

INTEGRATING DELIRIUM SCREENING AND
NONPHARMACOLOGIC INTERVENTIONS
IN A RURAL PROGRESSIVE CARE UNIT

by

Christine Kelli Miller

A scholarly project submitted in partial fulfillment
of the requirements for the degree

of

Doctor of Nursing Practice

in

Family and Individual Health

MONTANA STATE UNIVERSITY
Bozeman, Montana

April 2022

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ACKNOWLEDGEMENTS

The success of this project was made possible by many individuals who have provided a tremendous amount of support and guidance. I would like to say thank you and offer my appreciation to Dr. Sally Sluder, DNP, APRN, AGACNP-BC, who served as the primary chairperson on this doctoral committee. Dr. Sluder imparted wisdom and mentorship that helped guide the success of this project. I am beyond grateful for all of her time and support. I would also like to convey my gratitude to Dr. Tracey Hellem, PhD as she offered her knowledge and experience, which also contributed to the successful development of this project.

To the hospital and that supported and devoted time to my quality improvement project, I extend my sincere appreciation. I especially want to thank my fellow co-worker and friend, Krista Fischer. This project would not have been possible without your support and help, and I cannot thank you enough.

I would finally like to thank my children, Shaelyn, and Kendrick, my family, and Zak. They have provided me with a limitless amount of support and confidence throughout this project and graduate school. Their patience, kindness, and love helped me persevere through this arduous journey. I am very grateful and love you all immensely.

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ABSTRACT

Screening for delirium in the hospital is often inconsistent in areas outside of the intensive care unit (ICU). Delirium is often missed in this patient population, and this negatively affects these patients. Research indicated that hospital acquired delirium can increase morbidity and mortality and impose a financial burden on the health care system. This quality improvement project aimed to implement delirium screening with subsequent nonpharmacologic interventions for those who screened positive for delirium. The setting was a rural progressive care unit in a nonprofit hospital in the Pacific Northwest. Research suggested delirium prevention utilizing nonpharmacologic interventions was the foundation for management. The interventions proven to be effective in delirium management that were utilized in this project included routine screening for delirium, bowel management, adequate nutrition and hydration, sleep hygiene, frequent reorientation, and mobility. This DNP project included daily screening for delirium using the Confusion Assessment Method (CAM) on patients who were hospitalized for two or more nights and a nonpharmacologic delirium order set for patients who screened positive for delirium. The results demonstrated increased clinical awareness and early identification of delirium; however, the goals of screening for delirium using the CAM assessment 80% of the time and ordering the *Prevent Delirium* order set on 50% of patients who screened positive for delirium were not met. Although the goals for this project were not met, the results indicated that the patients who were screened scored positive for delirium 7.2% of the time. Furthermore, the results revealed a total of 14.2% of the patients in the progressive care unit screened positive for delirium over the five-week implementation period. This finding was consistent with the literature that patients in units outside of the ICU were found to be positive for delirium during their hospitalization. Providing evidence-based delirium screening and delirium prevention strategies has the potential to increase patient outcomes and decrease the financial burden by reducing delirium and its associated negative sequelae.

CHAPTER ONE

BACKGROUND AND SIGNIFICANCE OF PROPOSED PROBLEM

Introduction

Delirium is an acute condition characterized by confusion, altered cognition, and disturbances in attention and awareness (Hargrave et al., 2017). The Diagnostic Statistical Manual of Mental Disorders (DSM) criteria for delirium include disturbances in attention accompanied by changes in cognition and awareness that occur acutely and have a fluctuating course (Kotfis et al., 2018). The pathophysiology of delirium is not well understood. A common thought is stressors such as surgery, inflammation, organ failure, infection, and medications can cause neuroinflammation, which may subsequently lead to delirium (Kotfis et al., 2018). In post-cardiac surgery patients, time on the cardiopulmonary bypass machine leads to systemic inflammation with blood-brain barrier disruption resulting in neuroinflammation (Kotfis et al., 2018).

Overview

Risk factors for hospital acquired delirium include increased age, social isolation, physical restraint, sleep deprivation, use of psychoactive medications, use of a bladder catheter, comorbidities, severe illness, infection, surgery, prior cognitive impairment, dehydration, malnutrition, and temperature abnormality (Siddiqi et al., 2016). A specific patient population that is at risk for developing delirium is post-cardiac surgery patients. According to Kotfis et al. (2018), risk factors for developing delirium post-cardiac surgery include age, low ejection

fraction, extracardiac arteriopathy, postoperative atrial fibrillation, pneumonia, elevated creatinine, and prolonged hospital stay.

Individuals positive for coronavirus disease 2019 (COVID-19) are another population at risk for developing delirium. The World Health Organization has indicated that altered consciousness or confusion can be a presenting symptom of COVID-19 preceding fever and cough (Woolley, 2021). Individuals who are positive for COVID-19 are often isolated from friends and family while they are hospitalized. In addition, they isolate from support services such as physical therapy while they are quarantined in their room (Woolley, 2021). COVID-19 patients also experience hospital stays that are longer than medically necessary due to the limited availability of long-term acute care and skilled nursing facilities, which further increases the risk of developing delirium (Woolley, 2021).

Significance

The consequences of delirium have been shown to be a statistically significant independent prognostic determinant of poor hospital outcomes (Thomas et al., 2014). Moreover, delirium can be an independent predictor of prolonged intubation, extended hospital stays, and mortality (Kotfis et al., 2018). Additional repercussions of delirium include increased morbidity, long-term cognitive dysfunction, memory loss, increased risk of falls, and functional decline (Kotfis et al., 2018). Delirium in non-intensive care unit (ICU) patients is associated with functional decline, increased incidence of pressure ulcers, bladder, and bowel incontinence, increased use of health care resources, and greater caregiver burden (Thomas et al., 2014). Delirium has also been shown to trigger brain aging disorders and has been associated with the acceleration of cognitive decline (Kinchin et al., 2021). In comparison to patients who do not

develop delirium during hospitalization, patients who experience delirium are more likely to visit the emergency department within 30 days of discharge and are more often discharged to a skilled nursing facility or hospice (LaHue et al., 2019). The estimated costs associated with delirium in the United States range from \$16,303 to \$64,421 per patient, equating to a financial burden of \$38 billion to \$152 billion annually (Thomas et al., 2014).

Delirium in the ICU has been extensively studied and documented; however, delirium in progressive care units is understudied. The limited understanding of delirium outside the ICU leads to misdiagnosis and undertreatment of delirium (Thomas et al., 2014). Approximately 10% to 15% of medical patients and 26% to 52% of post-cardiac surgical patients who are cared for in non-ICU settings are affected by delirium (LaHue et al., 2019; Kotfis et al., 2018). Additionally, one in three patients with COVID-19 experience delirium during their hospitalization (Garcez et al., 2020).

According to Kinchin et al. (2021), approximately 30% to 40% of delirium cases can be avoided with monitoring and quick intervention. As a result, delirium screening is recommended for hospitalized patients due to the negative effects and sequelae that can be alleviated by early identification and treatment (Hargrave et al., 2017). Nevertheless, studies have demonstrated that more than 50% of delirium episodes are missed in hospital settings (Hargrave et al., 2017). Delirium cases are typically not identified in the general medical settings of the hospital for various reasons, including time constraints, lack of screening, and lack of education and training (Shenkin, 2019). Despite the availability of reliable and validated delirium screening tools, the hospital standard of care in the United States does not require systematic screening for delirium in non-ICU patients (Thomas et al., 2014). The Confusion Assessment Method (CAM) is a

possible solution for this gap in practice. CAM is a brief cognitive interview and test utilizing a four-item algorithm that detects delirium in hospitalized adults (Shenkin, 2019). The four criteria included in the CAM tool align with the DSM criteria for delirium. These criteria include acute onset and fluctuating course, inattention, disorganized thinking, and level of consciousness and are rated as either present or absent (Shenkin, 2019). The CAM tool is widely used and has been validated with a pooled sensitivity of 86% and a specificity of 93% (Wongviriyawong et al., 2019).

Primary prevention is the most successful approach to delirium prevention (Thomas et al., 2014). Delirium can be perpetuated by several factors, including dehydration, infection, and poor sleep (Siddiqi et al., 2016). Daily nursing interventions target these risk factors and are shown to have a positive impact on decreasing the risk and duration of delirium. The use of multicomponent interventions is an approach that has been shown to be more effective than pharmacologic interventions in targeting multiple risk factors for delirium (Siddiqi et al., 2016). Examples of multicomponent interventions include reorientation, providing nutrition and hydration, attention to sensory deprivation, early mobilization, sleep hygiene, pain control, and bowel and bladder care (Siddiqi et al., 2016). Multicomponent interventions improve clinical outcomes by keeping patients safe, maintaining functionality, and improving discharge plans to patients' original place of residence (Thomas et al., 2014). Evidence shows that multicomponent interventions also demonstrate improved costs related to delirium (Siddiqi et al., 2016). Cost savings from delirium prevention programs in the United States are estimated to be more than \$7.3 million, which includes savings from reduced length of stay (Thomas et al., 2014).

Identification of Problem at Project Site

The institution site for this quality improvement (QI) project has an organizational practice gap in screening hospitalized patients for delirium. The ICU is the only location in the hospital that screens and monitors patients for delirium using the CAM tool. Once patients leave the ICU, they are no longer monitored for delirium. According to Wongviriyawong et al. (2019), studies have shown the uniform use of a single delirium screening tool, as opposed to multiple screening tools, is ideal for consistency in the detection of delirium and ensuring continuity of patient care once patients leave the ICU. Currently, staff competency in recognizing and preventing delirium in patients who are in the intermediate care (IMC) unit has not been assessed, and delirium screening has not been incorporated into practice.

