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Bedside Nurse Recognition of Delirium in the Medical-Surgical Setting

Bridget Ann Denzik
Walden University

Walden University

College of Health Sciences

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Bridget Denzik

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Dr. Robert McWhirt, Committee Chairperson, Health Services Faculty
Dr. Cheryl Parker, Committee Member, Health Services Faculty
Dr. Tracy Wright, University Reviewer, Health Services Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
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Abstract

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Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Delirium in adults aged 65 and older is a common occurrence in the acute care setting and is often unrecognized by bedside nurses. Delirium can trigger a negative cascade of events resulting in an increase in morbidity and mortality, functional decline, longer length of stay, and high rates of post hospital institutionalization and has a significant socioeconomic impact. The purpose of this quality improvement project was to establish a solid foundation using scholarly literature to support the development of a delirium prevention, recognition, and treatment program in the medical-surgical acute care setting applying the program logic framework. The goal was accomplished by developing a structured program to enhance nurse education (phase 1) using a pretest/posttest design. Phase 2 will be implemented at a later date. The null hypothesis for the project was there is no difference between the pretest group knowledge of delirium scores and the posttest group scores following education. The results of the 36-paired pretests/posttests indicated a significant difference ($p < 0.05$) following the educational PowerPoint on delirium. Providing education and opportunities for bedside nurses to apply this new knowledge is an effective strategy to increase the identification of delirium, which can lead to improved patient outcomes, reduced socioeconomic burden associated with delirium, and increased positive social change. The economic impact of delirium is considerable with the average cost per day of delirium patients reaching nearly 3 times the cost of patients not having delirium. The elderly population is projected to continue to rise, which will have a profound impact on hospitals and health care as a whole.

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Section 1: Overview of the Evidence-Based Project

Introduction

The vision of Healthy People 2020 is to have a society in which all people live long healthy lives and a mission to help make that happen with overarching goals (Healthy People 2020). One goal is to "improve the health, function and quality of life for older adults" (Healthy People 2020). Older adults (aged 65 or older) are one of the fastest growing segments of the population in the United States with baby boomers primarily responsible for the growth in the older population as they began turning 65 in the year 2011 (U.S. Department of Commerce, 2014). By the year 2030, projections by the U.S. Department of Commerce (2014) reveal that 20 % of U.S. residents will be will be aged 65 or older compared with just 13 % in 2010. By the year 2050, the population aged 65 or older is projected to be over 83 million, almost doubling the current population for that age group of 43 million (U.S. Department of Commerce, 2014).

The changing ratios of the sexes at older ages may have social and economic implications. Female life expectancy has exceeded the male life expectancy in the past with women outnumbering men in the population aged 65 or greater (U.S. Department of Commerce, 2014), but this is changing. The lifespan gap is narrowing between women and men. Men are projected to have an increase in life expectancy over the next few decades according to the U.S. Department of Commerce (2014). Together, these changes may impact the marital status and living arrangements of this age group, which may result in a smaller percentage of older women living alone (U.S. Department of Commerce, 2014). Spouses may be able to care for one another for a longer period of time due to both surviving longer, which may result in a greater need for assisted-living

arrangements or institutional placement of couples as they age (U.S. Department of Commerce, 2014).

Older adults consume many health care services due to living longer and having chronic conditions such as diabetes, hypertension, and heart disease, often requiring an inpatient hospital stay according to the Institute of Medicine (IOM) report *Retooling for an Aging America: Building the Health Care Workforce* (IOM, 2008). Delirium, an acute confusional state (in comparison to dementia, a chronic confusional state) is a frequent complication in patients who are 65 years of age or older (Inouye, 2006), and if left untreated, it results in negative sequelae including increased mortality. Delirium is considered a medical emergency (Wachter, 2011).

Problem Statement

Delirium is a complex problem that is being seen more often on medical-surgical units due to the number of patients who are aged 65 years or older. According to the Health care Cost and Utilization Project, Statistical Brief # 6 (Russo & Elixhauser, 2006), patients aged 65 or older had more hospital stays than any other age group, accounting for more than 30% of all hospital stays. The rapidly expanding elderly population reached 40.3 million individuals in 2010; the largest level chronicled in the twenty-first century, and is projected to continue to rise, having a profound impact on hospitals and health care as a whole. According to Leslie, Marcantoni, Zhang, Leo-Summers, and Inouye (2008), the economic impact of delirium is considerable, with the average cost per day of delirium patients reaching nearly three times the cost of patients not having delirium. Total health care costs associated with delirium range from $38 billion to $152 billion each year, equaling the costs of injuries from falls and diabetes mellitus, both of which

receive significantly more recognition than delirium. Health care administrators must focus on delirium due to the long-lasting sequelae for this patient population including increased morbidity and mortality, decreased functional status, and need for institutionalization following an acute care stay as well as for the socioeconomic impact (Leslie & Inouye, 2011).

Bedside nurses fail to recognize more than 50% of the cases of delirium in the elderly patient population with (Collins, Blanchard, Tookman & Sampson, 2010; Lemiengre et al., 2006; Rice et al., 2011). This presents a significant opportunity to improve patient care and outcomes. McDonnell & Timmons (2012) state that delirium can be reduced as much as 30% with early recognition and prevention approaches.

The problem statement for this project was as follows: A screening tool and nurse education (in comparison with no screening tool) will improve the identification of patients' aged 65 or older with delirium on medical-surgical units. The outcome goal of the project was to improve bedside nurse recognition of delirium in this high-risk patient population on medical-surgical units, thereby decreasing the negative sequelae of delirium. This was accomplished by providing nurse education and training on delirium in phase one. Phase two will include the use of the Confusion Assessment Method (CAM).

Purpose Statement

The purpose of the quality improvement project was to examine bedside nurse education and use of an electronic screening tool CAM on medical-surgical units to identify patients' aged 65 or older who are at risk for or develop delirium during a hospital stay. Recognition and treatment of delirium has been linked to patient outcomes

and is a measure of quality of care and patient safety according to the National Quality Measures Clearinghouse of the U.S. Department of Health and Human Services Agency for Health care Research and Quality (n.d.). Delirium is a significant health issue often leading to poor outcomes for patients' aged 65 or older and is preventable in 30 to 40% of cases (Inouye, 2006), yet it remains unrecognized in more than 50% of cases (Collins et al., 2010; Lemiengre et al., 2006; Rice et al., 2011). Kleinpell, Fletcher, and Jennings (2008) estimate that almost half of all hospital admissions are 65 years of age or older. According to the Centers for Disease Control and Prevention (2010), the average length of stay (LOS) for this patient population has decreased to 5.5 days from 8.0 days in 1990. The shorter LOS can make it more challenging to assess and address the needs of this at-risk population. As the general population ages and more elderly patients are hospitalized, it is more critical now than ever for hospital staff, particularly bedside nurses with gerontological nurse competencies, to take action to prevent and treat delirium appropriately. This is important in order to minimize poor patient outcomes which impact hospital finances and publicly reported quality of care metrics.

Goals and Objectives

The goal of the proposed project was to reduce the incidence of delirium in patients' aged 65 or older on medical-surgical units in the acute hospital setting. This is in alignment with the IOM in *Crossing the Quality Chasm: A New Health System for the 21st Century* (IOM, 2001) to improve the quality of care for all Americans. The IOM states that health care should be safe, effective, patient-centered, timely, efficient, and equitable. The IOM has heralded a call to consistently provide high quality care, but the health care system has fallen short in providing evidence-based care for patients' aged 65

or older who are at risk for or develop delirium. The organization where the project took place lacked an education program for bedside nurses on delirium. Very few nurses were able to demonstrate a working knowledge of delirium at the bedside. There was no process or tool in place to support bedside nurses in identifying patients at risk for or with delirium. Delirium recognition and treatment are also not specifically taught in nursing schools, which leaves a large gap in knowledge for bedside nurses (Wendel, Durso, Cayea, Arbaje, & Tanner, 2010).

The delirium project was developed to create a structured program to enhance nurse education and promote utilization of an electronic tool to assist nurses in identifying patients with delirium or at risk for delirium so that appropriate interventions and treatment may follow. Global outcomes include improved quality of care and increased patient safety with nursing sensitive indicators already routinely collected and monitored on the facility-balanced scorecard. These nursing sensitive indicators included falls, infections, and pressure ulcers. Patients with delirium are at higher risk for these adverse events (Foreman, Mion, Tryostad, & Fletcher, 1999).

