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Evaluation Outcomes of Delirium and Abrupt Discontinuation of Psychiatric Medications of the Adult Acute Care Patient

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DNP Final Project

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Dedication

This work and my DNP Project are dedicated to my boys, Larry, Levi, and Landon. To Larry, thank you for putting everything on hold so that I could pursue this academic achievement. I am truly grateful and appreciate everything you do for our family. To Levi and Landon, I hope that I have inspired you to follow your heart and taught you that with hard work and dedication, you can achieve anything in life. This was to give you a brighter tomorrow and future. This is for my parents; you are my rock, thank you for everything you have done for me and for being my biggest cheerleaders over the years.

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Abstract

PURPOSE: Delirium remains a common consequence of critical illness and is known to cause negative patient outcomes during an intensive care unit (ICU) stay. Hence, the purpose of this project is to evaluate the outcomes of patients taking psychiatric medications whose medications are abruptly discontinued upon admission to an ICU. Specifically, the outcomes of interest will be altered mental status, length of hospital stay, restraint use and mortality.

METHODS: A correlational analysis using a retrospective chart audit was conducted on 602 patients admitted to the Neurological/ Neurosurgical ICUs at the University of Kentucky Chandler Hospital from January 2015 to December 2015. The proportion of patients who experience delirium in the ICU was examined using frequencies and percentages. Chi-square analysis was used to assess differences in the proportion of patients who experience delirium and the associations between demographics (age, gender, and race), restraint use, admitting diagnosis, mortality, and those who were/were not admitted with psychiatric medication. Differences in age and length of stay were examined using independent sample t-tests.

RESULTS: Those who had psychiatric medications on admission were significantly more likely to be female (65.9% vs. 44.7%) and to have a diagnosis of a mood disorder (29.5% vs. 12.1%) and anxiety (21.6% vs. 9.3%) disorder. There were no significant differences in length of stay, delirium and/or altered mental status, restraint use, and mortality between those with and without psychiatric medications on admission. As compared to those without delirium, those with delirium were significantly more likely to have a Glasgow coma scale score of 13 or less (68.6% vs. 43.9%), to have restraint use (74.5% vs. 37.2%), to be on an antipsychotic (37.3% vs. 11.6%) or anxiolytic (70.6% vs. 35.9%) medication, and have longer length of stay (19.9 days vs. 9.6 days).

CONCLUSION: There is limited research concerning the treatment of delirium and pre-existing psychiatric conditions. Further research is needed to assess if abrupt discontinuation of psychiatric medications has any association with delirium.

Evaluation Outcomes of Delirium and Abrupt Discontinuation of Psychiatric Medications of the Adult Acute Care Patient

Introduction

Delirium occurs quite frequently in the intensive care unit (ICU). It is estimated to affect up to eighty percent of ICU patients during their acute care hospital stay (American Academy of Critical Care Nursing [AACCN], 2011). This medical condition is associated with short and long-term negative patient outcomes, such as increased morbidity, increased six-month mortality, increased length of hospitalization, increased odds of disability in activities of daily living (ADLs), severe long-term cognitive impairment and higher health care costs (AACCN, 2011; Breitbart & Alici, 2012; Cerianna et al., 2010; Marino et al., 2015; Ista et al., 2014; Sykes, 2012). The cost of care for a delirium patient is estimated to be between $4 -16 billion per year (AACCN, 2011).

Delirium is characterized by an alteration in a patient's mental status that causes an impairment of attention, altered consciousness, hallucinations, agitation, and sleep disturbance that can develop over a short or long period of time (Gilmore & Wolfe, 2013). “Disturbances in attention related to delirium occur when a patient has a reduced ability to direct, focus, sustain and shift attention and/or reduce awareness of their current environment” (Diagnostic and Statistical Manual of Mental Disorders 5th ed. [DSM-5], 2013, p. 596; American Psychiatric Association, 2013). Cognitive disturbances may fluctuate with severity and can affect a memory, disorientation, language, visuospatial ability, and perception (DSM-5).

The pathophysiology of delirium is unknown; theories include the condition may be a direct physiological consequence of a side-effect from a medication, substance intoxication or withdrawal of medication (drug abuse or due to a lack thereof a medication), exposure to toxins and/or multiple other etiologies (DSM-5

, 2013). Many researchers have theorized and studied delirium as a secondary condition due to lack of sleep and/or interruption of a patient's daily routine (termed ICU psychosis) (Ely et al., 2004 & Ceriana et al., 2010). Other researchers have studied the side effects of medications, such as benzodiazepines, analgesics, and anesthetics and their association with delirium (Ely et al., 2004 & Ceriana et al., 2010). Common medical conditions that are associated with a delirium diagnosis include sepsis, hypoxia, hypothermia, hyperglycemia, hepatic and renal insufficiencies, thyroid dysfunction, adverse effects to drug intoxications, chemical withdrawal, and anticholinergic agents (Arend & Christensen, 2009; Ely et al., 2004; Ceriana et al., 2010).