Patients who become confused and impulsive at this institution often end up in restraints, with a one-to-one sitter, or with a video monitoring system known as a telesitter. Physical restraints are used in the hospital to prevent patient falls, disruption of therapy, and control disruptive behavior (Chou et al., 2020). It is worth noting that delirium and agitation are two of the most common reasons for using physical restraints in the hospital setting (Chou et al., 2020). From August 2020 to August 2021, the IMC unit had 13 patients in restraints. This number is estimated to be lower than the actual number, as patients who transfer to IMC with restraints previously ordered in another unit are not included in this count. The Joint Commission and the Health Care Financing Administration in the United States issued guidelines that discuss the potential negative outcomes of physical restraints, including physical or psychological harm, loss of dignity, violation of patients' rights, and death (Chou et al., 2020). Older adults who were physically restrained during hospitalization were also found to have a higher functional decline,

higher mortality rate, and longer length of stay compared to those who were not restrained (Chou et al., 2020).

The mission statement of the hospital where this project will be implemented is “to improve health, comfort, and life.” The hospital places value on “advancing medicine and enhancing care for all the communities and people we serve.” The vulnerability of the patients in IMC, including post-cardiac surgery and COVID-19 infection, places them at an increased risk for delirium. Frequent screening for delirium coupled with the initiation of early interventions when delirium is detected aligns with the organization’s mission and values by improving care and preventing poor clinical outcomes. Screening and prevention of delirium are essential given the paramount significance to patients, families, and health care facilities caused by the physical, emotional, and financial burdens of delirium.

Intended Improvement

The specific aim of this doctor of nursing practice (DNP) project is the early detection of patients with delirium in the IMC unit by screening with the CAM tool. The second aim of this project is to incorporate an order set for the hospitalist physicians, nurse practitioners, and physician’s assistants to initiate when delirium is detected. Early detection of delirium has been shown to decrease the negative sequelae of delirium, thus decreasing morbidity and mortality.

CHAPTER TWO

REVIEW OF THE LITERATURE

Introduction

A literature review was performed focusing on delirium protocols in hospitalized adults over the age of 18 years in units outside the ICU. The following medical subject headings (MESH) terms were used: delirium, acute confusion, acute altered mental state, non-ICU, hospitalization, elderly, older adults, protocols, confusion assessment method, screening, prevention, delirium incidence, nonpharmacologic interventions, multicomponent interventions, nursing care, outcomes, and QI. Databases used in the search included but were not limited to CINAHL, PubMed, Web of Science, and Google Scholar. Inclusion criteria included a date range of 2014 to 2021, peer-reviewed journal articles, English translation, adult patients over the age of 18 years, delirium interventions, and delirium screening. Eight studies were identified.

Identification of Delirium through Screening

Helfand et al. (2021) performed a systematic review to evaluate delirium identification instruments according to their psychometric properties and frequency of citation in the published literature. A total of 75 articles met the criteria resulting in 30 different delirium identification instruments. Each instrument was evaluated in multiple steps. First, the expert panel conducted a comprehensive search of the literature for reviews of delirium identification instruments from January 1, 1974 through January 31, 2020. The second step was to count the citations of the original publication of each instrument. Next, the psychometric characteristics of each

instrument were evaluated, and the methodological quality of the original publication of the instrument was measured using the Consensus-based Standards for the Selection of Health Measurements Instruments (COSMIN) framework. The six reliability and validity criteria on which the delirium identification instruments were graded on in the COSMIN framework were effect indicators, content validity, internal consistency, inter-rater reliability, construct validity, and external validity (Helfand et al., 2021). An expert panel was then used to identify the domains of delirium critical to identification based on the DSM criteria. Finally, the expert panel used a combination of the five steps to determine the recommended delirium identification instruments (Helfand et al., 2021).

Among the top four delirium identification instruments recommended by the expert panel was the CAM tool. The CAM had 2,909 citations within the specified timeframe, which was substantially more than the other tools being investigated. CAM scored 4.5/6 on the COSMIN rating scale and met 5/5 of the domains in the DSM-5 delirium criteria (Helfand et al., 2021). There were multiple limitations to this project. There was a potential bias with one of the authors who was the creator of four delirium identification instruments in the review. Also, restricting the COSMIN review to the original publication of each instrument may have missed additional validation studies and evidence. Using a citation count could have been biased toward older instruments. Another limitation was that the authors only considered the presence or absence of a validity or reliability assessment and did not incorporate the actual values of statistics. Finally, instruments developed for ICU patients were not included in the review (Helfand et al., 2021).

Van Velthuis et al. (2016) conducted a systematic review of the literature to determine the validity, reliability, and feasibility of instruments to identify delirium in hospitalized patients.

A total of 43 articles with 28 delirium identification instruments were included in this review. CAM was validated in 11 of the articles and was found to have a sensitivity ranging from 46% to 94% and a specificity ranging from 63% to 100% (Van Velthuisen et al., 2016). The inter-rater reliability was 0.65 to 1.00. CAM used both observational and interactive methods to assess delirium and took between seven to 15 minutes to complete (Van Velthuisen et al., 2016). The authors concluded that CAM was the best instrument for diagnosing and confirming possible cases of delirium because of its generally high sensitivity and specificity (Van Velthuisen et al., 2016). The limitations of this review were that the authors excluded studies that were not in English, thus excluding relevant studies in other languages. Also, the definition of delirium underwent slight alterations between the different publications of the DSM manuals, so the reference standard may differ depending on the reference standard that was used in the studies, which can change the sensitivity and specificity of the instruments. Another limitation was that no distinction was made between studies including critically ill patients or those with dementia. Finally, the inclusion criteria for age were a mean or medial age of at least 65 years, which led to the inclusion of 12 studies that also included younger adults (Van Velthuisen et al., 2016).

Wongviriyawong et al. (2019), conducted a prospective study of 271 postoperative patients admitted to surgical or orthopedic units between March and December 2017 at Siriraj Hospital in Bangkok, Thailand. The purpose of the study was to determine the sensitivity and specificity of the CAM-ICU tool in detecting delirium in non-ICU patients. Inclusion criteria included adults over the age of 60, nonemergent surgeries, and patients expected to be admitted for at least 24 hours after surgery. The findings revealed delirium occurred in 11.1% of the participants. The CAM-ICU had a sensitivity of 31.6% and specificity of 97.6% in the detection

of delirium with a positive predictive value of 50% and a negative predictive value of 95% in the non-ICU participants (Wongviriyawong et al., 2019). Feature three of the CAM-ICU scale (altered level of consciousness) had the lowest sensitivity at 26.3%, while feature four (disorganized thinking) had the highest sensitivity at 60% (Wongviriyawong et al., 2019). When the CAM-ICU scale was modified to remove feature two (inattention) and the diagnosis of delirium was made by the presence of any two out of feature one (acute change or fluctuating), feature three (altered level of consciousness), or feature four (disorganized thinking), the sensitivity increased to 80% with a specificity of 81.8% (Wongviriyawong et al., 2019). The limitations of this study included a lack of assessment for inter-rater reliability among staff evaluating the CAM-ICU (Wongviriyawong et al., 2019).

Nonpharmacologic Interventions for Delirium

A Cochrane review including 39 trials and 16,082 participants assessed 22 different nonpharmacologic interventions to address the risk, severity, and duration of delirium. Randomized controlled trials were used in the search criteria with the primary outcome being the incidence of delirium. Secondary outcomes were duration and severity of delirium, institutional care at discharge, quality of life, and health care costs (Siddiqi et al., 2016). Seven studies that focused on the effect of multicomponent interventions on delirium showed a 30% reduction in the risk of delirium compared to usual care for medical and surgical patients (RR 0.69) (Siddiqi et al., 2016). The findings were also consistent with support for multicomponent interventions, decreasing the risk for impaired cognition and developing pressure ulcers (Siddiqi et al., 2016). Data were inconclusive for an association between delirium duration, length of hospitalization, and severity of delirium with the utilization of multicomponent interventions (Siddiqi et al.,

2016). Limitations of this review included failure to exclude prevalent delirium at the beginning of participant enrollment, and most of the participants were orthopedic patients (Siddiqi et al., 2016).

Ludolph et al. (2020) conducted a systematic review and meta-analysis of eight randomized controlled trials comprising 2,105 participants that evaluated the efficacy of nonpharmacologic multicomponent interventions in delirium prevention in non-ICU patients. Inclusion criteria included adults 18 years and older, admission to an acute hospital, and at least one validated risk factor for developing delirium (Ludolph et al., 2020). Exclusion criteria included settings outside the hospital, participants with alcohol withdrawal delirium, studies assessing pharmacologic interventions, and participants with preexisting delirium prior to hospitalization (Ludolph et al., 2020). Multicomponent interventions utilized in the included articles consisted of daily orientation, early mobilization, vision and hearing protocols, hydration, prevention of constipation, feeding assistance, sleep enhancement, and family involvement (Ludolph et al., 2020). There was strong evidence favoring multicomponent intervention in reducing delirium incidence ($RR = .53$; $p < .001$) with no heterogeneity across studies (Ludolph et al., 2020). There was insufficient evidence to demonstrate an effect on the duration of delirium, decreased hospital duration, falls during a hospital stay, inpatient mortality, and discharge to institutional care (Ludolph et al., 2020). Although the data were not statistically significant for the decreased duration of delirium in patients who received multicomponent interventions, it did demonstrate delirium was, on average, 0.65 days shorter in the multicomponent intervention group compared to usual care (Ludolph et al., 2020). One limitation of this study was that some of the meta-analyses had inconsistent or contradictory

data. The authors requested information on the questionable data from the study authors, and if they did not get a response, a discussion of the data was performed, and the most convincing data were used for the study (Ludolph et al., 2020). Other limitations included missing information on the exclusion of baseline delirium in two studies, lack of power for secondary outcomes, and high homogeneity in some studies (Ludolph et al., 2020).

