recognition of delirium by acute care nurses. The major themes identified were: the different subtypes of delirium, the amount of delirium education provided, communication barriers caused by treatment modalities, inadequate use of delirium assessment tools, lack of understanding about delirium, and the similarity of delirium and dementia. The authors conclude that delirium remains unrecognized by critical care nurses, which reduces the quality of nursing care for patients developing ICU delirium.

Validated Delirium Assessment Tools Used in the ICU

Accurately assessing critically ill patients for delirium in the ICU can be challenging because of the complex medical equipment and treatment modalities in this environment. To accurately assess and monitor for delirium, a validated tool that identifies cognitive dysfunction is crucial. There are numerous assessment tools for delirium, such as: CAM-ICU, Intensive Care Delirium Screening Checklist (ICDSC), Nursing Delirium Screening Scale (Nu-DESC), and Delirium Detection Score (DDS) (Barr et al., 2012; Boot, 2012).

Tomasi et al. (2012) compared and assessed the concordance between the CAM-ICU and the ICSC in detecting delirium, and compared the results of these two delirium assessment tools to the clinical outcomes of LOS and mortality. This study's findings suggest that the CAM-ICU is a more accurate predictor of patients with higher mortality rates than is the IDSC. The authors conclude that the results from this study suggest the

CAM-ICU is a better predictor of clinical outcomes than is the ICSC and that the CAM-ICU is a better assessment tool for delirium in the critically ill patient.

Luetz et al. (2010) conducted a prospective cohort study to compare validity of the CAM-ICU, Nu-DESC, and the DDS for detection and assessment of delirium in ICU patients. The three scales were measured against a reference standard established separately using criteria from the Diagnostic and Standard Manual of Mental Disorders, Fourth Edition. Of the 156 patients, 40% of the patients met the criteria for delirium established by the reference standard criteria. The findings showed the CAM-ICU and the Nu-DESC had comparable sensitivities (CAM-ICU, 81%; Nu-DESC, 83%), but the specificity of the CAM-ICU was significantly higher than the Nu-DESC (96% vs. 81%, p <01). The DDS had poor sensitivity (30%), whereas the specificity was significantly higher compared with the Nu-DESC (DDS, 91%; Nu-DESC, 81%, p <.05). The authors concluded the CAM-ICU showed the best validity of the three scales. Other research studies found similar results and recommended the CAM-ICU to be the better tool to use in the ICU (Page, Navarange, Gama, & McAuley, 2009; van den boogaard et al., 2009; van Eijk et al., 2009). In 2010, The National Institute for Health and Clinical Excellence (2010) recommended the CAM-ICU be the diagnostic tool for assessing delirium in all ICU patients based on research findings (National Institute for Health and Care Excellence, 2010).

Scott, McIlveney, and Mallice (2013) recommend guidelines for a two-step approach for delirium assessment of critically ill patients. The first step in an accurate delirium assessment is to evaluate the patient's level of consciousness or the sedation level. A validated tool for this assessment is the Richmond Agitation Sedation Scale

(RASS) (Sessler, 2002). The RASS uses a 10-level scale for degree of arousal and agitation, with the scores ranging from -5 to +4 (Putensen, 2012). See Appendix B for a description of the levels of the RASS tool. The second step is the actual delirium assessment. A validated tool for delirium assessment is the Confusion Assessment Method-ICU (CAM-ICU). The CAM-ICU assessment uses four criteria: (1) acute mental status change, (2) inattention, (3) disorganized thinking, and (4) altered level of consciousness (McNicoll, 2005). See Appendix A for the CAM-ICU worksheet.

Management to Prevent Delirium

Critical care nurses need to incorporate measures to prevent ICU delirium into their management of critically ill patients. Preventative measures include the use of evidenced based non-pharmacological interventions. One of the most important preventative strategies is the early mobilization of the ICU patient. Needham et al. (2010) conducted a prospective study on 57 patients receiving mechanical ventilation in a medical ICU (MICU). One objective was to reduce deep sedation and delirium to permit mobilization. The results from this study found patients had less sedation (MICU [30% vs 67%, p <.01) and were not delirious [21% vs 53%, p = .03]). Statistical significance was found between mobilization and decreasing delirium in the mechanically ventilated patient population. Other research studies have found a similar correlation between early mobility and a reduction in the incidence of ICU delirium (Balas et al., 2014; Schweickert et al., 2009).

Kamdar et al. (2013) completed a QI observational study to evaluate sleep promotion interventions in a MICU to evaluate the effect of 300 patients acquiring delirium. The pre-design baseline was considered “usual care”. The post-design was the

non-pharmacological measures for sleep promotion, which included: night time measures - minimal stimulation, earplug, eye mask, music, and grouping care activities; and daytime interventions - opening blinds, mobilization, and preventing napping. The research findings, when comparing baseline usual care measures to the QI non-pharmacological measures for sleep promotion measures, found significant improvements in incidence of delirium/coma (odds ratio: 0.46; 95% confidence interval, 0.23-0.89; p = .02), and daily delirium/coma-free status (odds ratio: 1.64; 95% confidence interval, 1.04-2.58; p = 0.03). The authors concluded non-pharmacological measures that improve sleep are associated with significant improvement in the incidence of delirium and daily delirium free days for the patient (Kamdar et al., 2013). Other research findings using cognitive stimulation during the day documented a statistically significant decrease in the delirium rate for the ICU patients (Skrobik et al., 2010; Colombo et al., 2012).

Patel et al. (2014) investigated the implementation of non-pharmacological interventions. They found measures such as: noise reduction measures, grouping activities between 11:00 pm and 7:00 am to promote uninterrupted sleep, and early mobilization, decreased the incidence of delirium. Compliance with the bundle resulted in a reduced incidence of delirium (55/167 (33%) before vs 24/171 (14%) after, $p < .01$), and less time spent in delirium (3.4 (1.4) days before vs 1.2 (0.9) days after, $p = .21$). In addition, increases in sleep efficiency index were associated with a lower odds ratio of developing delirium (*OR* 0.90, 95% *CI* 0.84–0.97).

Rivosecchi, Smithburger, Svec, Campbell, and Kane-Gill (2015) completed a systematic review and found that the non-pharmacological interventions of mobilization,

reorientation, and music therapy prevented or decreased the duration of delirium. The authors conclude that ICUs must implement multicomponent non-pharmacological measures, and these measures must include: education of nurses, early mobilization, cognitive stimulation, and reorientation measures.

Delirium Education for Critical Care Nurses

Research studies establish the benefits of comprehensive delirium education for critical care nurses to improve the assessment and monitoring of delirium in the ICU. Wand et al. (2014) evaluated the success of an educational program for critical care nurses to accurately assess and implement measures to prevent delirium from developing in older patients. The data analysis focused on 129 patients out of a possible 568 eligible patients who agreed to participate in the study. The study found that staff improved their knowledge of delirium post-intervention and increased their confidence for assessing and managing delirious patients. In addition, staff addressed more known risk factors for delirium post-intervention (8.1 vs. 9.8 F (1, 253) = 73.44, $p < .01$) (Wand et al., 2014).

Gesin et al. (2012) examined the effectiveness of training of nurses to improve their ability to diagnose delirium and found that a multifaceted education, including the correct use of the validated assessment tool, improves nurses' assessment and knowledge about delirium (Gesin et al., 2012). Other research studies support these results and reinforce the benefits of critical care nurses receiving comprehensive delirium education to improve the assessment and management of delirium (Akechi et al., 2010).

McCrow et al., (2014), completed a randomized controlled trial of a web-based educational intervention for ICU nurses. A total of 147 nurses from four different hospitals and different ICUs were randomized to a control group (no education) and an

intervention group (received web-based education). Statistically significant differences were found between the interventions group and the control group in delirium knowledge (t = 3.78 p = < .01) and recognition (t = 2.56 p = .11). The authors concluded that nurses who are educated to recognize delirium could play a significant role in improving delirium recognition (McCrow et al., 2014).

Akechi et al. (2010) evaluated a delirium-training program given to 32 nurses that represented 30 different clinical departments in a university hospital in Japan. The delirium training program consisted of two workshops given by trained nurses and a physician, with lectures on the topics related to delirium that included: definition, diagnostic criteria, differential diagnosis, clinical symptoms, screening, risk factors, precipitating factors, nursing care, and clinical cases. These nurses then educated the staff in their units. A questionnaire was given to all nurses in the hospital, and the data showed the delirium training program had a significant effect on 12 of the 15 self-confidence categories, including identification of the causes of delirium. The authors concluded that education is an important component for critical care nurses to effectively assess and manage delirium in the clinical setting. Other studies examining delirium education for critical care nurses found similar results and validated the importance of a comprehensive educational program to accurately monitor and prevent patients from developing ICU delirium (Bowen et al., 2012; Harroche et al., 2014; Speed, 2015).

Summary

This section presented an extensive review of the literature that examined the social and clinical impact of delirium, risk factors, validated delirium assessment tools, non-pharmacological interventions, recognition of delirium, and delirium education. This

section discussed the framework for the project, the JHEBPM and PDSA tool. Local background and context, my role as the DNP student, and the role of the multidisciplinary team was also reviewed.

This review of literature supports this DNP project's long term goal to decrease length of stay for ICU patients and decrease in duration of mechanical ventilation hours which will be determined after my graduation. This was accomplished by developing an evidenced based policy and facilitating the education of the critical care nurses to increase their knowledge regarding assessment and management of ICU delirium. Section 3 will describe the approach and method used in this DNP project to address the comprehensive educational plan for delirium used to educate the critical care nurses. Included in this section will list of the multidisciplinary team and responsibilities, ethical and budgetary considerations, and evaluation plan.

Section 3: Methods/Approach

Introduction

The purpose of this DNP project was to develop an evidence-based policy and a comprehensive nursing education plan for the nursing assessment and nursing management of delirium in the ICU. The education plan included an analysis and synthesis of the literature, a curriculum plan, and a pretest/posttest. Section 3 of this paper will describe the approach, method, and ethical and budgetary considerations. The final section will give a brief overview of the evaluation plan.

The Multidisciplinary Team

The Institute for Healthcare Improvement (2012) recommends the multidisciplinary team members be comprised of a diverse group of key stakeholders that have an interest in the outcome and thrive to achieve the same goal. I was the team leader of this DNP project. One role of the team leader is to follow the principles of QI and support the process (Quality Insights of Pennsylvania, n.d.). Team leaders also promote collaboration among the team members (Bender, Connelly, & Brown, 2013). Key stakeholders in this target ICU having a vested interest in this DNP project included:

- Team Leader: I served as facilitator of the multidisciplinary team.
- Intensivist: Ensured current evidence-based guidelines were being implemented into clinical practice. Supported changes to order sets and guidelines related to delirium assessment and management recommended by multidisciplinary committee. Approved the evidence-based policy and educational plan.

- QI Coordinator: Responsible for data analysis and disseminated the outcome measures to the multidisciplinary team and staff.
- Critical Care Pharmacist: Assisted with the education plan that focused on the pharmacological management of delirium management. Aided with reviewing the literature for current evidence-based guidelines.
- Physical and Occupational Therapist: Focused on the non-pharmacological interventions related to mobility and cognitive stimulation. Approved the final evidence-based policy and educational plan.
- Respiratory Therapist: Focused on the impact of delirium and impact of increasing mobility with the mechanically ventilated patient population.
- Information Technologist (IT): Built the RASS, CAM-ICU, and non-pharmacological intervention electronic medical record screens and reports.
- ICU's Manager and Two Critical Care Nurses: Approved the evidence-based policy and educational plan. Will assist with the implementation of the delirium assessment tool and nursing management measures into clinical practice.

Approach and Rationale

For this DNP project, I used the QI approach and the JHEBPM framework to develop a comprehensive educational plan and an evidence-based policy for the assessment of delirium and nursing management measures in ICU patients. The QI

approach was selected for this project because of the four key principles: (a.) operates as systems and processes, (b.) centers on patients, (c.) team concept and, (d.) utilizes data to establish and evaluate baseline (U.S. Department of Health and Human Services Health Resources and Services Administration, 2011). This section will outline the process for developing a comprehensive education plan for the assessment and management of delirium in the ICU. The major steps are outlined below:

1. Using the JHEBPM, (see Appendix J), I developed the literature review matrix. I obtained permission from the Institute for Johns Hopkins Nursing, and utilized the JHEBPM grading scale to determine the level of evidence for each article that was reviewed.
2. A multidisciplinary QI team was formed of key stakeholders from this target ICU. This DNP project was divided into two phases, the educational and interventional.
3. During the educational phase, I presented an analysis and synthesis of this review to the multidisciplinary team. To assist with this evidence-based analysis, I developed a literature review matrix from the selected articles.
4. From this review of the literature, the educational plan and evidence-based policy were developed. The education plan consisted of the curriculum plan, the literature review matrix and the pretest/posttest. Each of these items were reviewed by two Ph.D. content experts. From their review and recommendations, the final educational plan was presented and approved by the multidisciplinary team.

5. From the approved comprehensive educational plan, I developed two 45 minute educational sessions that were reviewed by the multidisciplinary team. PowerPoint presentations (see Appendix M) were developed the educational sessions. In addition, videos of ICU patient testimonies who experienced delirium and case studies were used to support the key concepts taught for the educational session. The first educational session topics were: an overview of delirium, criteria, etiology, risk factors, clinical and social outcomes, validated screening tools overview, and management of delirium (with a specific focus on the non-pharmacological management). The second educational session concentrated on the correct assessment of delirium using the Richmond Agitation Sedation Scale (RASS) and the CAM-ICU. Case studies and videos were used to reinforce the teaching on the proper assessment of delirium using the validated RASS and CAM-ICU tools.
6. The didactic education of the critical care nurses was completed over a two-week period. I taught both educational sessions. A pretest was given prior to the first educational sessions and a post-test was completed after the second educational session.
7. The development of evidence-based policy for delirium assessment and management was completed and approved by the multidisciplinary team members.
8. The interventional phase involved the implementation of the RASS, CAM-ICU, and nursing management measures into clinical practice. The QI tool, the PDSA cycle (See Appendix K), was used for this part of the DNP project.

Critical care nurses' workflows in this target ICU were adjusted to incorporate these new evidence-based assessments and nursing management measures into their daily practice.

Method

This section outlines the JHEBPM three major phases for this project for the development of the evidence-based policy and the comprehensive educational plan..

1. Identification of the practice focused question

What evidence from the literature is available for the assessment and management of delirium within the ICU unit?

2. The second major phase is collection of the evidence. This involves searching, critiquing, summarizing, determining strength of evidence, and making recommendations.

The JHEBPM's research evidence appraisal tools were used to conduct the literature review. This review is divided into three main sections: delirium overview including, definition, criteria, impact, risk factors, clinical and social impact; RASS and CAM-ICU, including the frequency of assessments; and nursing management measures.

3. The third major stage is translation of the evidence for use in practice, which includes determining the likelihood of applying the change and developing an action plan for implementation (Schaffer et al., 2013).

The evidence-based policy was developed to offer guidelines for the assessment and management of ICU delirium in clinical practice. This evidence-based policy was the result of the recommendations from the review of literature matrix. The policy documented the translation of research findings related to the assessment and prevention

of ICU delirium for the critically ill patient. The multidisciplinary team approved the adoption of the evidence-based policy, Awakening and Breathing Coordination, Delirium Monitoring and Management, Early Mobility, and Family Participation (ABCDEF) (See Appendix D). The ABCDEF evidence-based policy is a multicomponent approach to improve patient outcome by enabling multidisciplinary team collaboration, standardizing care and medical interventional processes, and stopping over-sedation and prolonged ventilation. The ABCDEF evidence-based policy facilitates early mobilization, delirium recognition, early extubation, and family participation in the care and management of the ICU patient (Balas et al., 2012; Trogrlić et al., 2015).

Ethical Considerations

Approvals for this DNP project were obtained from Walden University and this facility's Institutional Review Board (IRB) (see Appendix N). Participants, the critical care nurses, were first informed of the background of the project and the procedure before each education session. The critical care nurses' names were not used for identification on the 10-question multiple choice pretest/posttest. Instead, a code number was assigned to each pretest that each critical care nurse used for both tests. Demographic data was collected on the pretest to assist in the data analysis. Specific instructions were given to each participant regarding confidentiality with the analysis of the 10-question multiple choice pretest/posttest. This is a minimal risk DNP project; therefore, no identification or informed consent of participants was part of the DNP project.

Budget

An additional cost to the ICU's operational budget was the two hours of educational time for the critical care nurses not attending the education sessions during

their regular work hours. The implementation of the RASS, CAM-ICU and nursing management measures had no financial implications for the ICU. The other budgetary consideration was related to the mobility intervention of the non-pharmacological measures. Chairs, gait belts and walkers were budgeted to the ICU's operational and capital expense budgets to meet the needs for the early mobilization protocol.

Evaluation Plan

An effective evaluation design is a critical component when developing a project (Hodges & Videto, 2011). Summative evaluation is "conducted to determine whether a program worked" (Hodges & Videto, 2011, p. 206). For this DNP project, there were two evaluations for two different populations. The first population were two PhD nursing leaders whom evaluated the curriculum and provided a content analysis index for the pretest/posttest. The multidisciplinary team provided a summary evaluation. The second population and evaluation plan were comprised of the clinical care nurses who participated in the education and completed the pretest/posttest. The findings and recommendations for both populations will be discussed in Section 4.

Summary

In this section, the approach and method in developing the comprehensive educational plan and the evidence-based policy for the assessment and nursing management measures to prevent delirium in ICU patients were discussed. The members of the multidisciplinary team and their responsibilities, including my role as team leader, for this DNP project were described. Ethical and budgetary considerations were offered, and the last section gave a brief overview of the evaluation plan.

Section 4 of this proposal will discuss the findings and recommendations for this DNP project. An evaluation of each of the DNP project's outcomes will be offered as well as a summative evaluation by the multidisciplinary team on the project and my leadership. In addition, implications, strengths, limitations, and recommendations of the project will be described. An analysis of self will also be provided.

Section 4: Findings and Recommendations

Introduction

The purpose of this DNP project was to develop an evidence-based policy and a comprehensive nursing education plan for the assessment and management of delirium in the ICU. To accomplish this, the following outcome products were created:

- Outcome 1. Literature Review Matrix (see Appendix C),
- Outcome 2. Evidence-Based Policy (see Appendix D),
- Outcome 3. Educational Curriculum Plan (see Appendix E)
- Outcome 4. Pretest and Posttest (see Appendix F)
- Outcome 5. Summative Evaluation Stakeholders/ Committee Members (see Appendix H).

The long-term goal for this DNP project was to decrease length of stay for ICU patients and decrease in duration of mechanical ventilation hours which will be determined after my graduation. This goal was accomplished by providing an evidenced-based policy and comprehensive education of the critical care nurses in this target ICU to increase their knowledge regarding assessment and management of ICU delirium.

This section discusses the evaluation and findings based on the project's outcome products and the results of the pretest/posttest. The implications of the project, including evidence-based policy, practice, research, and social change, are then reviewed. The strength and limitations of this project, as well as, an analysis of myself as a scholar, practitioner, and project developer are also provided.

Discussion, Findings, and Implications

This section will present the outcomes products of this DNP project including the content validation of the items of the curriculum plan, the evidence-based policy, and the results of the pretest/posttest. The content experts for the curriculum plan and the pretest/posttest were selected based on their nursing leadership, experience, and educational background. The multidisciplinary team completed a qualitative summative evaluation on my role as a team leader,

Expert Evaluation and Content Validation of the Project

Three content experts evaluated the components of the outcome products that included: the literature review matrix, the curriculum plan, and the pretest/posttest item. A PhD expert in educational psychology reviewed the construction of each pretest/posttest item. Then, two PhD prepared nursing leaders provided content validation for the curriculum plan and the pretest/posttest. The first content expert was the PhD prepared director of education and professional development, and the second content expert was a PhD prepared clinical nurse specialist of research and evidence-based practice. I developed a four objective Curriculum Plan with "1 = not met and 2 = met" for the content experts to evaluate the curriculum content. See Appendix O for the Expert Evaluation of the Curriculum Form and Appendix P for the Content Validation of the Pretest/Posttest.

Outcome 1. Literature Review Matrix

Discussion. I developed and reviewed the literature review matrix (see Appendix C) with the multidisciplinary team. From this review, the outcome products described above were created to meet the goal of the project.

Evaluation. After the literature review was reviewed**,** the team approved the RASS and CAM-ICU as the delirium assessment tool for this ICU. The team appreciated the extensive review of literature, which assisted with the development of the education curriculum and the pretest/posttest.

Data. None

Recommendations. One recommendation offered for future collaboration(s) is that all team members participate in the review of literature. Some of the multidisciplinary team members expressed the desire to gain more experience with reviewing a research article.

Outcome 2. Evidence-Based Policy

Discussion. An evidence-based policy (see Appendix D) for the assessment of delirium, including the implementation of the nursing management measures was developed.

Evaluation. Each member of the multidisciplinary team made recommendations and revisions to the evidence-based policy based on the review of literature matrix. The chief intensivist made final approval of the evidence-based policy. See Appendix D for the evidence-based policy that completed the hospital's approval process and was implemented in this target ICU.

Data. None

Recommendations. None

Outcome 3. Content Experts Evaluation Summary of the Curriculum Plan

Discussion. A comprehensive delirium educational curriculum plan was developed (see Appendix Q) for the critical care nurses. The components of the plan were

the literature review matrix, educational curriculum plan, and the 10-question multiple choice pretest/posttest exam. The evidence-based curriculum plan was developed for the problem identified, the purpose and the goal. The categories of the educational plan were the time, objectives, content outline, evidence, method of presenting, and the method of evaluation.

Evaluation. Two content clinical experts were given the curriculum plan and the literature review matrix to thoroughly evaluate and ensure the objectives were met. A four objective Curriculum Plan Evaluation Plan consisted of an evaluation scale with, "1 = not met and 2 = met".

Data. The two content experts' answers revealed that the educational curriculum plan's objectives were met (Content expert evaluation summary score = 2.0) (See Appendix Q).

Recommendations. The content experts recommended the objectives be increased from a Bloom taxonomy level 1 & 2 to level 4. The four objectives were changed to reflect this important change. Bloom taxonomy comprises six levels. The taxonomy is a framework for establishing learning objectives that range from lower order thinking skills to higher order thinking skills (Iowa State University, 2012). The multidisciplinary team approved the revised Educational Curriculum Plan based on the content experts' recommendations. After the content experts completed the evaluation of the educational curriculum plan, the didactic educational sessions were developed.

Outcome 4. Content Expert Evaluation Summary of the Pretest/Posttest

Discussion. The 10-question multiple choice pretest and posttest (see Appendix R) was designed to assess the critical care nurses' knowledge before and after the two

educational sessions. A PhD in educational psychology reviewed the construction of the multiple choice 10 questions for the pretest/posttest. After this review, the content validation was completed by the two PhD prepared nurses who reviewed the educational curriculum plan. The content experts also received a copy of literature review matrix and the educational curriculum plan to complete the validation process of each test item.