Other theories of the pathophysiology of delirium suggest that it is caused by a combination of predisposing factors and precipitating factors (Arend & Christensen, 2009; Ceriana et al., 2010; Hosie et al., 2013; McPherson, 2013). Predisposing factors are present at the time of hospital admission and include: advanced age (>70), hearing loss, dementia, transfer from a nursing home, alcohol abuse, smoker, illegal drug abuse, visual impairment, elevated urea-creatinine ratio, history of stroke, epilepsy, congestive heart failure and/or depression (Arend et al., 2009; Ceriana et al., 2010; Hosie et al., 2013; McPherson, 2013). Precipitating factors for delirium consist of acute illness, pharmacological agents, environmental factors (noise, lights, frequent interruptions, sensory overload, lack of windows), emotional issues (anxiety, fear, pre-existing psychological factors, coping skills), and medical equipment (restraints, presence of chest and/or endotracheal tubes, bladder catheters, invasive monitoring lines) (Arend et al., 2009; Ceriana et al., 2010; McPherson, 2013). Pharmacological agents that are associated with delirium include anesthetics, analgesics, antibiotics, anticholinergics, sedatives, steroids, psychopharmacological agents, and abrupt discontinuation of medications

(Arend et al., 2009; Cerianna et al., 2010 & McPherson et al., 2013). The concerns in relation to pharmacological agents are their effects on the brain; studies have shown that these agents have the potential to interfere with brain function and can lead to confusion, altered level of consciousness, and disorientation (Arend et al., 2009; Cerianna et al., 2010; McPherson et al., 2013).

Delirium is not commonly the cause of an acute care hospital stay and often goes unnoticed by healthcare workers until it has already developed (Ceriana et al., 2010). Generally, patients are admitted to the ICU with multi-organ failure, sepsis, stroke or trauma conditions; as a result, delirium can be easily overlooked. Once a patient is admitted to an acute care hospital, it is common practice to abruptly stop all currently prescribed medications until the patient has stabilized and a pharmacist can review medications. However, the abrupt discontinuation of certain medications, especially medications for long-term use, can cause withdrawal effects that could be observed as delirium in a patient (Arend et al., 2009). Thus, the abrupt withdrawal of medications upon entering the acute care hospital is a worthy concept to examine in relation to delirium cause theory.

Moreover, in 2008, the American Psychological Association (APA) reported an estimated one in ten persons in the U.S. is prescribed psychotropic medications. The APA also indicated that the prescribing of psychotropic medications increased between 2002 and 2006, with antidepressants prescriptions increasing by 12%, anxiety medications by 16% and antipsychotics by 35% (APA, 2008). The abrupt withdrawal of psychopharmacological medications upon hospital admission is not recommended (Burns et al., 2002). The sudden withdrawal of these medications can cause a patient to experience exacerbations or reemergence of psychotic symptoms, withdrawal symptoms (restlessness, insomnia, anxiety, confusion, nausea/vomiting,

cold sweats, muscular aches and pains, diaphoresis), and neuroleptic malignant syndrome, all of which can be misinterpreted as ICU delirium (Burns et al., 2002).

Problem Statement

Delirium research to date has focused on causes, risk factors, negative patient outcomes, economic consequences, assessment tools and their reliability and validity, medication treatment, and prevention protocols. However, there is a gap in the literature with regard to the factors associated with delirium and altered mental status among psychiatric patients in the ICU. Examining factors associated with delirium and altered mental status among psychiatric patients is critical to understand ways to mitigate ICU delirium. The abrupt discontinuation of home psychotropic medications may exacerbate a patient's psychotic symptoms (National Institutes of Mental Health, 2010). Hence, studying patient outcomes associated with the discontinuation of medications during an acute care hospitalization can provide important evidence for the development of patient care procedures and policies to minimize ICU-associated delirium and altered mental status.

Objective/Aims

The purpose of this project was to examine factors associated with delirium and altered mental status among patients in the ICU. Specifically, the goal was to assess the associations between having psychiatric medications on admission and delirium, altered mental status, length of hospital stay, restraint use, and mortality.

The specific aim was:

AIM 1: To determine the differences in demographics, length of stay, restraint use, and mortality between those with and without delirium.

AIM 2: To examine differences in demographics, length of stay, delirium, restraint use, and mortality between patients with and without psychiatric medications.

Methods

Setting

The analysis was conducted in the neurological and neurosurgical intensive care units (ICUs) of the University of Kentucky Chandler Hospital, a Level 1 Trauma medical center in Lexington. These two units (24 beds) have a total of 220 health care providers who serve approximately 235 patients monthly.

Study Design

A retrospective chart audit was conducted on patients admitted to the neurological and neurosurgical ICUs. Data from 602 patients who were admitted to the ICUs from January 2015 to December 2015 were extracted from electronic medical records (EMR).