Thomas et al. (2014) conducted a systematic review using extraction tools from the Joanna Briggs Institute. The review included studies that evaluated nonpharmacologic multicomponent interventions for the prevention of delirium compared to usual care in non-ICU patients. The outcome measures of the included studies were incidence of delirium, length of delirium time, and severity of delirium (Thomas et al., 2014). Ten studies were included: three were randomized controlled studies, and seven were prospective cohort or case-control studies, with a total of 5,054 participants. The first outcome measured in this study was the incidence of delirium. Findings revealed patients who received multicomponent interventions had a 31% lower risk of developing delirium (RR 0.69, $p < 0.001$) (Thomas et al., 2014). The common theme across the studies was early engagement from bedside staff in multicomponent interventions, including addressing cognition, mobility, sleep, hydration, nutrition, sensory deficits, pain, bowel and bladder function, and prevention of medical complications (Thomas et al., 2014). Findings on the second outcome revealed multicomponent interventions did not have a statistically significant effect in decreasing the duration of delirium ($p = 0.10$) (Thomas et al., 2014). Results from the third outcome measured revealed multicomponent interventions had no statistically significant effect on reducing the severity of delirium ($p = 0.88$) (Thomas et al., 2014). Limitations of this review include the risk of bias due to lack of randomization and

blinding, a low number of studies evaluating the relationship between nonpharmacologic multicomponent interventions to specific delirium outcomes, and a lack of reliable replication due to the variability in components of the interventions (Thomas et al., 2014).

Martinez et al. (2015) conducted a systematic review of randomized controlled trials that compared multicomponent interventions to usual care in preventing delirium. A total of 28 articles with 1,691 participants were included in the review. The multicomponent interventions included in this study were hydration, nutrition, electrolyte replacement, daily orientation, drug reviews, cognitive stimulation, family involvement, and physical or occupational therapy during hospital stays (Martinez et al., 2015). The results of the study showed a reduction in delirium rates of 30% with the use of multicomponent interventions (Martinez et al., 2015). The most commonly used interventions included physical or occupational therapy, daily orientation, and the avoidance of sensorial deprivation (Martinez et al., 2015). Evidence also suggested a reduction in falls with multicomponent interventions ($RR = 0.39$). There was no statistically significant reduction in length of stay and in-hospital mortality with multicomponent interventions (Martinez et al., 2015). The limitations of this study included using a broad definition of multicomponent interventions, which may have resulted in an inappropriate comparison of simple interventions being compared with more complex interventions (Martinez et al., 2015). Also, having a limited number of trials made sub-analyses for individual interventions within multicomponent interventions not feasible. Finally, there were no restricted data on key outcomes, including mortality and location of discharge, which would have provided more definitive conclusions (Martinez et al., 2015).

The American Geriatrics Society (2015) abstracted clinical practice guidelines for the prevention of postoperative delirium in at-risk older adults and the treatment of older surgical patients with delirium based on the 2014 American Geriatrics Society guidelines. The following nonpharmacologic interventions were determined to be strong recommendations where the benefits outweighed the harms. The first recommendation was multicomponent nonpharmacologic interventions administered by an interdisciplinary team, including physicians, nurses, and therapy to at-risk older adults to prevent and manage delirium. The interventions include cognitive reorientation, sleep enhancement, early mobility, nutrition and fluid repletion, pain management, adequate oxygenation, prevention of constipation, and adaptations for visual and hearing impairment (American Geriatrics Society, 2015). The second recommendation was that ongoing education on delirium should be provided for health care professionals to improve understanding of the epidemiology, assessment, prevention, and treatment of delirium (American Geriatrics Society, 2015). Third, a medical evaluation should be performed to identify and manage the underlying contributors to delirium. The fourth recommendation was the minimization of pain with preference given to nonopioid medications when possible (American Geriatrics Society, 2015). Limitations of this clinical practice guideline include feasibility restrictions in the completeness of the literature search, limited quality of available evidence, and extrapolation from studies conducted outside the surgical setting (American Geriatrics Society, 2015).

Practice Change

Overall, the literature supports delirium screening and nonpharmacologic multicomponent interventions to decrease the risk of delirium. Through examination of the

evidence, a QI project to implement delirium screening and incorporate nonpharmacologic multicomponent interventions in IMC is warranted to reduce the incidence of delirium, prevent excess health care spending, and improve patient outcomes.

CHAPTER THREE

SETTINGS AND METHODS

Theoretical Framework

Florence Nightingale's Environmental Model of Nursing served as the theoretical framework for this project. Nightingale's philosophy focused on the patient and the environment with nursing interventions intended to manipulate the environment to enhance patient recovery (Masters, 2015). This theory was centered on 13 canons: ventilation and warmth (keeping the room warm and well ventilated), the health of houses (pure air, pure water, efficient drainage, cleanliness, and light), petty management (continuity of care), noise (keeping noise to a minimum), variety (providing variety in an attempt to prevent boredom and depression), food intake (documenting the amount of food and liquid the patient is taking), food (including patient's food preference), bed and bedding (keeping the bed dry and wrinkle-free), light (providing adequate light in the patient's room), cleanliness of rooms and walls (keeping the environment clean), personal cleanliness (keeping the patient clean and dry), chattering hopes and advises (avoiding talking without reason or giving advice that is not fact), observation of the sick (make and document observations about the patient) (Masters, 2015). According to this theory, the primary function of the nurse is to manipulate the physical and social factors that influence illness and health to improve patient outcomes (Masters, 2015).

Nightingale's theory aligns well with this project through monitoring for and preventing delirium utilizing screening and nonpharmacologic nursing interventions. Patients were monitored daily for subtle cognitive changes and signs of delirium using the CAM tool.

Additionally, nonpharmacologic nursing interventions were built into an order set for patients. This order set was intended to be used for patients with a positive CAM score to aid in preventing further delirium. These interventions included orienting the person to daytime and nighttime, providing adequate nutrition and hydration, optimizing sleep, minimizing noise at night, and keeping the patient clean and dry.

Process Improvement Model

The Donabedian health care quality model served as the improvement model for this project (see Appendix B). Donabedian proposed this framework be used to evaluate the quality of health care in 1966, and it continues to be the foundation of quality assessment today (Ayanian & Markel, 2016). For example, the Institute of Medicine used the Donabedian framework for the foundation of their report entitled *Medicare: A Strategy for Quality Assurance* (Ayanian & Markel, 2016). This model focuses on three factors as the basis of quality: structure, process, and outcome (Polit & Beck, 2017). The Joint Commission have used the structure when accrediting hospitals, while Medicare has used process and outcome measures to publicly report the performance of hospitals, nursing homes, and health plans (Ayanian & Markel, 2016).

Structural measures are defined as broad characteristics of the space where care occurs. This includes the building, equipment, and processes available to provide care, including the ratio of providers to patients (Binder et al., 2021). The structural variables in this project included the acute care hospital where the project occurred and the electronic medical records at the facility. Another structural measure was the experience level of the nurses in IMC. There were 14 bachelors-prepared and 7 associates-prepared nurses in IMC during the project

implementation. Another structural measure was the nurse-to-patient ratio in IMC, which was 1:3.

Process measures are defined as workflow and the way in which patient care is delivered (Binder et al., 2021). The process measures involved in this project included the education provided to the nurses on the CAM assessment through the HealthStream online education application the facility utilizes. Another structural measure included the hospitalist provider education on the *Prevent Delirium* order set. The CAM tool and *Prevent Delirium* order set were additional structural measures in this project. Outcome measures are defined as the effects of health care services or interventions on the health of patients (Binder et al., 2021).

Outcomes in this project included the number of patients in IMC who were screened for delirium with the CAM tool and the number of patients in IMC who had the *Prevent Delirium* order set ordered by a hospitalist provider. Future outcomes outside the scope of this project included the number of patients who were placed in restraints and required a one-to-one sitter for confusion and safety purposes. These outcomes would provide information on the effect of the CAM assessment on patient safety and outcomes.

Agency Description

Setting

The setting of this project was a 192-bed, nonprofit acute care hospital located in the Pacific Northwest. The population of the county the hospital served was 103,806 in July 2019 (U.S. Census, n.d.). Of that population, 20.3% were 65 years and over (U.S. Census, n.d.). The IMC unit is a 16-bed progressive care and cardiac unit. The patients in this unit had varying illnesses and diagnoses, including but not limited to postoperative open heart surgery, complex

medical illnesses, multiple comorbid conditions, and COVID-19 positive patients requiring noninvasive positive pressure ventilation. There were 21 full-time registered nurses and one part-time registered nurse who worked in IMC with an average of four years of nursing experience. These nurses provided total patient care without the use of certified nurse's aides. The hospitalist group consisted of four full-time nurse practitioners, one full-time physician assistant, and 10 full-time internal medicine physicians who saw patients on every unit throughout the hospital. The hospitalist team also utilized locum physicians at the time of the project.

Target Population

The target population for this project was all patients who were hospitalized in IMC between January 27, 2022 and March 3, 2022. The inclusion criteria included adults who were 18 years and older, English speaking, hospitalized for two or more nights, and willing to participate in the delirium screening. Any patients who did not meet the above criteria were excluded.

Stakeholders

Stakeholders have a vested interest in health care facilities and can either affect or be affected by QI projects. The primary stakeholder who was responsible for the implementation of this project was a DNP student who was also a registered nurse for six years. The main role of the DNP student was to provide education to the nurses on the CAM assessment, provide support and resources for the nurses during implementation, and gather data after implementation. Another specific stakeholder in this project was one of the hospitalist physicians who partnered with the DNP student to develop interventions that were included in the *Prevent Delirium* order set.

Stakeholders identified in the process phase who supported implementation included the nursing staff in IMC. Nursing staff buy-in was obtained through discussing the need for delirium screening with the unit based counsel and charge nurses in IMC. Other stakeholders included the charge nurses in IMC who were notified when patients had a positive CAM screening, the critical care director who was the direct supervisor of ICU and IMC, hospitalists providers who were responsible for ordering the *Prevent Delirium* order set, health information technology (HIT) department who helped build the *Prevent Delirium* order set, education department who added the CAM education on the IMC nurses quarterly education, and patients in IMC during the implementation period.