Objectives to help meet the IOM's initiative to improve quality of care included increasing bedside nursing knowledge regarding delirium as measured by comparison of pretest and posttest scores. An educational Microsoft PowerPoint was completed by all bedside nursing staff prior to completing the posttest with a score of eighty being the acceptable score. If a score of eighty was not achieved, the bedside nurse was required to repeat the education. The second objective was to increase by 50% bedside nurse recognition of patients' aged 65 or older on medical-surgical units at risk for or with delirium as documented on the phase two CAM tool.

Theoretical Foundation

A model was used as a conceptual framework to guide this project and enrich the value of causal relationships that were identified (McEwen & Wills, 2011). The model most appropriate to the problem of delirium in patients' aged 65 or older on medical-surgical units was the program logic model. This was the most appropriate model since it is based on an action theory about the causal links among the components of a program, which is most suitable when examining delirium in the elderly (Hallinan, 2010). According to Hallinan (2010), the program logic model links resources and activities with outputs and outcomes. This model maps out the relationships between the factors that can contribute to the outcomes of a program and helps to focus on an overall view of delirium while keeping in mind the different components and causal relationships. This model was useful in communicating the purpose and anticipated results of the delirium project to stakeholders and policymakers and helped to identify potential obstacles so these could be addressed early on in the program (CDC, 2008). A more detailed explanation of this model will be provided in Section Two.

Significance of the Project

Nationally, health care providers are not taking an active role to systematically address delirium prevention and treatment despite the known serious sequelae and the billions of dollars spent each year in caring for these patients, an amount equaling that spent for diabetes mellitus and falls, which receive far more attention (Young & Inouye, 2007; Leslie & Inouye, 2011). Delirium presents challenges for those in the health care field and may serve as a marker of quality care in the acute care setting (Inouye, Schlesinger, & Lydon, 1999). More specifically, "monitoring rates of delirium can

improve quality of care, because delirium can be linked to processes of care and is highly sensitive to events that occur during hospitalization" (Inouye et al., 1999, p. 565).

Implications for Social Change

Society's ingrained view of delirium as a normal part of aging contributes to the lack of recognition of delirium by the health care community as a true medical emergency (Inouye, Schlesinger, & Lydon). Although delirium is now recognized in the literature as potentially preventable, resources are not being allocated for clinical care, despite the socioeconomic impact (Leslie & Inouye, 2011). The costs associated with delirium are substantial, with delirium complicating hospital stays for 20% or more of the 11.8 million elderly persons in the United States, equating to health care costs ranging from $143 billion a year to $152 billion nationally (Inouye et al., 1999). This data from 1999 has grown, with the 2010 Census Bureau stating there are currently 40.3 million people over the age of 65, which represents 13.0 percent of the entire population (U.S. Department of Commerce, 2014). Further costs may also be incurred if the patient is sent to a post-acute care facility for rehabilitation services due to functional decline, a need for skilled nursing care, or home care (Inouye, et al, 1999). In many communities, there is a lack of skilled nursing beds making placement of patients with delirium more difficult. The Medicare cost to society for the care of these patients must also be considered. The burden associated with delirium is vast and action must be taken by the health care community at the local, regional, and national levels to improve the quality of care to this at-risk patient population.

Definitions of Terms

The following definitions of terms were used in this project:

Bedside Nurse. A bedside nurse is a registered professional nurse who is authorized by a license under the Georgia Registered Professional Nurse Practice Act to practice as a registered professional nurse (Georgia Board of Nursing, 2013) and provides direct patient care at the bedside.

Confusion Assessment Method (CAM). CAM was developed by S. Inouye, MD, MPH and an expert panel to facilitate non psychiatrically trained clinicians to correctly and rapidly identify delirium in clinical settings (Inouye et al., 1990). The CAM tool has been validated with diagnoses made by psychiatrists and has demonstrated greater than 90% specificity and 90% predictive accuracy (Inouye et al, 1990). This tool has also been validated extensively in different patient populations and is considered the leading model for measuring delirium (Lemiengre, et al, 2006).

Delirium. Delirium is an acute confusional state defined as an acute disorder of attention and cognition (Inouye et al, 1990, p. 941.)

Gerontology. The scientific study of aging and the process of becoming old (Merriam-Webster's online dictionary, 2015).

Medicare. Medicare is a federally supported health insurance program for people aged 65 or older, people with qualifying disabilities, and people with end-stage renal disease (Centers for Medicare and Medicaid Services, n.d.)

Assumptions and Limitations

Assumptions

According to Grove, Burns, and Gray (2013), assumptions are statements taken for granted or considered true, even though they have not been scientifically tested. There were three assumptions for this project. The first assumption was that the delirium project

would be a positive experience for bedside nurses and stakeholders in the organization. The second assumption was that education for bedside nurses would increase the nurse's knowledge, confidence, and competency in assessing patients' aged 65 and older for delirium. The third assumption was that the delirium project would be cost effective to the hospital.

Limitations

Limitations are theoretical and methodological restrictions or weaknesses in a study that may decrease the generalizability of the findings (Grove, Burns, & Gray, 2013). Three limitations existed for this project. The first limitation was that the project was done at the hospital where I am employed. The second limitation was that my current role at the hospital was the Chief Nursing Officer, which could have an impact on bedside nurse participation and stakeholder involvement. The final limitation was that the project may not be generalizable to other hospitals in the division.

Summary

Section 1 presents an overview of the evidence-based project on delirium, highlighting the significant impact delirium has on patients' aged 65 and older, which could result in poor outcomes including increased mortality. As the population in this high-risk age group grows rapidly, the impact of delirium will be more pronounced and will be felt by health care providers, health care organizations, the government, and society as a whole due to the rising costs of health care. Bedside nurses play a pivotal role in recognizing delirium as they spend more time at the bedside than other health care professionals, including physicians (Akechi, 2010). Bedside nurses must be educated

regarding delirium prevention, recognition, and treatment to decrease the incidence of delirium (Gordon, Melilo, Nannini, & Lakatos, 2013.)

Section 2: Review of the Scholarly Literature

Introduction

The purpose of this quality improvement project on delirium was to develop education and training for bedside nurses to support prevention, recognition, and treatment of delirium in patients' aged 65 and older on medical-surgical units. A comprehensive review of the scholarly literature was completed to identify causal relationships for the failure of bedside nurses to recognize delirium and to justify the development of a delirium prevention, recognition, and treatment program. Section 2 of the project examines the scholarly literature regarding the concept and history, clinical features, etiology, risk factors, prevention, management, and the organizational approach for addressing delirium, as well as the program logic model to guide the course of action for the program.

Literature Search Strategy

The literature search was conducted electronically using the following major electronic databases: Cochrane Library, Medline, Cumulative Index for Nursing and Allied Health Literature, ProQuest Psychology Journals, and PubMed. Inclusion criteria included articles in the English language or translated into the English language, and original articles. Reference lists from original articles were also included. Articles that were excluded included articles that focused on a setting other than the medical-surgical setting. Scholarly articles older than 10 years were excluded unless the article was a landmark study or was written by a leading expert in the field of delirium, given that most research on delirium did not become prominent until the 1990's. Search terms included *acute confusion*, *confusion*, *Confusion Assessment Method*, *cost*, *delirium*,

education, *elderly*, *hospitalization*, *causal links*, *nurse education*, *older adult*, and *recognition*. A Boolean search with key words was used along with operational words (and, or) to produce more relevant results.

Delirium

Concept of Delirium

The term delirium is derived from the Latin word "delirare," which means to go out of the furrow or to deviate from a straight line (Adamis, Treloar, Martin, & McDonald, 2007). The concept of delirium has existed in the literature for thousands of years and dates back to Aulus Cornelius Celsus (ca 25 BC-ca 50), the great Roman medical author. Celsus described mental disorders during fever or head trauma, using the term phrenitis instead of delirium (Adamis, Treloar, Martin & McDonald, 2007). Hippocrates had previously introduced the term phrenitis in 500 BC "to describe mental abnormalities that were caused by fever, poison, or head trauma" (Adamis, Treloar, Martin & McDonald, 2007, p. 460). Hippocrates was also noted to have used approximately sixteen different words to refer to delirium; however, the clinical meaning remained consistent until the 19th century (Adamis, Treloar, Martin & McDonald, 2007). During the 19th century, delirium became associated with the concepts of disordered consciousness and confusion (Lipowski, 1991). It was also during this time that delirium caused by alcohol was being differentiated as a separate disorder (Adamis, Treloar, Martin & McDonald, 2007).