Evaluation. Content Validation. The content validation experts reviewed the pretest/posttest by using a four point Likert rating scale from 1 = not relevant, 2= somewhat relevant, 3 = relevant, and 4 = very relevant

Data. Content Validation Index = 1.0 (See Appendix R)

Recommendations. The content experts recommended minor changes to the questions and felt the pretest/posttest questions were reflective of the objectives of the curriculum plan. The multidisciplinary team approved the changes recommended by the content expert to the pretest/posttest.

Outcome 5. Summative Evaluation Stakeholders/ Committee Members

Discussion. After the last meeting, members of the multidisciplinary team were asked to evaluate my role as the team leader. A seven-question open-ended summative evaluation (see Appendix H) was sent to each team member via e-mail. Included in the e-mail were instructions on the process for completing evaluation and returning the form via interoffice mail to maintain anonymity

Evaluation. There were seven open-ended questions. The main themes the team evaluated this project were divided into three categories, team approach, project outcomes, and me as a team leader.

Data. Of the 10 possible multidisciplinary team members who could complete the evaluation, seven completed forms were returned via interoffice mail. Each question on the evaluation was analyzed and the main themes were:

Team approach with the student as team leader. Each team member felt their opinion and recommendations were valued by other team members and were grateful to be part of this initiative. They appreciated the active involvement and support of the intensivist, and felt empowered to offer recommendations based on the evidence and their expertise (e.g. physical therapist for the early mobility protocol). The team members wrote that I, as team leader, created an atmosphere where everyone felt free to express their thoughts and recommendations for the development of the evidence-based curriculum plan, didactic educations sessions, and the evidence-based policy. The team members also expressed appreciation that I, as team leader, sent the agenda for the meeting one week prior to the meeting. The agenda included the topics, who was responsible for each topic and the length of time allowed to discuss each topic. This practice allowed the meeting to be organized and all agenda items to be discussed within the allotted time.

Outcome products. All team members were appreciative of the extensive literature review and felt this allowed for effective development of the evidenced based curriculum plan, didactic educational sessions, and evidence-based policy. Team members felt positively about their contribution(s) to the approval process and that their opinions were valued. Specific comments from team members included: “I have a better understanding of what evidence-based practice means!”; “Thank you for sending the

agenda in advance, I had time to prepare and knew what to expect.", and: "This was a collaborative effort, thank you for including our department in this important initiative."

The role of the student as the team leader. Most team members felt I encouraged active participation from each team member. Several team members commented positively on the active involvement of the intensivist for this project. In addition, an atmosphere where the acceptance of different viewpoints was created, and each team member was given the opportunity to offer suggestions and recommendations when reviewing the educational plan and evidence-based policy before final approval was obtained. Specific comments from team members included: "It was nice to see the intensivist actively involved and contributing to this initiative!", and "I learned a lot from this initiative and understand why assessing for delirium is so important."

Recommendations. The main suggestion was a more active involvement by the team members in the development of the review of literature matrix and evidence-based policy development. Although the team members understood this was my DNP project, each member expressed the desire to be directly involved in the development phase of these important documents.

Evaluation of the Knowledge Gained from the Educational Session

A pretest/posttest (see Appendix F) was given to the critical care nurses to evaluate the knowledge that was gained from the two education sessions. From the delirium educational curriculum plan, two one-hour educational sessions were developed and taught over a two-week period. The first educational session occurred over a one week period and was offered at numerous times to accommodate all shifts. The topics in the first session were: the definition and criteria for delirium, etiology, risk factors,

clinical and social outcomes, validated assessment tools, and management of delirium (with a specific focus on the evidenced based non-pharmacological management.). Videos of patient testimonials who experienced ICU delirium were used to reinforce the importance of assessing and preventing patient from developing ICU delirium.

The second educational session occurred the following week and was offered at numerous times to accommodate all shifts. The topic for this session specifically focused on the assessment of delirium, by correctly using the RASS and the CAM-ICU. A CAM-ICU Training Manual (Vanderbilt University Medical Center, 2013), case studies and videos that showed the CAM-ICU being utilized to assess for delirium in ICU patients, were all used to reinforce the didactic teaching.

Prior to the first session, the pretest was given to each critical care nurse attending the educational session. To ensure confidentiality and identification of each critical care nurse, a code number was written on the pretest, and that number would be used for the post-test identification. Demographic data was also collected, such as age, gender, years in nursing, years in critical care, and highest educational level to be used for the data collection. After the second educational session, the posttest was given to each nurse with instructions to write the code number in the space provided on the test.

Data. Analyses was conducted with SPSS Version 21 (SPSS Inc., Chicago, Illinois). A total of 32 out of the 35 nurses working in this ICU completed both educational sessions. Three nurses did not complete the training, two were on vacation and one was on Family and Medical Leave (FML). The demographic characteristics of the nurses are summarized on Table 1. Many critical care nurses working in this ICU are female, mean age of 39.3 (*SD* 10.0) years, with a majority achieving their Baccalaureate

in Nursing (BSN). The mean years in nursing was 11.9 (*SD* 8.4) years, with 9.80 (*SD* 8.5) years in critical care.

Results. The 10-question pretest/posttest resulted in a pretest mean score of 81.25 (*SD* 11.29) versus a post-test mean score of 94.06 (*SD* 7.12). A paired-samples t-test was conducted to compare pretest, given prior to the first educational session, and the posttest, which was given at the completion of the second educational session. There was a significant difference in the scores for the pretest (*M*=81.25, *SD*=11.29) and post-test (*M*=94.06, *SD*=7.12) conditions; *t* (31) = -5.92, *p* = 0.01 (see Figure 2 and Table 2).

Table 1
Demographic Characteristics of the Critical Care Nurses

N=32	Minimum	Maximum	Mean	Standard Deviation
Age	27	67	39.28	10.046
Years in Nursing	3	33	11.94	8.353
Years in Critical Care	1	33	9.8	8.466
	Frequency	Percent		
Gender				
Female	30	93.8		
Male	2	6.3		
Highest Degree Achieved:				
Associates	1	3.1		
Diploma	8	25.0		
Bachelor of Science	19	59.4		
Masters	4	12.5		

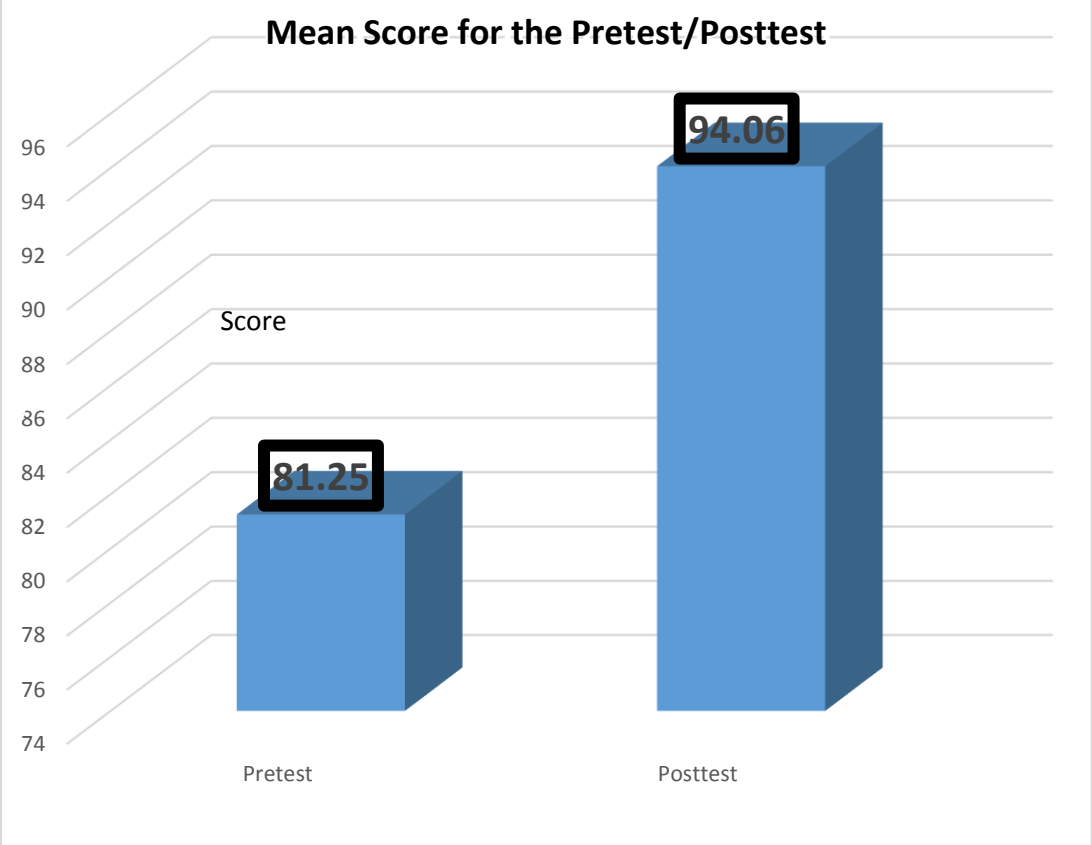

Figure 2. Mean tests results between the critical care nurses' pretests and posttests

Table 2
Paired Sample T- Test for Pretest/Posttest Delirium Education Ananlysis

	N	Mean	Std. Deviation	Std. Error Mean	95% Confidence Difference Interval Lower	Upper	t
Pretest	32	81.25	11.29	1.995			
Post-test	32	94.06	7.12	1.26			
Pretest-Posttest		-12.81	12.24	2.164	-17.23	-8.40	-5.92

Recommendations. The signifiicant finding from this DNP project was that critical care nurses in this target ICU had a knowledge deficit regarding patients acquring ICU delirium, but this deficit was reduced with comprehensive education. This project's findings support other research studies that establish the benefits of comprehensive

delirium education for critical care nurses to improve the assessment and monitoring of delrium in the ICU (Akechi et al., 2010; Bowen et al., 2012; Gesin et al. 2012; Harroche et al., 2014; McCrow et al., Speed, 2015; Wand et al., 2014). The benefits in patient outcomes (e.g. decreased LOS and ventilator hours) from critical care nurses receving this comprehensive delrium education will be monitored monthly after the implementation of the CAM-ICU and the nursing management measures.

Implications

Critical care nurses are vital in the prevention, assessment, and early diagnosis of delirium in critically ill patients, but lack the knowledge of the current evidenced based guidelines or the adverse outcomes (Hamdan-Mansour et al., 2010; Rice et al., 2011). A gap existed between the evidence and patient care practices that contributed to ICU patients acquiring delirium. Therefore, the development of a comprehensive delirium educational plan and evidence-based policy for critical care nurses was important for closing the gap between research and clinical practice in this ICU. By implementing this process, the ICU LOS and duration of mechanical ventilations hours may decrease. The development of EBP for the nursing assessment and management of ICU delirium affect this ICU's and organization's evidence-based policy, practice, and research, exhibiting a social change among critical care nurses and patient outcomes.

Policy Implications

The American Association of Colleges of Nursing (AACN) identified one of the essentials of doctoral education for advanced nursing practice is Healthcare Policy for Advocacy in Health Care (AACN, 2006). For the DNP prepared healthcare leader, an important responsibility of this essential is providing the education and tools when

integrating EBP into clinical practice to ensure safe patient care (Mullin, 2016). I led a multidisciplinary team in a DNP project that developed a curriculum educational plan and evidence-based policy for the assessment and management of delirium for the ICU patient. The signifiicant finding from this DNP project was that critical care nurses in this target ICU had a knowledge deficit regarding patients acquring ICU delirium, but this deficit was reduced with comprehensive education and evidence-based policy. This finding and the implementation of the evidenced-based policy may benefit patient outcomes, such as decreased ICU LOS and decrease in the duration of ventilator hours. .

Practice Implications

An important role of the DNP prepared advanced practice nurses is translating and disseminating evidence-based research into clinical practice (AACN, 2006). Clinical leaders are trying to improve and sustain quality and efficiency by implementing evidence-based practice (EBP) initiatives. One major implication from the results of this study is, when necessary knowledge is attained, the critical care nurses can successfully assess and implement preventative measures for ICU delirium into clinical practice. A second implication is that implementation of an evidence-based policy and educational curriculum plan will bring a positive change in practice.

Research Implications

An important role of the DNP prepared advance practice nurse is to evaluate the outcomes of the integrating evidence-based research in clinical practice (AACN, 2006). The purpose of this DNP project was to develop an evidence-based policy and a comprehensive nursing education plan for the assessment and nursing management of delirium in the ICU. Since the delirium assessment tool, the CAM-ICU, and nursing

management measures were implemented into clinical practice, there are two evaluation methods. A monthly assessment will be completed comparing the total number of patients admitted to the unit, and the number patients who develop delirium. Delirium's adverse outcomes will be measured before and after implementation of the CAM-ICU assessment and nursing management measures. The specific outcomes that will be measured are: ICU LOS, duration of ventilator hours. Further research regarding delirium will continue to be evaluated and changes will be made to the evidence-based policy and clinical practice in this target ICU.

Social Change Implications

Walden University (2017) defines positive social change as, "deliberate process of creating and applying ideas, strategies, and actions to promote the worth, dignity, and development of individuals, cultures, and societies. Positive change results in the improvement of human and social conditions" (para 12).

When the critical care nurses follow the policy and incorporate the evidence-based education they received for the assessment and management of ICU delirium, a positive social change will occur for patients', critical care nurses' and hospitals' outcomes. A positive social change for patients occurs when they do not acquire any short or long term cognitive impairment and return to their pre-hospitalization baseline function. In addition, patients are not facing the increased mortality or morbidities associated with acquiring ICU delirium. The positive social change for critical care nurses occurs by enhanced clinical practice knowledge, increased patient and nurse safety, and decreased job stress. The improvement in work environment results in increased job satisfaction. The positive social change for hospitals occurs by decreased

length of stay, increased throughput, and decreased cost and resource utilization. Hospitals' improved efficiency promotes positive social change by meeting communities' health care needs.

Strengths and Limitations of the Project

Strengths

One strength of this project was the creation of a multidisciplinary team that included the key stakeholders who played a role in the assessment and management of the delirium in this ICU. Each stakeholder actively participated by reviewing the research matrix and developed the outcome products. This participation in the development of the outcome products included the chief intensivist of the ICU.

Another strength of the project was ensuring the three domains of learning were achieved when choosing the teaching methods for the educational sessions to meet the objectives of the curriculum plan. These three domains of learning were: (1.) Cognitive domain - refers to theoretical knowledge and understanding; (2.) Psychomotor domain - refers to the ability to attain practical skills, and; (3.) Affective domain - refers to professional behavior and acceptance of new skills (Hayes, 2016). The three domains of learning were achieved in the delirium educational sessions by using teaching methods such as, case studies, videos, PowerPoints, patient testimonials, video demonstrations, and the pretest/posttest.

Limitations

Some of the pretest/posttest questions were newly developed from the curriculum plan and reviewed only for content validation and structure. Another limitation was the short time span of two weeks between taking the pretest and the posttest because the

critical care nurses may have remembered the items on the test, which may have skewed the results.

Analysis of Self

The Doctor of Nursing Practice (DNP) degree was developed to create practice focused experts (AACN, 2006). To accomplish this, AACN developed eight essential competencies for the DNP curriculum, with three essentials focusing on clinical scholarship and analytical methods for evidence-based practice (EBP). Therefore, the DNP prepared nurse is a scholar-practitioner who is grounded in the critical appraisal and application of EBP into clinical setting (Ponte & Nicholas, 2015).

Role as Scholar Practitioner

Through the findings, development, implementation, and writing of this DNP project, I facilitated the integration of evidence-based knowledge to improve healthcare outcomes. At this target ICU, there was a gap between EBP recommendations for delirium monitoring and nursing management measures, and what is being practiced, which is no assessment or preventative measures. Therefore, my DNP EBP project was the development of a comprehensive delirium educational plan and evidence-based policy for these critical care nurses to close the gap between research and clinical practice in this ICU, which is the essence of a scholarship practitioner. I have gained valuable insight about how to effectively integrate EBP into clinical practice. The development and implementation of this DNP project has taught me two key principles to succeed as a scholar practitioner, namely, patience and effective communication with key stakeholders.

Role as Project Manager

The DNP leader displays "adaptive skill in leading change through the translation and application of evidence, and their understanding of the meaning of sustainable value within the practice setting in which they lead" (Montgomery & Porter-O'Grady, 2010, p. 46). The leader plays an important role in forming, sustaining, and developing the efforts of a team in finalizing a project (Kelly, 2013). According to research findings, effective teamwork results in improved patient outcomes (Kelly, 2013). The team leader must provide certain characteristics, such as coaching, supporting, mentoring, and evaluating improvement processes (Kloppenbog & Petrick, 1999). Being team leader of the multidisciplinary team enhanced my ability to be an effective leader. I learned the importance of defining responsibilities of each team member, active listening, developing meeting agendas, open communication, and creating an environment of mutual respect that allows teamwork and collaboration.

Contribution to My Professional Development

In 2006, the AACN determined that the DNP curriculum ensures that students become proficient in competencies specific to their specialty and the eight "foundational" essential competencies (AACN, 2006). By establishing competencies related to leadership, interprofessional collaboration, and EBP, the guidelines emphasize the role of DNP prepared nurse in leading healthcare organizations and translating evidence into practice for improving health outcomes (Ponte & Nicholas, 2015). This DNP project provided an opportunity to develop the eight essential competencies, grow in scholarship and leadership in advancing the DNP role; promote quality improvement; improve health outcomes; and impact health care evidence-based policy.

For many years, I have been a critical care clinical nurse specialist. My DNP education and this DNP project has enhanced my knowledge of clinical theory and implementing evidenced based research into clinical practice. I now have the educational preparation to lead and facilitate a multidisciplinary healthcare team. My education and this DNP project have enhanced my leadership skills and I am better prepared to function in roles, such as educator, outcome manager, consultant, and change agent. Walden University's DNP program enhanced my academic preparation by teaching the scientific foundation of nursing practice and the essentials of doctoral education for advanced practice nursing. This foundation will enhance my clinical practice and allow me to promote the spheres of influence that are associated with the roles of the clinical nurse specialist.

Summary

The long-term goal of this DNP project was to decrease length of stay for ICU patients and decrease in duration of mechanical ventilation hours which will be determined after my graduation. This will be accomplished by developing an evidenced-based policy and facilitating the education of the critical care nurses in this target ICU to increase their knowledge regarding assessment and management of ICU delirium. The results of the DNP project showed that the outcome products met their intended objectives and upon implementation the ICU nurses demonstrated the increased knowledge from the comprehensive delirium education. Section 5 will present the method that will be used to disseminate this project to a larger audience of critical care nurses and nursing leadership.

Section 5: Scholarly Product

Section 5 discusses the method used for the dissemination of my project. Sharing and effectively communicating an evidence-based practice (EBP) project with other healthcare providers enables the communication of professional work in practice, research, and education (Bindon & Davenport, 2013). There are various methods to formally present an EBP project, such as: publication, formal lecture, and poster presentation. I selected a poster presentation as the method to disseminate the results of my DNP project. See Appendix S for the poster board for this conference. I presented this DNP project at the national conference of the National Association of Clinical Nurse Specialists. The organization's national conference, The Clinical Nurse Specialist Conquering Change in the Health Care Environment, which was held on March 9-11, 2017, in Atlanta, Georgia.

Scholarly Product Abstract

Learning Objective

After reviewing this poster presentation, the participant will be able to explain if providing education to the critical care nurses in this intensive care unit (ICU) increased their knowledge regarding delirium assessment and management of patients.

Significance and Background

Patients in the intensive care unit (ICU) are at increased risk to develop delirium, which is a life-threatening condition with short- and long-term negative outcomes. Consistent delirium assessment, prevention, and nursing management measures have the potential to reduce these negative outcomes. Critical care nurses are essential but may fail to recognize delirium due to an overall lack of knowledge. Providing critical care nurses

with comprehensive education is the most important factor for the successful assessment and management of ICU delirium. The Johns Hopkins evidence-based practice model framed this quality improvement educational project that was led by a doctor of nursing practice student ICU clinical nurse specialist.

Purpose

The purpose of this DNP project was to develop an evidence-based policy and a comprehensive nursing education plan for the assessment and management of delirium in the ICU. Two PhD-prepared nursing leaders served as content experts for the curriculum plan and the pretest/posttest. The pretest/posttest was administered before and after the two 60-minute educational programs offered over a two week period, to determine the knowledge gained. A paired samples t-test was conducted and found a statistically significant difference in the scores for the pretest (M= 81.25, SD= 11.29) and post-test (M=94.06, SD=7.12); t (31) = -5.92, p = 0.000.

Discussion

These results revealed the critical care nurses gained significant knowledge with the delirium educational intervention. This project will promote positive social change because early recognition and management of the patient with delirium will facilitate positive patient, family, and system outcomes.