Facilitators and Barriers

Change is often difficult to achieve but can be facilitated through planning. According to Zaccagnini and White (2017), planning can help expedite change and increase the likelihood of long-term success. Lewin's Change Theory aids in understanding the process of change within a group or system (Zaccagnini & White, 2017). The process of change occurs in three stages: unfreezing, moving, and refreezing. For this project, the unfreezing phase began with a needs assessment on IMC, which demonstrated a practice gap in delirium screening. This phase also included preparing the team members for change (Zaccagnini & White, 2017). In the moving phase, the nurses in IMC screened the patients in IMC for delirium using the CAM assessment, and the hospitalist providers utilized the *Prevent Delirium* order set on patients who screened positive for delirium. Finally, in the refreezing phase, the practice of delirium screening in IMC and the ordering of the *Prevent Delirium* order set must be secured to maintain the desired modification (Zaccagnini & White, 2017).

Barriers. Barriers, or opposing forces, to the implications of this project were centered around the IMC nurses and their workflow. One barrier was ensuring the CAM intervention was completed each day. The CAM intervention was only performed in the ICU prior to implementation, so IMC nurses were not accustomed to having this intervention as a daily task. Another barrier was that the CAM assessment could not be added to the electronic charting system, so a manual process using a paper copy of the CAM tool was used. This was the only intervention the IMC nurses charted on paper during their shift, which resulted in a change in practice for the nursing staff. Another barrier was ensuring the CAM assessment was performed correctly and documented accurately. To address this barrier, the nursing staff was instructed with a module that was added in their quarterly education. Another barrier was increased communication, ensuring the primary nurse notified the charge nurse and hospitalist provider to relay the positive CAM score. A significant barrier in this project was nurse turnover and the large number of travel nurses the facility was using at the time of the project implementation. The travel nurses were not required to attend staff meetings or complete quarterly education. To combat this barrier, the charge nurse educated the travel nurses that a positive CAM score should be relayed to the hospitalist provider. If the travel nurses had not used the CAM tool in a prior facility, the charge nurse performed the intervention.

Barriers for the hospitalist providers included a change of practice in ordering the *Prevent Delirium* order set when a patient was found to have a positive CAM score. To facilitate this barrier, the hospitalist providers received education in a staff meeting with specific information on the *Prevent Delirium* order set. In addition, the nurses prompted the hospitalist provider to order the *Prevent Delirium* order set when they notified the provider of a positive CAM score.

Another barrier was the number of locum physicians the hospitalist group was utilized during the time of the project. The locum physicians did not receive education on the *Prevent Delirium* order set.

Another significant barrier was time constraints. The CAM tool built in the electronic medical system at the facility was geared toward ICU and ventilated patients. The DNP student proposed a different version of the CAM tool that was more suitable for nonventilated patients to be built into the computer system for the patients in IMC. The HIT employee the DNP student was working directly with reported it would take months to be approved through the committee that votes on the addition of interventions and to be built into Meditech which is the electronic charting system in the facility. Given the time constraints for this project, it was decided to utilize the same CAM tool that was already built in Meditech.

Facilitators. Facilitators, or driving forces, for this project included the DNP student partnering with a hospitalist physician to incorporate nonpharmacologic interventions into an order set. This helped increase buy-in from the hospitalist provider group. Additionally, the DNP student was a charge nurse in IMC and had worked in the facility for six years. Another facilitator was the nurses in IMC had not piloted a QI project on the unit in approximately five years, so there was little burnout from trialing new projects. Another facilitator was the CAM tool was already built into the EMR at this facility for the ICU. The IMC nurses who float to the ICU had previously used the tool, so it was familiar to them. Additionally, this would facilitate the addition of the CAM assessment to the IMC nurse's worklist in the future if warranted.

Cost and Budget Analysis

Nationally, the cost of delirium ranges from \$38 billion to \$152 billion annually (Thomas et al., 2014). The literature suggests that delirium screening in hospitalized adults leads to decreased rates of delirium, resulting in less unnecessary health care spending. This project did not require a budget and did not accrue any revenue during implementation. The existing EMR in the facility was sufficient for the DNP student to gather the daily patient census and determine those who were excluded from the project. The CAM tool was printed on paper purchased by the DNP student, so no costs were accrued to the facility. Additionally, the nurses were not required to attend education on the CAM tool outside of their normal working hours.

Goals

The aims of this project included the early recognition and prevention of delirium. The first goal was for the patients in IMC who met the inclusion criteria to have a documented CAM assessment one time each day 80% of the time from January 27, 2022 to March 3, 2022. The second goal was for the hospitalist providers to order the *Prevent Delirium* order set on 50% of the patients in IMC who had a positive CAM screen from January 27, 2022 to March 3, 2022. The expected outcome and long-term goal, which were outside the scope of the project, were that the incidence of delirium in IMC would decrease. This could be monitored by comparing the number of restraints and one-to-one sitters ordered for patients in IMC before and after the implementation of delirium screening and multicomponent delirium prevention interventions.

Project Methods

Structure Phase

The project began in the structure phase of the Donabedian model with a needs assessment. The DNP student searched the literature for a delirium screening tool for this project that was widely used and had high specificity and sensitivity. The CAM tool fits the above-mentioned criteria and was being used in the ICU at the project site. The DNP student met with the critical care educator and critical care director to discuss the proposed project in IMC. The DNP student presented the literature supporting delirium screening and the proposed CAM screening tool to be utilized. The critical care director and educator agreed this would be a beneficial QI project and gave the DNP student permission to proceed.

The DNP student then attended a Unit Based Council meeting in IMC to discuss screening patients in IMC for delirium. Unit Based Council is a group of bedside nurses who work toward making clinical decisions that affect the delivery of nursing care in their unit. The five IMC nurses on the council and the five charge nurses unanimously agreed to pilot the delirium screening project in IMC.

Process Phase

During the process phase of the Donabedian model, the DNP student prepared the nurses for change by conveying the purpose and importance of delirium screening for patients in the unit. Education was provided with the addition of a video to the nurses required quarterly education. The video was added to the first quarter of mandatory education, which was due March 31, 2022. The DNP student compiled a spreadsheet with the names of the nurses in the unit to ensure each nurse completed the education on the CAM tool. If a nurse did not finish the

education prior to implementation, the DNP student individually educated the nurse on how to administer the CAM tool. The nurses in the unit were also instructed on how to administer the paper version of the CAM tool and where to place the completed screening. The nurses were instructed to notify the attending hospitalist provider and the charge nurse when a patient had a positive delirium score.

The DNP student worked with the hospitalist physician to develop nonpharmacologic interventions to prevent delirium. The following multicomponent nonpharmacologic interventions were agreed upon: sitting in a chair for all meals, lights on during the day, frequent orientation, minimize sleep disruptions at night, physical therapy consult for early mobilization, promote bowel hygiene, and nutrition consult to promote adequate nutrition. The DNP student worked with the HIT department to build the above interventions into an order set entitled *Delirium Prevention*. The hospitalist providers were educated about the *Prevent Delirium* order set through an email from the hospitalist physician who partnered with the DNP student. They were informed of the delirium assessment the nurses in IMC performed and that they would be notified by the nurse if their patient screened positive for delirium.

The HIT department was contacted during the process phase. The CAM tool was previously built into the facility's EMR but was only open for the staff in the ICU and was inaccessible for other units. The DNP student contacted HIT in November 2021, requesting the CAM assessment be added to the IMC nurse's daily worklist. HIT was unable to open the CAM assessment on the IMC worklist in time for implementation, so a paper form of the CAM assessment was used.

The project was implemented in the process phase of the Donabedian model from January 27, 2022 to March 3, 2022. The DNP student provided weekly reminders to the daytime charge nurses in IMC to help prompt the nurses to complete the delirium screening. The DNP student was available through email for questions from the nursing staff and hospitalists regarding the CAM tool or the *Prevent Delirium* order set.

Outcome Phase

This QI project allowed for the collection of baseline data for future determination on building the CAM assessment in the IMC worklist. The data will help guide the decision to continue screening for delirium in the unit and the benefit of delirium screening throughout all units in the hospital.

Human Subjects Protection

An exempt application for this QI project was submitted to the Montana State University Institutional Review Board (IRB) and approved on December 13, 2022. Aggregate data were collected with no patient identifiers used. The CAM assessment was an existing tool in the literature that had shown to be effective in detecting delirium. No patient or staff identifiers were used in this project. It was also important to note that the assessment done for the project was an assessment performed as part of the daily nursing care in the ICU; the only difference was the department where the assessment was performed, and that the assessment was documented on paper instead of the EMR. The change from documenting the CAM assessment in the EMR to documenting the assessment on paper was submitted to the IRB with approval of the manual process prior to project implementation.

Instruments

The CAM tool was the delirium assessment used during the project (see Appendix A). The decision to utilize this tool was made because of the high sensitivity (86%) and specificity (93%) of the screening tool (Wongviriyawong et al., 2019). Additionally, the assessment was currently being used in the ICU at this facility. The decision to utilize this assessment tool in IMC was also based on staff competence that had already been established in the performance of the assessment tool as several nurses in IMC occasionally work in ICU.

Data Collection Plan

The completed CAM assessments were recorded on paper one time each day, during the day shift, for each patient in IMC. All patients were screened for delirium regardless of inclusion and exclusion criteria. Only screenings that met the inclusion criteria were included in the final data set. The charge nurse collected the completed CAM assessments at the end of the shift and placed them in a manilla envelope that was locked in the charge nurse's office at the end of each day shift. The completed paper CAM assessments included the room number and date and did not contain patient identifiers.

The DNP student performed a triweekly chart review to gather daily census in IMC and determine which patients met inclusion criteria from January 27, 2022 to March 3, 2022. If a CAM assessment was done on a patient that did not meet the inclusion criteria, the DNP student placed the completed assessment in the paper shredder, and it was not included in the data set. The data from the assessments were recorded in an Excel spreadsheet with assigned numbers to deidentify patients. The patients who met the inclusion criteria and did not have a CAM score completed were given a score of zero. The patients who scored negative for delirium and had a

CAM screen documented were given a score of one. The patients who screened positive for delirium and had a CAM screen documented were given a score of two.