Efforts in the twentieth century to further classify mental disturbances, including delirium, brought about the development of two distinct systems: the DSM (Diagnostic and Statistical Manual of Mental Disorders) from the American Psychiatric Association

and the ICD (International Classification of Diseases) from the World Health Organization (Adamis, Treloar, Martin & McDonald, 2007). The DSM-III included a *clouding of consciousness* as the main symptom of delirium, but this was later removed as delirium "was too difficult to assess" (Deksnyte, Aranauskas, Budrys, Kasiulevicius, & Spoka, 2012, p. 484). Experts later added delirium back into the DSM-IV and ICD-10 with clouding of consciousness as a characteristic of delirium (Deksnyte, Aranauskas, Budrys, Kasiulevicius, and Spoka, 2012). The concept of delirium has changed over time, remains complex, and has had many synonyms assigned to it, but for the purpose of this project, the concept of delirium was defined as an acute confusional state, which is the term most prominent in current literature and the one used by delirium experts.

Clinical Features of Delirium

Inouye (2006) described the clinical features of delirium, which include an acute onset, a fluctuating course, inattention or difficulty focusing and following commands or keeping up a conversation, disorganized thinking, altered level of consciousness, cognitive deficits, perceptual disturbances such as illusions or hallucinations, psychomotor disturbances, an altered sleep-wake cycle, and emotional disturbances such as fear, paranoia, depression, apathy, anger, and others.

There are three distinct clinical subtypes of delirium: hypoactive, hyperactive, and mixed (Young & Inouye, 2007). Hypoactive delirium is more common than the hyperactive type of delirium. Patients with this form of delirium may present clinically with decreased psychomotor activity, viewed as lethargic, apathetic, somnolent, and experiencing a confusion that is not readily identifiable with a cursory conversation and is subtler than the hyperactive type of delirium (O'Keefe & Lavan, 1999; Saxena &

Lawley, 2009). Hypoactive delirium is often not considered significant by clinicians due to the lack of disruptive, unusual behaviors and may be misdiagnosed as depression (Saxena & Lawley, 2009). From a quality and safety perspective, patients with hypoactive delirium are at risk for pressure ulcers and nosocomial infections (McCusker et al., 2003; O'Keefe & Lavan, 1999).

The hyperactive type of delirium is the most easily recognized type of delirium, with increased psychomotor activity being readily evident (Saxena & Lawley, 2009). This type of delirium is "often associated with adverse effects of anticholinergic medications, drug intoxication, and withdrawal" (Saxena & Lawley, 2009, p. 405). Patients with the hyperactive form of delirium may present clinically with agitation. Patients with hyperactive delirium may also have "psychosis, restlessness, impulsiveness, illusions, hallucinations, and paranoia" leading to the patient being a risk to self or others as the patient may become uncooperative and combative during these episodes (Schofield, Tolson, & Fleming, p. 166). From a quality or care and safety perspective, the patient with hyperactive delirium is at risk for falls and for pulling out invasive lines (O'Keefe & Lavan, 1999; Saxena & Lawley, 2009).

The mixed type of delirium is the most common of the three subtypes of delirium and presents as a fluctuation of features of both hyper- and hypoactive delirium (Liptzin & Levkoff, 1992). Essentially, "patients can wax and wane" between hypoactive and hyperactive delirium during a shift, course of hospitalization, or course of the disease (Inouye, Westendorp, & Saczynski, 2014, p. 918). According to Stagno, Gibson, and Breitbart (2004), the mixed subtype of delirium has the worst prognosis, while hyperactive delirium presents the best prognosis.

Etiology and Risk Factors for Delirium

Delirium is seldom caused by a single factor and is widely accepted in the literature as being multifactorial in nature (Inouye, et al., 1999; Inouye, 2006; Inouye, et al., 2014; Saxena & Lawley, 2009). Risks for delirium may be divided into two categories: predisposing and precipitating factors (Kalish, Gillham, & Unwim, 2014). The multifactorial model of delirium in older people depicts delirium as being dependent on the patient's vulnerability at admission (i.e., predisposing risk factors) and precipitating risk factors or harmful insults that occur during hospitalization (Inouye & Charpentier, 1996; Inouye, Westendorp, & Saczynski, 2014).

Predisposing Risk Factors

Predisposing risk factors at admission according to Inouye (1996) include demographic factors such as being age 65 or older and of the male sex. Cognitive status risk factors include dementia, cognitive impairment, history of delirium, and depression. Functional status includes functional dependence, immobility, low level of activity (sedentary), and a history of falls. Sensory impairment (hearing and sight) is also a predisposing risk factor. Decreased oral intake (dehydration and malnutrition) also plays a role as a predisposing risk factor as do drugs, which includes treatment with multiple psychoactive drugs, alcohol abuse, and polypharmacy, with more than three new medications added (Siddiqi, Holt, Britton & Holmes, 2007). Coexisting medical conditions are also considered predisposing risk factors and include severe illness, multiple coexisting conditions, chronic renal or hepatic disease, history of stroke, neurologic disease, metabolic disorders, fracture or trauma, terminal illness, and human immunodeficiency virus (HIV).

Precipitating Risk Factors

Inouye (2006) cites a list of precipitating risk factors (i.e., harmful insults that occur during hospitalization) including treatment with the following drugs: sedative hypnotics, narcotics, anticholinergic drugs, and polypharmacy. Alcohol or drug withdrawal are also precipitating risk factors. Neurologic events such as stroke, intracranial bleeding, and meningitis or encephalitis can contribute to delirium. Contributing illnesses include infections, iatrogenic complications, hypoxia, shock, fever or hypothermia, anemia, dehydration, poor nutritional status, low serum albumin levels, and metabolic imbalances (Inouye, 2006). Surgery is a significant precipitating risk factor according to de Castro et al. (2014), with the highest rates of postoperative delirium occurring in elderly patients following orthopedic surgery (Schuurmans et al., 2003), major cardiac surgery (Koster et al., 2008), and vascular surgery (Bohner et al., 2003). Environmental precipitating factors also play a role and include transfer or admission to an intensive care unit, the use of physical restraints, the use of an indwelling bladder catheter, multiple procedures, pain, and emotional stress. Prolonged sleep deprivation may also precipitate delirium. The more risk factors present, the higher the risk that the patient develops delirium (Inouye, 1999; Siddiqi, et al., 2007).

Diagnosis of Delirium

The diagnosis of delirium is primarily a bedside clinical diagnosis, which is "often unrecognized and easily overlooked" (Inouye, Westendorp, & Saczynski, 2014, p. 914). The diagnosis of delirium requires an astute clinician who is well versed in the clinical features of delirium given that no diagnostic tests exist to diagnose delirium (Young & Inouye, 2007). The patient evaluation should be individualized to include the

patient's chief complaint or concern, medical history, current illness, and any physical exam findings. An accurate history is essential to establish the patient's baseline mental status. Gathering this information from the patient's family member or caregiver is important as well as completing a cognitive assessment (Inouye, Westendorp, & Saczynski, 2014). Diagnostic neuroimaging may not be required unless there has been a head trauma or bruising on the upper body (Wachter, 2012). Basic diagnostic testing, including complete blood count, electrolyte levels, renal and liver panel, urinalysis and electrocardiography, of all older persons presenting with delirium is necessary to rule out any underlying medical conditions (Kalish, Gillham, & Unwin, 2014). A standardized validated bedside screening tool or instrument can be beneficial in identifying delirium. The most extensively used instrument is CAM, which takes 5 minutes to administer, is evidence-based, and is strongly supported with a sensitivity of 94%, specificity of 89% and high interrater reliability, has been used in in excess of 4000 published studies, has been translated into more than 10 languages, and has been adapted for use in various clinical settings (Wei et al., 2008; Wong et al., 2010; Inouye, et al., 2014).

Prevention and Management of Delirium

Preventing delirium is the primary and most effective strategy for reducing the complication of delirium (Inouye, 2006). Bedside nurses play a crucial role in delirium prevention due to their amount of time spent at the bedside and are in the unique position to quickly address the predisposing and precipitating factors which can help decrease the risk for developing delirium while the elderly patient is in the acute care setting (Inouye, 2006). One strategy alone is not sufficient since delirium is multifactorial therefore a multicomponent strategy must be used. Once delirium has occurred interventions will be

less successful (Inouye, Bogardus, Charpentier, Leo-Summers, Acampora, Holford, & Cooney, 1999).