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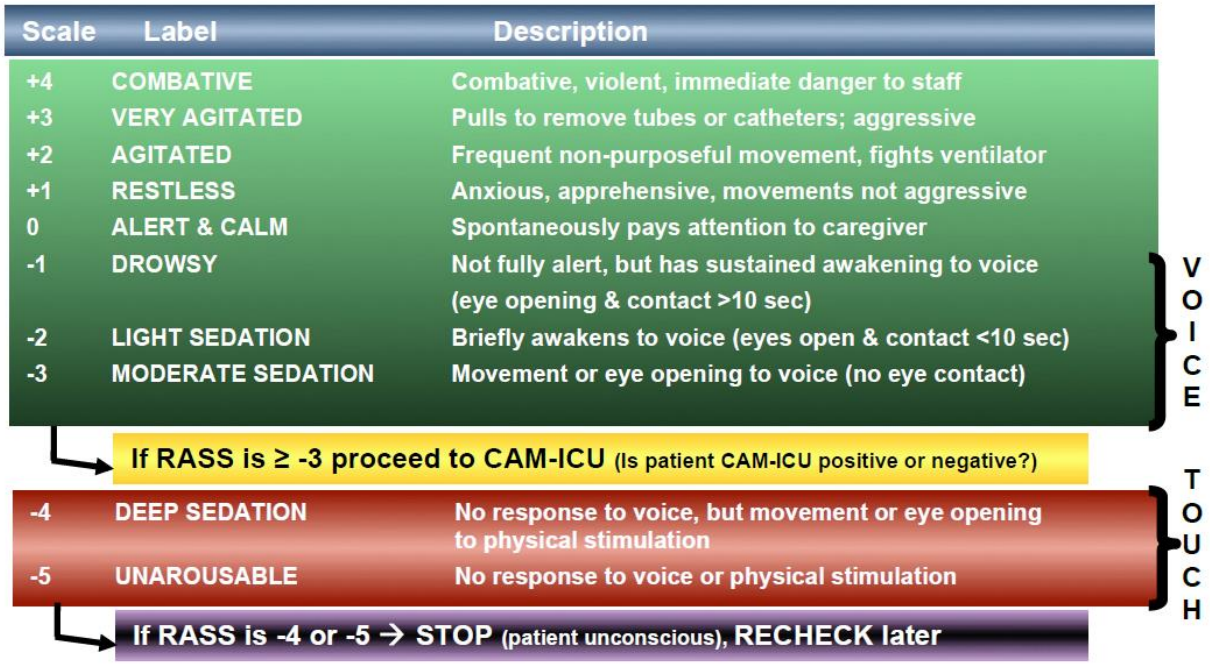
Appendix A: Confusion Assessment Method-Intensive Care Unit

Feature 1: Acute Onset or Fluctuating Course	Score	Check here if Present
Is the patient different than his/her baseline mental status? OR Has the patient had any fluctuation in mental status in the past 24 hours as evidenced by fluctuation on a sedation/level of consciousness scale (i.e., RASS/SAS), GCS, or previous delirium assessment?	Either question Yes →	☐
Feature 2: Inattention		
Letters Attention Test (See training manual for alternate **Pictures**) Directions: Say to the patient, *"I am going to read you a series of 10 letters. Whenever you hear the letter 'A,' indicate by squeezing my hand."* Read letters from the following letter list in a normal tone 3 seconds apart. **S A V E A H A A R T** or **C A S A B L A N C A** or **A B A D B A D A A Y** **Errors are counted when patient fails to squeeze on the letter "A" and when the patient squeezes on any letter other than "A."**	Number of Errors >2 →	☐
Feature 3: Altered Level of Consciousness		
Present if the Actual RASS score is anything other than alert and calm (zero)	RASS anything other than zero →	☐
Feature 4:Disorganized Thinking		
Yes/No Questions (See training manual for alternate set of questions) 1. Will a stone float on water? 2. Are there fish in the sea? 3. Does one pound weigh more than two pounds? 4. Can you use a hammer to pound a nail? **Errors are counted when the patient incorrectly answers a question.** **Command** Say to patient: "Hold up this many fingers" (Hold 2 fingers in front of patient) "Now do the same thing with the other hand" (Do not repeat number of fingers) *If the patient is unable to move both arms, for 2nd part of command ask patient to "Add one more finger" **An error is counted if patient is unable to complete the entire command.**	Combined number of errors >1→	☐

Overall CAM-ICU Feature 1 plus 2 and either 3 or 4 present = CAM-ICU positive		
	Criteria Met →	☐ **CAM-ICU Positive** (Delirium Present)
	Criteria Not Met →	☐ **CAM-ICU Negative** (No Delirium)

Appendix B: Richmond Agitation Sedation Scale (RASS)



Ely, E. W., Truman, B., Shintani, A., Thomason, J. W., Wheeler, A. P., Gordon, S., ... Bernard, G. R. (2003). Monitoring sedation status over time in ICU patients: reliability and validity of the Richmond Agitation-Sedation Scale (RASS). *Journal American Medical Association, 289*(22), 2983-2991.

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Appendix C: Literature Review Matrix

Johns Hopkins Rating Scale Used with Permission

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
American Psychiatric Association, 2000, p. 123.	NA	NA	NA	➢ Defini-tion of delirium	IIIA	Characterized by a disturbance of consciousness and a change in cognition that develops over a short period of time.
American Psychiatric Association, 2013.	NA	NA	NA	➢ Updated criteria	IIIA	New criteria A. Disturbance in attention B. Disturbance develops over a short period of time. is a change, fluctuates in severity C. An additional disturbance in cognition; D. Disturbances in criteria A and C are not explained by another pre-existing neurocognitive disorder. E. Is evidence from the history, physical exam, or laboratory findings the disturbance is a consequence of another medical condition, or exposure to a toxin is because of multiple etiologies.

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
Akechi, T., Ishiguro, C., Okuyama, T., Endo, C., Sagawa, R., Uchida, M., & Furukawa, T. A. (2010). Delirium training program for nurses. *Psychosomatics*, *51*(2), 106-111.	NA	The objective of this study was to investigate the usefulness of a delirium training program to improve nurses' self-confidence in caring for patients with delirium.	Nurses were chosen to become the "delirium-experts" and receive special training. These nurses were then compared to a control group who received no training.	The outcome was evaluated with a self-reported 15-item measure to assess self-confidence. A total of 390 nurses. A significant effect was observed for 12 of the 15 items.	III C	This brief program can improve nurses' self-confidence in treating delirium patients; however, more work is needed to improve nurses' ability to detect delirium early.
Barr, J., Fraser, G. L., et al., (2013). Clinical practice guidelines …. *Critical Care Medicine*, *41*(1), 263-306. doi: 10.1097/CCM.0b013e31827 83b72	NA	To update and revise the "Clinical Practice Guidelines" from 2002.	The American College of Critical Care Medicine assembled experts. Evidence for each statement was ranked as high (A), to low/very (C).	➢The CAM-ICU is a valid (A). ➢Routine monitoring of delirium in ICU patients (B). ➢Use a team approach for education (+1B). Early mobilizatio n (+1B)	IV A, B	These guidelines provide a roadmap for developing integrated, evidence-based, and patient-centered protocols for delirium in critically ill patients.

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
Boot, R. (2012). Delirium: A review of the nurses' role in the intensive care unit. *Intensive & Critical Care Nursing*, *28*(3), 185-189. doi:10.1016/j.iccn.2011.11.004	NA	This article reviews current literature on the use of assessment tools for the diagnosis of delirium and the implications of care for the patient with delirium.	Review of Literature	Critical care nurses can improve patients' outcomes by early recognition of delirium, and determining the causes. Due to the fluctuating nature of delirium, nurses need to incorporate screening into patient care at least once every 8—12 hours.	IV B C	Nurses play a key role in identification of delirium using CAM-ICU and identifying modifiable risks to improve patient's outcome. Through implementation, nurses' knowledge of delirium, the associated adverse outcomes and the use of CAM-ICU can aide in the recognition early delirium and the initiation of strategies.
Bowen**,** C., M., Stanton, M., & Manno, M. (2012). Using diffusion of innovations theory to implement the confusion assessment method for the intensive care unit. *Journal of Nursing Care Quality*, *27*(2), 139-145.	Diffusion of Innovations Theory	The purpose of this project was to use the Diffusion of Innovations Theory to develop effective strategies to guide the process when implementing the CAM-ICU	Descriptive Case Study	The nurses performed 159 (85%) of the 187 expected CAM-ICU assessments that exceeded the benchmark of 80%.	VC	Diffusion of Innovations Theory can be effective for guiding the process of implementing the CAM-ICU, frequency of its use, and adoption ➢ of this and other EBP changes

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
Carbone, M. K., & Gugliucci, M. R. (2014). *Delirium and the family caregiver: The need for evidence-based education intervention*. Biddeford: ME: Geriatrics Education and Research.	NA	Systematic review focused (1) Impact of delirium on the family (2) Impact of education on family's coping skills and ability to recognize and/or manage delirium	Thirty articles addressed impact on family caregivers (objective 1) 7 addressed caregiver education regarding the delirious state of a loved one (objective 2).	*Objective 1: Impact on the Family Caregiver* Feeling if fear, fatigue, frustration, depression, illness, financial burden, and overall stress *Objective 2: Education/ Training for Family Caregivers* Educating family of patients at high risk of developing delirium is beneficial.	IV B/C	With increased risks to older adult patients, high cost of care, and the preventable nature of delirium, family caregiver education may be an important tactic to improve outcomes for both patient and caregiver.
Colombo, R., Corona, A., Praga, F., Minari, C., Giannotti, C., Castelli, A., & Raimondi, F. (2012). A reorientation strategy for reducing delirium in the critically ill. *Minerva Anestesiologica*, *78*(9), 1026-1033.	NA	To assess delirium epidemiology, risk factors and impact on patient outcome, by enrolling all patients admitted to our Intensive Care Unit (ICU) over a year.	A two-stage prospective observational study	170 (I-) and 144 pts. (II). Delirium significantly lower in (II) 22% vs. 35% in (I) (P=0.020). Reorienta-tion is the strongest protective predictors of delirium: (OR0.504, 95% C.I. 0.313-0.890, P=0.034.	III B	A timely reorientation strategy seems to be correlated with significantly lower occurrence of delirium.

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evidence	Conclusions
Desai, S., Chau, T., & George, L. (2013). Intensive care unit delirium. *Critical Care Nursing Quarterly*, *36*(4), 370-389. doi:10.1097/CNQ.0b013e3182a10e8e	NA	NA	Review of Literature	➢ Screening for delirium, identify causative risk factors for delirium. ➢ Correcting delirium via a non-pharmaco-logical approach should occur first. ➢ Risk factors for delirium should be targeted.	I-V A-C	➢ Since ICU delirium is associated with mortality, efforts aimed at prevention need to be underscored. ➢ The ABCDE strategy to is a systematic approach that can be followed to improve patient outcomes. ➢ Utilization of validated scoring tools (CAM-ICU) will identify patients with delirium
Gesin, G., Russell, B. B., Lin, A. P., Norton, H. J., Evans, S. L., & Devlin, J. W. (2012). Impact of a delirium screening tool and multifaceted education on nurses' knowledge of delirium and ability to evaluate it correctly. *American Journal of Critical Care, 21*(1), e1-e11.	NA	To measure the impact of using the Intensive Care Delirium Screening Checklist (ICDSC), with or without a multifaceted education program, on SICU nurses' knowledge and perceptions of delirium and their ability to evaluate it.	Quasi-Experimen-tal Study	➢ Nurses' knowledge (mean [*SD*] score out of 10 points) was similar in phase 1 and phase 2 but was greater (*P* = .001) in phase 3 (8.2 [1.4]). Nurses and the expert increased from phase 1 (k = 0.40) to phase 2 (k = 0.62) to phase 3 (k = 0.74).	II C	➢ Use of a multifaceted education program improves nurses' knowledge about delirium and their perceptions about its recognition

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
Girard, T. D., Jackson, J. C., Pandharipande, P. P., Pun, B. T., Thompson, J. L., Shintani, A. K., … Ely, E.W. (2010). Delirium as a predictor of long-term cognitive impairment illness. *Critical Care Medicine*, *38*(7), 1513–1520. *doi: 10.1097/CCM.0b013e3181e47be1*	None	To test the hypothesis that duration of delirium in the intensive care unit (ICU) is an independent predictor of long-term cognitive impairment after critical illness requiring mechanical ventilation	Prospective cohort study	Of 126 patients, 99 survived ≥3 month's post-critical illness; long-term cognitive outcomes for 77 (78%) patients. At 3-and 12-months 79% and 71% of had cognitive impairment, (with 62% and 36% severely impaired).	IV C	In mechanically ventilated medical ICU patients, duration of delirium was independently associated with long-term cognitive outcomes, representing a potentially modifiable predictor of this common public health problem
Greve, I., et al., (2012). Interven-tions for preventing ICU delirium. *Cochrane Database of Systematic Reviews*, *2012*(4), 1-19.	NA	To examine the evidence for an effect of interventions for preventing ICU delirium in adult ICU patients	Cochrane Systematic Review that included: randomized controlled trials (RCTs), non-randomized controlled trials, controlled before-and-after trials, historically controlled trials and cohort studies.	➢ The definitive treatment is identifica-tion and treatment of causes. ➢ Etiology of delirium is requires multi-component preventive interven-tions..	I A,B	Interventions that target predisposing and precipitating factors for ICU delirium may reduce the incidence of ICU delirium by treating one or several of its underlying causes

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evidence	Conclusions
Hamdan-Mansour, A., Farhan, N., Othman, E., & Yacoub, M. (2010). Knowledge and nursing practice of critical care nurses caring for patients with delirium intensive care units in Jordan. *Journal of Continuing Education in Nursing, 41*(12), 571-576.	NA	The goal for this study was to determine the level of knowledge and management skills among critical care nurses caring for patients with delirium who were treated in intensive care units (ICUs) in Jordan.	Descriptive Correlational	Nurses had a moderate to low level of knowledge, with a mean score of 64.4 (*SD* = 6.5). Knowledge about delirium in ICU patients had positive and significant correlation with nursing practice (r = .20, p < .001). Nurses with more delirium knowledge had a higher level of effective management.	III C	➢ Delirium is associated with a high rate of complications for patients in the ICU. ➢ Nurses lacked the knowledge and the ability to demonstrate competency in managing delirium. ➢ Educational strategies are needed promoting assessment and management of delirium among critical care nurses.
Harroche, J., St-Louis, L., & Gagnon, M. (2014). The detection of delirium in the ICU: An important aspect of care. *Journal of Nursing Education and Practice, 4*(9), 135-145. doi: 10.5430/jnep.v4n9p135	NA	This study determined the validity and reliability of the "CAM-ICU Flowsheet," a practical, time-sparing algorithm to assess the 4 delirium criteria in intubated patients.	Descriptive Convenience sample.	CAM-ICU sensitivities 92% (74%-99%), specificities of 100% (85%-100%), very high interrater reliability (κ, 0.96; 0.87-1.00), vs 45 seconds (interquar-tile range, 40–75 sec) without delirium.	III C	➢ The CAM-ICU has high sensitivity, high specificity, and very high interrater reliability. False-negative ratings occur infrequently. The CAM-ICU is a valid, reliable, and quickly performed bedside delirium instrument.

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
Kamdar, B. et al., (2013). The effect of a QI intervention on perceived sleep quality and cognition in a medical ICU. *Critical Care Medicine*, *41*(3), 800-809.	NA	A quality improveme nt (QI) intervention improves sleep and delirium/ cognition.	Observationa l QI pre-post design	Over the 826 patient-day quality improve-ment period, there improve-ments in incidence of delirium/ odds ratio: 0.46; 95% confidence interval, 0.23-0.89; p = 0.02), and daily delirium/co ma-free status (odds ratio: 1.64; 95% confidence interval, 1.04-2.58; p = 0.03).	V C	An ICU-wide quality improvement intervention to improve sleep and delirium is feasible and associated with significant improvements in perceived nighttime noise, incidence of delirium/coma, and daily delirium/coma-free status. Improvement in perceived sleep quality did not reach statistical significance.
Luetz, A., et al., (2010). Different assessment tools for ICU delirium: Which score to use? *Critical Care Medicine*, *38*(2), 409-418. doi:10.1097/ CCM.0b013 e3181cabb42	NA	To compare validity and reliability of three instruments for the assessment of delirium in the ICU: CAM-ICU) the Nursing Delirium Screening Scale (Nu-DESC), and the Delirium Detection Score	Prospective cohort study.	Specificity of the CAM-ICU was significant-ly higher than of the Nu-DESC (96% vs. 81%, p < .01). The DDS showed poor sensitivity The interrater reliability was "almost perfect" for the CAM-ICU (kappa = 0.89)	I A	The CAM-ICU showed the best validity of the evaluated scales to identify delirium in ICU patients. The Nu-DESC might be an alternative tool for detection of ICU delirium. The DDS should not be used as a screening tool.

Table continues

Full reference	Theoretical /conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
McCrow, J., Sullivan, K. A., & Beattie, E. R. (2014). Delirium knowledge and recognition: *Nursing Education Today, 34*(6), 912-917. doi: 10.1016/j.nedt.2013.12.006. Epub 2013 Dec 22.	NA	This study evaluated the impact of a delirium specific educational website.	A Pretest/posttest cluster randomized controlled trial over three defines time points.	Statistically significant differences found between the interven-tion and non-interven-tion group. [T3 and T1 (t=3.78 p= <0.001) and T2 and T1 baseline (t=5.83 p =<0.001)].	III B	Study supports that web-based delirium learning is an effective method of information delivery for RNs. Future research is required to investigate clinical outcomes as a result of this web-based education.
Mehta, S., Cook, D., Devlin, J. W., Skrobik, Y., Meade, M., Fergusson, D., ... Burry, L. (2015). Prevalence, risk factors, and outcomes of delirium in mechanically ventilated adults. *Critical Care Medicine*, *43*(3), 557-566. doi:10.1097/CCM.0000000000000727	NA	Compared character-istics and outcomes of delirious and non-delirious patients enrolled in a multicenter trial comparing protoco-lized sedation with protoco-lized sedation plus daily sedation interruption.	Random-ized trial of sixteen North American medical and surgical ICUs. Four hundred thirty critically ill, mechanical-ly ventilated adults.	Delirium diagnosed in 226 of 420 pts. (53.8%). Median onset was 3.5 days, Patients with delirium screening-longer duration of ventilation (13 vs 7d; p < 0.001), ICU stay (12 vs 8 d; p < 0.0001), Delirious patients were physically restrained (86.3% vs 76.7%; p = 0.014).	I A	In mechanically ventilated adults, delirium was common and associated with longer duration of ventilation and hospitalization. Physical restraint was most strongly associated with delirium.

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
Meagher, D. (2009). Motor subtypes of delirium: past, present and future. *International Review of Psychiatry, 21*(1), 59-73. doi:10.1080/09540260802675460	NA	Review of Literature for the three subtypes of delirium	➢ Differs clinically between subtypes; ➢ Critique existing method-logies for defining subtypes and consider the utility of different criteria.	➢ Psychosis more common hyper-active ➢ LOS and mortality lowest in hyper-active ➢ Mortality higher in mixed subtype patients ➢ Outcome best for hyper-active.	IV B,C	Methods to define subtypes with better account of the clinical heterogeneity of delirium in studies that include longitudinal assessments offers the prospect of more targeted studies in the domains of pathophysio-logy, treatment, and prognosis.
Needham, D. M., et al.,2010). Early physical medicine and rehabili-tation for patients… A QI project. *Archives of Physical Medicine and Rehabilita-tion, 91*(4), 536-542. doi:10.1016/j.apmr.2010.01.002	NA	(1) Reduce deep sedation and delirium to permit mobilizatio n (2) Increase the frequency of rehabilitatio n consultatio ns and treatments to improve patients' functional mobility, and (3) evaluate effects on length of stay.	Seven-month prospective before/after quality improveme nt project.	Greater median number of rehab. treatments per patient (1 vs 7, P<.001). Higher level of functional mobility, 56% vs 78%, P=.03). In MICU pts, decrease in ICU and hospital LOS by 2.1 (95% CI: 0.4-3.8) and 3.1 (0.3-5.9) days,	V B	Using a quality improvement process, intensive care unit delirium, physical rehabilitation, and functional mobility were markedly improved and associated with decreased length of stay.

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
Olson, T. (2012). Delirium in the intensive care unit: Role of the critical care nurse in early detection and treatment. *Dynamics, 23*(4), 32-36.	NA	Review of the literature	A compre-hensive literature review to identify the current knowledge regarding the presence of delirium in the ICU	➢ Critical care nurses play a vital role in all aspects of ICU delirium. ➢ Reviews delirium in the ICU, subtypes, assessment methods, etiology and risk factors, strategies to improve detection of delirium in the ICU.	V B,	➢ Critical care nurses are key in prevention, detection and treatment. ➢ Delirium is shown to have negative impacts on the health of patient and family. ➢ Ongoing education, the use of validated assessment tools, and the early prevention strategies, can diminish the occurrence of delirium.
Page, V. J., Navarange, S., Gama, S., & McAuley, D. F. (2009). Routine delirium monitoring in a UK critical care unit. *Critical Care, 13*(1), R16. doi:10.1186/ cc7714	NA	Describe the use of the CAM-ICU and to determine the incidence and outcome of patients with delirium in a UK critical care unit.	Observatio nal and retrospect-tive cohort	➢ 71 pts, with 60 pts.in the retrospect-tive cohort. In the OC, delirium was 45%. In the 27 ventilated patients it was 63%. From the retrospecti ve data the CAM-ICU assessment was 92%. Delirium. Retrospect ive ventilated patients was 65%	IV C	Delirium screening is feasible in a UK ICU population. The high incidence of delirium and the impact on outcomes in this UK cohort of patients is in line with previous reports.

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
Pandhari-pande, P. P., et al., (2013). Long-term cognitive impairment after critical illness. *The New England Journal of Medicine, 369*(14), 1306-1316. doi:10.1056/ NEJMoa130 1372	NA	To test the hypothesis: a longer duration of delirium in the hospital and higher doses of sedative and analgesic agents are indepen-dently associated with more severe cognitive impairment up to 1 year after hospital discharge.	Multicenter prospective cohort study.	821 patients enrolled, 6% had cognitive impairment at baseline, delirium developed in 74% during the hospital stay. At 3 months, 40% of the patients had global cognition scores that were 1.5 *SD* below the population mean. Longer duration of delirium was associated with worse global cognition at 3 and 12 months (P=0.001 and P=0.04, and worse executive function at 3 and 12 months.	III A	Patients in medical and surgical ICUs are at high risk for long-term cognitive impairment. A longer duration of delirium in the hospital was associated with worse global cognition and executive function scores at 3 and 12 months.

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
Patel, J., Baldwin, J., Bunting, P., & Laha, S. (2014). The effect of a bundle of interventions on sleep and delirium in MICU and SICU. *Anaesthesia*, *69*(6), 540-549.	NA	Does implement-ting a bundle of non-pharm-acological interven-tions, improved sleep and reduce the incidence of delirium?	Mixed methodology	Care bundle reduced delirium (55/167 (33%) before vs 24/171 (14%) after, $p < 0.001$), and decreased delirium (3.4 [1.4] days before vs 1.2 [0.9] days after, $p = 0.021$).	III C	Introduction of environmental noise and light reduction program as a bundle of nonpharmaco-logical interventions in the ICU was effective in reducing sleep deprivation and delirium.
Rice, K. L., Bennett, M., Gomez, M., Theall, K. P., Knight, M., & Foreman, M. D. (2011). Nurses' recognition of delirium in the hospitalized older adult. *Clinical Nurse Specialist*, *25*(6), 299-311. doi:10.1097/NUR.0b013e318234897b	Model of diagnostic reasoning	Prospective, descriptive design	This study investigated the rate of agreement/ disagree-ment between researchers and a convenience sample of 167 nurses caring for 170 medical surgical patients in detecting delirium.	The researcher detected delirium in 7% (12/170) of patients. Nurses failed to recognize delirium 75% (9/12) of the time, with poor agreement between nurse/resear cher for all observa-tions.	IV C	Findings Support the significance of nurses' recognition of delirium in the hospitalized older adult when using the CAM-ICU. Additional research is warranted regarding the clinical decision-making processes that nurses use in assessing acute cognitive changes and in identifying strategies to improve delirium recognition.