Sample

Inclusion criteria for patients were: a) 18 years of age or older and b) ICU length of stay > 72 hours. Exclusion criteria were patients diagnosed with: a) Moderate to severe dementia, b) structural brain damage, c) history of Parkinson disease, d) hepatic encephalopathy, and e) sodium level >150. In addition, patients receiving benzodiazepines for alcohol withdrawal were further excluded. Patients diagnosed with these conditions were excluded because these diseases/disorders share similar symptoms with delirium. Patients were also excluded if their medical records had insufficient data. A medical record with insufficient data was defined as a

record that was missing information on neurological assessments, and/or pharmacy medication reconciliation verification documents.

Procedures

Retrospective patient data were obtained from electronic medical records from January to December 2015. The electronic medical records are secured on the system at UK HealthCare. UK Information Technology queried the database for patients that met the specific inclusion criteria. Demographic variables along with main outcome variables were extracted for the study. De-identified retrieved data were recorded on a spreadsheet for data analysis. Because this study was based on a retrospective analysis, a waiver of documentation of patient consent was obtained from the University of Kentucky Institutional Review Board prior to EMR review.

Measures:

The following measures were extracted from the electronic medical records (see Table 1):

1. **Demographic data**: Demographic data included sex (male vs. female), age (in years), and admitting diagnosis (reason for acute care admission), and race (ethnicity: African American/Black, Caucasian/white, Hispanic, Black Hispanic, White Hispanic, and/or other).
2. **Medication** reconciliation document: The medication reconciliation document was used to determine which patients were prescribed with psychiatric medications prior to admission and which medications were prescribed to patients during hospital stay.
3. **Delirium**: Diagnostic codes related to" delirium," "delirium due to alcohol withdrawal or drug withdrawal," or "disorientation,"' or "altered mental status," or "restlessness and agitation" were obtained from the medical record. These codes are related to the Confusion Assessment Method for the ICU (CAM-ICU) score (i.e., a code for delirium). These

diagnostic codes were recoded as ‘0’ for none, or ‘1’ for ‘delirium/disorientation/altered mental status’

4. **Neurological assessment**: Neurological assessments involved determining if the patient had a change in level of consciousness, Glasgow Coma Scale, and/or documentation of the patient being acutely confused. The neurological assessments were used to further determine if a patient met the criteria for a positive CAM-ICU score.
5. **Length of stay**: Total number of days patient admitted into the University of Kentucky Chandler Hospital
6. **Restraint use**: Patient history of restraint use during the acute care hospital stay.
7. **Mortality rate**: Patients who expired during the ICU stay.

Data Analysis

For aim 1, the proportion of patients who experience delirium in the ICU was described using frequencies and percentages. Demographic differences in the proportion of patients who experience delirium were also examined by using chi-square analysis to assess differences by sex, admitting diagnosis and race; whereas differences in age were analyzed using independent sample t-tests. In addition, the differences in the proportion of patients that exhibit delirium between those who and who were not admitted with psychiatric medications were examined using chi-square analyses.

For aim 2, independent sample t-tests were used to examine differences in length of stay between those who were admitted with psychiatric medications and those who were not. Chi-square analyses were used to examine differences between these two groups with regard to restraint use and mortality.

Results

Sample Characteristics

The sample (*N* = 602) was primarily male (52.2%), white (91.7%), and on average 60.0 (*SD* = 17.3) years of age. The majority of the sample had a primary medical diagnosis of cerebral infarction and hemorrhage (52.5%), followed by arterial embolism/aortic aneurysm (21.9%), or other neurosurgery diagnosis (13.3%). The primary psychiatric diagnosis was mood disorders (14.6%), followed by substance use disorder (12.3%). Nearly half of the sample had a Glasgow coma scale score of 13 or less (46.0%), 40% experienced restraint use during hospitalization, and 5.1% expired. The average length of stay was 10.4 days (*SD*=13.8; see Table 2).

Differences in demographic, length of stay, restraint use, and mortality between those with and without Delirium

Table 2 presents the differences in demographics, length of stay, restraint use, mortality, and psychiatric medication use between those with and without delirium. As compared to those without delirium, patients with delirium were significantly more likely to have a mood disorder (21.6% vs. 14.0%), cognitive/psychotic/sexual dysfunction (11.8% vs. 5.4%), and substance use disorder (29.4% vs. 10.7%). In addition, those with delirium were significantly more likely to have a Glasgow coma scale score of 13 or less (68.6% vs. 43.9%), to have restraint use (74.5% vs. 37.2%), to be on an antipsychotic (37.3% vs. 11.6%) or anxiolytic (70.6% vs. 35.9%) medication, and had a significantly longer length of stay (19.9 days vs 9.6 days). There were no other significant differences between those with and without delirium (see Table 2).