A study by Vidan et al. (2009) demonstrated that "a multicomponent, non-pharmacological intervention plan integrated into routine practice reduced delirium during hospitalization in older patients, improved quality of care and was implemented without additional resources" (p. 2029). Multicomponent interventions specifically cited in this study included the following: orientation of all patients with clocks and calendars in each room, reminding patients daily of the day, date, place and reason for hospitalization, and giving the family a letter which detailed the delirium prevention interventions and encouraged family presence at the bedside. Patients were reminded to wear their own glasses and hearing aids to avoid sensory impairment. Sleep interventions focused on maintaining an uninterrupted sleep schedule with medications and treatments being avoided during sleep time. Hot milk and chamomile tea were offered before bedtime. All patients were expected to get out of bed every day and ambulate around their room and nursing unit with daily reminders being given by the staff. If the patient could not be mobilized, then changing positions in bed every three hours was maintained. Continuous intravenous therapy was avoided, as was the use of physical restraints. If a urinary catheter was necessary, it was removed as soon as possible. Hydration was prescribed and maintained by administering glasses of water similar to a medication: four glasses a day. Nutrition was monitored daily by recording intake and administering nutritional supplements.

Medications were reviewed by geriatricians with avoidance of specific medications such as psychoactive and sedative drugs. Sedative medications considered

for dose reduction during this review process were benzodiazepines, neuroleptics, and opioid analgesics as well as drugs with anticholinergic effects, which included amitriptyline/nortriptyline, buscapine, oxybutynin, and biperiden. These multicomponent interventions are simple, easy to operationalize and improve patient outcomes. Other studies (Akunne et al., 2012; Inouye et al., 1999; Lundstom et al., 2005; Robinson et al., 2008; Ward et al., 2014) have identified similar results with these basic multicomponent interventions and have not reported any harm.

The management of delirium is focused on identifying and treating the underlying cause or combination of causes since delirium may be the only indication of a life threatening illness. (Saxena & Lawley, 2009). Delirium may require the prescription of medications to treat the behaviors that may be manifested such as agitation and hallucinations, particularly if the patient is a danger to themselves or others. Haloperidol (Haldol) is the traditional medication or first drug of choice in treating the behavior disturbances that may occur with delirium. Olanzapine (Zyprexa), in addition to Haldol, is also included in the delirium guideline summary by the Agency for Health care Research and Quality (2010). According to O'Mahony, Murthy, Akunne, and Young (2011) in the Synopsis of the National Institute for Health and Clinical Excellence Guideline for Prevention of Delirium (2011) pharmacological approaches to the prevention and treatment of delirium are not recommended. Non-pharmacological multicomponent interventions continue to be the most effective prevention and management strategy for delirium (O'Mahony, Murthy, Akunne, & Young, 2011).

Organizational Approach

An initial organizational approach was needed to address delirium since delirium

interventions are multicomponent. Physical therapists, pharmacists, volunteers, a geriatrician, nurses, and patient care technicians are essential members of the interdisciplinary team. These team members were crucial in carrying out the necessary interventions for prevention and treatment of delirium. Front-line staff was also a must for an organizational approach since front line staff must be engaged in the process and demonstrate "buy-in" for the program. Teamwork and leadership helped drive the success of the program (Reston & Schoelles, 2013).

Conceptual Framework

The logic model, also known as the logic framework, served as the model for this project. "The use of a logic model is an effective way to ensure program success" according to Kellogg (2004, p. 5). The logic model is a road map that depicts how a program will work. This model served as a systematic way to demonstrate the causal relationships amongst the components of the program, which included available resources or inputs, activities, outputs and impact (Kellogg, 2004; CDC, 2008; Hallinan, 2010; Community Tool Box, 2014). The Kellogg Foundation (2004) defined the logic model components as follows: Inputs are the resources that go into a program to do the work, which includes the human, financial, organizational, and community resources. Inputs may also include constraints such as regulations or funding gaps (Community Tool Box, 2014). Activities are specific events, actions or interventions that take place to bring about changes. Outputs are a product or results of the program activities and services delivered. Outcomes include short, intermediate and long-term outcomes and demonstrate the impact of the program or changes in behavior. Impact is the change occurring as a result of the program. The logic model brought together planning,

implementation, and evaluation, and served as a mechanism to provide feedback to the program stakeholders. The logic model also served as a communication and marketing tool for the project as this model described the program, focused attention on the needed resources, helped market the strategy of the program, and allowed for combining evidence-based practices from previous research with new ideas that the clinicians believed would make a difference (Kellogg, 2004; Community Tool Box, 2014). The logic model was flexible and could be adjusted or altered as the program plans evolved resulting in a better program. The evaluation phase of the logic model will be covered more in depth in Section 3.

Summary

The concept of delirium has existed for more than 2000 years and remains a complex syndrome to recognize for both physicians and nurses alike regardless of the specific subtype. Bedside nurses play a critical role in the prevention and treatment of delirium but must be trained and educated on the clinical features, etiology, risk factors, prevention and clinical management of delirium as well as the use of a screening tool. Clearly, multicomponent interventions are the best prevention measure given that delirium is seldom caused by one single factor and may overlap with dementia. Having an organizational approach to manage the prevention and treatment of delirium is most desirable given that multicomponent interventions are necessary to improve the quality of care for the patient population aged 65 and older. The management and treatment of delirium is not complex but focuses on identifying the underlying cause(s) in addition to implementing the basic multicomponent interventions for the prevention of delirium. The prevention of delirium is very likely to reduce the incidence of delirium and increase

quality of care by minimizing falls, infections, and pressure ulcers. As the aging population grows over the next thirty years, the prevention of delirium becomes even more of a priority given the negative sequelae of delirium and the economic impact to the patient, the health care system, the government for health care sponsored insurance plans (Medicare), and society as a whole.

Section 3: Approach

Introduction

The purpose of the quality improvement project was to examine bedside nurse education and use of an electronic screening tool (CAM) on medical-surgical units to identify patients' aged 65 or older who are at risk for or develop delirium during a hospital stay. The vice-president of quality for the hospital was the organizational project champion for the delirium project while I took the leadership role in directing the project. This section outlines the process for the implementation, evaluation, and timeline of the delirium project. The Gantt chart in Figure 1 shows the project activities and timeline.

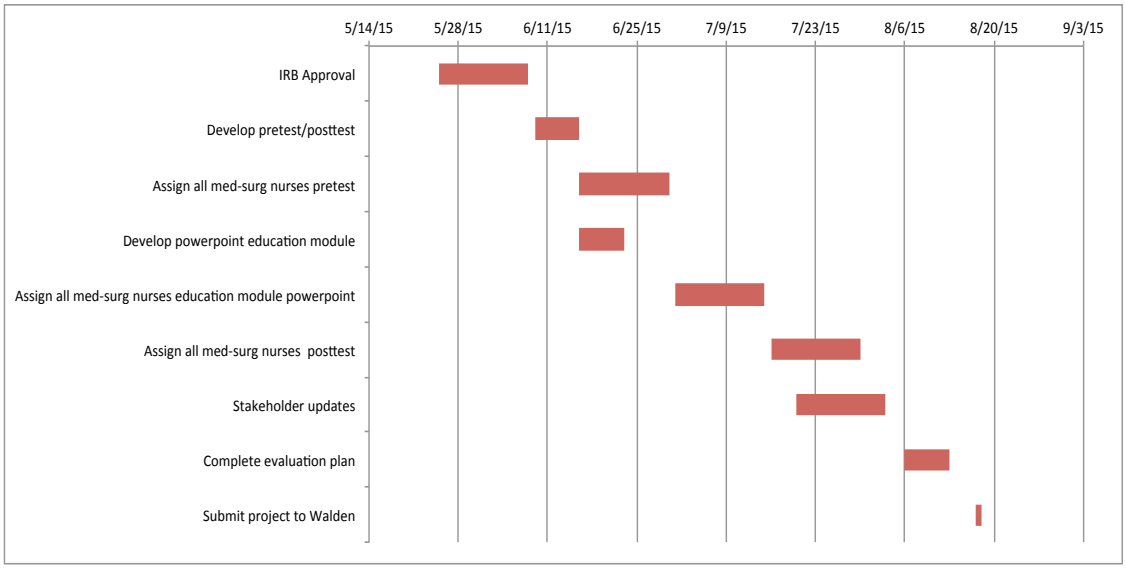

Figure 1. Gantt chart with project timeline

Interdisciplinary Project Team

Having an interdisciplinary team was crucial to the success of the delirium project given that many of the interventions were multicomponent and required teamwork. According to Kelly (2011, p.193) "effective teams do not happen, they are thoughtfully and purposefully designed." Members of the interdisciplinary team, the internal

stakeholders, were selected based on their knowledge, skills, and abilities (CDC, n.d.) that paired well with the needs of the program. Also included in the selection of the team members was their propensity to be innovators and early adopters, which served as a strategy to gain acceptance of the delirium program (Kelly, 2011).