The data for the *Prevent Delirium* order set were stored on a separate Excel sheet. The patients who screened positive on the CAM assessment and did not have the *Prevent Delirium* order set ordered by the hospitalist provider were given a zero score. The patients who screened positive on the CAM assessment and had the *Prevent Delirium* order set ordered were given a score of one. The DNP student also documented characteristics of the patients who screened positive for delirium, including age, gender, and admitting medical diagnosis.

The numerical data were recorded and stored on the DNP student's password-protected personal computer. No data with patient identifiers were saved on this computer. Once the data were analyzed and the results were disseminated, the Excel spreadsheets were permanently deleted from the DNP student's computer, and the completed CAM assessments were placed in the paper shredder at the project site. A project log was maintained during the entirety of the project to document issues and stakeholder communication that occurred.

CHAPTER FOUR

RESULTS

Introduction

The QI project had two goals: to screen patients in IMC for delirium using the CAM tool one time per shift, 80% of the time and to have the *Prevent Delirium* order set ordered by a hospitalist provider on 50% of the patients who screened positive for delirium.

Characteristics of Participants

A chart review conducted on patients who were in IMC between January 27, 2022 and March 3, 2022 identified a total of 141 patients who met the criteria for this project. Of the 504 CAM assessments completed, 72 were excluded from the project for not being hospitalized for two or more nights. Of the CAM assessments that were missed, 20 were excluded for the patients who did not spend two or more nights in the hospital. No patients were excluded due to age, non-English speaking, or unwillingness to participate (see Figure 1 and Table 1).

Figure 1. Included and Excluded CAM Assessments

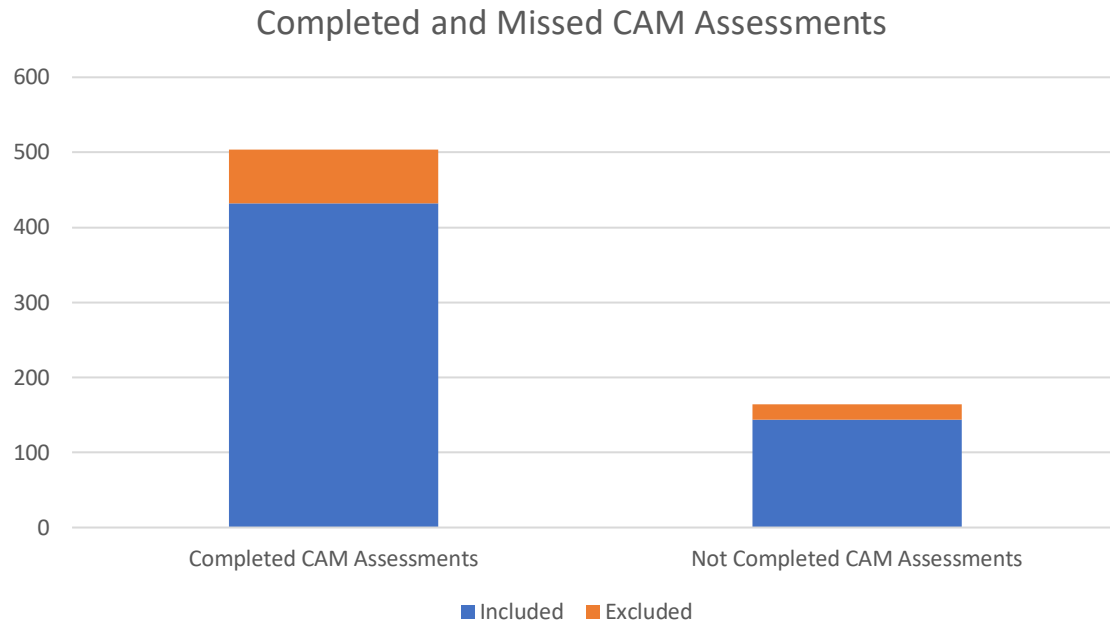


Table 1. Included and Excluded CAM Assessments

Completed CAM Assessments	Completed CAM Assessments Excluded from Project	Missed CAM Assessments	Missed CAM Assessments Excluded from Project
504	72	164	20

Findings from Process Evaluation

Of the 21 nurses who worked in IMC during project implementation, three day shift nurses and four night shift nurses completed CAM education prior to implementation. Of the same group of nurses, eight day shift nurses and six night shift nurses did not finish their education prior to implementation (see Figure 2 and Table 2).

Figure 2. Nursing CAM Education

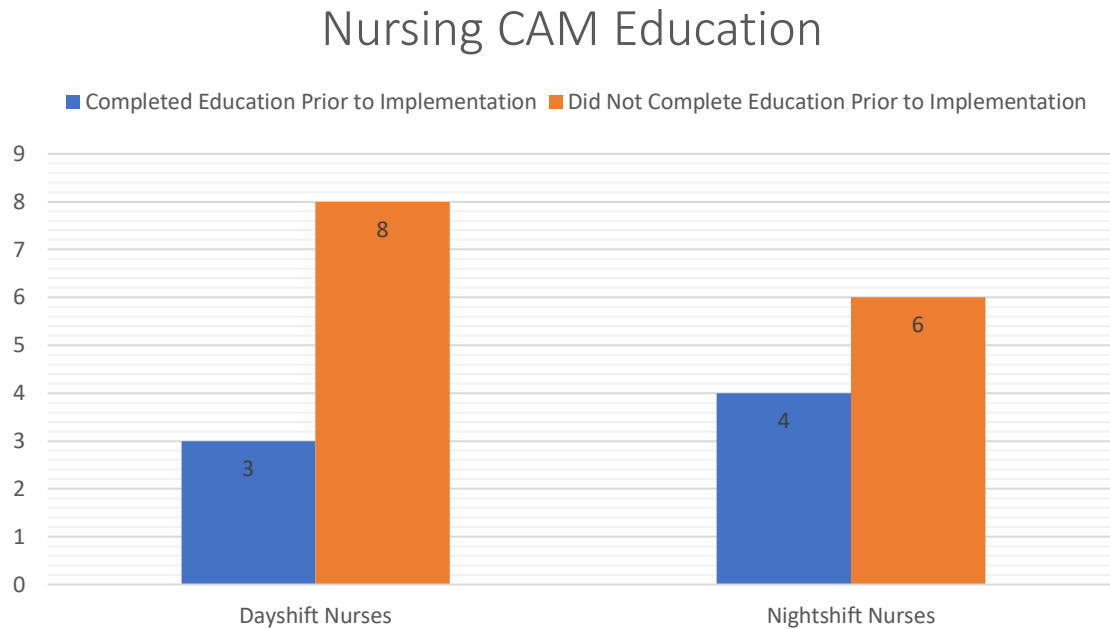


Table 2. Nursing CAM Education

	Finished CAM Education Prior to Implementation	Did Not Finish CAM Education Prior to Implementation
Number of Day shift Nurses	3 (37.5%)	8 (72.7%)
Number of Night shift Nurses	4 (40%)	6 (60%)

Findings from Outcome Measures

Goal One

Of the 576 potential CAM assessments on patients who met the project's inclusion criteria, 432 (75%) CAM assessments were successfully performed and 144 (25%) were missed (see Figure 3 and Table 3).

Figure 3. Completed and Missed CAM Assessments

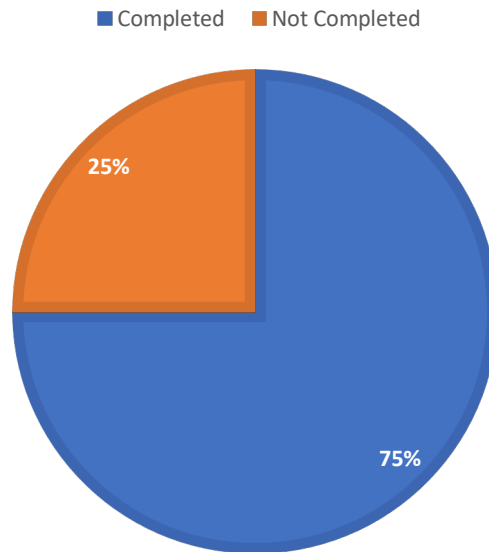
COMPLETED AND MISSED CAM ASSESSMENTS

Table 3. Completed and Missed CAM Assessments

	Completed	Not Completed
Number of CAM Assessments	432 (75%)	144 (25%)

Of the 432 CAM assessments performed, 401 (92.8%) scored negative for delirium and 31 (7.2%) scored positive for delirium (see Figure 4 and Table 4).

Figure 4. CAM Assessment Scores

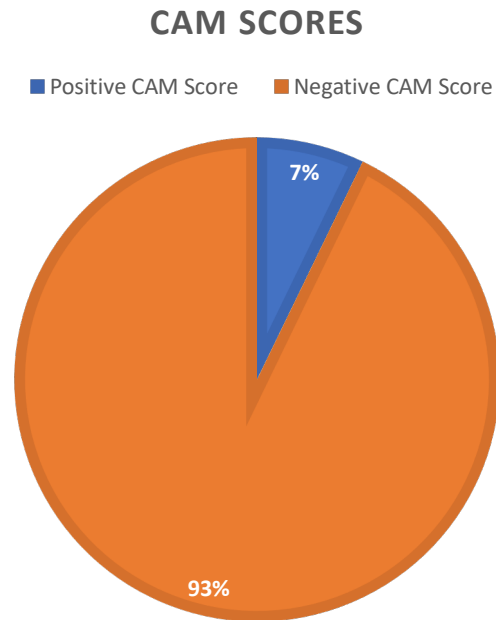


Table 4. CAM Assessment Scores

	Negative Delirium Score	Positive Delirium Score
Number of CAM Assessments	401 (92.8%)	31 (7.2%)

Goal Two

Of the patients who scored positive for delirium, three (15%) had the *Prevent Delirium* order set ordered by a hospitalist provider and 17 (85%) did not (see Figure 5). Of the same group, 16 (80%) patients had a hospitalist provider as their attending provider and four (20%) did not have a hospitalist provider following them (see Table 5).