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
Salluh, J. F., et al., (2015). Outcome of delirium in critically ill patients: Systematic review and meta-analysis. *BMJ, 350*(2538). doi:10.1136/ bmj.h2538	NA	Determine the relation between delirium in critically ill patients and their outcomes in the short term (in the intensive care unit and in hospital) and after discharge from hospital.	Systematic review and meta-analysis of published studies.	Delirium occurred in 5280 of 16,595 (31.8%). In control – patients-delirium higher mortality (risk ratio 2.19, 94% confidence interval 1.78 to 2.70; P<0.001) and longer durations of mechanical ventilation.	IV B	One third of patients admitted to an intensive care unit develop delirium, and these patients are at increased risk of dying during admission, longer stays in hospital, and cognitive impairment after discharge.
Schweickert, W. D., Pohlman, M. C., Pohlman, A. S., Nigos, C., Pawlik, A. J., Esbrook, C. L., ... Kress, J. P. (2009). Early physical and occupational therapy in mechanically ventilated, critically ill patients: A randomised controlled trial. *Lancet, 373*(9678), 1874-1882. doi:10.1016/ S0140-6736(09)606 58-9	NA	Assessed the efficacy of combining daily interruption of sedation with physical and occupationa l therapy on functional outcomes in patients receiving mechanical ventilation in intensive care.	Randomized Control Trial	104 patients return to independen t functional status at hospital discharge occurred in 29 (59%) patients in the intervention group compared with 19 (35%) patients in the control group (p=0.02; odds ratio 2 7 [95% CI 1 2–6 1]).	I B	A strategy for whole-body rehabilitation—consisting of interruption of sedation and physical and occupational therapy in the earliest days of critical illness—was safe and well tolerated, and resulted in better functional outcomes at hospital discharge, a shorter duration of delirium, and more ventilator-free days compared with standard care.

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
Scott, P., McIlveney, F., & Mallice, M. (2013). Implementation of a validated delirium assessment tool in critically ill adults. *Intensive & Critical Care Nursing*, *29*(2), 96-102 7p. doi:10.1016/j.iccn.2012.09.001	NA	To evaluate the feasibility and effectiveness of the validated Confusion Assessment Method-ICU (CAM-ICU) delirium screening tool in a critical care unit.	A single center evaluation Two self-report question-naires were given to 78 nursing staff one prior to and then three months following delirium education and CAM-ICU training	Following educational intervention 68% (32/47) believed delirium was a serious problem, 74.5% (35/47) frequently evaluated their patients. (85.1%, 40/47) of nurses found the CAM-ICU easy to use and confident using the tool (74.4%, 35/47).	V C	Implementation of a delirium screening tool into daily nursing practice is achievable within a short time period. A simple, educational intervention using written and video information can provide the knowledge for critical care nurses to learn and perform delirium assessments
Sessler, C. N., et al., (2002). The RASS: Validity and reliability in adult intensive care unit patients. *American Journal of Respiratory and Critical Care Medicine*, *166*(10), 1338-1344.	NA	Measured interrater reliability and validity of a new 10-level scale, the Richmond Agitation Sedation Scale	Inter rater reliability and validity	Excellent interrater reliability (r = 0.956, lower 90% confidence limit = 0.948; κ = 0.73, 95% confidence interval_0.71, 0.75) n= 192. Validity testing RASS correlated highly (r= 0.93).	NA	RASS is an instrument to assess sedation and agitation of adult ICU patients that is simple to use. The study demonstrated very good inter-rater reliability and validity across a broad spectrum of adult ICU patients.

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
Skrobik, Y.,et al., (2010). Protocolized intensive care unit management of analgesia, sedation, and delirium improves analgesia and subsyndromal delirium rates. *Anesthesia and Analgesia, 111*(2), 451-463.	NA	Hypothe-sized that the likely reduction in iatrogenic coma would result in less delirium, because these 2 morbid conditions seem to be linked.	All patients were consecutively admitted to an ICU PRE-protocol (August 2003 to February 2004, 610 patients) and POST-protocol (April 2005 to November 2005, 604 patients).	Medication-induced coma rates (18.1%vs 7.2%, P < 0.0001), ICU and hospital LOS, and dependency at discharge were lower in the POST-protocol group. delirium was significantly reduced; The 30-day mortality risk in the pre cohort was 29.4% vs 22.9% in the post.	III C	Educational initiatives incorporating systematic management protocols with nonpharmacological measures and individualized titration of sedation, analgesia, and delirium therapies are associated with better outcomes.
Tomasi, C. et al., (2012). Comparison of CAM-ICU and ICDSC for the detection of delirium in critically ill patients focusing on relevant clinical outcomes. *Journal of Critical Care, 27*(2), 212-217.	NA	Compare and assess the agreement between the diagnosis of delirium obtained by CAM-ICU and Intensive Care Delirium Screening Checklist (ICDSC) with outcome	Prospective Cohort Study.	Of 383 pts.-162 (42%) were evaluated; delirium was identified in 26.5% of patients by CAM-ICU and in 34.6% by ICDSC. Agreement diagnosing delirium between the two was 42 (27.8%) patients.	III B	The findings from the study suggest that the CAM-ICU is better predictor of outcome when compared with ICDSC.

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
van den Boogaard, M., et al., (2012). Delirium in critically ill patients: Impact on long-term health-related quality of life and cognitive functioning. *Critical Care Medicine, 40*(1), 112–118.	NA	Examine the impact of delirium during ICU stay on long-term health-related quality of life and cognitive function in intensive care unit survivors.	Prospective 18-month follow-up study. Question-naires were sent to 1,292 intensive care survivors with (n = 272) and without (n = 1020) delirium during their intensive care stay.	915 responded, 171 patients were delirious during their ICU stay. Survivors who suffered from delirium reported their total cognitive failure score was higher, compared to those with no delirium. Hypoactive delirium performed the best mental health.	III B	Intensive care survivors with delirium during their intensive care unit stay had a similar adjusted health-related quality of life evaluation, but significantly more cognitive problems than those who did not suffer from delirium, even after adjusting for relevant covariates. In addition, the duration of delirium was related to long-term cognitive problems.
van den Boogaard, et al., (2009). Implementat ion of a delirium assessment tool in the ICU can influence haloperidol use. *Critical Care, 13*(4), R131.	NA	Purpose of this study was to evaluate the implement-ation of the confusion assessment method-ICU (CAM-ICU) and the effect of haloperidol use.	Quality Improvement Study	Compliance and delirium knowledge increased from 77% to 92% and from 6.2 to 7.4, respectively (both, $P <$ 0.0001). The interrater reliability increased from 0.78 to 0.89.	V B	A delirium assessment tool was successfully introduced in the ICU with the main goals achieved within four months. Early detection of delirium in critically ill patients increases the number of patients that receive treatment with haloperidol.

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
van Eijk, M. J., et al., (2009). Comparison of delirium assessment tools in a mixed intensive care unit. *Critical Care Medicine*, *37*(6), 1881-1885. doi:10.1097/CCM.0b013e3181a00118	NA	The aim of this study was to compare the value of two detection methods (the Confusion Assessment Method for the ICU [CAM-ICU], the Intensive Care Delirium Screening Checklist [ICDSC] with clinical providers	Prospective study.	The CAM-ICU showed superior sensitivity and negative predictive value (64% and 83%) compared with the ICDSC (43% and 75%). The ICDSC showed higher specificity and positive predictive value (95% and 82% vs. 88% and 72%).	III B	ICU physicians underdiagnose delirium in the ICU, which underlines the necessity of standard evaluation in all critically ill patients. In mixed ICU population, the CAM-ICU had a higher sensitivity than the ICDSC.
Vasilevskis, E. E., et al., (2010). Reducing iatrogenic risks: ICU-acquired delirium and weakness--crossing the quality chasm. *Chest*, *138*(5), 1224-1233.	NA	Adoption and implementa-tion of a standard bundle of ICU measures.	Review of literature which supports the use of the ABCDE bundle	ABCDE is a multi-process designed to: (1) standardize care; (2) stop over sedation and prolonged ventilation, which may cause delirium.	IV B C	ICU-delirium and weakness should be viewed as potentially preventable and /or modifiable outcomes for ICU survivors. Implement of a ABCDE bundle to achieve this goal.

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
Wand, A. P., et al., (2014). A multifaceted educational intervention to prevent delirium in older inpatients: A before and after study. *International Journal of Nursing Studies*, *51*(7), 974-982. doi:10.1016/j.ijnurstu.2013.11.005	NA	Evaluate the effectiveness of a multifaceted educational program in preventing delirium in hospitalized older patients and improving staff practice, knowledge and confidence.	Before and after study.	Post-intervention - significant reduction in the incidence of delirium (19% vs. 10.1%, X2 = 4.14, p = 0.042), and improved function on discharge (mean improvement 5.3 points, p < 0.001, *SD* 13.31, 95% CI 7.61 to 2.97). Staff knowledge/ confidence of delirium assessment and management improved.	III C	A low-cost educational intervention reduced the incidence of delirium and improved function in older medical patients and staff knowledge and practice addressing risk factors for delirium. The program is readily transferable to other settings, but requires replication due to limitations of the before and after design.
Zaal, I. J., Devlin, J. W., Peelen, L. M., & Slooter, A. C. (2015). A systematic review of risk factors for delirium in the ICU. *Critical Care Medicine*, *43*(1), 40-47. doi:10.1097/CCM.0000000000000625	NA	Review systematically identifies risk factors for delirium in critically ill adults where current evidence is strong.	CINAHL, EMBASE, MEDLINE, the Cochrane Central Register for Controlled Trials, and the Cochrane Database of Systematic Review Studies published from 2000 to February 2013.	Strong evidence age, dementia, hypertension, pre-ICU emergency surgery or trauma, mechanical ventilation, metabolic acidosis, delirium on the prior day, and coma are risk factors.	IV B	Only 11 risk factors for delirium are supported by either strong or moderate level of evidence. These factors should be considered when designing delirium prevention strategies or controlling for confounding variables in future etiologic studies.

Table continues

Full reference	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Research methodology	Analysis and results	Level of evi-dence	Conclusions
Zhang, Z., Pan, L., & Ni, H. (2013). Impact of delirium on clinical outcome in critically ill patients: A meta-analysis. *General Hospital Psychiatry*, *35*(2), 105-111. doi:10.1016/j.genhosppsych.2012.11.003	NA	Meta-analysis of clinical observational studies was performed to investigate the association between delirium and clinical outcomes.	Relevant studies were from databases including Medline, Embase, OVID and EBSCO from inception to May 2012.	5891 delirious patients had higher mortality rate than non-delirious patients (OR) 3.22; 95% (CI): 2.30–4.52). Patients with delirium had longer LOS in both ICU [WMD]: 7.32 days; 95% CI:4.63–10.01) and hospital (WMD: 6.53 days; 95% CI: 3.03–10.03), and spent more time mechanical ventilation (WMD: 7.22 days; 95% CI: 5.15 9.29)	I B	Delirium in critically ill patients is associated with higher mortality rate, more complications, longer duration of mechanical ventilation, and longer length of stay in ICU and hospital.

Appendix D: Evidence-Based Policy

Intensive Care Unit: Effective Date: 1/2017
Policy Name: Awakening and Breathing Coordination, Delirium Monitoring/Management, Early Mobility, Family Participation (ABCDEF) Protocol in the Intensive Care Unit (ICU)

This evidence-based policy is intended as a guideline to assist in the delivery of patient care or management of hospital services. It is not intended to replace professional judgment in patient care or administrative matters.

PURPOSE:

The purpose of this evidence-based policy is to provide an evidenced based model for the prevention and treatment of ICU acquired delirium and weakness.

EVIDENCE-BASED POLICY:

1. Patients in the ICU should be routinely monitored for the presence of delirium. The Confusion Assessment Method- Intensive Care Unit (CAM-ICU) tool will be utilized to detect ICU related delirium.
2. The Early Mobilization Protocol will be initiated on patients who meet established criteria in order to reduce the incidence and duration of delirium.
3. Promoting sleep in all ICU patients has been shown to decrease the incidence of delirium. During the overnight hours of 11:00pm to 5:00am light, noise and stimulation will be limited and patient care activities will be clustered to prevent overnight stimuli.
4. The ABCDEF protocol is comprised of three distinct, yet highly interconnected, components including:
    a. Awakening and breathing trial coordination
    b. Delirium monitoring and management
    c. Early mobilization
5. The physician reserves the right to withhold any or all components of this bundle for any patient who would have negative clinical consequences from such procedures and interventions.

PROCEDURE:

1. <u>Awakening and Breathing Trial Coordination</u>
    a. Every mechanically ventilated patient receiving a continuous sedative infusion will receive a daily spontaneous awakening trial (SAT) and a spontaneous breathing trial (SBT) unless contraindicated.
    b. There are four major steps in completing the SAT and SBT process:
        i. Step 1: SAT/SBT safety screen: The SAT/SBT assessment will be performed daily. The time of the assessments will be determined by the primary nurse and Respiratory Care Practitioner (RCP) at the beginning of their shift.
            A. The nurse or RCP will assess for contraindications to either SAT or SBT.

- If the nurse identifies a contraindication, the SAT/SBT will not be completed. A reassessment will occur in 24 hours or as clinically indicated.

B. Contraindications include:
- Acute Respiratory Distress Syndrome
- Hypothermia Protocol
- Intracranial hypertension
- Use of neuromuscular blockade agents (intermittent or continuous)
- Richmond Agitation Sedation Scale (RASS) of +2 or greater
- Seizures requiring continuous sedative infusions
- Alcohol withdrawal requiring continuous sedative infusions
- Active or previous MI within the last 24 hours.
- Systolic BP less than 90mmHg despite vasopressor therapy
- Use of high dose (defined as greater than 50% of the maximum dose) or dual vasoactive medications.
- Patient with an Intra-Aortic Balloon Pump (IABP)
- Transvenous Pacemaker

ii. Step 2: Perform SAT

A. Turn off continuous sedative infusions and hold all bolus doses of sedatives if ordered.
- If the patient complains or demonstrates signs/symptoms of pain, the RN may administer bolus doses of ordered analgesic agents during the SAT. All sedative agents are withheld.
- Continuous analgesic infusion will be continued if approved by the attending physician.

B. The nurse will determine if the patient tolerated the interruption of sedation defined by the **LACK** of any of the following:
- RASS of +2 for 5 minutes or longer
- Pulse oximetry reading of less than 88% for 5 minutes or longer
- Respiratory rate of 35 breaths per minute for 5 minutes or longer
- New acute cardiac arrhythmia
- Two or more of the following symptoms:
  - Heart rate increase greater than 20 beats from baseline
  - Use of accessory muscles
  - Diaphoresis
  - Abdominal paradoxus
  - Dyspnea

C. If the patient fails the SAT, restart the sedative infusion at 50% of the previous rate, and then titrate to a RASS of 0 to -2. A reassessment will be in 24 hours or as clinically indicated.

- Note that in certain clinical situations it is appropriate to provide small doses of a sedative during the SBT if the patient failed the SAT due to agitation alone. This should be discussed with and approved by the intensivist.

D. If the patient tolerates the SAT and can remain off their sedative agent for at least 30 minutes**,** the nurse will notify the RCP that the patient meets criteria for an SBT safety screen. Continue to hold sedation and do not attempt a SBT until the patient has an inspiratory effort. If at any time during the SAT the patient meets one of the above failure criteria, resume the sedation at 50% of the previous rate, titrate to a RASS 0 to -2, and reassess in 24 hours or as clinically indicated.

iii. Step 3 – SBT safety screen:

A. The RCP will determine if it is safe to perform a SBT. Contraindications to performing a SBT are as follows:
   - Chronic ventilator dependent patient
   - Pulse oximetry reading less than 88%
   - FIO2greater than or equal to 50%
   - PEEP greater than 8
   - Patient lack of inspiratory effort

B. If the patient does not meet criteria for an SBT, the RCP will inform the RN to restart the patient sedation at dose not to exceed 50% of the previous rate if needed due to agitation, titrate to a RASS of 0 to -2, and repeat the screening in 24 hours or as clinically indicated.

C. If the patient meets criteria for an SBT the RCP will move on to step 4.

iv. Step 4 – Perform SBT

A. Explain to the patient what the SBT is and why it is being done.

B. Change the ventilator setting to CPAP with pressure support of 5cmH20 and PEEP 5cmH20 or as determined by physician in collaboration with RCP.

C. Allow the patient to spontaneously breathe for 30-60 minutes.

D. If at any point during the SBT the patient demonstrates one of the below findings, the trial should be stopped and the patient should be placed back on the previous mode and settings:
   - Respiratory rate of 35 breaths per minute for 5 minutes or longer
   - Respiratory rate less than 8 breaths per minute
   - Pulse oximetry reading of less than 88% for 5 minutes or longer
   - Mental status changes
   - New onset arrhythmia
   - Two or more of the following:
     - Use of accessory muscles
     - Abdominal paradoxus

- Diaphoresis
- Dyspnea

E. If the patient meets any of the above criteria the RCP will conclude that the patient has failed the SBT. They will inform the RN to restart the patient sedation at 50% of the previous rate and titrate to a RASS of 0 to -2 if needed. A reassessment will be in 24 hours or as clinically indicated.

F. If the patient does not meet any of the above criteria, the RCP will conclude that the patient passed the SBT and will notify the RN and the intensivist and will await additional orders.

2. Delirium Monitoring and Management
   a. Every ICU patient will be assessed for delirium using CAM-ICU.
   b. The nurse will perform and record the results of the RASS and CAM-ICU assessment every 8 hours.
   c. Patients found to be CAM-ICU positive should have a thorough daily assessment for potential causes of the acute delirium.
   d. The interdisciplinary team will employ all non-pharmacologic interventions whenever possible to treat a delirious patient.

Repeated reorientation of patients Provisions of cognitively stimulating activities for the patients multiple times a day A non-pharmacological sleep protocol Early mobilization activities Timely removal of catheters and physical restraints Use of eye glasses and magnifying lenses, hearing aids Early correction of dehydration Use of a scheduled pain management protocol Minimization of unnecessary noise/stimuli Vanderbilt University, 2015.
Note: From: Vanderbilt University Medical Center. (2013). *Delirium management protocol*. Retrieved from: http://www.icudelirium.org/delirium/management.html

   e. Minimization of unnecessary noise/stimuli
      i. Foster orientation: frequently reassure and reorient patient, utilize easily visible calendars, clock.
      ii. Caregivers' identification, carefully explain all activities, and communicate clearly.
      iii. Provide appropriate sensory stimulation: quiet room, adequate light; one task at a time, noise reduction strategies.
      iv. Facilitate sleep, back massage, relaxation music/tapes, noise reduction measures, avoid awakening patient unnecessarily- No bath between 11 pm- 5am.

v. Foster familiarity: encourage family/friends to stay at bedside, bring familiar objects from home; maintain consistency of caregivers, minimize relocations.
vi. Maximize mobility: avoid physical and chemical restraints and urinary catheters when possible, ambulate or mobilize patient early and often.
vii. Communicate clearly, provide explanations.
viii. Reassure and educate family.
ix. Minimize invasive interventions.
x. Consider psychotropic medications as a last resort.

3. Early Mobility
   a. Each patient is assessed upon admission to the ICU and those who qualify will immediately begin the protocol as ordered. Those who are not eligible are reassessed during the daily multidisciplinary rounds.
   b. The multidisciplinary team will assess the patients to determine if they are a candidate for mobilization.
      i. A physical/ occupational therapy (PT/OT) consult will be ordered upon admission or as soon as possible (ASAP) to evaluate the patient for the exact activity level
   c. Criteria for Early Mobilization
      i. General guidelines
         - Neurological: responds to verbal stimulation (RASS > -3) or passive activity (OOB) for patients RASS < -3
         - Cardiovascular: No active acute titration of vasoactive infusion; No evidence of active myocardial ischemia; No injuries in which mobility is contraindicated
         - Respiratory: Hemodynamically stable not requiring acute adjustments to O2
      ii. The latest evidenced based guidelines and recommendations will be used for the early mobility protocol:
      Hodgson, C. L., Stiller, K., Needham, D. M., Tipping, C. J., Harrold, M., Baldwin, C. E., & ... Webb, S. A. (2014). Expert consensus and recommendations on safety criteria for active mobilization of mechanically ventilated critically ill adults. *Critical Care*, *18*(6), 658-576. doi:10.1186/s13054-014-0658-y

Appendix E: Educational Curriculum Plan

Problem: The practice problem addressed in this DNP project was the lack of an evidenced -based policy and nursing assessment and nursing management of delirium in the ICU.

Purpose: The purpose of this DNP project was to develop an evidence-based policy and a comprehensive nursing education plan for the assessment and management of delirium in the ICU. A positive social change will occur because critical care nurses will be educated on ICU delirium assessment and management modalities, thereby decreasing the associated long term adverse outcomes that impact the patient and family. This DNP project will demonstrate the importance of preventing and monitoring for delirium in the ICU patient; therefore healthcare providers working in a critical care setting will gain valuable insight by reading this paper.

Goal: The long-term goal of this DNP project was to decrease length of stay for ICU patients and decrease in duration of mechanical ventilation hours which will be determined after my graduation.