The internal stakeholders that were involved in the planning process included bedside nurses; physicians (especially the hospitalists who see over 90% of all patients in the hospital); the chief medical officer, who also served as the medical director of the hospitalist group; the associate medical director of the hospitalist group, who also is a geriatrician; patients in the hospital over the age of 65 on medical-surgical units who were at risk for or developed delirium; administration; medical-surgical nursing unit directors and managers; the director of staff development; and the vice president of quality. External stakeholders included families of patients in the targeted patient population, physicians in the community, and hospital division leadership.

Strategies to facilitate the stakeholders' involvement included having the vice president of quality serve as the project champion since that individual was well versed at running meetings, had a good reputation in the organization, and could facilitate integrating new strategies into the many levels of the organization (Compas, Hopkins, & Townsley, 2008). For the bedside nurses, a strategy to involve them in the planning process included the opportunity for them to have their voices heard by being at the table with the other leaders and being able to facilitate change to improve care of this high risk patient population. The nurses in the organization had voiced frustration in providing care to this challenging population, especially when the patient was in the hyperactive phase of delirium. Therefore, including these nurses in the decision- making process was most

important. The hospitalist group was strongly involved and sought to have a geriatric service line group created to help address these issues, so the positive outcome for the hospitalists' involvement was setting up a geriatric service line group in which the delirium project was considered a part of the geriatric service line quality improvement initiative. Involving patients from the hospital who were in the target population and obtaining their input was a critical component of stakeholder involvement. A strategy to facilitate their involvement was simply to provide information on delirium and the negative sequelae that often followed, which served as motivation to prevent this complication of hospitalization.

Review of Evidence

The interdisciplinary team was provided an overview of the scholarly literature, theoretical framework, and logic model to guide the work of the team. The team was assembled at the local hospital, which was located in Northwest Georgia, as a pilot that would then be implemented at 15 hospitals across the division in three states: Kentucky, Tennessee, and Georgia. The pilot hospital and the other 15 hospitals in the division are a part of the largest hospital owning company in the United States, so the delirium project had the potential to have an significant impact on quality of patient care and company finances across the United States, especially if the project were to be adopted in all 135 hospitals that the company owns.

The logic model served as the framework for the project, communicated the purpose of the program along with desired results, and served as a reference point for all stakeholders in the program (CDC, 2008). This model helped guide the stakeholders along the way and could be changed periodically to indicate new evidence or

expectations as the program matured. The model also helped identify any barriers to the program so they could be addressed promptly (CDC, 2008). The logic model (Figure 2) was an effective tool for program evaluation and helped determine whether the program produced the desired effect of improving bedside nurse recognition of delirium in patient's aged 65 or older on medical-surgical units (Hodges & Videto, 2011).

Inputs	**Outputs**	
	Activities	*Participation*
Hospital funding (Phase 1)	Assemble Interdisciplinary team	Interdisciplinary team fully engaged and participating in activities
Staff time (Phase 1)	Train bedside staff on delirium (pretest, education module, posttest)	Staff successfully complete the tests with a score of 80% or higher
Technical assistance from Senior Nurse Clinical Analyst (Phase 2)	Build the Short Confusion Assessment Method into the electronic health record	The Short Confusion Assessment Method is fully operational and functions as designed
Staff Development/Geriatrician time (Phase 2)	Train bedside caregivers on use of the computerized Short Confusion Assessment Method	Bedside staff demonstrate competency with the computerized Short Confusion Assessment Method

Assumptions
- Delirium is a complication of hospitalization and is associated with poor health outcomes in patients' ages 65 or greater.
- Delirium is potentially preventable with education and training, the use of a screening tool, and multicomponent interventions.

Outcomes -- Impact		
Short	***Medium***	***Long***
The interdisciplinary team is trained on the clinical guidelines for delirium	The interdisciplinary team will share their success with the division hospitals	Community health education campaign is completed with skilled nursing facilities
Change in attitude of bedside caregivers regarding delirium	Multicomponent interventions are implemented on 80% of all patients ages 65 or greater	Multicomponent interventions are implemented 80% of the time and added into the care plan
The Short Confusion Assessment Method is completed 80% of the time at admission	The Short Confusion Assessment Method is completed every shift following admission	The Short Confusion Assessment Method is completed 80% of the time at admission and every shift following admission
80% of bedside staff demonstrate competency with the computerized Short Confusion Assessment Method	New bedside staff are oriented during hospital orientation on use of the computerized Short Confusion Assessment Method	The Short Confusion Assessment Method is ingrained in the culture of the organization and is incorporated into the care plan 80% of the time

External Factors
- There are not enough long-term care beds in the community currently which will be exacerbated in the future with the rapidly rising number of elderly in the United States.

Figure 2. Program logic model for the delirium program

Ethical Considerations

Approval for the project was obtained through Walden University and the Institutional Review Board prior to developing the delirium project. Given that the Short CAM is a copyrighted tool, written permission to use this instrument will be obtained prior to developing the tool in the electronic health record.

Develop the Delirium Program

Education Development

The delirium program was intended to raise bedside nurses' knowledge level of delirium in the medical-surgical setting. A pretest/posttest (Appendix A) was developed to determine medical-surgical nurses' baseline knowledge of delirium. An educational module was delivered to all medical-surgical bedside nurses using a PowerPoint presentation in an online learning management system (Appendix B). Retesting of knowledge regarding delirium occurred once the nurse completed the educational module with the posttest being the same as the pretest. Also included in the curriculum was web-based training on the Short CAM.

Educational Delivery Modalities

The educational PowerPoint along with the pretest/posttest was developed at the local level and will later be expanded to include all the hospitals in the division once the pilot is completed. The Short CAM is available via web-based training and will also be included as education at the local and division level for all hospitals in phase two.

Content Validation

The content of the pretest/posttest along with the educational module on delirium are derived from the scholarly literature. The pretest/posttest, written by the researcher, included case studies, in which the nurse had to apply knowledge and critical thinking. Case studies are an effective teaching tool and serve to bridge the gap with theory and actual practice to achieve the best patient outcomes according to Popil (2011). The Short CAM is already a well-validated tool.

Develop the Delirium Implementation Plan

The delirium project implementation plan occurred in two phases. Phase one was validating that the organization had a problem with bedside nurse identification of delirium in patients' aged 65 and older on medical surgical units and was the focus of this quality improvement project. Phase two will be completed at a later date after the initial project is completed and will be based on the results of phase one. Phase two will involve obtaining copyright from The Hospital Elder Life Program (2015) for use of the Short CAM tool as permission must be obtained for use in an electronic medical record or for any for-profit use. The cost of using this copyrighted tool will also be incorporated into phase two. Staff will receive education and training on use of the short CAM tool during phase two.

The VP of Quality served as the project leader and was the liaison with the researcher and the interdisciplinary team. Phase one of the implementation plan for the pilot hospital included the collection of baseline data using the logic model. This data included inputs, outputs, outcomes, contextual or external factors and assumptions according to the logic model. An accurate budget was also developed and was "critical to the success of the program" (Hodges & Videto, 2011, p.113). The interdisciplinary team designed the implementation plan for the medical-surgical units at the pilot hospital. Once all interdisciplinary team members received education, the delirium project was implemented.

Develop Evaluation Plan

The development of the evaluation plan began very early in the planning process with four main steps. These steps included clarifying program objectives and goals,

developing evaluation questions, developing evaluation methods and setting up a timeline for evaluation activities (Community Toolbox, 2014). It was important for the researcher to quantify and evaluate the benefit of an intervention and not to assume the intervention was beneficial (Friis & Sellers, 2014). The interdisciplinary team played a significant role in the development of the evaluation plan, developed further questions and offered insight.

Anticipated results of the educational interventions from the delirium program included an increase in bedside nurse recognition of delirium as evidenced by an increase in the posttest scores as compared to the pretest scores. Additionally, with the use of the screening tool (Short CAM) in phase two, delirium will be identified early in the target population thereby preventing the negative sequelae of delirium, which leads to an increase in LOS for the medical-surgical units.