Demographic, Length of Stay, delirium, Restraint Use, and Mortality differences between those with and without Psychiatric Medications on Admission

Table 3 presents differences in demographics, length of stay, delirium, restraint use, and mortality between those with and without psychiatric medications on admission. As compared to those without psychiatric medications on admission, those who had psychiatric medications on admission were significantly more likely to be female (65.9% vs. 44.7%) and to have a primary psychiatric diagnosis of a mood (29.5% vs. 12.1%), anxiety (21.6% vs. 9.3%), or cognitive/psychotic/sexual dysfunction (10.2% vs. 5.3%). However, there were no significant differences in length of stay, delirium and/or altered mental status, restraint use, and mortality between those with and without psychiatric medications on admission (see Table 3).

Discussion

This study examined factors that are associated with delirium and altered mental status in the ICU, as well as the impact of discontinuation of psychiatric medications upon admission on patient outcomes. To my knowledge, this is the first study to examine the relationship between discontinuation of psychiatric medications and delirium and how such interruption affects the patients' length of stay, restraint use, and mortality. This study established that there are no significant differences in the occurrence of delirium between patients admitted to the ICU with psychiatric medications and those admitted without psychiatric medications (8.0% versus 8.6%; $\chi 2 = 0.04$ [df=1], p =.850). In other words, abrupt discontinuation of psychiatric medications upon admission may not be a factor for delirium development for ICU patients. However, there were associations between anxiolytic and antipsychotic medications and delirium. These findings

have several implications for nursing research and practice, and indicate a need to develop technology for the documentation of accurate assessments for delirium.

Patient Characteristics

The sample for this study was primarily male (52.5%); however, patients that were admitted with psychiatric medications were significantly more likely to be female (65.9% vs. 44.7%). This finding is similar to a study by Gopalan et al. (2016), who found that the majority of patients with a psychiatric disorder were female. However, in this study the incidence of delirium by gender was not significant, $\chi 2$ (1, N = 602) =0.49, p= 0.482. No previous studies have compared gender differences in psychiatric diagnosis and delirium.

The average length of stay of our sample was 10.4 days. Consistent with previous studies (Cavallazzi et al., 2012; Brietbart & Alici, 2012; Cerianna et al., 2010), patients who experienced delirium were significantly more likely to have a longer length of stay as compared to patients who did not experience delirium (19.9 days vs. 9.6 days). However, patients who were admitted with psychiatric medications in the current study showed no significant difference in length of stay compared to those patients without psychiatric medications. The lack of difference in delirium between those with and without psychiatric medications on admission may suggest that psychiatric medication discontinuation is not a factor for delirium onset. Even so, more studies should be conducted to replicate this result to establish a lack of association between psychiatric medication discontinuation and delirium development.

Current non-medication management of delirium includes physical restraints on the patients to prevent device removal and self-harm in agitated patients. However, by limiting movements, physical restraints have been shown to have an adverse physical and psychological

effect, including delirium (Cerianne et al., 2010; McPherson et al., 2013; Brieibart & Alici, 2012). In this study, restraints were used for 40% of the sample, and patients who experienced delirium were significantly more likely to have restraints as compared to those who did not experience delirium (74.5% vs. 37.2%). Cerianne et al. (2010) reported that the use of physical restraints was a predisposing risk factor for the development of delirium when patients were transitioned from an ICU to a step-down unit. McPherson et al. (2013) also found that physical and chemical (medications such as a benzodiazepine) restraints are predisposing risk factors for delirium. Unfortunately, current practices for delirium treatment include physical restraint of the altered mental status patient (AACCN, 2011; Breitbart & Alici, 2012). Hence, restraint use should be a last resort for delirium treatment; prompt recognition of symptoms and early mobilization of patients may decrease the number of days of delirium (AACCN, 2011; Breitbart & Alici, 2012).

Psychiatric Diagnosis

This study further found an association between delirium in the ICU and mood disorder prevalence, and this is consistent with recent research. For example, Gopalan et al. (2016) cited in their study that included 384 subjects that 10.9% of that population had a major depressive disorder and 33.5% of that population had a diagnosis of either anxiety or depressive disorder. This is similar to the findings of our current study, as the primary psychiatric diagnosis for the patients was mood disorder (14.6%); patients that were admitted with psychiatric medications had a diagnosis of mood disorder (29.5%) and patients that experienced delirium was significantly more likely to have a mood disorder (21.9%). Ghoneim and O'Hara (2016) conducted a literature review and identified depression as an independent risk factor for postoperative delirium. One study found a 13.7% incidence of depression among patients on the

first day of admission to the ICU (Rincon et al., 2001). Another study demonstrated a 32% incidence of depression or PTSD in patients who were admitted to the ICU to receive abdominal aortic surgery (Liberzon et al., 2006). Ghoneim and O'Hara (2016) concluded that patients with preoperative depressive symptoms are more likely to develop postoperative delirium for a longer duration and experience an incomplete recovery to independent functioning post-surgery.