Figure 5. Prevent Delirium Order Set

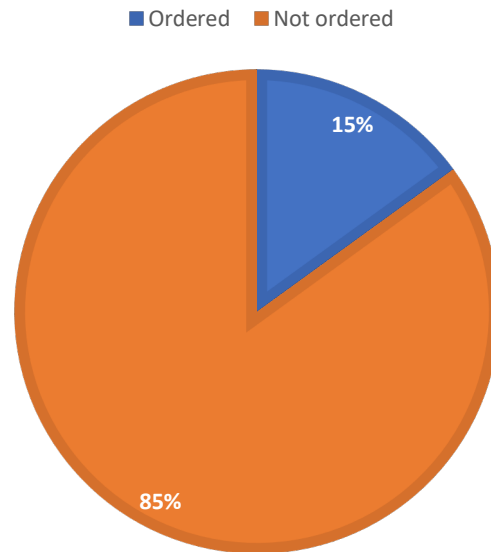
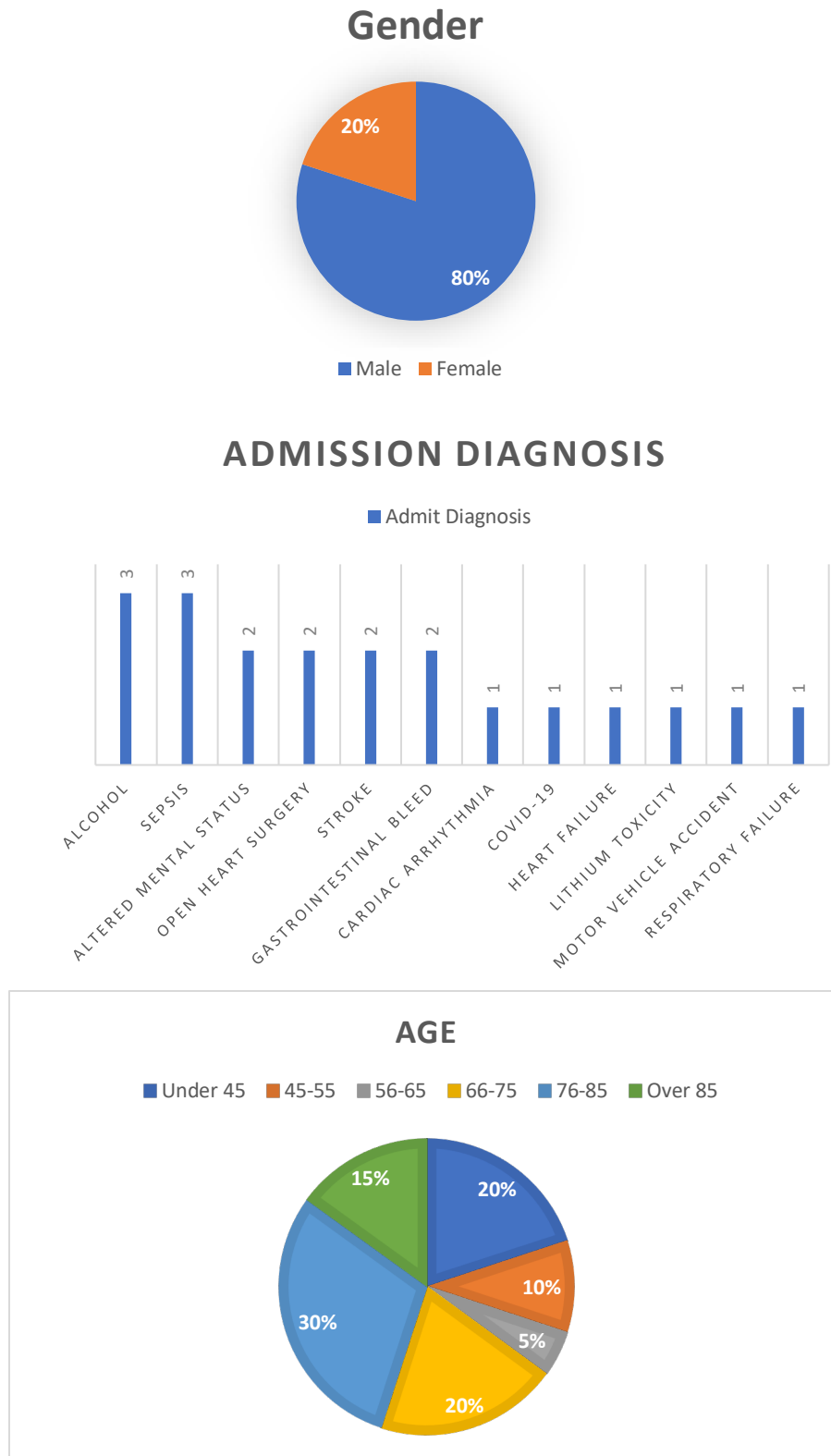
PREVENT DELIRIUM ORDER SET

Table 5. Prevent Delirium Order Set

	Prevent Delirium Order Set Ordered	Prevent Delirium Order Set Not Ordered	Hospitalist Provider Following Patient	Hospitalist Provider Not Following Patient
Number of Patients	3 (15%)	17 (85%)	16 (80%)	4 (20%)

Characteristics of the patients who scored positive for delirium were obtained. These characteristics included age, gender, and hospital admission diagnosis. The above characteristics were collected to determine whether common themes would emerge. One common theme noted was that a majority of the patients (80%) who scored positive for delirium were male. Another theme noted was a majority of the patients (65%) who scored positive for delirium were over the age of 65. The data were not used for any further analysis (see Appendix E).

Figure 6. Characteristics of Delirium Positive Patients



Interpretation of Results and Comparison to Relevant Literature

Goal One

The first goal was for patients in IMC to be screened for delirium using the CAM assessment one time per day, 80% of the time. The QI project did not meet the first goal within the 5-week timeframe. Instead, patients in IMC who met the inclusion criteria were screened for delirium each day 75% of the time. Two of the three day time charge nurses gave the bedside nurses reminders in the morning huddle to fill out their CAM assessment, and they would fill out the assessment with the nurses if it had not been done by the end of the shift. One of the charge nurses was new to the facility and was not consistent in reminding the nurses to complete the assessment. Implementing delirium screening in IMC found that 7.2% of the screenings were positive for delirium. Furthermore, out of the 141 patients who met inclusion criteria and were screened for delirium in IMC, 20 screened positive for delirium, which equates to 14.2% of patients in IMC screening positive for delirium. If the nurses had a positive CAM score, they would discuss it with the charge nurse to ensure a false positive result was not obtained. The charge nurses agreed with each positive CAM score and did not believe a false positive score occurred.

The literature suggested approximately 10% to 15% of medical patients who are cared for in non-ICU settings are affected by delirium (LaHue et al., 2019). This is congruent with the findings of 14.2% of patients in this project who had a positive delirium screening. Two specific patient populations at risk for developing delirium include post-cardiac surgery patients and patients positive for COVID-19 (Kotfis et al., 2018; Woolley, 2021). This project found two post-cardiac surgery patients and one patient positive for COVID-19 who scored positive for

delirium, which is consistent with the literature findings. The post-cardiac surgery patients did not have the *Prevent Delirium* order set ordered as their attending provider was the cardiovascular surgeon and were not followed by a hospitalist provider. The COVID-19 positive patient who scored positive for delirium was followed by a hospitalist provider but did not have the *Prevent Delirium* order set ordered. Additionally, risk factors for hospital acquired delirium include increased age, social isolation, sleep deprivation, use of psychoactive medications, comorbidities, severe illness, infection, surgery, dehydration, malnutrition, and temperature abnormality (Siddiqi et al., 2016). These risk factors were relevant to patients who were found to be positive for delirium in IMC during project implementation (see Appendix E).

The literature supports the use of the CAM tool as one of the best instruments for diagnosing delirium (Van Velthuisen et al., 2016). CAM has been found to have a sensitivity ranging from 46% to 94% and a specificity ranging from 63% to 100% (Van Velthuisen et al., 2016). Additionally, inter-rater reliability was 0.65 to 1.00, and completion time took between seven and 15 minutes (Van Velthuisen et al., 2016). The literature found that 30% to 40% of delirium cases can be avoided with monitoring and quick intervention (Kinchin et al., 2021). Therefore, delirium screening is recommended for hospitalized patients due to the negative effects and sequelae, which can be alleviated by early screening and identification (Hargrave et al., 2017).

Goal Two

The second goal of this project was for the *Prevent Delirium* order set to be ordered on 50% of patients who screened positive for delirium. This goal was not met; instead, it was ordered on 15% of the patients who screened positive for delirium. Out of the 20 patients who

screened positive for delirium, three patients did not have a hospitalist provider following them. Excluding the three patients who were not followed by a hospitalist provider, three patients out of 17 had the *Prevent Delirium* order set ordered, which was 17.6% of the patients. This still fell short of the project's goal of 50%. The DNP student noted approximately three weeks into implementation that the results were falling short of the goal. The DNP student communicated with the nurses via email asking them to remind the hospitalist provider to order the *Prevent Delirium* order set on the patients with a positive CAM score.

The literature supports the use of multicomponent interventions for delirium prevention. Studies have shown a 30% reduction in the risk of delirium and a decreased risk of developing pressure ulcers compared to usual care (Siddiqi et al., 2016). Multicomponent interventions have demonstrated a 31% lower risk of developing delirium and a reduction in falls (Martinez et al., 2015; Thomas et al., 2014).

The multicomponent interventions included in the *Prevent Delirium* order set for this project aligned with the American Geriatrics Society clinical practice guidelines for the prevention of postoperative delirium. The first recommendation in the clinical practice guideline was multicomponent nonpharmacologic interventions, which included cognitive reorientation, sleep enhancement, early mobility, nutrition and fluid repletion, pain management, adequate oxygenation, prevention of constipation, and adaptations for visual and hearing impairment (American Geriatrics Society, 2015).