Summary

Delirium is a devastating complication of hospitalization for the elderly and may be prevented with simple, low to no cost interventions. With the rapidly rising number of people in the United States reaching the ages of 65 or greater, the implication of this quality improvement project is profound and may lead to improved health outcomes for many patients' aged 65 or older on medical-surgical units. The evaluation of the delirium project will help strengthen the program.

Section 4: Discussion and Implications

Introduction

The purpose of the quality improvement project was to examine bedside nurse education and use of an electronic screening tool (CAM) on medical-surgical units to identify patients' aged 65 or older who are at risk for or develop delirium during a hospital stay. The goal of the project was to reduce the incidence of delirium in patients' aged 65 or older on medical-surgical units in the acute hospital setting. The first step in this quality improvement project was to determine if there was a gap in knowledge for bedside nurses regarding delirium in the medical-surgical setting for patients aged 65 years and older. Specifically, the null hypothesis for this project was that there is no difference in the pretest scores and the posttest scores following an educational PowerPoint. A pretest, education, and posttest (Appendices A and B) were developed and administered following Institutional Review Board approval (Appendix C). An invitation for participation via email was sent to all medical-surgical registered nurses one week prior to opening the project. The project was opened for bedside nurses to complete the pretest immediately followed by the educational PowerPoint. Participants were required to take the pretest prior to viewing the PowerPoint. The pretest was then re-administered electronically and served as the posttest.

Summary and Evaluation of Findings

A total of 104 bedside nurses on four medical-surgical units had the opportunity to voluntarily participate in this quality improvement project in a 112-bed community hospital in the southeastern United States. Of the 104 bedside nurses, 56 nurses (53.8%) successfully completed the pretest (Appendix A) and educational PowerPoint (Appendix

B). Of those 56 bedside nurses, 10 participants were excluded for failure to complete the posttest. Ten participants were excluded for completing the posttest outside the allotted time frame, which resulted in 36 participants for paired assessments of the pretest and posttest resulting in an overall participation rate of 34.6% for the project. There was a statistically significant difference in the posttest scores following the educational PowerPoint indicating that education can improve bedside nurses' ability to recognize delirium.

Data Collection and Analysis

The data collection was completed in a 4 week period from 9/21/15 through 10/23/15. The data were analyzed using Microsoft Excel version 2011. Aggregate pretest and posttest scores were evaluated and crosschecked manually as they were entered into an Excel spreadsheet, which served as the foundational database. A two-tailed *t* test was used to establish if mean test scores improved after the educational PowerPoint. A *p* value of $< .05$ was considered as statistically significant.

Results (Pretest/Posttest)

The pretest/posttest was comprised of 21 questions with a mean score of 15.92 (75.83%) correct answers on the pretest and a mean score of 18.95 (90.27%) correct answers on the posttest (Table 1). This represented a significant improvement in aggregate scores from pretest to posttest ($p < .05$). Eleven (30.5%) out of the 36 participants had to take the posttest a second time while one participant was required to take the posttest a third time to attain a passing score of 80%, the established rate for content competency.

Table 1.

Pretest and Posttest Results and Significance

	N	Mean score	SD	Minimum score	Maximum score	Two tailed *t*-test 7.35906
Pretest	21	15.92	13.73	80	100	p = < 0.05
Posttest	21	18.95	7.16	80	100	p = < 0.05

Discussion of Findings

The key finding in this quality improvement project was that bedside nurses have a knowledge deficit in regard to delirium, but this may be improved with education. Clearly, this project's findings are very similar to others in the literature (Baker, Taggert, Nivens, & Tillman, 2015; Gordon et al., 2013; Hare, Wynaden, McGowan, Landsborough, & Speed, 2008; Steis & Fick, 2008; Varghese, Macaden, Premkumar, Mathews, & Kumar, 2014) who have also identified that bedside nurse education is pivotal in improving patient outcomes in patients aged 65 or older who are at risk for or develop delirium.

Implications

Practice and Action

Given that delirium is difficult to recognize, it is undertreated by health care providers (O'Mahony et al., 2011; Rice et al., 2011). Implications for improvement in practice and action include bedside nurses assuming responsibility for assessing patients on admission and each shift during the patient's stay. This includes assessing for

predisposing and precipitating factors along with signs and symptoms of delirium. Bedside nurses are frequently at the bedside and are able to identify subtle changes in a patient's status (Baker et al., 2015). Physicians, nurse practitioners, and physician assistants in the clinical setting will also need to be active partners with nursing in the prevention, identification, and treatment of delirium.

Future Research

Multicomponent prevention strategies, rapid identification, and treatment can help prevent an increase in length of stay and increases in morbidity and mortality of patients' aged 65 or greater (Leslie & Inouye, 2011). Future studies are needed to identify a bundled approach for hospitals to adopt as a standardized protocol for preventing and treating delirium. Future research should also include reduction of risk factors during hospitalization.

Social Change

Prevention, identification, and treatment can have a profound impact on the cost of health care not only to the patient but also to the hospital, community, and government given that the majority of these patients are on government-sponsored health care plans. Nursing alone will not be able effect these changes given the magnitude of the problem but will need administrators, policy makers, government agencies, patient advocacy groups, and physicians to promote social change for this high risk patient population.

Limitations, Strengths, and Recommendations

Limitations

An important limitation of this project was that the pretest/posttest was not formally assessed for validity, although the content originated from the most recent

research. A second limitation was that the sample size was small with 104 bedside nurses as the potential sample pool but 36 fully participating. As this quality improvement project was completed as a part of a doctoral project, the time available for data collection was brief. The study would have benefitted from repeating the project in three months with a larger sample size. Another limitation was that bedside nurses from one community hospital participated in the project, which limits the generalizability of the project to other settings. Further studies and research are needed. An additional limitation was using the pretest as the posttest as participants may have recalled test questions or educational content.

Strengths

A strength is that this project is easily replicated. Another strength is that the project was essentially cost free given that the staff completed the pretest, PowerPoint, and posttest while at work on their downtime. An additional and significant strength is that this project can be a starting point for impact studies based on the project's findings.

Recommendations

Having a robust educational program with geriatric competencies should be included in professional development for all health care providers including physicians, physician assistants, and nurse practitioners who work not only medical-surgical units but also on any unit or area that provides care to patients aged 65 or older. The rapidly increasing numbers of patients who are aged 65 or older and the increasing life expectancy of this patient population merits a concentrated effort by all acute care facilities, as the challenges in caring for this population will only grow if not dealt with now. Annual or ongoing competencies must also be developed to ensure all professionals

are utilizing this skill set in caring for the elderly on a routine basis. Focused attention must be given to delirium as delirium is considered a medical emergency (Wachter, 2011).

While nursing schools are generally unable to meet the expanding need for specialized education, responsibility for this vital education is falling on the hiring facilities to ensure that the appropriate knowledge and skill set is available to adequately care for this unique and ever expanding patient population. Facilities providing this education could also benefit, as the nurses might feel more confident and competent in managing the complexities of care for this vulnerable patient population.

Summary and Conclusions

Phase one of this quality improvement project clearly demonstrated that there is a knowledge deficit in regard to bedside nurses' recognition of delirium that can be overcome with education and training. Given the aging of America, health care providers must unite to prevent and treat delirium in the acute care setting.

Section 5: Scholarly Product for Dissemination

Introduction

There are two avenues for dissemination of project results: reporting the results of the project to stakeholders, the academic community, and dissemination of results to other professionals in like settings (Zaccagnini & White, 2011).

Stakeholders

Project closure is an important and planned event in the lifecycle of a project. Stakeholders and the academic community need to be a part of this process. Project closure includes sharing of results, planning to sustain the gains, and transitioning leadership of the project to the institution. This is also a time to celebrate the accomplishments of the team (Zaccagnini & White, 2011). The results of the delirium project will be presented to the administrative team by executive summary and to the other stakeholders in the organization by use of a PowerPoint during an oral presentation on the project.

Other Professionals

Dissemination of project results is essential in order to advance the profession of nursing; it serves as a mechanism to communicate knowledge and share experiences with other professionals (Oermann & Hayes, 2011). The results of the project may be disseminated through manuscript submission to a peer-reviewed journal such as the *Journal of Nursing Administration*, which is designed for nurse leaders in a variety of settings. This journal provides information on management of human, material, and financial resources; policy, legislation, regulations, and economics related to health care

program development; legal, ethical, and political issues; and professional trends (Journal of Nursing Administration [JONA], 2015).