Time	Objectives at the conclusion of educational experience	Content outline	Evidence	Method of Present-ing	Method of evaluation
15 mins	The critical care nurse will be able to explain the significance of ICU registered nurses (RNs) understanding the importance of assessing delirium in the ICU patients	A. DNP Project Overview 1. Patients in the ICU are at increased risk to develop delirium. 2. The prevalence of delirium could be reduced by 30% through the provision of preventative measures and early recognition of ICU delirium.	Gesin et al., 2012 Girard et al., 2010; van den Boogaard et al., 2012	➢ Power Point/ Discus-sion	Statistical signifi-cance between the paired t-test on the pre/post test

Table continues

Time	Objectives at the conclusion of educational experience	Content outline	Evidence	Method of presen-ting	Method of evaluation
15 mins	The critical care nurse will be able to explain the significance of ICU registered nurses (RNs) understanding the importance of assessing delirium in the ICU patients. (con't)	B. Project Significance 1.Critical care nurses' failure to recognize delirium is caused by lack of knowledge about delirium assessment, delirium risk factors, and preventative measures. 2. Critical care nurses are essential for assessing delirium and preventing patients from developing delirium. 3.Nurses are the healthcare providers most impacted by the consequences associated with patients developing delirium. Patients with hyperactive or mixed delirium exhibit disruptive or combative behaviors, which can impact critical care nurses' safety.	Bowen, Stanton, & Manno, 2012 Gesin et al., 2012 Harroche, St-Louis, & Gagnon, 2014.	➢ Power Point/ Discus-sion	Statistical signifi-cance between the paired t-test on the pre/post test

Table continues

Time	Objectives at the conclusion of educational experience	Content outline	Evidence	Method of present-ing	Method of evaluation
15 mins	The critical care nurse will be able to explain the significance of ICU registered nurses (RNs) understanding the importance of assessing delirium in the ICU patients. (con't)	4. Providing proper education and training to critical care nurses is the most important factor for the successful assessment and management of ICU delirium. C. Incidence of the Problem/ Statement 1. The practice problem addressed in this DNP project was the lack of an evidenced -based policy and nursing assessment and nursing management of delirium in the ICU 2. A gap exists between the evidence and patient care practices regarding delirium	Wand et al., 2014; Akechi et al., 2010 McCrow et al., 2014 Hamdan-Mansour, Farhan, Othman, & Yacoub, 2010 Rice et al., 2011	Power Point/ Discus-sion	Statistical signifi-cance between the paired t-test on the pre/post test

Table continues

Time	Objectives at the conclusion of educational experience	Content outline	Evidence	Method of present-ing	Method of evaluation
15 mins	The critical care nurse will be able to explain the significance of ICU registered nurses (RNs) understanding the importance of assessing delirium in the ICU patients. (con't)	3. The development of a comprehensive delirium educational plan and evidence-based policy for these critical care nurses is important for closing the gap between research and clinical practice.	Boot, 2012	Power Point/ Discus-sion	Statistical signifi-cance between the paired t-test on the pre/post test
15 mins	The critical care nurse will be able to explain the definition for delirium, and the criteria for delirium, as well as risk factors and their significance for patients developing this syndrome in the ICU.	A. Delirium Defined: Characterized by a disturbance of consciousness and a change in cognition that develops over a short period of time. Classified three subtypes: hyperactive, hypoactive, mixed. B. Criteria Delirium 1. The disturbance develops over a short period of time, represents a change from baseline attention and awareness, and fluctuates in severity during the course of the day;	American Psychia-tric Associa-tion, 2000, p. 123. American Psychia-tric Associa-tion, 2013.	➢ Power Point/ Discus-sion ➢ Power Point/ Discus-sion ➢	Pre/Post Test #1,2 Pre/Post Test #1,2

Table continues

Time	Objectives at the conclusion of educational experience	Content outline	Evidence	Method of present-ing	Method of evaluation
15 mins	The critical care nurse will be able to explain the definition for delirium, and the criteria for delirium, as well as risk factors and their significance for patients developing this syndrome in the ICU (con't)	2. An additional disturbance in cognition (e.g., memory deficit, disorientation, language, visuospatial ability, or perception); 3. The disturbances in criteria 1 and 3 are not explained by pre-existing, established, neurocognitive disorder and do not occur in the context of a severely reduced level of arousal coma; 4. There is evidence from the history, physical examination, or laboratory findings that the disturbance is a direct physiologic consequence of another medical condition, substance intoxication or withdrawal (i.e., because of a drug of abuse medication), or exposure to a toxin, or is because of multiple etiologies.	American Psychia-tric Associa-tion, 2013.	➢ Power Point/ Discus-sion	Pre/Post Test #1,2

Table continues

Time	Objectives at the conclusion of educational experience	Content outline	Evidence	Method of present-ing	Method of evaluation
15 mins	The critical care nurse will be able to explain the definition for delirium, and the criteria for delirium, as well as risk factors and their significance for patients developing this syndrome in the ICU (con't)	C. State the risk factors 1. Risk factors are divided into two categories: predisposing and precipitating. a. Predisposing risk factors -difficult to control. ➢ Age ➢ Dementia ➢ Severity of illness and comorbidity ➢ Pre-ICU emergency surgery or trauma ➢ Mechanical ventilation ➢ Fever ➢ Coma b. Precipitating risk factors can be modified. ➢ Immobility ➢ Medications ➢ Physical restraints ➢ Sleep deprivation ➢ Dehydration ➢ Sepsis ➢ Alcohol or drug withdrawal ➢ Catheters	Desai, Chau, & George, 2013; Olson, 2012; Vasilev-skis et al., 2010; Zaal et al. 2015 Greve et al., 2012; Mehta et al., 2015; Zhang, Pan, & Ni, 2013	➢ Power Point/ Discus-sion ➢ Power Point/ Discus-sion	Pre/Post-test #3,8 Pre/Post-test #3,8

Table continues

Time	Objectives at the conclusion of educational experience	Content outline	Evidence	Method of present-ing	Method of evaluation
15 mins	The critical care nurse will be able to explain the definition for delirium, and the criteria for delirium, as well as risk factors and their significance for patients developing this syndrome in the ICU (con't)	D. Significance of patients developing ICU delirium. 1.Clinical Outcomes a.Higher mortality b.More likely to be discharged to skilled placement c.Increased LOS ICU/ hospital, and vent hours. 2.Social Outcomes a. ICU patients with delirium -high risk for long-term cognitive impairment. b. Specific cognitive issues: Memory, Processing c. A correlation of the length of time ICU delirium with the amount of cognitive impairment d.These cognitive impairments influence employment, demonstrated no substantial improvements over time	Girard et al., 2010; van den Boogaard et al., 2012 Pand-hari-pande, et al., 2013	➢ Power Point/ Discus-sion ➢ Power Point/ Discus-sion	Pre/Post-test #4,9 Pre/Post-test #4,9

Table continues

Time	Objectives at the conclusion of educational experience	Content outline	Evidence	Method of present-ing	Method of evaluation
45min	The critical care nurse will accurately assess the ICU patient for delirium using the RASS/ CAM-ICU.	A. Accurately assessing critically ill patients for delirium in the ICU is challenging because of the complex medical equipment and treatment modalities. To accurately assess and monitor for delirium, a validated tool that identifies cognitive dysfunction is crucial. 1. Discuss ICU patients can be assessed for delirium using the CAM-ICU except for patients in coma or a RASS from -4 to -5. B. Validated assessment tools for delirium are: RASS/ CAM-ICU, Intensive Care Delirium Screening Checklist (ICDSC), Nursing Delirium Screening Scale (Nu-DESC), and Delirium Detection Score (DDS)	Barr et al., 2012; Boot, 2012 Luetz et al. (2010); Tomasi et al., (2012); van den boogaard et al., (2009) Sessler et al., 2002	➢ Power Point/ Discus-sion ➢ Self/ Leaning Educa-tional Module ➢ Video Case Study	Pre/Post Test #6,7 Pre/Post Test #5

Table continues

Time	Objectives at the conclusion of educational experience	Content outline	Evidence	Method of present-ing	Method of evaluation
45 mins	The critical care nurse will accurately assess the ICU patient for delirium using the RASS/ CAM-ICU (con't).	i. Give brief overview of the each tool and discuss the why the CAM-ICU is the best validated tool C. CAM-ICU is a two-step approach 1. Accurate assessment is the evaluation of the patient's level of consciousness or the sedation level using the RASS. a. The RASS uses a 10-level scale for degree of arousal and agitation, with the scores from -5 (unarousable) to +4 (combative). 2. The CAM-ICU assessment uses four criteria: (1) acute mental status change, (2) inattention, (3) disorganized thinking, and (4) altered level of consciousness. Positive delirium requires 1 and 2 must be present and either criterion 3 or criterion 4.	Scott, McIlveney & Mallice, 2013 Vanderbilt University, 2015	➢ Power Point/ Discus-sion ➢ Self/ Learn-ing Educa-tional Module ➢ Video Case Study	Pre/Post Test #6,7 Pre/Post Test #6,7

Table continues

Time	Objectives at the conclusion of educational experience	Content outline	Evidence	Method of presen-ting	Method of evaluation
15 mins	The critical care nurse will analyze the non-pharmaco-logical measures to prevent delirium and explain the importance of implementing them in the ICU clinical setting.	A. The precipitating risk factors are the basis from which the non-pharmacological interventions were developed to assist in the prevention of delirium B. ICUs must implement multicomponent non-pharmacological measures, and these measures must include: education of nurses, early mobilization, cognitive stimulation, and reorientation measure (see D) C. Discuss the evidence that supports early mobilization for the ICU patient in order to decrease ICU patients acquiring delirium	Desai, Chau, & George, 2013; Patel, Balwin, Bunting, & Laha, 2014	➢ Power Point/ Discus-sion	Pre/Post Test #3,8

Table continues

Time	Objectives at the conclusion of educational experience	Content outline	Evidence	Method of present-ing	Method of evaluation
15 mins	The critical care nurse will analyze the non-pharmaco-logical measures to prevent delirium and explain the importance of implementing them in the ICU clinical setting. (con't)	D. Nonpharmacologic al interventions that will be implemented this ICU are based on the evidence 1. Repeated orientation of patients 2. Provisions of cognitively stimulating activities for the patients 3. A non-pharmacological sleep protocol 4. Early mobilization activities 5. Timely removal of catheters and physical restraints 6. Use of eye glasses and magnifying lenses, and hearing aids 7. Use of a scheduled pain management protocol 8. Minimization of noise/stimuli 9. Family involvement	Vasilev-skis et al., 2010	➢ Power Point/ Discus-sion	Pre/Post Test #10

Appendix F: Pretest and Posttest:

Code Number _____ (Please write this number on your posttest)

Demographic Date:

Age _____

Gender _____

Years in Nursing _____

Years in Critical Care Nursing _____

Degree in Nursing: Diploma _____ Associates_____ BSN_____ Masters_____

Questions:

1. Which factor listed below is the most important in determining if a patient has delirium?
   a. Memory Deficit
   b. Inattention
   c. Confusion
   d. Altered Level of Consciousness

2. The following statements regarding the criteria for delirium are true **EXCEPT**:
   a. The disturbance develops over a long period of time
   b. There is a disturbance in attention and awareness
   c. The disturbance represents a change from baseline attention and awareness and fluctuates in severity through the day
   d. The disturbance(s) is/are not explained by another pre-existing, established, or evolving neurocognitive disorder

3. Which of the following would NOT be a precipitating risk factor for the development of intensive care unit delirium?
   a. Immobility
   b. Medications (Benzodiazepines)
   c. Age
   d. Sepsis

4. Social outcomes associated with patients who developed intensive care unit delirium include long term cognitive impairment. Specific examples of long term cognitive impairment include:
   a. Memory loss
   b. Inability to stay focused
   c. A delay in processing information and formulating or enacting a response
   d. All of the above
   e. None of the above

5. Which of the following cannot be assessed for delirium*?
   a. A patient who is intubated and requires intravenous sedation
   b. A patient having visual hallucinations
   c. A patient in acute alcohol withdrawal
   d. A patient who had a stroke
   e. A patient who is comatose

6. An appropriate target Richmond Agitation Sedation Scale (RASS) score for most patients receiving continuous sedation is:
   a. -4 to -5
   b. 0 to -2
   c. +2 to 0
   d. +2 to +4

7. When assessing an intensive care unit patient for delirium with the Confusion Assessment Method-Intensive Care Unit (CAM-ICU), when is a positive screen for delirium achieved?
   a. Feature 1 negative, Feature 2 negative, Feature 3 negative, Feature 4 positive
   b. Feature 1 positive, Feature 2 negative , Feature 3 negative, Feature 4 positive
   c. Feature 1 positive, Feature 2 positive, Feature 3 positive, Feature 4 negative
   d. Feature 1 positive, Feature 2 negative , Feature 3 positive, Feature 4 negative

8. All of the following are predisposing risk factors for delirium **EXCEPT***:
   a. Dementia
   b. Smoking
   c. Comatose state at any point during hospitalization
   d. History of ETOH abuse

9. Clinical outcomes associated with patients developing Intensive Care Unit delirium as compared to patients who do not develop intensive care unit delirium include:

a. Higher mortality
b. Increased length of stay in the intensive care unit and the hospital
c. More likely to be discharged to a long term skilled facility
d. All of the above
e. None of the above

10. All of the following are appropriate non-pharmacological interventions to prevent delirium **EXCEPT***:
    a. Administering a benzodiazepine to promote sleep
    b. Early mobilization protocol
    c. Family Involvement
    d. Timely removal of catheters and physical restraints

*Some of the questions were adapted from Marino, J., Bucher, D., Beach, M., Yegneswaran, B., & Cooper, B. (2015). Implementation of an Intensive Care Unit Delirium Protocol. *Dimensions of Critical Care Nursing, 34*(5), 273-284. doi:10.1097/DCC.0000000000000130 (see next page for permission letter)

Appendix G: Permission to use Questions for the Pretest/Posttest

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Number of figures/tables /illustrations	1
Figures/tables/illustrations used	test
Author of this Wolters Kluwer article	No
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Expected completion date	Apr 2017
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Appendix H: Summative Evaluation Stakeholders/Committee Members

TITLE OF PROJECT: Caring for Patients with Patients with Delirium in the ICU

Student: Susan Archer

Thank you for completing the Summative evaluation on my project. Please complete and send anonymously via interoffice mail to: Susan Archer, ICU

A. This project was a team approach with the student as the team leader.

1. Please describe the effectiveness (or not) of this project as a team approach related to meetings, communication, and desired outcomes etc.

2. How do you feel about your involvement as a stakeholder/committee member?

3. What aspects of the committee process would you like to see improved?

B. The outcome products involved in this project were: The review of literature matrix, the curriculum plan, the pretest/posttest, and the didactic education for the two educational sessions.

1. Describe your involvement in participating in the development/approval of the products.

2. Share how you might have liked to have participated in another way in developing the products.

C. The role of the student was to be the team leader.

1. As a team leader how did the student direct the team to meet the project goals?

2. How did the leader support the team members in meeting the project goals?

D. Please offer suggestions for improvement.

Appendix I: Johns Hopkins Evidence-Based Practice Model

PRACTICE QUESTION

Step 1: Recruit interprofessional team
Step 2: Develop and refine the EBP question
Step 3: Define the scope of the EBP question and identify stakeholders
Step 4: Determine responsibility for project leadership
Step 5: Schedule team meetings

EVIDENCE

Step 6: Conduct internal and external search for evidence
Step 7: Appraise the level and quality of each piece of evidence
Step 8: Summarize the individual evidence
Step 9: Synthesize overall strength and quality of evidence
Step 10: Develop recommendations for change based on evidence synthesis
- Strong, compelling evidence, consistent results
- Good evidence, consistent results
- Good evidence, conflicting results
- Insufficient or absent evidence

TRANSLATION

Step 11: Determine fit, feasibility, and appropriateness of recommendation(s) for translation path
Step 12: Create action plan
Step 13: Secure support and resources to implement action plan
Step 14: Implement action plan
Step 15: Evaluate outcomes
Step 16: Report outcomes to stakeholders
Step 17: Identify next steps
Step 18: Disseminate findings

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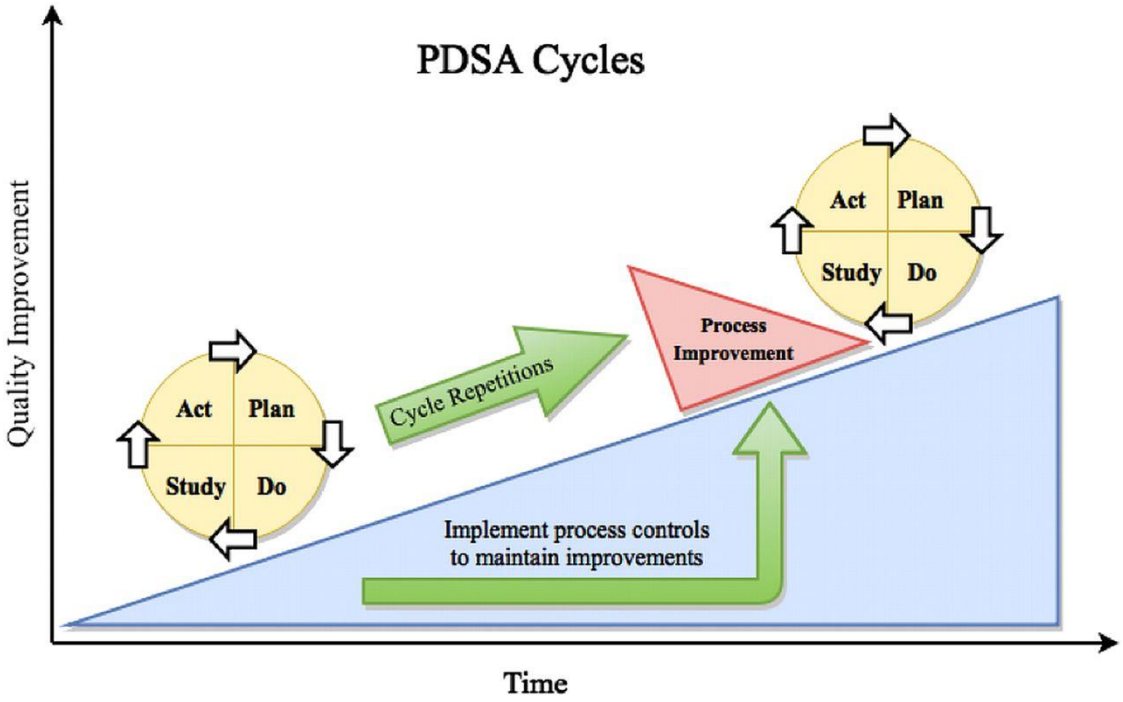
Appendix J: Plan Do Study Act (PDSA) Cycles



Figures 1: PDSA cycles showing continuous improvement over time through repetition of the cycle and implementation of altered process design
From Girder, S. J., Glezos, C. D., Link, T. M., & Sharan, A. (2016). The science of quality improvement. *The Journal of Bone and Joint Surgery Reviews, 4*(8), e1. doi https://doi.org/10.2106/JBJS.RVW.15.00094
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Appendix K: Permission to Use Plan Do Study Act Figure

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Portion	Figures/table/illustration
Number of figures/tables/illustrations	1
Figures/tables/illustrations used	PDSA Cycles
Author of this Wolters Kluwer article	No
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Expected completion date	Apr 2017
Estimated size(pages)	150
Requestor Location	Susan Archer Attn: Susan Archer
Publisher Tax ID	13-2932696

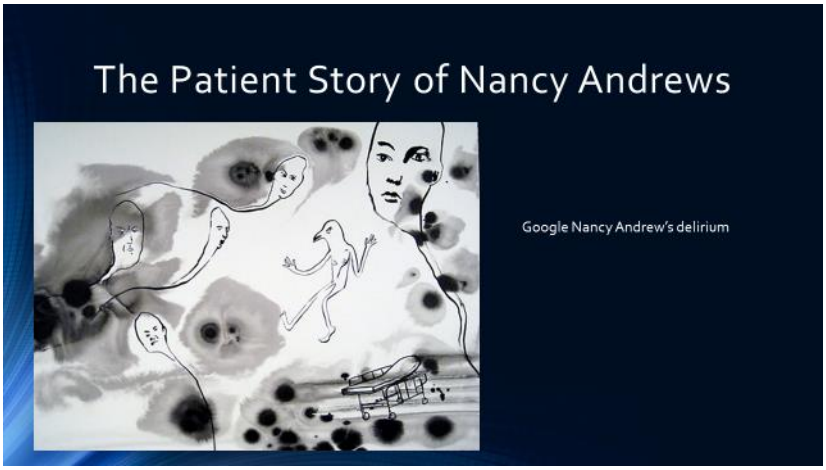
Appendix L: The American Psychiatric Association (2013) Criteria for Delirium

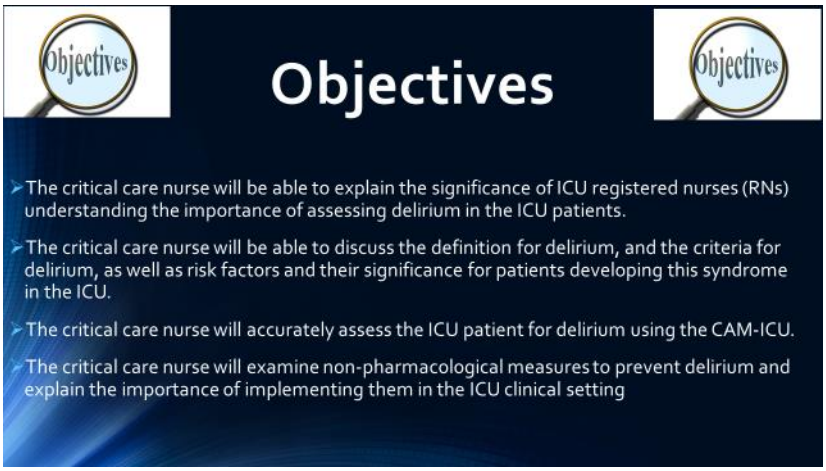
1.	Disturbance in attention (i.e., reduced ability to direct, focus, sustain, and shift attention) and awareness (reduced orientation to the environment);
2.	The disturbance develops over a short period of time (usually hours to a few days), represents a change from baseline attention and awareness, and tends to fluctuate in severity during the course of the day;
3.	An additional disturbance in cognition (e.g., memory deficit, disorientation, language, visuospatial ability, or perception);
4.	The disturbances in criteria A and C are not explained by another pre-existing, established, or evolving neurocognitive disorder and do not occur in the context of a severely reduced level of arousal, such as coma;
5.	There is evidence from the history, physical examination, or laboratory findings that the disturbance is a direct physiologic consequence of another medical condition, substance intoxication or withdrawal (i.e., because of a drug of abuse medication), or exposure to a toxin, or is because of multiple etiologies.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev). Washington, D.C: Author.

Appendix M: PowerPoint Educational Sessions 1 & 2:

Education Session #1 PowerPoint





The pathophysiology of delirium

Delirium Hypotheses	Reasoning proposed to explain physical effects manifested in the patient.
Neurotransmitter Hypothesis	Decreased cholinergic function with excess release of dopamine, norepinephrine, and glutamate. Decreased or increased levels of serotonergic (fluctuating levels correspond to the different symptoms seen in the clinical presentation hypo- hyper- or mixed active presentation)
Cell Signaling Hypothesis	Fundamental process of disruption to intra-neuronal signal transduction which greatly disturb neurotransmitter synthesis and release.
Neuronal Aging	Proposes that elderly patients are at increased risk of developing delirium due to age related cerebral changes in stress-regulating neurotransmitter and intracellular signal transduction systems.
Inflammatory Hypothesis	Increased cerebral secretions of cytokines as a result of widespread physical stresses lead to development of delirium by their effect on multiple neurotransmitter systems.
Physiological Stress	Trauma, severe illness, and surgery lead to modifications to blood brain barrier permeability.

Maldonado, J.R., (2008).