Followed by mood disorders, substance use disorders (12.3%) were the primary psychiatric diagnosis for the patient population of this study. Patients with a diagnosis of a substance abuse disorder are more likely to experience delirium (29.4% vs. 10.7%). However, at admission to the ICU, these patients were not admitted with psychiatric medications. Prior studies have concluded that substance abuse withdrawal is a risk factor for delirium (Arend et al., 2009; Ceriana et al., 2010; Hosie et al., 2013; McPherson et al., 2013). Patients in the ICU with an alcohol abuse disorder are at increased risk for alcohol withdrawal syndrome (AWS) (Sutten & Jutel, 2016). Alcohol withdrawal syndrome and alcohol abuse disorder can prolong the patient's length of stay, increase the patient's risk for infectious complications, increase their risk for delirium, and predispose the patient for mechanical ventilation assistance (Sutten & Jutel, 2016).

Psychiatric Medications

Anxiolytic and antipsychotic medications were associated with delirium for this study. Patients with a history of anxiolytic (70.6% vs. 35.9%) and antipsychotic (37.3% vs. 11.6%) medications use were significantly more likely to develop delirium. Medications that have a precipitating risk factor for delirium include anesthetics, analgesics, antibiotics, anticholinergics, sedatives, steroids and psychopharmacological agents (Arend et al., 2009; Cerianna et al., 2010;

McPherson et al., 2013). Benzodiazepines can promote delirium (Cavallazzi et al., 2012). Also, lorazepam independently increases the risk for the development of delirium, whereas propofol and opiates do not (Cavallazzi et al., 2012). Benzodiazepines should be avoided in critically ill patients in the ICU, because they are a high-risk factor for delirium, and studies have shown that limiting their use may decrease the overall incidence of delirium in the ICU (Cavallazzi et al., 2012; Arend et al., 2009; Cerianna et al., 2010; McPherson et al., 2013). Benzodiazepines are not recommended for treating delirium; however, patients with a benzodiazepine dependence and/or long-term use should not be abruptly discontinued from this medication because it can cause withdrawal and/or delirium (Cavallazzi et al., 2012). Unfortunately, for patients with AWS, a slow taper off benzodiazepines is the recommended treatment therapy to prevent withdrawal associated delirium (Cavallazzi et al., 2012).

Abrupt withdrawal of antipsychotic medications is not recommended, and the standard of care is to slowly taper off these medications (Burns et al., 2002). The sudden withdrawal of these medications can cause a patient to experience exacerbation or reemergence of psychotic symptoms, withdrawal symptoms (restlessness, insomnia, anxiety, confusion, nausea/vomiting, cold sweats, muscular aches and pains, diaphoresis), and neuroleptic malignant syndrome, all of which could be mistaken by the medical personnel as ICU delirium (Burns et al., 2002). In contrast, the use of antipsychotic medications is a potential treatment for delirium (Breitbart & Alici, 2012; Gilchrist et al., 2012).

Breitbart & Alici (2012) conducted a systemic review of evidence-based delirium treatment of cancer patients. They found that antipsychotic medications were effective in improving or resolving symptoms of delirium in patients. Low-dose haloperidol was the most suitable medication, and atypical antipsychotics should be considered as effective alternatives to

Haldol (Breitbart & Alici, 2012). However, the use of pharmacological interventions for the prevention of delirium has not been supported by evidence, because prevention studies are so sparse (Breitbart & Alici, 2012). In contrast, Gilchrist et al. (2012) conducted a comprehensive review and found that atypical antipsychotics were just as effective as Haldol for ICU delirium for short-term treatment therapy. However, they concluded that further studies are needed to further evaluate this drug therapy.

Recent research on delirium and antipsychotic medications focus more on the use of antipsychotic medications as a prophylactic delirium treatment. Gilmore and Wolfe (2012) conducted a meta-analysis study of existing trials that compared delirium incidence among patients given prophylactic antipsychotic medications versus post-surgical patients there were given placebos. They concluded that prophylactic antipsychotic medications given to surgical patients decreased the incidence of delirium (Gilmore & Wolfe, 2012). However, they also found that prophylactic antipsychotic medications did not reduce the length of stay, or the duration or severity of delirium (Gilmore & Wolfe, 2012). Callvallazzi et al. (2012) found when Haldol (0.5 mg followed by an infusion of 0.1mg/hr over 12 hours) was used for prevention of delirium in the ICU, patients had a significant decrease in the incidence of delirium within the first seven days after surgery (15.3% vs. 23.2%; $p=0.031$), and a decreased length of ICU stay (21.3 hours vs. 23 hours; $p=0.024$).