Another dissemination method is to present at a Georgia Hospital Association (GHA) Conference. GHA serves more than 170 hospitals in Georgia and has a mission statement to advance the health of individuals and communities by serving as the leading advocate for all Georgia hospitals and health care systems (Georgia Hospital Association, 2011). Reaching the hospitals in Georgia is a significant start and call for action in uniting health care providers and administrators in addressing the common problem of delirium, its negative sequelae and financial impact to organizations.

Analysis of Self

The term journey, as defined by Merriam-Webster's online dictionary (2015), is "an act of traveling from one place to another: something suggesting travel or passage from one place to another" (p. 1). Journey is a very apt description of the travels or passage made over the last two years while in the DNP Program. Sometimes the journey did not always lead in the direction I thought it would take, but nonetheless personal and professional growth occurred. As a scholar, I learned how to take an actual clinical problem, read and analyze the scholarly literature using critical thinking skills, determine what gaps existed, and translate the research into evidence-based practice (Terry, 2012). This also gave me the opportunity to review and critically evaluate new knowledge and to integrate this in the clinical setting to improve patient care outcomes (American Association of Colleges of Nursing, 2006).

In my professional practice role as a leader and as a Chief Nursing Officer (CNO), it is my responsibility to balance the welfare of patients, staff, and the needs of

the health care organization (Zaccagnini & White, 2011). The role of patient advocate is what separates the role of the CNO from that of the other executive officers, henceforth the significance of the CNO role (Zaccagnini & White, 2011). As the CNO, it is imperative that I be able to take a clinical problem and use the research to improve patient outcomes. I must serve as the patient advocate, and I believe that this project placed the patient at the forefront along with staff needs for education and also the needs of the organization, which includes well-trained and competent staff, high quality patient care, and a fiscally viable organization.

As the project developer, I worked through obstacles such as resistance, time constraints, and use of a computer-based training program at the organizational level to move the project forward. The bedside nurses and providers were great proponents of the project, were eager to learn and improve patient care, and advocated for the project to the rest of the administrative team. Being able to promote the project as one that did not require additional resource utilization was also important given resource constraints in today's health care environment.

Encouraging staff throughout this project was most enjoyable as I was able to witness learning and the desire to use new knowledge to improve patient care. My journey was a worthwhile effort that enabled me to help others improve patient care and outcomes.

Summary

Dissemination of results is important beyond the practice environment of the project. Sharing the results of this project may benefit other clinicians who can utilize the

evidence-based delirium project to improve patient outcomes and improve the state of health care in the United States.

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Appendix A: Delirium Pretest/Posttest

Bridget Denzik, MSN, RN, NEA-BC

1. Delirium is potentially preventable in 30-40% of cases

   True False

2. 50% of patients that are hospitalized may have delirium at some point in their hospitalization

   True False

3. Mr. Anderson is a 72-year-old male that fell at home while washing windows on a ladder. He has cataracts, osteoarthritis and has occasional constipation but does not take any medications. He underwent a successful surgery for a fractured femur. Two days later, Mr. Anderson is confused, pulls out his IV line and was found wandering down the hallway on the nursing unit. When the nurse attempted to escort Mr. Anderson back to his room, he became paranoid, anxious and stated that the nurse wanted to choke him.

   A. This is classified as hyperactive delirium
   B. This is classified as hypoactive delirium
   C. This is classified as manic depression
   D. This is classified as Wolff Parkinson White Syndrome

4. The charge nurse on your skilled nursing unit has noted that Mrs. Bowling, an 80-year-old woman with a moderate degree of dementia, has had a sudden change in her level of confusion and orientation. Although responsive, she appears lethargic, apathetic and is incoherent. Mrs. Bowling has refused food and medication, was awake all night, and is drowsy now on the day shift. She was just transferred to the inpatient acute medicine unit due to suffering a stroke.

   A. This is classified as hyperactive delirium
   B. This is classified as hypoactive delirium
   C. This is classified as manic depression
   D. This is classified as Progeria disease

5. The best management for delirium is the following:

   A. Keep the blinds open during the day

B. Post a calendar so the patient knows what day it is and provide frequent reorientation
C. Have the patient sit up in the chair for all meals
D. Clean the patient's glasses and ensure the patient wears them
E. Insert an indwelling Foley catheter

1. A, B, and E
2. A, C and D
3. A, B, C and E
4. E only
5. A, B, C, and D

6. Lithium is the most commonly used drug to treat delirium

True False

7. Delirium occurs in higher frequency with patients who have a pre-existing cognitive impairment

True False

8. Adverse consequences of delirium include the following:
A. Malnutrition
B. Falls
C. Continence problems
D. Pressure ulcers
E. Dehydration

1. A & B
2. A, C & D
3. A, B & C
4. A, B, C & D
5. All the above

9. Patients with delirium may have a disturbance in perception. What percentage of patients with delirium may have hallucinations, misperceptions, illusions and delusions?

A. 10%
B. 20%
C. 30%
D. 40%

10. Patients who have delirium may have adverse consequences. Which of the following are adverse consequences of delirium?

    A. Higher mortality rates
    B. Lower readmission rates
    C. Lower risk of being placed in a skilled nursing facility
    D. All the above

11. What percentage of delirium goes undiagnosed?

    A. 1/3 to 2/3
    B. 1/2 to 3/4
    C. 1/3 to 3/4
    D. 1/8 to 1/2

12. Reasons why delirium goes undetected include the following:

    A. Lack of obtaining an adequate history
    B. Staff communication
    C. Older people may occasionally just get confused
    D. All the above

13. Risk factors for delirium include the following:

    A. Impaired vision, cognitive impairment and severe illness
    B. Severe illness and high BUN/Creatinine ratio
    C. High BUN/Creatinine ratio, cognitive impairment and impaired vision
    D. Impaired vision, severe illness, cognitive impairment and High BUN/Creatinine ratio

14. One component of managing delirium is to identify patients at risk. Would a 69-year-old male patient with cognitive impairment be considered at risk?

    Yes No

15. You have been assigned a patient that is diagnosed with delirium. Which one of the following would not be a good nursing intervention?

    A. Ensure continuity of care when making shift assignments
    B. Ambulate the patient in the hallway
    C. Limit fluid intake
    D. Reduce medication but ensure adequate analgesia

16. With dementia the purpose of drug treatment is to treat the underlying cause. What drug is traditionally used to treat the behavioral disturbances associated with delirium?

    A. Benadryl
    B. Zantac
    C. Elavil
    D. Haldol

17. Precipitating factors for delirium would not include the following:

    A. Treatment with multiple drugs (> 6 medications, 3 new inpatient medications)
    B. Drug toxicity
    C. CVA
    D. Normal electrolyte levels

18. Haldol may cause excessive falls particularly in high doses

    True False

19. Anticholinergic medication side effects may cause the following:

    A. Increased cognition
    B. Incontinence
    C. Prolonged QT interval
    D. Extrapyramidal side effects including rigidity

20. It is not possible for the prescription of antipsychotic drugs or benzodiazepines to make delirium worse or exacerbate any underlying causes or worsen respiratory failure.