The Many Names of Delirium

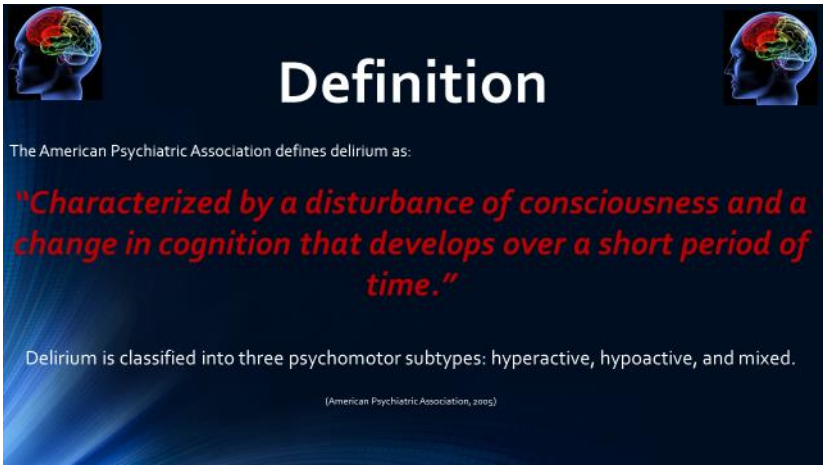
- Altered mental status
- Dementia
- Confusion
- ICU Psychosis
- Sundowners
- "Cra-Cra"
- Acute Confusional State

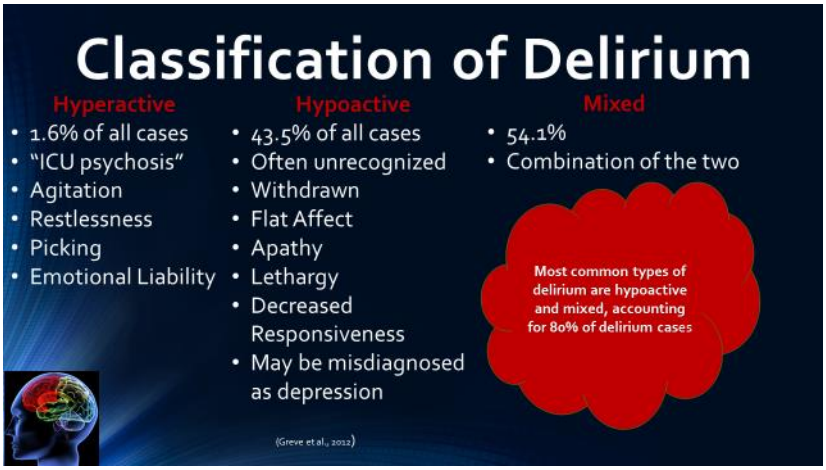
Criteria of Delirium

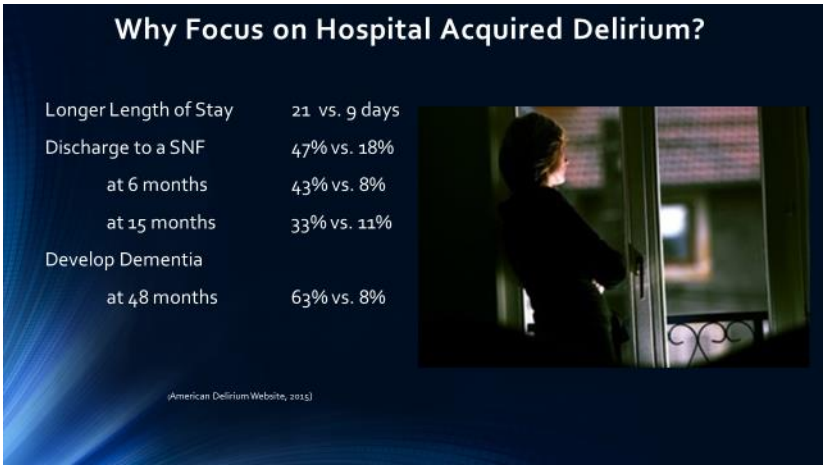
The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) diagnostic criteria for delirium are:

1. Their disturbance in attention (i.e., reduced ability to direct, focus, sustain, and shift attention) and awareness (reduced orientation to the environment);
2. The disturbance develops over a short period of time (usually hours to a few days), represents a change from baseline attention and awareness, and tends to fluctuate in severity during the course of the day;
3. An additional disturbance in cognition (e.g., memory deficit, disorientation, language, visuospatial ability, or perception);
4. The disturbances in criteria 1 and 3 are not explained by another pre-existing, established, or evolving neurocognitive disorder and do not occur in the context of a severely reduced level of arousal, such as coma;
5. There is evidence from the history, physical examination, or laboratory findings that the disturbance is a direct physiologic consequence of another medical condition, substance intoxication or withdrawal (i.e., because of a drug of abuse medication), or exposure to a toxin, or is because of multiple etiologies.

(American Psychiatric Association, 2013)


Definition
The American Psychiatric Association defines delirium as:
"Characterized by a disturbance of consciousness and a change in cognition that develops over a short period of time."
Delirium is classified into three psychomotor subtypes: hyperactive, hypoactive, and mixed.
(American Psychiatric Association, 2005)


Classification of Delirium
Hyperactive
1.6% of all cases
"ICU psychosis"
Agitation
Restlessness
Picking
Emotional Liability
Hypoactive
43.5% of all cases
Often unrecognized
Withdrawn
Flat Affect
Apathy
Lethargy
Decreased Responsiveness
May be misdiagnosed as depression
Mixed
54.1%
Combination of the two
Most common types of delirium are hypoactive and mixed, accounting for 80% of delirium cases
(Greve et al., 2012)


Why Focus on Hospital Acquired Delirium?
Longer Length of Stay 21 vs. 9 days
Discharge to a SNF 47% vs. 18%
at 6 months 43% vs. 8%
at 15 months 33% vs. 11%
Develop Dementia
at 48 months 63% vs. 8%
(American Delirium Website, 2015)

U.S. Delirium Costs

- $16,303 to $64,421 additional per delirious patient.
- U.S. cost-of-care directly attributed to delirium ranges from $143 to $152 billion

(Leslie & Inouye, 2011)

Why is the focus on hospital acquired delirium?

Extends Beyond the Hospital!

Post-hospital costs (>$100 billion/year)
- Institutionalization
- Rehabilitation
- Home care
- Caregiver burden

(Leslie & Inouye, 2011)

Delirium Hospital Rates

Five patients become delirious in US Hospitals every minute

Hospital:

Prevalence (on admission)	10-40%
Incidence (hospital-acquired)	15-60%
Postoperative:	15-53%
Intensive care unit:	70-87%

(U.S. Department of Health and Human Services, AoA Report, Profile of Older Americans, 2011)

Etiology

Multifactorial

- Systemic illness
- Medications and infections
- Presence of risk factors

Etiology

Multifactorial

- Systemic illness
- Medications and infections
- Presence of risk factors

Delirium Versus Dementia

Delirium Versus Dementia

	Delirium	Dementia
Onset	Abrupt, Acute	Gradual, usually insidious but depends on cause
Course	Short, Fluctuates ; worse at night and on awakening	Slow decline
Duration	Hours to days; up to 6 months	Months to years
Attention	Impaired, Fluctuates	Intact early; often impaired late
Sleep-Wake	Disrupted	Usually normal
Alertness	Fluctuates ; lethargic or hyper vigilant	Normal
Orientation	Fluctuates in severity; generally impaired	Intact early; Impaired late
Behavior	Agitated, withdrawn or depressed; or combative	Intact early
Speech	Incoherent, rapid/slowed	Word finding problems
Thoughts	Disorganized, delusions, fragmented, slow or accelerated, incoherent	Impoverished
Perceptions	Hallucinations , Illusions. Delusions, difficulty distinguishing between reality and misperceptions	Usually intact early

Gower, L. J., Gatewood, M. O., & Kang, C. S. (2012). Emergency department management of delirium in the elderly. *The Western Journal Of Emergency Medicine*, *13*(2), 194-201. doi:10.5811/westjem.2011.10.6654.

Strong Relationship Between Delirium and Dementia

Delirious patients 8X's risk to get dementia. (Davis,2012)

>50% dementia patients develop delirium & have a 25% increased risk of dying within 30 days. (Fick, 2013).

Probability of transitioning to delirium increases dramatically (by 2%) for each year of life after 65 years. (Pandharipande, 2006)

Patients Developing Delirium

Patient Vulnerability and Severity of Precipitating Risk Factor are WHY One Patient Develops Delirium, While a Similar Patient Does Not

(Greve et al., 2012; Mehta et al., 2015)

Risk Factors associated with ICU Delirium

Predisposing

- Difficult to control but can assist the health care provider to identify patients at high risk for developing delirium

Precipitating

- Can be modified and are correlated to the healthcare environment or the acute illness.
- The precipitating risk factors are the basis from which the evidence based non-pharmacological interventions were developed to assist in the prevention of delirium

Predisposing Risk Factors

- Age (> 60 Years of age)
- Male Sex
- Preexisting Dementia
- Visual/ Hearing Impairment
- Severity of illness and comorbidity
- Pre-ICU emergency surgery or trauma
- Mechanical ventilation
- Fever
- Coma

(Mehta et al., 2015)

Precipitating Risk Factors

- Immobility
- Sever Acute Illness (Sepsis, ARDS, Stroke, Dehydration)
- Smoking
- Medication
- Physical restraints
- Sleep deprivation
- Dehydration
- Sepsis
- Alcohol or drug withdrawal
- Indwelling catheters

(Mehta et al., 2015)

Risk Factors

Knowing the risk factors will assist the critical care nurse with identifying patients at increased risk to develop delirium and implement the appropriate non-pharmacological interventions.

(Morandi et al., 2009)

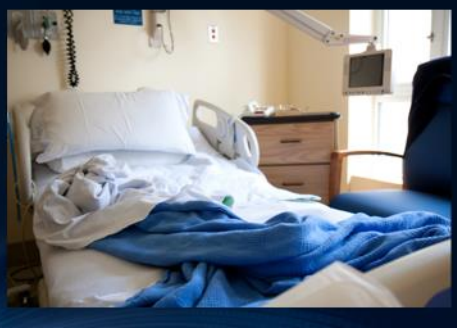
Clinical Characteristics

- Develops acutely (hours to days)
- Characterized by fluctuating level of consciousness
- Reduced ability to maintain attention
- Agitation or hyper somnolence
- Extreme emotional lability
- Cognitive deficits will likely occur

Inattention is the most important sign for delirium

Patient Testimonial

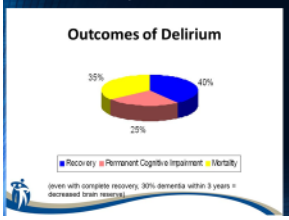
https://www.youtube.com/watch?v=ZYhooWoYHJg&spfreload=10



Significance of Patients With Delirium

CLINICAL OUTCOMES

- Higher Morality Rate
- More likely to be discharge to a skilled placement facility
- Longer LOS in the ICU and hospital, including increased duration being mechanically ventilated



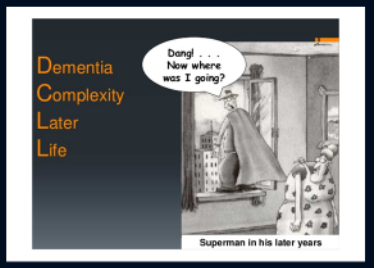
SOCIAL OUTCOMES

- High risk for long-term cognitive impairment
- Specific cognitive impairment include
  Memory,
  Attention,
  Processing speed,
  Executive dysfunction.
- A correlation of the length of time that patients experience ICU delirium with the amount of cognitive impairment
- These cognitive impairments are constant, influence employment, and, for some ICU patients, demonstrated no substantial improvements over time

(Girard et al., 2010; Mehta et al., 2015; Pandharipande et al., 2013)

Specific Examples of Cognitive Deficits

- Language difficulties: word finding difficulties, dysgraphia
- Speech disturbances: slurred, mumbling, incoherent or disorganized
- Memory dysfunction: marked short-term memory impairment, disorientation to person, place, time.
- Perceptions: misinterpretations, illusions, delusions and/or visual (more common) or auditory hallucinations
- Constructional ability: can't copy objects



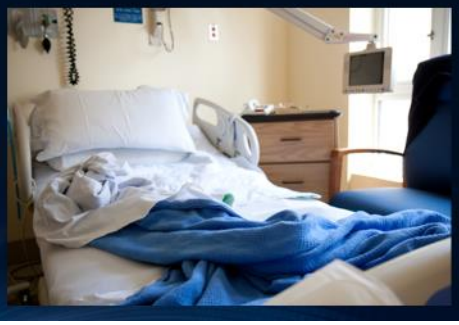
Delirium

The duration of delirium is an independent predictor of long-term cognitive impairment

(Girard et al., 2010)

Patient Testimonial

http://www.icudelirium.org/testimonials.html



Summary of Delirium

Delirium is a dangerous syndrome:
More than 7 million inpatients suffer from delirium each year.
Patients who experience delirium in the hospital (compared to patients without delirium) are more likely to:

- Stay longer in the hospital and have more hospital associated complications
- Experience higher mortality rates in the hospital and up to 6-12 months later
- Lose physical function in the hospital and need long-term care after the hospital
- Develop cognitive impairment
- Develop dementia or similar types of cognitive impairment even if the delirium clears

Greater than 60% of patients with delirium are not identified by the health care system!

(American Delirium Society, 2015)

Identifying Delirium

Critical care nurses, with comprehensive education, are the key healthcare providers to assist in the prevention, assessment, and early diagnosis of delirium in the critically ill patient.

(Gesin, 2012; Girard et al., 2010; Jackson, Mitchell, & Hopkins, 2009; Phillips, 2013; van den Boogaard et al., 2012).

Patient Testimonial

Assessing Delirium in the ICU Patient

- **Using a validated tool is crucial!**
- There are numerous assessment tools for delirium:
  1. Confusion Assessment Method- Intensive Care Unit (CAM-ICU)
  2. Intensive Care Delirium Screening Checklist (ICDSC)
  3. Nursing Delirium Screening Scale (Nu-DESC)
  4. Delirium Detection Score (DDS)

(Barr et al., 2012; Boot, 2012)

Nursing Delirium Screening Scale (Nu-DESC)

Features and descriptions	Symptoms Rating (0-2)		
Symptom / Time Period	Midnight - 8 AM	8 AM - 4 PM	4 PM - Midnight
I. Disorientation Verbal or behavioural manifestation of not being oriented to time or place or misperceiving persons in the environment			
II. Inappropriate behaviour Behaviour inappropriate to place and/or for the person; e.g., pulling at tubes or dressings, attempting to get out of bed when that is contraindicated, and the like.			
III. Inappropriate communication Communication inappropriate to place and/or for the person: e.g., incoherence, noncommunicativeness, nonsensical or unintelligible speech.			
IV. Illusions/Hallucinations Seeing or hearing things that are not there; distortions of visual objects.			
V. Psychomotor retardation Delayed responsiveness, few or no spontaneous actions/words; e.g., when the patient is prodded, reaction is deferred and/or the patient is unarousable.			
Total score			

Fig. 1. The Nursing Delirium Screening Scale (Nu-DESC). Symptoms are rated from 0 to 2 based on the presence and intensity of each symptom and individual ratings are added to obtain a total score per shift. The first four items of the Nu-DESC are included in the CRS. This table may be reproduced without permission. For clinical use only.

Delirium Detection Score (DDS)

Symptoms	Symptoms/ Rating
1. Orientation	
• Oriented to time, place, and personal identity, able to concentrate	□ 0
• Bot sure about time, place, or both, not able to concentrate	□ 1
• Not oriented to time or place, or both	□ 4
• Not oriented to time, place, and personal identity	□ 7
2. Hallucinations	
• None	□ 0
• Mild hallucinations at times	□ 1
• Permanent mild to moderate hallucinations	□ 4
• Permeant severe hallucinations	□ 7
3. Agitation	
• Normal activity	□ 0
• Slight higher activity	□ 1
• Moderate restlessness	□ 4
• Sever restlessness	□ 7
4. Anxiety	
• No anxiety when resting	□ 0
• Slight anxiety	□ 1
• Moderate anxiety at times	□ 4
• Acute panic attack	□ 7
5. Paroxysmal Seating	
• No sweeting	□ 0
• Almost not detectable, only palms	□ 1
• Beads of perspiration on the forehead	□ 4
• Heaving sweating	□ 7
Delirium	≥ 8 points □ yes (≤ 8 points) □ no

Intensive Care Delirium Screening Checklist (ICDSC)

Intensive Care Delirium Screening Checklist (ICDSC)

Intensive Care Delirium Screening Checklist (ICDSC)

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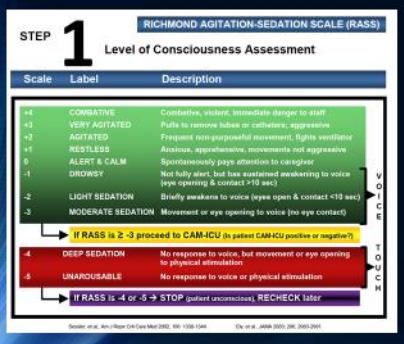
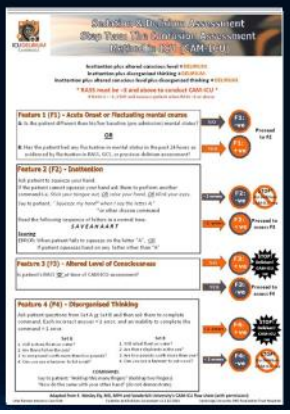
Research Studies Comparing the Four Assessment Tools

Research Study	Research Methodology/ Level of Evidence	Research Findings	Conclusion(s)
Tomasi, C. D., Grandi, C., Salluh, J., Soares, M., Giombelli, V. R., Cascaes, S., ... Dal Pizzol, F. (2012). Comparison of CAM-ICU and ICDSC for the detection of delirium in critically ill patients: focusing on relevant clinical outcomes. *Journal of Critical Care*, *27*(2), 212-217.	Prospective Cohort Study III B	During the study period, 383 patients were admitted to the ICU and 162 (42%) were evaluated; delirium was identified in 26.5% of patients by CAM-ICU and in 34.6% by ICDSC. There was agreement in diagnosing delirium between the two methods in 42 (27.8%) patients and in excluding delirium in 105 (64.8%) patients.	The findings from the study suggest that the **CAM-ICU** is better predictor of outcome when compared with ICDSC.
Luetz, A., Heymann, A., Radtke, F., Chenitir, C., Neuhaus, U., Nachtigall, I., ... Spies, C. (2010). Different assessment tools for intensive care unit delirium: Which score to use? *Critical Care Medicine*, *38*(2), 409-418. doi:10.1097/CCM.0b013e3181c8bb42	Prospective cohort study/ IIIA	The specificity of the CAM-ICU was significantly higher than that of the Nu-DESC (98% vs. 81%, p < .01). In contrast, the DDS showed poor sensitivity (20%), whereas the specificity was significantly higher compared with the Nu-DESC (DDS, 91%; Nu-DESC, 81%; p < .05). The interrater reliability was "almost perfect" for the CAM-ICU (kappa = 0.89) and "substantial" for DDS and Nu-DESC (kappa = 0.79, 0.68)	The **CAM-ICU** showed the best validity of the evaluated scales to identify delirium in ICU patients. The Nu-DESC might be an alternative tool for detection of ICU delirium. The DDS should not be used as a screening tool.
Page, V. J., Navarange, S., Gama, S., & McAuley, D. F. (2009). Routine delirium monitoring in a UK critical care unit. *Critical Care*, *13*(1), R16. doi:10.1186/cc7714	Observational and retrospective cohort IV C	73 patients in the observational cohort, with 60 patients in the retrospective cohort. In the observational cohort, the incidence of delirium was 45% in patients. in the 27 ventilated patients who could be assessed it was 63%. From the retrospective data the CAM-ICU assessment was 92%. The incidence of delirium in retrospective ventilated patients was 65%.	Delirium screening with the **CAM-ICU** is feasible in a UK ICU population. The high incidence of delirium and the impact on outcomes in this UK cohort of patients is in line with previous reports.
van Eijk, M. J., van Marum, R. J., Klijn, I. M., de Wit, N., Kesecioglu, J., & Slooter, A. C. (2009). Comparison of delirium assessment tools in a mixed intensive care unit. *Critical Care Medicine*, *37*(6), 1881-1885. doi:10.1097/CCM.0b013e3181a00118	Prospective study IIIB	The CAM-ICU showed superior sensitivity and negative predictive value (64% and 83%) compared with the ICDSC (43% and 75%). The ICDSC showed higher specificity and positive predictive value (95% and 82% vs. 80% and 72%). The sensitivity of the physicians view was only 29%.	ICU physicians underdiagnose delirium in the ICU, which underlines the necessity of standard evaluation in all critically ill patients. In mixed ICU population, the **CAM-ICU** had a higher sensitivity than [illegible]

Intensive Care Delirium Screening Checklist (ICDSC)

CAM-ICU





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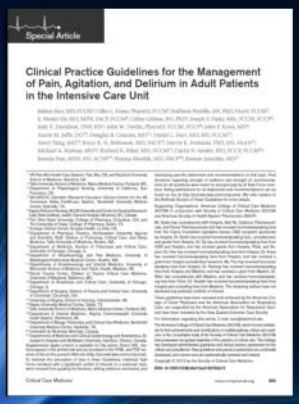
CAM-ICU Sensitivity and Specificity

Over a dozen studies have now compared the 30 second CAM-ICU evaluation to Geriatric psychiatrists' 30 to 45 minute evaluations:

- Sensitivity 80% to 95%
- Specificity 90% to 97%
- Inter-rater reliability, kappa = 0.96 (0.92-0.99)
- Delirium prevalence rates in mechanically ventilated ICU patients consistently 60% to 80%

(Ely, 2001; Gusmao-Flores , 2012)

Research Findings Recommendations


Special Article

Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium in Adult Patients in the Intensive Care Unit

- The CAM-ICU is one of the most valid delirium monitoring tools in adult ICU patients (A).
- Routine monitoring of delirium in adult ICU patients is feasible in clinical practice (B).

(Barr et al., 2013)

Patient Testimonial

Preventing Delirium- Can it be Done?

Landmark study by Inouye in 1999 using the non-pharmacological interventions by a interdisciplinary team.

- Randomized trial of 852 patients
- Multicomponent intervention plan
- Delirium developed in 9.9% intervention group vs 15% usual care group
- Total number days with delirium: 62 intervention group, 90 in control group
- NO DIFFERENCE in severity or recurrence of delirium once it developed:

The Key to Delirium is PREVENTION

Non-Pharmacological Management

Evidenced Based Non-Pharmacological Interventions

- Repeated orientation of patients
- **Provisions of cognitively stimulating activities for the patients multiple times a day***
- **A non-pharmacological sleep protocol***
- **Early mobilization activities***
- Timely removal of catheters and physical restraints
- Use of eye glasses and magnifying lenses, hearing aids
- Use of a scheduled pain management protocol
- Minimization of unnecessary noise/stimuli
- Family involvement

* Strongly supported by research findings!

Vanderbilt University Medical Center. (2015). Delirium management protocol. Retrieved from: http://www.icudelirium.org/delirium/management.html.