Limitations

A few important limitations should be considered in interpreting the findings of this study. First, an original aim of this study was to determine the difference in the proportion of patients that develop ICU delirium between patients with and without psychiatric medication on admission using the CAM-ICU assessment tool (AACCN, 2011). However, between the two units from which patient data were obtained, only 78 patients that year were assessed for ICU delirium using the evidence-based CAM-ICU scale. Consequently, none of these 78 patients met the study criteria. So, to determine if patients had experienced delirium in the ICU, the patients who were assessed as having a GCS <13 and were coded with the diagnostic billing codes of disorientation, altered mental status, restless and agitated, unspecified psychosis and Glasgow coma scale 9-12, were used as a proxy for delirium. The diagnostic billing code for disorientation, altered mental status, restless and agitation, unspecified psychosis and a Glasgow coma scale 9-12 would equal a positive CAM-ICU if scored correctly on the scale (Gilmore & Wolfe, 2013). Sacynski et al. (2014) were also successfully able to identify delirium patients in the hospital setting by using a chart-based delirium instrument tool to identify delirium. Their tool used terms such as change of mental status, evidence of agitation and confusion.

Second, these data show that the majority of the patients in this study had a neurological diagnosis as their primary diagnosis (52.5%), which is consistent with the study setting, two specialty neurological ICUs (Sacynski et al., 2014). Alterations in consciousness might be severe enough to preclude assessment of delirium and altered mental status. It is unknown if setting the study in a different ICU, such as a medical or trauma unit, would have yielded different results.

Finally, time constraints were a limitation factor for this study. Due to deadline constraints, I was unable to look at the length of time it took for psychiatric medications to be restarted, to investigate individual electronic medical records for provider notes for more descriptive assessments for delirium and altered mental status, and further investigate why patients were not being assessed for delirium every shift. Regardless of these limitations, the strengths of this study provide direction for doctoral nursing practice and research to improve the outcome of ICU patients who have complex medical and psychiatric needs.

Implications for Future Doctoral Nursing Practice and Research

Delirium Assessment

One recommendation for future research is to investigate why ICU nurses may not be using the delirium assessment tool, CAM-ICU, daily. This study found that in 2015, both ICU units only assessed 78 patients using the CAM-ICU assessment tool in their EMR. Providing delirium screening to critically ill patients with a validated assessment tool could give providers the potential causative agent for delirium and prompt discussion of early treatment or prevention in daily multidisciplinary rounds.

Providing continuous monitoring for delirium by the bedside nurse is an essential need to successfully assess and treat delirium. Delirium in the ICU goes undetected by healthcare professionals 65% of the time (AACN, 2011). The AACN recommends that ICU critical care nurses use a standardized and validated assessment tool for delirium screening for all patients (2011). Assessment for delirium for the ICU patient is to be performed twice a day with the use of validated assessment tools such as the CAM-ICU or Intensive Care Delirium Screening Checklist (ICDSC) (Neto et al., 2012 &AACN, 2011).

Current research on delirium assessment suggests that in addition to the CAM-ICU and/or ICDSC, sedation should also be assessed at the time of delirium screening. Neto et al. (2012) suggest that before assessing the patient for delirium using the CAM-ICU, the patient's level of consciousness should be evaluated first using the validated tool, the Richmond Agitation Sedation Scale. Patients assessed using the Richmond Agitation Sedation Scale with a score $\geq$-3 are deemed to be appropriate for an assessment using the CAM-ICU for delirium (Neto et al., 2012). The researchers also recommend that delirium evaluation should be performed by a neurologist, neurophysiologist, psychiatrist, psychiatric nurse practitioner, and/or clinical geriatrician, as this should be the "gold standard" for a diagnosis of delirium (Neto et al., 2012).

Medication Reconciliation

The second recommendation for further evidence-based nursing practice is to investigate the discontinuation of psychiatric medications and how long it takes to restart such medications. The restarting of medications was not investigated during this study because of time constraints. Also, current research is focused on the use of antipsychotic medications as a treatment for delirium. However, patients in this study were significantly more likely to develop delirium when admitted into the ICU on antipsychotic medication. Further investigation is needed into why there is a lack of medication reconciliation for psychiatric medications, as well as what is the average length of time it takes to restart psychiatric medications for ICU patients.

Implications Using DNP Essentials

To further investigate ICU delirium assessment and medication reconciliation into practice and research on the Neurological ICU units, a Doctoral Nursing Practice (DNP) graduate will be able to apply the following DNP Essentials: Essential III, Clinical Scholarship; Essential IV, Information Technology and Patient Care Technology for the Improvement and Transformation of Healthcare; and Essential VIII, Advanced Nursing Practice. The AACN (2006) states that the DNP graduate is capable of engaging in advanced nursing practice and providing leadership for evidence-based practice. DNP Essential III states that a "graduate is competent in knowledge application, such as the translation of research into practice, improvement of the reliability of health care practice and outcomes, and the evaluation of practice and participation in collaborative research" (AACN, p. 12,2006). An investigation of why delirium assessments are not being performed could consist of the DNP graduate conducting chart audits of the bedside nurses to assess again if they are being performed (as this study was a retrospective chart review of the year 2015). The DNP graduate could educate the bedside nurses about delirium, how to assess the patient, and the charting assessment tool, and then reassess compliance levels of delirium assessments after re-education of bedside nurses.