Challenges and Lessons Learned

Several challenges were encountered during this project. The first challenge was not having the CAM assessment available in Meditech for the IMC nurses. This led to a delay in the

start time of the project, which shortened the data collection to 5-weeks. A longer duration of data collection would have led to a larger sample size, which could have provided a more meaningful analysis. This challenge also led to the CAM assessment being documented on paper instead of in Meditech. A lesson learned from this challenge was the importance of involving HIT early in the process of a QI project.

Another challenge involved using a delirium tool intended for patients in the ICU. The HIT department reported it would have taken up to four months to approve a new delirium screening tool and have it built into Meditech. This was not feasible with the time constraints of this QI project, so it was decided to use the CAM assessment that was already being used at the facility to screen the patients in IMC. Feature two on the tool, inattention, was noted to be more applicable to intubated patients, as it focuses on patients squeezing a nurse's hand when the nurse reads the letter "A" out of a series of 10 letters. Feature three, altered level of consciousness, was also noted to be more applicable to patients in the ICU. This feature measures the level of consciousness based on the Richmond Agitation-Sedation Scale (RASS) score, which is a scale used in the ICU to determine an intubated patient's level of agitation or sedation. Again, the lesson learned was to get HIT involved early to ensure adequate time to build a tool in the electronic charting system that is applicable to the patient population.

Another challenge was ensuring the nurses finished the education on the CAM assessment prior to project implementation. The due date for the CAM education in the nurse's quarterly education was after project implementation. The DNP student gathered a list of day shift nurses who had not completed the education prior to implementation. These nurses were educated individually by the DNP student on how to perform the CAM assessment. The lesson

learned was to involve the education department early when requesting the addition of content to quarterly education.

Limitations

Several limitations were noted during the implementation phase of the project. First, was the method in which the CAM assessments were charted. Since this was the only intervention that the nurses charted manually, this could have led to an increase in missed delirium screening. Also, using a delirium tool that was designed to be used in the ICU could have resulted in false positive or false negative delirium assessments. The positive CAM scores were reviewed by the DNP student, and it was not believed that a false negative occurred.

Second, the hospitalist providers were the only group who received education on the *Prevent Delirium* order set. Many patients in IMC have either cardiology or cardiovascular surgery as their attending physician and do not have the hospitalist group following them. The cardiologist group did not receive education on the *Prevent Delirium* order set and was not notified by the nurses if their patients scored positive for delirium on the CAM assessment. This limited the number of patients who received the *Prevent Delirium* order set to patients who were followed by the hospitalists, which excluded many surgical patients.

Third was the short time frame of the project. The data collection period was shortened to 5-weeks while the DNP student communicated with HIT to get the CAM assessment activated in Meditech for the IMC nurses' daily charting.

Strengths

Several strengths were noted in this project. The first was utilizing a tool that has been shown in the literature to be standardized and psychometrically sound. Second was the support the DNP student had from the partnering hospitalist physician. This allowed both disciplines to collaborate on ideas that would be best for the patient from nursing and physician point of view. The third strength was the established relationship between the DNP student and the nurses in IMC. This relationship helped with nurse buy-in early in the project and allowed for frequent reminders to the nurses to perform the CAM assessments. It also allowed for real-time support for the nurses and allowed for questions to be answered when the DNP student was working on the unit.

Recommendations for Practice

The risk versus benefit of delirium screening supports implementation of the CAM tool on all adult patients throughout the organization. Delirium screening does not pose a risk to the patients. While it takes extra time for the nurses to perform, this does not outweigh the benefits of preventing poor patient outcomes by early detection through screening. Therefore, future practice should include building a CAM assessment into Meditech that is applicable for non-ICU areas of the hospital.

Another recommendation for future practice is to educate all providers and surgeons in the organization on the *Prevent Delirium* order set. The literature supports the use of nonpharmacologic interventions in minimizing negative sequelae of delirium, including morbidity and mortality, falls, and pressure ulcerations. This benefits the patients in the

organization by improving their outcomes, and the organization by preventing increased patient stays and the financial consequences of delirium. Additionally, it is recommended to make the *Prevent Delirium* order set a nurse driven protocol which would allow the nurses to independently order the set when a patient has a positive CAM screen. This would allow for nurse autonomy and minimize the risk of missed communication as the physician would not have to be notified to have the order set ordered. Furthermore, most of the interventions in the *Prevent Delirium* order set are nursing specific.

Retrospective data should be gathered on the number of patients in IMC who were ordered restraints or a one-to-one sitter. These data could be compared to prospective data to determine whether early detection of delirium using the CAM assessment and interventions in the *Prevent Delirium* order set decreased the number of patients who were ordered restraints and a one-to-one sitter.

Conclusion

Patients who develop delirium during their hospitalization face many challenges during and after their stay. Lack of systematic screening for delirium in hospital standards of care places patients at risk for missed delirium diagnoses and poor outcomes. This QI project aimed to decrease this risk by incorporating delirium screening for patients in the progressive care unit using the CAM tool. It also aimed to incorporate nonpharmacologic interventions to help minimize the negative sequelae of delirium when it was detected. The two goals of this project were not met within the five-week timeframe: the patients in IMC who met inclusion criteria did not have a documented CAM assessment one time each day, 80% of the time, and the hospitalist providers did not order the *Prevent Delirium* order set on 50% of the patients in IMC who had a

positive CAM screen. The results indicated that the patients who were screened scored positive for delirium 7.2% of the time. Furthermore, the results revealed a total of 14.2% of the patients in the progressive care unit screened positive for delirium over the five-week implementation period which was consistent with the literature.

Although the goals for this project were not met, the results demonstrated an increased clinical awareness of delirium. Three themes emerged from this QI project: lack of nursing engagement with documenting a delirium assessment, lack of hospitalist provider engagement with ordering the *Prevent Delirium* order set, and the need for the continued pursuit of delirium screening. Overall, this QI project revealed that patients in IMC are suffering from hospital acquired delirium and would benefit from delirium screening and the addition of nonpharmacologic interventions into their plan of care.

The future sustainability of this project will require collaboration between HIT and the nursing staff to build a delirium tool into Meditech that is appropriate for patients in non-ICU settings. It will also require collaboration between nurses and providers to recognize patients who develop hospital acquired delirium and initiate interventions to prevent or minimize the negative sequelae of delirium. Moving forward, a prospective study to assess the efficacy of delirium screening and nonpharmacologic interventions on patient outcomes is warranted to quantify the findings in this project.

CHAPTER FIVE

PROJECT WORKS RELATED TO DNP ESSENTIALS

Introduction

According to the American Association of Colleges of Nursing (AACN) (2006), practice-focused doctoral nursing education programs have rigorous and demanding expectations, including a scholarly approach to the discipline and a commitment to the advancement of the profession. The AACN has developed eight essentials that detail the curricular elements and foundational outcome competencies that are essential for graduates of a DNP program (AACN, 2006). This QI project demonstrated how the essentials are integrated to center around meeting the needs of the patient and the organization. The DNP essentials that were most markedly attained in this project were the first, second, third, sixth, seventh, and eighth. The fourth and fifth DNP essentials were achieved in this project but to a lesser extent.

In addition to this project, the clinical experience and coursework completed throughout the DNP curriculum enabled the DNP student to achieve each essential and play a leadership role during this QI project. According to Moran et al. (2020), the foundation of DNP education involves the eight essentials that are attained through courses in leadership, advanced practice based on evidence-based science, working in interprofessional teams, and influencing policy.

DNP Essential One

The first essential, *Scientific Underpinnings for Practice*, describes how the DNP graduate is able to integrate nursing science with real-life issues to identify actions and their

consequences (Zaccagnini & White, 2017). Through an understanding of nursing theory, the DNP graduate is able to develop and evaluate new practice approaches (AACN, 2006). With the use of Florence Nightingale's Environmental Model of Nursing and the Donabedian health care quality model, delirium screening and nonpharmacologic interventions to prevent delirium were integrated into the organization's clinical workflow. Quantitative data were collected to determine the success rate of delirium screening and ordering of the *Prevent Delirium* order set to ascertain the need for the above interventions in a progressive care unit.

Translational research was a class that met this essential. The DNP student reviewed the literature on screening and brief intervention for substance use disorder in the primary care setting. The DNP student designed a theoretical QI project with the aims of increasing screening for substance use disorder in primary care and implementing a brief intervention for adults who screened positive for substance use disorder. This assignment gave the DNP student knowledge in conducting and evaluating a QI project while connecting nursing theory to science concepts to enhance patient outcomes.

DNP Essential Two

This project was created from the need to draw attention to hospital acquired delirium in non-ICU patients. The second DNP essential, *Organizational and Systems Leadership for Quality Improvement*, allows the DNP graduate to assess an organization, identify the system's issues, and facilitate changes in practice delivery that meet the current and future needs of patient populations (AACN, 2006). This was applicable as the QI project site did not screen for delirium in non-ICU units. Given the vast consequences and poor outcomes of hospital acquired delirium, the needs of the patients at this facility were not being met. The DNP student must have the

ability to focus on the needs of a patient population while creating sustained changes at the organizational level (AACN, 2006). The sustainability of delirium screening was considered prior to implementation. One of the main reasons the CAM tool was chosen was because the organization had been using the tool in the ICU for years. The risk of delirium screening to the patients was considered negligible, and it had no associated financial cost at the organizational level.

Multiple classes supported this DNP essential. First, finance and budget focused on fiscal management principles of health care systems. This taught the DNP student about providing care that is financially feasible and cost-effective. It was a good learning opportunity to work on a health care budget, and it was eye opening to learn how much money is spent on operating a health care organization. Advanced leadership prepared the DNP graduate for advanced nursing roles and core competencies in communication, negotiation, team functioning, conflict resolution, and leadership. This class provided important information on leading groups, and provided strategies for effective communication skills, which are essential in the DNP role.