Delirium Management

It has as easy as ABCDEF

Delirium Management

PAD BUNDLE

Figure 1: The ICU PAD Care Bundle

	PAIN	AGITATION	DELIRIUM
ASSESS	Assess pain q4x/shift & prn Preferred pain assessment tools: • Patient able to self-report → NRS (0-10) • Unable to self-report → BPS (3-12) or CPOT (0-8) Patient is in significant pain if NRS > 4, BPS > 6, or CPOT > 2	Assess agitation, sedation q4x/shift & prn Preferred sedation assessment tools: • RASS (-5 to +4) or SAS (1 to 7) • NMS → suggest using brain function monitoring Depth of agitation, sedation defined as: • *agitated* if RASS = +1 to +4, or SAS = 5 to 7 • *awake and calm* if RASS = 0, or SAS = 4 • *lightly sedated* if RASS = -1 to -2, or SAS = 3 • *deeply sedated* if RASS = -3 to -5, or SAS = 1 to 2	Assess delirium Q shift & prn Preferred delirium assessment tools: • CAM-ICU (+ or -) • ICDSC (0 to 8) Delirium present if: • CAM-ICU is positive • ICDSC ≥ 4
TREAT	Treat pain within 30' then reassess: • Non-pharmacologic treatment - relaxation therapy • Pharmacologic treatment – Non-neuropathic pain → IV opioids +/- non-opioid analgesics – Neuropathic pain → gabapentin or carbamazepine, +/- IV opioids – S/p AAA repair, rib fractures → thoracic epidural	Targeted sedation or DSI (*goal: patient purposely follows commands without agitation*) RASS = -2 – 0, SAS = 3 - 4 • If *awake/agitated* (RASS >0, SAS >4) assess/treat pain → treat w/sedatives prn (non-benzodiazepines preferred, unless ETOH or benzodiazepine withdrawal is suspected) • If *over-sedated* (RASS < -2, SAS <3) hold sedatives until at target, then restart at 50% of previous dose	• Treat pain as needed • Reorient patients: familiarize surroundings; use patient's eyeglasses, hearing aids if needed • Pharmacologic treatment of delirium: – Avoid benzodiazepines unless ETOH or benzodiazepine withdrawal is suspected – Avoid risperidone – Avoid antipsychotics if ↑ risk of Torsades de pointes
PREVENT	• Administer pre-procedural analgesia and/or non-pharmacologic interventions (e.g., relaxation therapy) • Treat pain first, then sedate	• Consider daily SBT, early mobility and exercise when patients are at goal sedation level, unless contraindicated • EEG monitoring if: – at risk for seizures – burst suppression therapy is indicated for ↑ ICP	• Identify delirium risk factors: dementia, HTN, ETOH abuse, high severity of illness, coma, benzodiazepine administration • Avoid benzodiazepine use in those at ↑ risk for delirium • Mobilize and exercise patients early • Promote sleep (control light, noise; cluster patient care activities; decrease nocturnal stimuli) • Restart baseline psychiatric meds, if indicated

Delirium Management

Antipsychotic Use

- Commonly used… maybe too commonly
- Care to ensure not missing underlying pain, urinary retention, psychiatric disorder, withdrawal syndrome, infection!
- If used, use atypicals in very, very low dose!
- No great data to support this use… so use care

- Increased association with stroke and sudden death
- Does not improve delirium; may increase LOS; likely makes your delirious patient a more sedated delirious patient
- May benefit a subset of patients with psychotic symptoms or aggressive behavior patterns
- Chemical restraints
  - Haloperidol
  - Zyprexa
  - Seroquel
  - Geodon
  - Clozapine

(Inouye et al., 1999; Pandharipande et al., 2006 ; Bar et al., 2012)

What to THINK if Positive for Delirium

Toxic Situations
- CHF, shock, dehydration
- Deliriogenic meds (tight titration, sedative choice)
- New organ failure, e.g., liver, kidney

Hypoxemia; also, consider giving **H**aloperidol or other antipsychotics

Infection/sepsis (nosocomial), **I**mmobilization

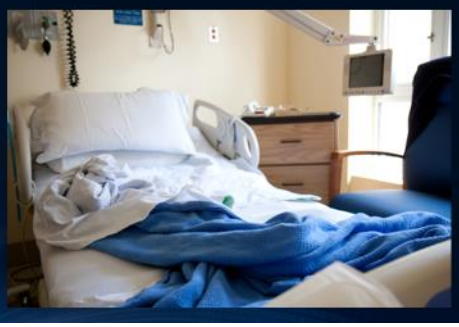
Nonpharmacological interventions
- Hearing aids, glasses, reorient, sleep protocols, music, noise control, early mobility, cognitive stimulation

K+ or Electrolyte problems

(Skrobik, 2009)

Patient Testimonial

http://www.icudelirium.org/testimonials.html



Conclusions

- Delirium is a significant problem for hospitalized patients and a predictor of many negative clinical and social outcomes.
- Reliable and easy evidence based tools, such as the CAM-ICU, are available for identification of delirium in patients in the ICU.
- The non-pharmacological interventions are an important component of the prevention of ICU delirium
- Some operational culture change is involved with the assessment and management of delirium in the ICU.
- *Critical care nurses, with comprehensive education, are the key healthcare providers to assist in the prevention, assessment, and early diagnosis of delirium in the critically ill patient.*

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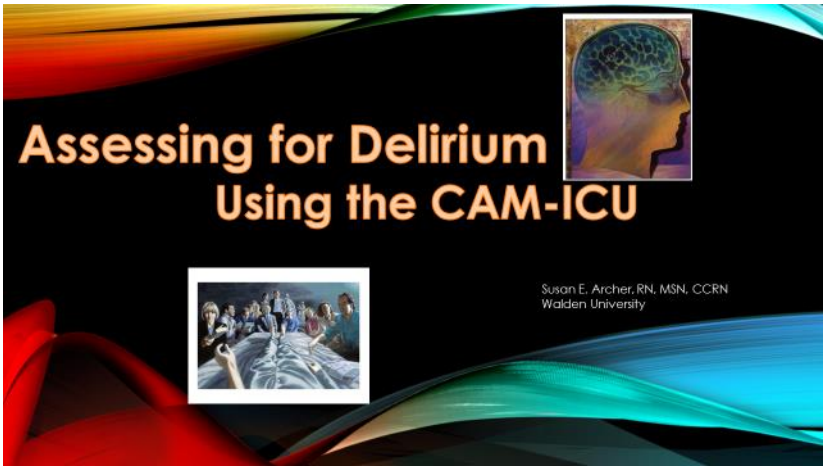
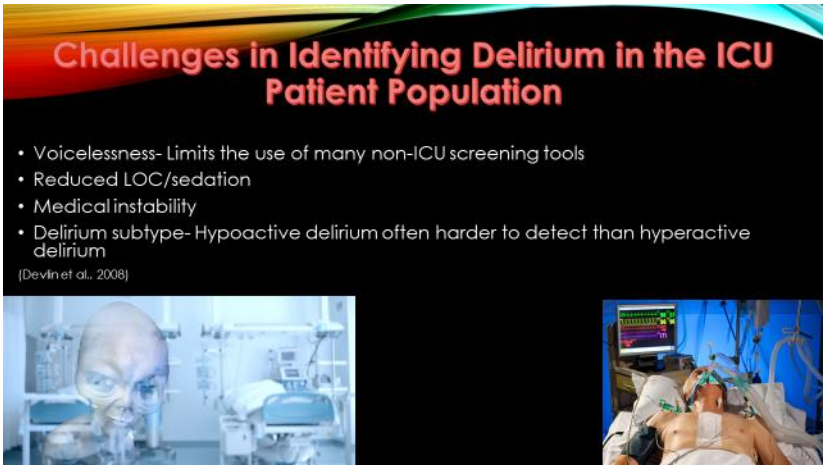
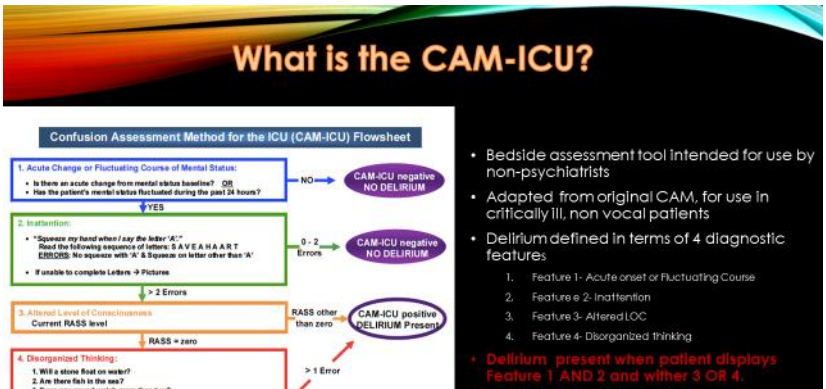
Education Session #2 PowerPoint

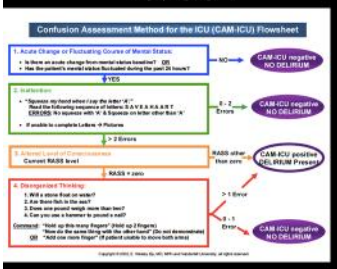






CAM-ICU-Step 1- Administer RASS

Feature 1



- Determine if you can even administer the CAM-ICU
- Consciousness= Arousal Level + Content
- Use valid and reliable tool (i.e. the Richmond Agitation Sedation Scale (RASS)

(Vanderbilt University Medical Center, 2013)

CAM-ICU-Step 1- Administer RASS

STEP 1 — RICHMOND AGITATION-SEDATION SCALE (RASS)

Level of Consciousness Assessment

Scale	Label	Description	
+4	COMBATIVE	Combative, violent, immediate danger to staff	VOICE
+3	VERY AGITATED	Pulls to remove tubes or catheters; aggressive	
+2	AGITATED	Frequent non-purposeful movement, fights ventilator	
+1	RESTLESS	Anxious, apprehensive, movements not aggressive	
0	ALERT & CALM	Spontaneously pays attention to caregiver	
-1	DROWSY	Not fully alert, but has sustained awakening to voice (eye opening & contact >10 sec)	
-2	LIGHT SEDATION	Briefly awakens to voice (eyes open & contact <10 sec)	
-3	MODERATE SEDATION	Movement or eye opening to voice (no eye contact)	
	If RASS is ≥ -3 proceed to CAM-ICU (is patient CAM-ICU positive or negative?)		
-4	DEEP SEDATION	No response to voice, but movement or eye opening to physical stimulation	TOUCH
-5	UNAROUSABLE	No response to voice or physical stimulation	
	If RASS is -4 or -5 → STOP (patient unconscious), RECHECK later		

Feature 1

- Off sedation
- Complete on every patient except if they are comatose (i.e. RASS -4 or -5)
- Has the patient had acute change from mental status baseline?

OR

- Has the patient's mental status fluctuated during the past 24 hours

If both of these questions are answered NO, STOP you are done. The patient is NOT delirious!

(Vanderbilt University Medical Center, 2013)

Frequently Asked Questions for Feature 1

How do you determine baseline mental status?

- This is the patient's pre-hospital mental status. Use critical thinking skills with this Feature. For example:
- If the patient is young (e.g. <65) and admitted from home with no documented neurocognitive disorder or history of stroke, assume the patient has a "normal" baseline mental status (i.e., alert and calm).
- If the patient is older, has documented stroke or dementia, ask the family or the institution for more patient's pre-hospital baseline mental status.

Do you use that same 'baseline' with successive CAM-ICU assessments?

- Always , unless a permanent change in baseline occurs .
- You should consistently use the patient's established pre-hospital baseline.

(Vanderbilt University Medical Center, 2013)

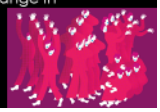
Frequently Asked Questions for Feature 1

How do you handle a permanent change of baseline during the hospitalization – e.g. , a stroke or anoxic injury? Is that modified and permanent new baseline used for CAM-ICU purposes?

Yes. If there is a permanent change in baseline, the new baseline is used for subsequent CAM-ICU evaluations. This may be difficult to determine because of the difficulty in separating delirium from the new baseline. In practice, it is easiest to gather Feature 1 in such a situation by documenting 'fluctuations' in the mental status.

Does it still count as fluctuation in mental status or change from baseline mental status when a patient is on sedatives?

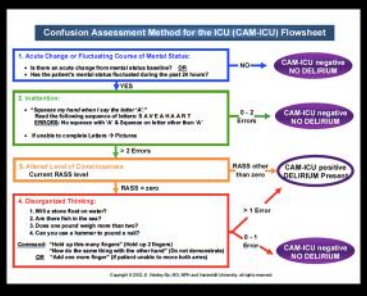
Yes. Alteration in mental status includes those that are chemically induced by the healthcare team, including fluctuation due to titration of sedatives. This is not the patient's usual mental status. It is often difficult to completely distinguish a disease-induced change from a drug - induced change in mental status



(Vanderbilt University Medical Center, 2013)

CAM-ICU-Step 2- Must Have Feature 2

Feature 2



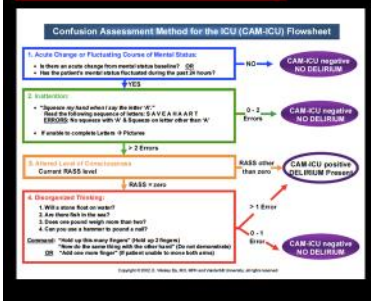
Inattention

- Squeeze my hand when I say the letter A to **SAVEAHAART**
- **Errors = No squeeze with A and/or squeeze on letter other than a**
- **Feature 2 is present if the patient has > 2 errors**
- **If inattention is NOT present, STOP you are done. The Patient is NOT delirious**

(Vanderbilt University Medical Center, 2013)

CAM-ICU-Step 2- Must Have

Feature 2



Alternate Inattention

Assessment Use of Pictures

Step 1-5

Step 2-10

Scoring

(Vanderbilt University Medical Center, 2013)

Frequently Asked Questions for Feature 2

If a patient is RASS -3 or very lethargic, is the CAM -ICU 'unable to assess' (UTA)? Is the patient delirious?

- The ability to be tested with the CAM-ICU is based on a patient being responsive to verbal stimulation, regardless of sedative use.
- The 2-step approach to assess consciousness with the RASS and CAM-ICU provides a filter for the majority of patients who cannot participate in the assessment.
- Comatose patients (i.e., RASS -4/-5) are not tested with the CAM-ICU because they are unconscious.
- Though it seems like a gray zone, patients with a RASS -3 can provide enough data to be rated as delirious by the CAM-ICU.

(Vanderbilt University Medical Center, 2013)

Frequently Asked Questions for Feature 2

If a patient is RASS -3 or very lethargic, is the CAM -ICU 'unable to assess' (UTA)? Is the patient delirious?

If a patient has any movement or eye opening to your voice directed to them and doesn't squeeze at all or stay awake long enough to squeeze for more than one letter, then this patient is obviously inattentive. At this point, assess the other CAM-ICU Features as needed to determine if the patient is delirious. Example:

- If the patient ever squeezed, then count the errors .
- If the patient never squeezed then the patient is inattentive. Also be suspicious for inattention when you have to repeat the instructions more than twice.
- These concepts also apply to a patient who is agitated (i.e., RASS +1 thru +4) and not participating in assessment or comprehending your instructions.

(Vanderbilt University Medical Center, 2013)

Frequently Asked Questions for Feature 2

If a patient has any movement or eye opening to your voice directed to them and doesn't squeeze at all or stay awake long enough to squeeze for more than one letter, then this patient is inattentive. At this point, assess the other CAM-ICU Features as needed to determine if the patient is delirious. Example:

- f the patient ever squeezed, then count the errors
- If the patient never squeezed then the patient is inattentive. Also be suspicious for inattention when you have to repeat the instructions more than twice.

(Vanderbilt University Medical Center, 2013)

Frequently Asked Questions for Feature 2

Do you have to complete both Letters and Pictures on every patient?

- No. You do not have to use both tests in each assessment. Attempt the Letters first. If the patient is able to perform this test and the score is clear, record this score and move to the Feature 3.
- If the patient is incapable of performing the Letters or you are unable to interpret the score, perform the Pictures.
- If you perform both tests, use the Pictures result to determine if the patient is inattentive.

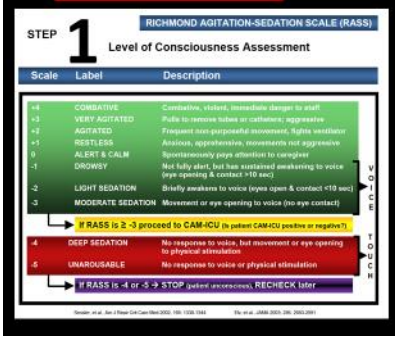
Are there other Letter sequences that I can use to assess Feature 2?

- C A S A B L A N C A
- S A V E A B R A A N

(Vanderbilt University Medical Center, 2013)

CAM-ICU-Step 3

Feature 3



Altered LOC

Assess with RASS

Feature is PRESENT when patient scores anything other than a PASS of 0

If Features 1,2 &3 are present STOP you are done, the patient is delirious or CAM-ICU positive

(Vanderbilt University Medical Center, 2013)

Frequently Asked Questions for Feature 3

Is Feature 3 positive in coma?

No: Coma is not considered delirium. The CAM-ICU is not performed if a patient is comatose (i.e. RASS -4 or -5). Many delirious patients have recently been comatose, indicating a fluctuation of mental status. Comatose patients often, but not always, progress through a period of delirium before recovering to their baseline mental status.

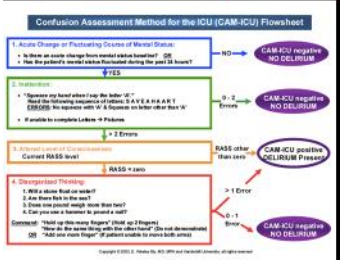
What is the difference between Feature 3 and Feature 1?

- **Feature 3 (Altered Level of Consciousness)** evaluates the patient's current level of consciousness (right now). The current level of consciousness as detected with the actual current RASS regardless of the patient's baseline mental status.
- • **Feature 1 (Acute Change or Fluctuating Course of Mental Status)** evaluates the patient's pre-hospital mental status baseline and whether there has been fluctuation in mental status during the past 24 hours.
- • **Take home point:** A patient can have an alert/calm baseline, RASS fluctuations (-1 to -2) over the past 24 hours, and currently be RASS 0. Feature 1 is present due to fluctuations, but Feature 3 is absent because the patient is currently alert (RASS 0).

(Vanderbilt University Medical Center, 2013)

CAM-ICU-Step 4

Feature 4



Disorganized Thinking

The patient is 0 in Feature 3 you have to do Feature 4.

2 Steps Process

Feature 4 is present if there is > 1 error for the combined Questions and Commands

If Feature 1,2 & 4 are deemed present STOP you are done the patient is delirium (CAM-ICU)

Procedure

Step 1-Questions

- Will a stone float in water?
- Are there fish in the sea?
- Does 1 pound weigh more than 2 pounds
- Can you use a hammer to pound a nail?

Step 2- Command

- Hold up this many finger (2 fingers)
- Now do the same thing with the other hand (Do not demonstrate)
- Or add one more finger (if the patient is unable to move both arms)

(Vanderbilt University Medical Center, 2013)

Frequently Asked Questions for Feature 4

How frequently do you have to use this Feature?

According to the CAM-ICU a patient is delirious if Features 1 and 2 and either 3 or 4 are present. Many times you will not need to assess this Feature because you will have the information you need from Features 1, 2, and 3. It is only when Features 1 and 2 are present and Feature 3 is absent (patient is alert) that you have to complete this Feature.

If a patient answers the four questions correctly, do you still assess the command?

Yes. We encourage you to perform the 2-step command even if the patient scores 100% on the questions because there is a chance the patient had four lucky guesses. The combination of questions and 2-step command gives the clinician more data to make a judgment of whether there is disorganized thinking. If the patient answers all questions correctly, the performance on the 2-step command can help identify subsyndromal delirium

(Vanderbilt University Medical Center, 2013)

Frequently Asked Questions for Feature 4

Is there an alternate set of questions?

Yes. These questions can be used as an alternative to the set listed above. Try to alternate questions with 'yes' then 'no' answers.

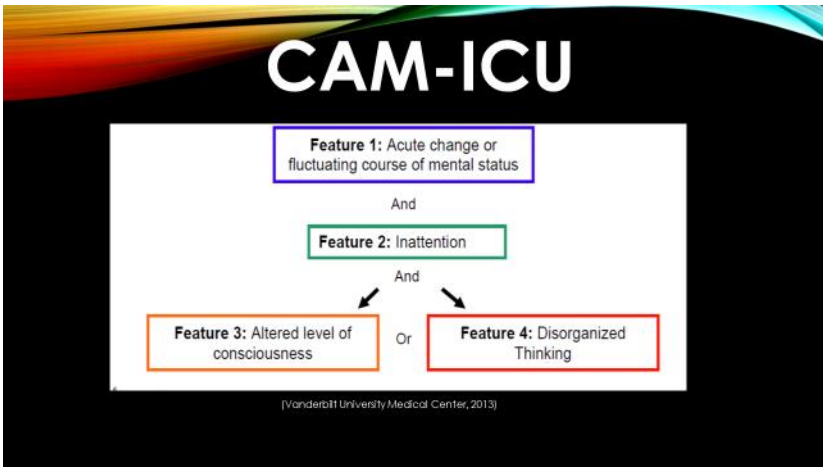
- Will a leaf float on water?
- Are there elephants in the sea?
- Do two pounds weigh more than one?
- Can you use a hammer to cut wood?

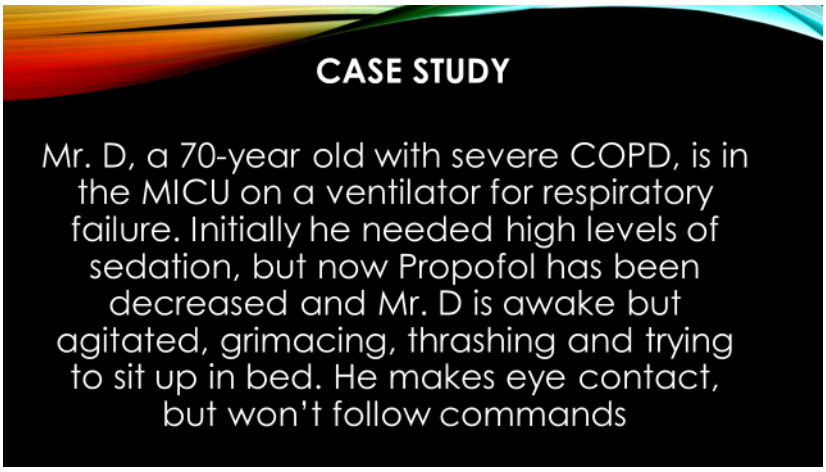
Do you assess the 2-step command if the patient is paralyzed, quadriplegic, or visually impaired?