DNP Essential IV states that a DNP graduate is distinguished in his or her ability to use information systems/technology, from supporting and improving patient care to applying new knowledge, provide proficient leadership and assessing the efficacy of patient care technology (AACN, 2006). The DNP graduate is prepared to not only evaluate programs but also to design, select, and use programs that assess and monitor outcomes of care, care systems, and quality improvement of health care information systems (AACN, 2006). Implications for future practice using Essential IV would involve the DNP graduate assessing the EMR delirium assessment and

investigating why bedside nurses are failing to comply. The investigation would include an involvement with Information Technology (IT), again based on why the delirium assessments are not being charted. An IT investigation could include the location of the delirium assessment tool within the EMR. In addition, for medication reconciliation, IT could be consulted to help design and implement a standardized medication reconciliation note in the EMR for the medications present at admission. Currently, this is not available in the EMR used in this study setting and is only included in a provider note; this is why the medication restart information was difficult to find and was not included in this study.

According to the AACN (2006), "all DNP graduates are expected to demonstrate refined assessment skills and base practice on the application of biophysical, psychosocial, behavioral, sociopolitical, cultural, economic, and nursing science as appropriate in their area of specialization" (p. 16). This refers to DNP Essential VIII, Advanced Nursing Practice. This Essential ensures that the DNP graduate is prepared to design, implement, and evaluate therapeutic interventions based not only on nursing science, but other sciences as well (AACN, 2006). In addition, the DNP graduate is prepared to demonstrate advanced levels of clinical judgment, systems thinking and accountability when evaluating evidence-based care to improve patient outcomes (AACN, 2006). The use of DNP Essential VIII for this study is that the graduate can not only study the problem of delirium assessment but can further assess what is required to ensure that patients are being evaluated, and implementing clinical judgment to improve outcomes for patients who experience delirium. The DNP graduate knows that it is essential to not only treat but prevent delirium, so that the patient does not experience increased length of stay, restraints, or falls during their hospitalization. To prevent these negative

outcomes, the DNP graduate could implement programs that resulted from this research into everyday evidence-based practice.

Conclusions

Delirium is a serious condition that requires the immediate attention of hospital personnel. This clinical problem requires quick and accurate clinical assessment, as well as immediate treatment to reduce the incidence and negative patient outcomes. Delirium is considered to be a preventable health condition, and with immediate recognition of risk factors, CAM-ICU assessments, and proper treatment management, the prevalence in the acute care hospital should decrease (AACCN, 2013; APA, 2004; Neto et al., 2012; Carbone et al., 2015). However, there is limited research concerning the treatment of delirium and psychiatric conditions. In conclusion, further research is needed to assess if abrupt discontinuation of psychiatric medications increases patients for risk for delirium.

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Table 1. Measures

Variable name	Measures	Data source	Level of measure	Statistical analysis
Aim 1				
Medication reconciliation document	Name of home psychiatric medication prescribed to patient And yes/no if psychiatric medication present upon admission	EMR	Nominal	Frequency (%) Chi-square analysis
Delirium	Based on diagnostic code (yes/no)	EMR	Nominal	Frequency (%) Chi-square analysis
Neurological assessment	Glasgow Coma Scale	EMR	Interval	Mean (SD) Chi-square analysis
Aim 2				
Length of hospital stay	Number of days	EMR	Interval	Mean (SD) Independent T-Test
Restraint used	Yes/no	EMR	Nominal	Frequency Chi-Square analysis
DEMOGRAPHICS				
Age	Age of participant in years	EMR	Nominal	Mean (SD)
Sex	Sex (male, female, other)	EMR	Nominal	Frequency

Race	Ethnicity (African American/Black, Caucasian/white, Hispanic, Black Hispanic, White Hispanic)	EMR	Nominal	Frequency
Admitting diagnosis	Reason for acute care admission	EMR	Nominal	Frequency

Table 2. Demographic, Length of Stay, Restraint Use, Mortality, and Psychiatric Medications Use differences between those with and without Delirium

	Total (N=602)		Patients with Delirium (n=51)		Patients without Delirium (n=551)		Differences Chi square (df), p-value
	N	%	n	%	n	%	
Sex							.49 (1), p =.482
Male	314	52.2	29	56.9	285	51.7	
Female	288	47.8	22	43.1	266	48.3	
Ethnicity							.16 (1), p=.685
White	552	91.7	46	90.2	506	91.8	
Non-White	50	8.3	5	9.8	45	8.2	
Psychiatric Diagnosis							27.52 (4), p<.0001
None	337	56.0	13	25.5	324	58.8	
Mood	88	14.6	11	21.6	77	14.0	
Anxiety	67	11.1	6	11.8	61	11.1	
Cognitive & Psychotic & Sexual Dysfunction	36	6.0	6	11.8	30	5.4	
Substance Use	74	12.3	15	29.4	59	10.7	
Primary Diagnosis							5.92 (5), p=.315
Cerebral Infarction and Hemorrhage	316	52.5	26	51.0	290	52.6	
Traumatic Brain	40	6.6	5	9.8	35	6.4	