DNP Essential Three

This project also aligned with essential three, *Clinical Scholarship and Analytical Methods for Evidence-Based Practice*, which involved the translation of research into practice (AACN, 2006). The project was guided by current evidence-based literature supporting delirium screening in non-ICU settings and nonpharmacologic interventions to minimize the progression of delirium. The DNP student is well prepared to disseminate and integrate new knowledge into practice (AACN, 2006). The DNP student successfully integrated the knowledge gained from a literature search into a QI project. The information was disseminated at a staff meeting after the

project was completed. The DNP student will present the findings from the project to the Quality and Safety Counsel at the organization with recommendations to initiate house-wide delirium screening. The DNP student was also tasked with transforming the *Prevent Delirium* order set into a nurse-driven protocol that nurses can order for patients who score positive on the CAM assessment or for patients who are at high risk for developing delirium. The intent of changing the order set into a nurse-driven protocol is to minimize the workload of the physicians as the interventions included in the order set are centered around nursing. The creation of this protocol also aligns with the fifth DNP essential, *Health Care Policy for Advocacy in Health Care*.

The evidence-based practice courses in the DNP curriculum focused on a critical review of the literature to improve clinical outcomes. These classes were effective in teaching how to critically appraise literature. Additionally, statistics helped in understanding the statistical strength of published research to be able to better critique health science research. This has been invaluable knowledge for the DNP student to take into future practice. These skills will aid in deciphering whether the evidence is meaningful, statistically significant, and best practice.

DNP Essential Six

The sixth DNP essential, *Interprofessional Collaboration for Improving Patient and Population Health Outcomes*, prepares the DNP student to lead and work in interprofessional teams to analyze issues in practice systems through collaboration and effective communication (Zaccagnini & White, 2017). The ability of the DNP student to take on a leadership role in developing practice models, standards of care, and scholarly projects is essential (Zaccagnini & White, 2017). Specific to this QI project, the DNP student successfully maintained a leadership role in collaborating with members of the HIT department. Although delirium screening was not

incorporated into the EMR prior to the implementation of the project, the DNP student was able to collaborate with HIT to plan the future development of a delirium screening tool specific to non-ICU patients. This collaboration with HIT is also an example of how DNP essential four, *Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care*, was met.

The DNP student also worked with the education department to incorporate delirium screening into the quarterly education for the nurses in IMC. Additionally, the DNP student led the collaboration with the hospitalist physician and the HIT department to develop, build, and incorporate the *Prevent Delirium* order set into Meditech. This order set contained evidence-based nonpharmacologic interventions that were supported by the literature. The DNP student encouraged nurse feedback on the CAM assessment and was available for questions and support.

DNP essential four was met in the health care informatics class, which explored information systems and computer technology that will help the DNP student to optimize health information management and practice information systems. Essential six was met with the course design of health care delivery systems. This class examined systems within health care while coordinating interdisciplinary health care teams with engineering students to enhance health care quality. This class allowed students with a background in nursing to team with engineering students to learn strategies for analyzing and improving processes in health care. Through this class, the DNP student gained knowledge and experience in leading and working with a multidisciplinary group.

DNP Essential Seven

Essential seven, *Clinical Prevention and Population Health for Improving the Nation's Health*, connects well with the aim of this project which was delirium screening and early interventions to minimize the negative sequelae associated with delirium. The DNP graduate is prepared with a foundation in clinical prevention and health promotion, which is necessary as prevention interventions are often underutilized in health care settings (AACN, 2006). A common theme that emerged from the literature was hospital acquired delirium is associated with poor outcomes. Though it is known that delirium can complicate a patient's hospital course, many locations outside of the ICU do not screen for delirium. The ultimate future goal that was outside the scope of this project was to minimize the occurrence of delirium in IMC through screening and nonpharmacologic interventions, thus improving patient outcomes.

This essential was met through multiple didactic courses. Ethics, law and policy, and vulnerability in diverse communities were classes that taught the DNP student epidemiological and cultural information to improve the health of communities. This foundation will allow the DNP student to provide ethical and culturally competent care to patients who are part of vulnerable populations.

DNP Essential Eight

Finally, the eighth DNP essential, *Advanced Nursing Practice*, was demonstrated throughout this QI project. According to the AACN (2006), this essential involves conducting needs assessments, mentoring, guiding, and supporting other nurses to achieve excellence in nursing practice. A needs assessment revealed that delirium screening was not being done in

IMC, though the patient population had risk factors for developing delirium. The eighth essential also focuses on developing therapeutic relationships with professionals, and mentoring and supporting nurses to achieve excellence in nursing practice and optimal patient outcomes (AACN, 2006). The DNP student designed this QI project and implemented, and evaluated delirium screening and nonpharmacologic interventions to decrease delirium based on evidence-based research. The nurses in IMC were mentored through training on the CAM assessment through their quarterly education and from the DNP student who was also a charge nurse on the unit. The DNP student was available on the unit three days per week to help assist the nurses and answer questions in real time.

The DNP essential eight was met through the four advanced clinical courses. These courses taught the student how to perform a comprehensive assessment, implement and evaluate therapeutic interventions, and develop therapeutic relationships with patients. This course has also been helpful in providing the DNP student with clinical judgment, developing differential diagnoses, and preparing the student for independent practice after graduation.

Conclusion

DNPs are change agents in their organizations. They are prepared to analyze and interpret clinical outcomes to improve patient care. The DNP has strong leadership skills and clinical expertise, which helps to translate evidence-based knowledge into quality patient care in the clinical setting. The DNP student will ensure patients are receiving the most up-to-date care through evidence-based practice, conferences, and continuing education.

Overall, the eight DNP essentials that were learned throughout the DNP coursework and built upon during this project guided the planning, implementation, and evaluation of this

project. It has provided the DNP student with growth in professional and personal leadership. It also offered the DNP student the opportunity to perform an organizational needs assessment, design a QI project, lead a group, and evaluate outcomes. The DNP student will take these skills into practice as a future nurse practitioner.

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APPENDICES

APPENDIX A

CAM SCREENING TOOL

CAM-ICU Worksheet

Feature 1: Acute Onset or Fluctuating Course	Score	Check here if Present
Is the pt 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 scale (i.e., RASS), GCS, or previous delirium assessment?	Either question Yes →	☐
Feature 2: Inattention		
<u>Letters Attention Test</u> (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 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		
<u>Yes/No Questions</u> (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. <u>Command</u> 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 pt is unable to move both arms, for 2 nd 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 <u>plus</u> 2 <u>and</u> either 3 <u>or</u> 4 present = CAM-ICU positive	Criteria Met →	☐ CAM-ICU Positive (Delirium Present)
	Criteria Not Met →	☐ CAM-ICU Negative (No Delirium)

APPENDIX B

DONABEDIAN MODEL OF IMPROVEMENT

Structure	Process	Outcome
• Acute care hospital • Pacific Northwest • IMC unit • Meditech EMR • 14 Bachelors RNs • 7 Associates RNs • 1:3 nurse to patient ratio	• Nursing education • Hospitalist education • CAM tool • Prevent Delirium order set	• Patients who received delirium screening • Patients positive for delirium who received delirium prevention order set • Future outcomes • Number of patients in restraints • Number of patients with 1:1 sitters

APPENDIX C

CAM SCREENING DATA

	COMPLETED	MISSED	NEGATIVE	POSITIVE	DISQUALIFIED
27-Jan	19	0	18	1	3
28-Jan	23	0	21	2	3
29-Jan	20	0	16	4	3
30-Jan	20	0	19	1	3
31-Jan	0	20			1
1-Feb	0	20			3
2-Feb	25	0	24	1	6
3-Feb	19	0	18	1	4
4-Feb	20	0	20	0	0
5-Feb	20	0	19	1	2
6-Feb	0	15			1
7-Feb	0	15			1
8-Feb	0	14			2
9-Feb	15	0	15	0	1
10-Feb	12	0	12	0	1
11-Feb	13	0	12	1	2
12-Feb	16	0	15	0	3
13-Feb	16	0	15	1	1
14-Feb	0	22			4
15-Feb	0	22			5
16-Feb	22	0	20	2	3
17-Feb	19	0	18	1	1
18-Feb	21	0	20	1	3
19-Feb	19	0	19	0	3
20-Feb	16	0	16	0	0
21-Feb	16	0	15	1	0
22-Feb	17	0	16	1	3
23-Feb	20	0	18	2	5
24-Feb	21	0	19	2	8
25-Feb	21	0	19	2	6
26-Feb	19	0	17	2	2
27-Feb	19	0	18	1	1
28-Feb	0	19			1
1-Mar	0	17			2
2-Mar	19	0	17	2	1
3-Mar	16	0	15	1	0

APPENDIX D

CHARACTERISTICS OF DELIRIUM POSITIVE PATIENTS

Age	Gender	Diagnosis	Delirium Order Set Ordered	Hospitalist as Attending Provider
34	Male	Respiratory failure, ischemic cardiomyopathy	No	Yes
37	Male	Motor vehicle accident	No	No
40	Male	Hepatic cirrhosis	No	Yes
41	Male	Atrial fibrillation with rapid ventricular response, alcohol withdrawal	No	Yes
45	Female	Lithium toxicity	No	Yes
45	Male	Alcohol Withdrawal	No	Yes
63	Male	Open heart surgery, aortic valve replacement	No	No
66	Male	Sepsis, hypotension	No	Yes
69	Female	Congestive heart failure, chronic obstructive pulmonary disease exacerbation	No	Yes
75	Male	Gastrointestinal bleed	Yes	Yes
75	Male	Altered mental status	No	Yes
78	Male	Open heart surgery, coronary artery bypass graft	No	No
81	Male	Altered mental status	No	Yes
83	Female	Atrial fibrillation with rapid ventricular response	No	No
84	Female	Sepsis, atrial fibrillation with rapid ventricular rate	No	Yes
85	Male	Gastrointestinal bleed	Yes	Yes
85	Male	Urosepsis, sialadenitis	No	Yes
86	Male	Covid	Yes	Yes
86	Male	Ischemic stroke	No	Yes
88	Male	Seizure, ischemic stroke	Yes	Yes