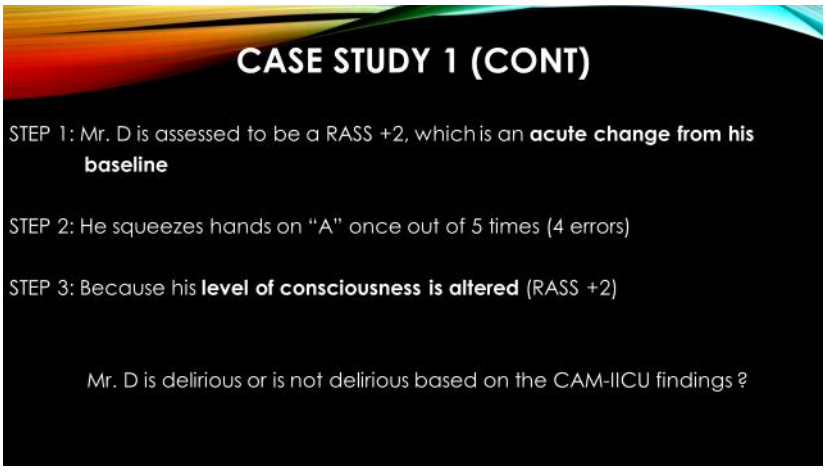
No.

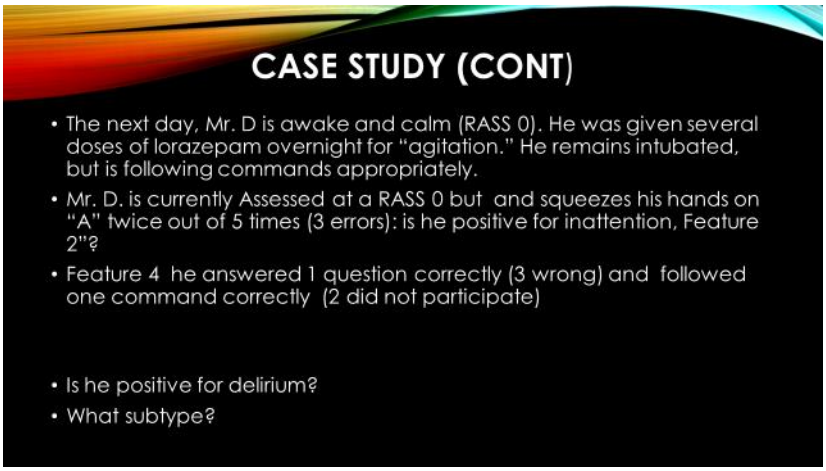
If a patient cannot move his/her arms or is blind, score solely on Feature 4 questions. Therefore, Feature 4 is present if the patient misses more than one question (>1 error).

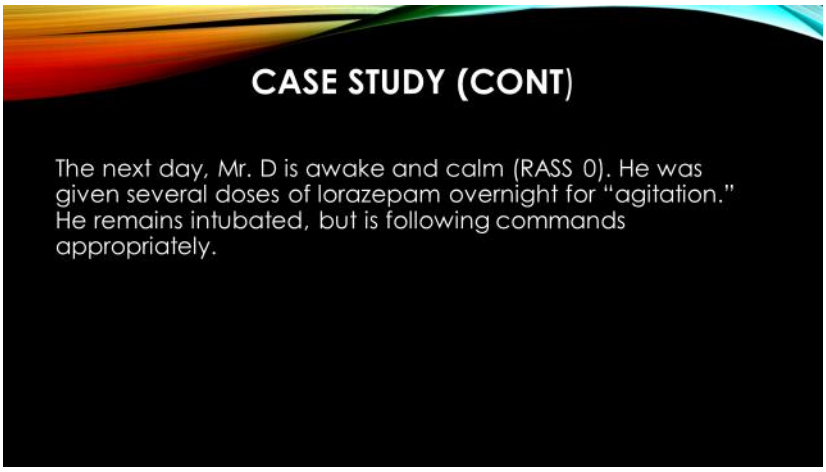
(Vanderbilt University Medical Center, 2013)

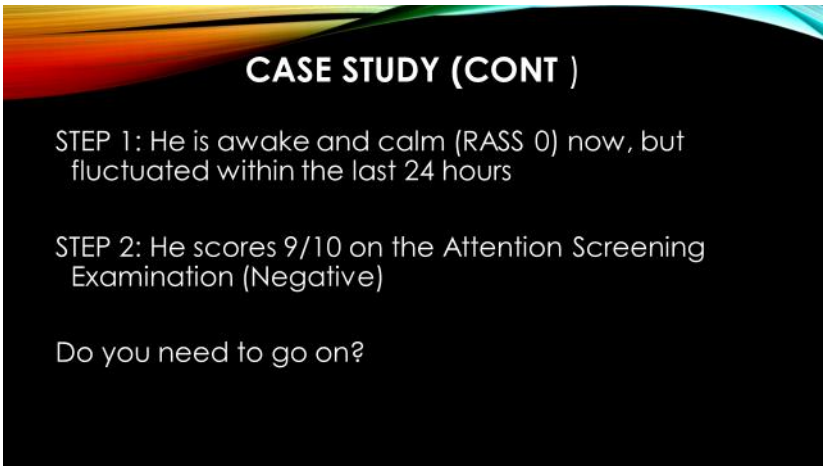

CAM-ICU
Feature 1: Acute change or fluctuating course of mental status
And
Feature 2: Inattention
And
Feature 3: Altered level of consciousness
Or
Feature 4: Disorganized Thinking
(Vanderbilt University Medical Center, 2013)


CASE STUDY
Mr. D, a 70-year old with severe COPD, is in the MICU on a ventilator for respiratory failure. Initially he needed high levels of sedation, but now Propofol has been decreased and Mr. D is awake but agitated, grimacing, thrashing and trying to sit up in bed. He makes eye contact, but won't follow commands


CASE STUDY 1 (CONT)
STEP 1: Mr. D is assessed to be a RASS +2, which is an acute change from his baseline
STEP 2: He squeezes hands on "A" once out of 5 times (4 errors)
STEP 3: Because his level of consciousness is altered (RASS +2)
Mr. D is delirious or is not delirious based on the CAM-IICU findings ?


CASE STUDY (CONT)
• The next day, Mr. D is awake and calm (RASS 0). He was given several doses of lorazepam overnight for "agitation." He remains intubated, but is following commands appropriately.
• Mr. D. is currently Assessed at a RASS 0 but and squeezes his hands on "A" twice out of 5 times (3 errors): is he positive for inattention, Feature 2"?
• Feature 4 he answered 1 question correctly (3 wrong) and followed one command correctly (2 did not participate)
• Is he positive for delirium?
• What subtype?


CASE STUDY (CONT)
The next day, Mr. D is awake and calm (RASS 0). He was given several doses of lorazepam overnight for "agitation." He remains intubated, but is following commands appropriately.


CASE STUDY (CONT)
STEP 1: He is awake and calm (RASS 0) now, but fluctuated within the last 24 hours
STEP 2: He scores 9/10 on the Attention Screening Examination (Negative)
Do you need to go on?

MANAGING DELIRIUM

- Look for it
- Identify and treat correctable risk factors
- Optimize non-pharmacologic interventions
- Goal-oriented pain (treat first) and sedation with daily wake-ups
- Communication between nursing and MDs
- Pharmacologic intervention

Conclusion

Critical care nurses, with comprehensive education, are the key healthcare providers to assist in the prevention, assessment, and early diagnosis of delirium in the critically ill patient.

(Gesin, 2012; Girard et al., 2010; Jackson, Mitchell, & Hopkins, 2009; van den Boogaard et al., 2012).

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Devlin, J. W., Fong, J. J., Howard, E. P., Skrobik, Y., McCoy, N., Yasuda, C., & Marshall, J. (2008). Assessment of delirium in the intensive care unit: Nursing practices and perceptions. *American Journal of Critical Care, 17*(6), 555-566.

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Jackson, J. C., Mitchell, N., & Hopkins, R. O. (2009). Cognitive functioning, mental health, and quality of life in ICU survivors: An overview. *Critical Care Clinics, 25*(3), 615–628. doi: 10.1016/j.ccc.2009.04.005

van den Boogaard, M., Schoonhoven, L., Evers, A.W. M., vander Hoeven, J. G., van Achterberg, T., & Pickkers, P. (2012). Delirium in critically ill patients: Impact on long-term health-related quality of life and cognitive functioning. *Critical Care Medicine, 40*(1), 112–118. doi: 10.1097/CCM.0b013e31822e9fc9

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Appendix N: Facilities Institutional Review Board Approval

December 12, 2015

Dear Susan,

Based on my review of your research proposal, I give permission for you to conduct the project entitled "Caring for the Patients with Delirium in the Intensive Care Unit". As part of the project, I authorize you to:

1. Recruit the ICU nurses to participate in the educational session related to ICU delirium.
2. Use the information obtained in the pre and post-test and delirium assessment as a means of data collection for your project as outlined in your proposal.
3. Disseminate your findings in ICU committee meeting as outline in your IRB application.

Individual's participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include: providing a room for the educational sessions to take place (which will be secured by the DNP student), and allowing the nurses on the ICU to participate in the educational sessions. The student will be responsible for complying with our site's research policies and requirements, including submission of the institutions IRB application. In addition, we understand that this organization's IRB will serve as the IRB of record for the project.

I confirm that I am authorized to approve research in this setting and that this plan complies with organization's policies.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside the student's supervising faculty/staff without permission.

Appendix O: Expert Evaluation of DNP Project/Outline/Content/Evidence Form

Title of Project: Caring for Patients with Delirium in the Intensive Care Unit

Student: Susan Archer **Date:** **Name of Reviewer:**

Products for Review: Curriculum Plan, Complete Curriculum Content, Literature Review Matrix

Instructions: Please review each objective related to the curriculum plan content and matrix. The answer will be "met" or "not met" with comments if there is a problem understanding the content or if the content does not speak to the objective

Objective 1: The critical care nurse will be able to explain the significance of intensive care unit (ICU) registered nurse (RNs) understanding the importance of assessing delirium in the ICU patients. Comments:		
Objective 2: The critical care nurses will be able to explain the definition for delirium, and the criteria for delirium, as well as the risk factors, and their significance for patients developing the syndrome in the ICU. Comments:		
Objective 3: The critical care nurse will accurately assess the ICU patient for delirium using the confusion assessment method-(CAM)-ICU. Comments:		
Objective 4: The critical care nurse will analyze the non-pharmacological measures to prevent delirium and explain the importance of implementing them in the ICU clinical setting. Comment		

Appendix P: Content Validation of the Pretest/Posttest Form

Date: Student Name: Susan Archer
Reviewer's Name:

Packet: Education Plan (Pretest/Posttest, Complete Curriculum, and Review of Literature Matrix)

INSTRUCTIONS: Please check each item to see if the question is representative of the course objective and the correct answer is reflected in the course content.

Test Item	Not Relevant	Somewhat Relevant	Relevant	Not Relevant
1. Which factor listed below is the most important in determining if a patient has delirium? A. Memory Deficit B. Inattention C. Confusion D. Altered Level of Consciousness Comments:				
2. The following statements regarding the criteria for delirium are true **EXCEPT**: A. The disturbance develops over a long period of time B. There is a disturbance in attention and awareness C. The disturbance represents a change from baseline attention and awareness and fluctuates in severity through the day D. The disturbance(s) is/are not explained by another pre-existing, established, or evolving neurocognitive disorder Comments:				

Table Continues

Test Item	Not Relevant	Somewhat Relevant	Relevant	Not Relevant
3. Which of the following would NOT be a precipitating risk factor for the development of intensive care unit delirium? A. Immobility B. Medications (Benzodiazepines) C. Age D. Sepsis Comments:				
4. Social outcomes associated with patients who developed intensive care unit delirium include long term cognitive impairment. Specific examples of long term cognitive impairment include: A. Memory loss B. Inability to stay focused C. A delay in processing information and formulating or enacting a response D. All of the above E. None of the above Comments:				
5. Which of the following cannot be assessed for delirium? A. A patient who is intubated and requires intravenous sedation B. A patient having visual hallucinations C. A patient in acute alcohol withdrawal D. A patient who had a stroke E. A patient who is comatose Comments:				

Table Continues

Test Item	Not Relevant	Somewhat Relevant	Relevant	Not Relevant
6. An appropriate target Richmond Agitation Sedation Scale (RASS) score for most patients receiving continuous sedation is: A. -4 to -5 B. 0 to -2 C. +2 to 0 D. +2 to +4 Comments:				
7. When assessing an intensive care unit patient for delirium with the Confusion Assessment Method-Intensive Care Unit (CAM-ICU), when is a positive screen for delirium achieved? A. Feature 1 negative, Feature 2 negative, Feature 3 negative, Feature 4 positive B. Feature 1 positive, Feature 2 negative , Feature 3 negative, Feature 4 positive C. Feature 1 positive, Feature 2 positive, Feature 3 positive, Feature 4 negative D. Feature 1 positive, Feature 2 negative , Feature 3 positive, Feature 4 negative Comments:				
8. All of the following are predisposing risk factors for delirium **EXCEPT**: A. Dementia B. Smoking C. Comatose state at any point during hospitalization D. History of ETOH abuse Comments:				

Table Continues

Test Item	Not Relevant	Somewhat Relevant	Relevant	Not Relevant
9 Clinical outcomes associated with patients developing Intensive Care Unit delirium as compared to patients who do not develop intensive care unit delirium include: A. Higher mortality B. Increased length of stay in the intensive care unit and the hospital C. More likely to be discharged to a long term skilled facility upon discharge D. All of the above E. None of the above Comments:				
10. All of the following are appropriate non-pharmacological interventions to prevent delirium **EXCEPT**: A. Administering a benzodiazepine before sleep to promote sleep B. Early mobilization protocol C. Family Involvement D. Timely removal of catheters and physical restraints Comments:				

Appendix Q: Content Expert Evaluation Summary of the Curriculum Plan

At the conclusion of this educational experience, the participant will be able to:

Objective	Evaluator 1	Evaluator 2	Average Score
1. The critical care nurse will be able to explain the significance of ICU registered nurses (RNs) understanding the importance of assessing delirium in the ICU patients.	2*	2	2
2. The critical care nurse will be able to discuss the definition for delirium, and the criteria for delirium, as well as risk factors and their significance for patients developing this syndrome in the ICU.	2	2	2
3. The critical care nurse will accurately assess the ICU patient for delirium using the RASS/ CAM-ICU.	2	2	2
4. The critical care nurse will examine non-pharmacological measures to prevent delirium and explain the importance of implementing them in the ICU clinical setting.	2	2	2

*Key:
Not Met = 1
Met =2

Appendix R: Content Expert Evaluation Summary of Pretest/Posttest

Test Item	Evaluator 1	Evaluator 2	Average
1.Which factor listed below is the most important in determining if a patient has delirium? a. Memory Deficit **b. Inattention** c. Confusion d. Altered Level of Consciousness	4	4	4
2.The following statements regarding the criteria for delirium are true **EXCEPT**: **a. The disturbance develops over a long period of time** b. There is a disturbance in attention and awareness c. The disturbance represents a change from baseline attention and awareness and fluctuates in severity through the day d. The disturbance(s) is/are not explained by another pre-existing, established, or evolving neurocognitive disorder	4	4	4
3. Which of the following would NOT be a precipitating risk factor for the development of intensive care unit delirium? **a.** Immobility **b.** Medications (Benzodiazepines) c. **Age** d. Sepsis	4	4	4
4. Social outcomes associated with patients who developed intensive care unit delirium include long term cognitive impairment. Specific examples of long term cognitive impairment include: **a.** Memory loss **b.** Inability to stay focused **c.** A delay in processing information and formulating or enacting a response **d. All of the above** e. None of the above	4	4	

Table Continues

Test Item	Evaluator 1	Evaluator 2	Average
5. Which of the following cannot be assessed for delirium? a. A patient who is intubated and requires intravenous sedation b. A patient having visual hallucinations c. A patient in acute alcohol withdrawal d. A patient who had a stroke e. **A patient who is comatose**	4	4	4
6. An appropriate target Richmond Agitation Sedation Scale (RASS) score for most patients receiving continuous sedation is: a. -4 to -5 **b. 0 to -2** c. +2 to 0 d. +2 to +4	4	4	4
7. When assessing an intensive care unit patient for delirium with the Confusion Assessment Method-Intensive Care Unit (CAM-ICU), when is a positive screen for delirium achieved? a. Feature 1 negative, Feature 2 negative, Feature 3 negative, Feature 4 positive b. Feature 1 positive, Feature 2 negative , Feature 3 negative, Feature 4 positive c. **Feature 1 positive, Feature 2 positive, Feature 3 positive, Feature 4 negative** d. Feature 1 positive, Feature 2 negative , Feature 3 positive, Feature 4 negative	4	4	4
8. All of the following are predisposing risk factors for delirium **EXCEPT**: a. Dementia b. **Smoking** c. Comatose state at any point during hospitalization d. History of ETOH abuse	4	4	4

Table Continues

Test Item	Evaluator 1	Evaluator 2	Average
9. Clinical outcomes associated with patients developing Intensive Care Unit delirium as compared to patients who do not develop intensive care unit delirium include: a. Higher mortality b. Increased length of stay in the intensive care unit and the hospital c. More likely to be discharged to a long term skilled facility d. **All of the above** e. None of the above	4	4	4
10. All of the following are appropriate non-pharmacological interventions to prevent delirium **EXCEPT**: E. **Administering a benzodiazepine to promote sleep** F. Early mobilization protocol G. Family Involvement H. Timely removal of catheters and physical restraints	4	4	4

Appendix S: Poster Presentation

Caring for Patients with Delirium in the Intensive Care Unit

A Quality Improvement Evidence Based Project

Susan Archer, MSN, CCRN, RN
Dr. Joan Moon, EdD, CNM, RN
Dr. Donna Bailey, PhD, RN

WALDEN UNIVERSITY
A higher degree. A higher purpose.

WALDEN UNIVERSITY
A higher degree. A higher purpose.

Problem and Significance:

ICU patients increased risk to develop delirium, occurrence cited at 20% to 84% (Greve et al., 2012). Wide variation in occurrence caused by:

- Diverse patient populations
- Varying assessment tools and monitoring of delirium in the ICUs
- Inconsistent delirium education of critical care staff
- Lack of evidenced based guidelines for ICU delirium management (Allen & Alexander, 2012; Zaal, Devlin, Peelen, & Slooter, 2012).

Adverse effects correlated with ICU patients acquiring delirium include:

- Increased hospital and ICU LOS, ventilator hours
- Increased mortality
- Self-extubation and self-removal of catheters
- Long term cognitive impairment (Greve et al., 2012; Shehabi et al., 2010)

PICO Question

If critical care nurses receive comprehensive education on ICU delirium, will these nurses consistently use the CAM-ICU to assess for delirium and implement the non-pharmacological interventions, as compared to before the education when no delirium assessment or non-pharmacological interventions were implemented, to prevent or decrease the duration of delirium for ICU patients ?

Summary of the Review of Literature

- ICU's consistently assessing and managing delirium is low (Gesin et al., 2012; Greve et al., 2012).
- Delirium's etiology is multifactorial, implementing non-pharmacological interventions are recommended to prevent delirium (Balas et al., 2014; Greve et al., 2012, Rivosecchi, Smithburger, Svec, Campbell, & Kane-Gill, 2015).
- A validated tool, such as the Confusion Assessment Method-Intensive Care Unit (CAM-ICU) is proven to accurately assess for delirium (National Institute for Health and Care Excellence, 2010).
- **Critical care nurses need comprehensive delirium educational program to understand and accurately assess and manage ICU patients for delirium (Bowen et al., 2012; Harroche et al., 2014).**

Purpose/Nature of Project

The purpose of this QI EBP is to develop a comprehensive education program and policy.

The steps for this project were:

1. **Framework- Johns Hopkins Evidence Based Practice Model**
2. **I led a multidisciplinary team of key stakeholders**
3. **Divided into two phases:**
   - **Educational phase - From the review of literature mat**
     - **Policy**
     - **Curriculum plan**
     - **Pretest/posttest**

     Reviewed by two PhD nurses who served as Content Experts

     Didactic education completed over a two week period.
     Pretest was given prior to the first educational sessions
     Post-test was completed after the second educational session.
     Topics were: Overview of delirium,
     Criteria
     Etiology
     Risk factors
     Clinical and social outcomes
     Validated screening tools overview
     Non-pharmacological management
     ICU patient testimony videos and case studies
   - **Interventional phase - RASS, CAM-ICU, and non-pharmacological interventions**

Implementation Process

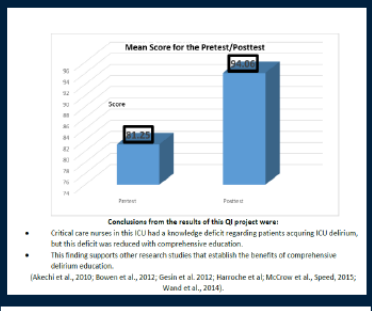
Setting: 300 bed non-profit community hospital's 18 bed combined cardiac/medical/surgical ICU

Inclusion Criteria: All critical care nurses working full-time, part-time, and per diem at the target ICU

Practice Change

- **Assessment for delirium using the CAM-ICU BID**
- **Implementation of the non-pharmacological interventions in the ICU**

Findings/Outcomes of This Project



Conclusions from the results of this QI project were:

- Critical care nurses in this ICU had a knowledge deficit regarding patients acquiring ICU delirium, but this deficit was reduced with comprehensive education.
- This finding supports other research studies that establish the benefits of comprehensive delirium education.

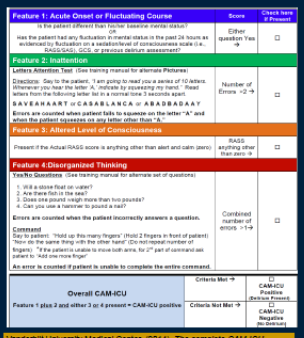
(Akechi et al., 2010; Bowen et al., 2012; Gesin et al. 2012; Harroche et al; McCrow et al., Speed, 2015; Wand et al., 2014).

Demographic Characteristics of the Critical Care Nurses

N = 32	Minimum	Maximum	Mean	Standard Deviation
Age	27	67	39.28	10.046
Years in Nursing	3	33	11.94	8.353
Years in Critical Care	1	33	9.8	8.466

Gender	Frequency	Percent
Female	30	93.8
Male	2	6.3

Highest Degree Achieved		
Associates	1	3.1
Diploma	8	25.0
Bachelor of Science	19	59.4
Masters	4	12.5



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Vanderbilt University Medical Center Evidence Based Nonpharmacological Interventions (2013)

- Repeated orientation of patients
- Provision of cognitively stimulating activities for the patients multiple times a day
- A non-pharmacological sleep protocol
- Early mobilization activities
- Timely removal of catheters and physical restraints
- Use of eye glasses, magnifying lenses, and/or hearing aids
- Use of a scheduled pain management protocol
- Minimization of unnecessary noise/stimuli
- Family involvement.

From: Vanderbilt University Medical Center. (2013). *Delirium management protocol.* Retrieved from: http://www.icudelirium.org/delirium/management.html.

Conclusions/ Implications for Practice

- Educate critical care nurses on delirium assessment using the CAM-ICU and management prior to implementing
- Measure understanding, compliance, and accuracy
- Educate and implement nonpharmacological measures
- Measure delirium relevant to patient outcomes