Injury/Falls/MVA							
Arterial embolism/stent/Aortic Aneurysm	132	21.9	9	17.6	123	22.3	
Spinal Cord Injury	18	3.0	4	7.8	14	2.5	
Malignant and Benign Neoplasm	16	2.7	1	2.0	15	2.7	
Other Neurosurgery or Diagnosis (Epilepsy, congenital issues, endocardial issues, Encephalopathy,etc.)	80	13.3	6	11.8	74	13.4	
Glasgow Coma Scale							11.47 (1), p=.001
Greater than 13	325	54.0	16	31.4	309	56.1	
13 or less	277	46.0	35	68.6	242	43.9	
Restraint Use							27.0 (1), p<.0001
No	359	59.6	13	25,5	346	62.8	
Yes	243	40.4	38	74.5	205	37.2	
Mortality							1.16 (1), p=.281
No	571	94.9	50	98.0	521	94.6	
Yes	31	5.1	1	2.0	30	5.4	
Antipsychotic	83	13.8	19	37.3	64	11.6	25.82 (1), p<.0001
Anxiolytics	234	38.9	36	70.6	198	35.9	23.59 (1), p<.0001
Antidepressants	156	25.9	13	25.5	143	26.0	.01 (1), p=.942
Anticonvulsants	19	3.2	2	3.9	17	3.1	.11 (1), p=.744
	m	sd	m	sd	m	sd	Differences t-test (df), p-value

Age (years)	60.0	17.3	61.5	19.2	59.9	17.2	.66 (600), p=.509
Length of Stay (days)	10.4	13.8	19.9	25.4	9.6	11.9	2.83 (50.97), p=.007

*differences were calculated using chi square analyses for categorical data and independent sample t-test (with Levine's test for equality of variance) for continuous variables.

Table 3. Differences in demographics, length of stay, restraints used, and mortality between patients with and without psychiatric medications on admission who experience delirium and/or altered mental status

	Total (N=602)		Patients with Psych Meds (n=88)		Patients without Psych Meds (n=514)		Differences Chi square (df), p-value
	N	%	n	%	n	%	
Sex							13.5 (1), p <.0001
Male	314	52.2	30	34.1	284	55.3	
Female	288	47.8	58	65.9	230	44.7	
Ethnicity							.01 (1), p=.897
White	552	91.7	81	92.0	471	91.6	
Non-White	50	8.3	7	8.0	43	8.4	
Psychiatric Diagnosis							43.3 (4), p<.0001
None	337	56.0	25	28.4	312	60.7	
Mood	88	14.6	26	29.5	62	12.1	
Anxiety	67	11.1	19	21.6	48	9.3	
Cognitive & Psychotic & Sexual Dysfunction	36	6.0	9	10.2	27	5.3	
Substance Use	74	12.3	9	10.2	65	12.6	
Primary Diagnosis							3.8 (5), p=.574
Cerebral Infarction and	316	52.5	47	53.4	269	52.3	

Hemorrhage							
Traumatic Brain Injury/Falls/MVA	40	6.6	3	3.4	37	7.2	
Arterial embolism/stent/Aortic Aneurysm	132	21.9	18	20.5	114	22.2	
Spinal Cord Injury	18	3.0	2	2.3	16	3.1	
Malignant and Benign Neoplasm	16	2.7	2	2.3	14	2.7	
Other Neurosurgery or Diagnosis (Epilepsy, congenital issues, endocardial issues, Encephalopathy,etc.)	80	13.3	16	18.2	64	12.5	
Delirium							.04 (1), p=.850
No	551	91.5	81	92.0	470	91.4	
Yes	51	8.5	7	8.0	44	8.6	
Glasgow Coma Scale							3.0 (1), p=.083
Greater than 13	325	54.0	55	62.5	270	52.5	
13 or less	277	46.0	33	37.5	244	47.5	
Restraint Use							.01 (1), p=.910
No	359	59.6	52	59.1	307	59.7	
Yes	243	40.4	36	40.9	207	40.3	
Mortality							1.74 (1), p=.186
No	571	94.9	86	97.7	485	94.4	
Yes	31	5.1	2	2.3	29	5.6	
	m	sd	m	sd	m	sd	Differences t-test (df), p-value

Age (years)	60.0	17.3	60.8	16.9	59.9	17.4	.45 (600), p=.652
Length of Stay (days)	10.4	13.8	8.7	8.0	10.7	14.6	1.26 (204.2), p=.060

*differences were calculated using chi square analyses for categorical data and independent sample t-test (with Levine's test for equality of variance) for continuous variables.