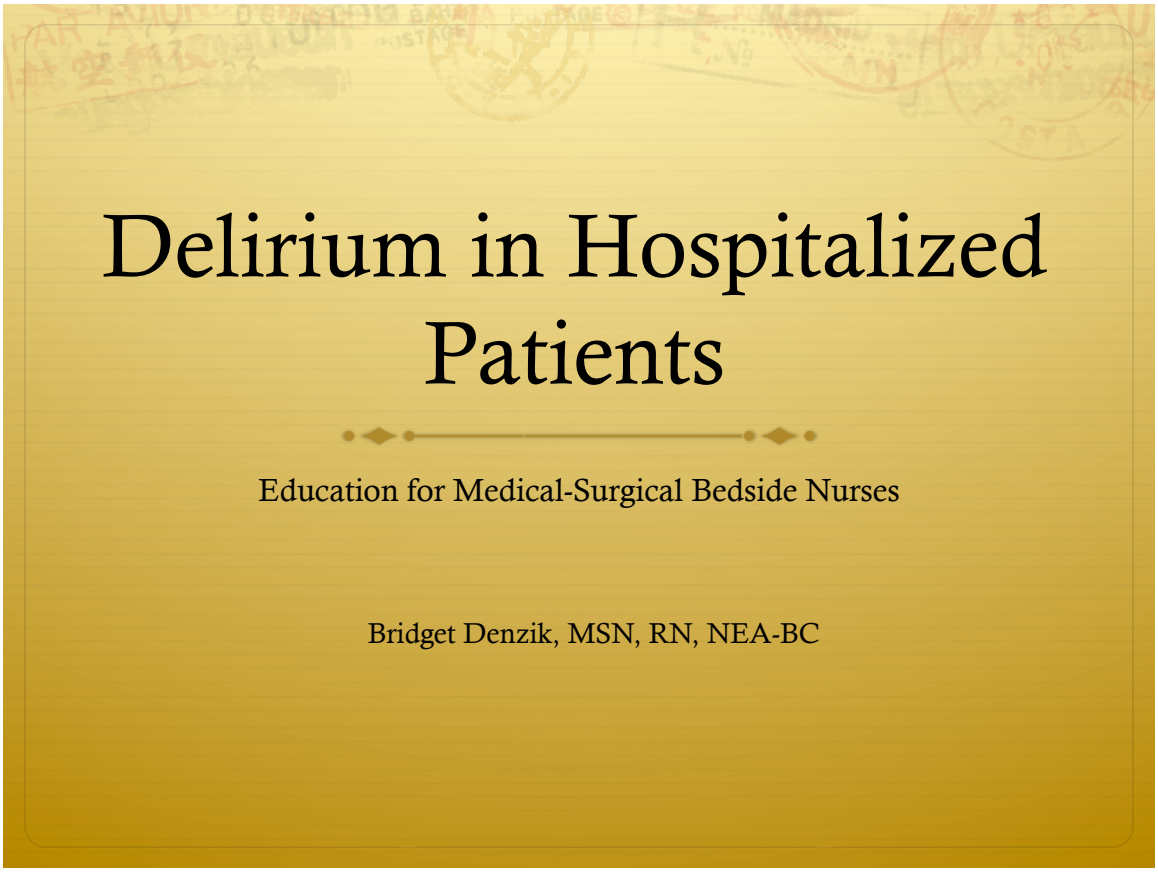
    True False

21. You are assigned to care for Mr. Jacobs, a 78-year-old male who is status post vascular surgery on his right femoral artery. Mr. Jacobs has developed delirium as evidenced by his confusion, is refusing to eat, has been incontinent, and is mumbling incoherently and is uncooperative. Which of the following nursing diagnoses is least relevant to include in Mr. Jacob's plan of care at this time?

    A. Alteration in nutrition
    B. Alteration in sleep
    C. Alteration in elimination
    D. Alteration in communication

E. Alteration in ineffective airway clearance

Appendix B: Educational PowerPoint



Content

- Definition & Subtypes
- Incidence and Prevalence
- Consequences
- Risk Factors & Prevention
- Detection & Screening Tools
- Treatment & Management
- Special Circumstances
- Socioeconomic Impact
- The Significant Role of the Bedside Nurse

Delirium Defined

- The word delirium comes from the latin word delirare which means to become "crazy or to rave" (Saxena & Lawley, 2009, *Postgrad Med Journal*).
- Delirium has many synonyms, such as acute brain failure, acute organic brain syndrome, acute confusional state and postoperative psychosis.
- Delirium is a *syndrome* of disturbance of consciousness, with reduced ability to focus, sustain, or shift attention, that occurs over a short period of time and fluctuates over the course of the day (Inouye et al, 1999, *New England Journal of Medicine*).

Clinical Subtypes of Delirium

Type	Percent	Presentation
Hyperactive Delirium	(21%)	Agitation, confusion, mood lability, psychotic symptoms, disruptive behaviors
Hypoactive Delirium	(29%)	Lethargy, apathy, confusion
Mixed	(43%)	Features of both increased and decreased psychomotor activity
Unclassified	(7%)	Psychomotor activity is normal

Saxena & Law, 2009, Postgrad Medical Journal

Clinical Subtypes of Delirium

1. **Hyperactive Delirium**-increased psychomotor activity and is the most recognized. It is often associated with the adverse effects of anticholinergic drugs, drug intoxication and withdrawal states. These patients may exhibit the following:

- Agitation
- Psychosis
- Mood lability
- May refuse to cooperate with medical care
- May demonstrate disruptive behaviors (shouting, resisting)
- May sustain injuries from falling, pulling out catheters and intravascular lines

Saxena & Law, 2009, Postgrad Medical Journal

Clinical Subtypes of Delirium

2. **Hypoactive Delirium**(decreased psychomotor activity) is more common than hyperactive delirium in elderly patients. It is less frequently recognized or is often dismissed as a transient , insignificant problem due to an absence of disruptive, bizarre and injurious behaviors. Patients with hypoactive delirium may appear:

- Sluggish and lethargic
- Low in mood
- Confused
- Confusion not being apparent on superficial conversation

Saxena & Law, 2009, Postgrad Medical Journal

Prevalence of Delirium

- Occurs with higher frequency in those with pre-existing cognitive impairment (Saxena & Lawley, 2009, *Postgrad Med Journal*)

- Among hospitalized patients, those particularly at risk are surgical inpatients, especially those undergoing cardiothoracic, emergency orthopedic procedures and vascular surgery (Saxena & Lawley, 2009, *Postgrad Med Journal*)

Consequences of Delirium

- Patients with Delirium also have:
  - ✓ Higher functional decline
  - ✓ Longer length of hospital stay
  - ✓ Higher mortality rates
  - ✓ Higher readmission rates
  - ✓ Higher risk of institutionalization (nursing home placement)

(Leslie & Inouye, 2011, The American Geriatrics Society)

Consequences of Delirium (Cont.)

- Patients diagnosed with delirium have an overall higher morbidity due to a high risk of:
  - ✓ Malnutrition
  - ✓ Falls
  - ✓ Continence problems
  - ✓ Pressure ulcers
  - ✓ Dehydration

Saxena & Lawley (2009) *Postgrad Med Journal*

Delirium Risk Factors

- Pre-existing cognitive impairment
- Co-morbid conditions like diabetes, pneumonia and many others
- Typically, delirium is **multifactorial** in nature

Predisposing and Precipitating Factors

Predisposing Factors	Precipitating Factors
Demographics ✓ age ≥ 65 years ✓ Male sex	**Acute medical illness (examples)** ✓ Infections (UTI, sepsis, etc.) ✓ Renal or hepatic failure ✓ Urinary retention/fecal impaction ✓ Severe illness (CHF, AMI)
Cognitive Status ✓ Dementia ✓ Other causes of delirium ✓ Depression	**Metabolic** ✓ Electrolyte, glucose and acid/base imbalances ✓ Endocrine imbalances
Visual and hearing impairment	**Surgery** ✓ orthopedic ✓ cardiac
Decreased oral intake ✓ Dehydration ✓ malnutrition	**Neurological conditions** ✓ Meningitis/Encephalitis ✓ CVA ✓ Head trauma ✓ Epilepsy
Prolonged sleep deprivation	**Iatrogenic complications**

Predisposing and Precipitating Factors

Predisposing Factors	Precipitating Factors
Drugs ✓ Treatment with multiple drugs ✓ Treatment with psychoactive drugs ✓ Alcohol abuse	**Drugs** ✓ Toxicity or overdose ✓ Sedatives, narcotics, anticholinergic drugs, anticonvulsants ✓ Treatment with multiple drugs: **> 6 medications; 3 new inpatient medications** (Rudolph, James, et al. Caring for the Postoperative Patient with Delirium, *The Hospitalist's Geriatric Symposium*, 2004)
Coexisting medical condition (examples) ✓ Severe illness ✓ Chronic renal or hepatic disease ✓ History of stroke	**Pain**
Functional status ✓ Dependence, immobility ✓ Frailty, history of falls ✓ Pain ✓ constipation	**Environmental issues** ✓ Use of physical restraints ✓ Bladder catheterization ✓ Multiple procedures ✓ Prolonged sleep deprivation ✓ Emotional stress

Onset of Symptoms

- Typically, the onset is rapid, over a few hours or days-and the symptoms can be highly variable and intermittent
- Variability in attention, arousal or both can occur unpredictably and irregularly, often getting worse at night
- This may be witnessed as different behaviors occurring within a short time frame:
  - Drowsiness
  - Hypervigilance
  - Normal wakefulness
  - Agitation

Attentional Deficits

- A disturbance of attention is a cardinal symptom with patients presenting as distractible with an impaired ability to focus, concentrate, process information, and think clearly
- Due to fatigue and reduced sensory input these disturbances in attention often increase in the evening-often referred to as "sun downing"

Saxena & Law, 2009, Postgrad Medical Journal

Disorganized Thinking

- Patients may present as confused, being unable to maintain clarity, coherence and speed of thought
- This is often mirrored in speech that can be rambling, tangential, circumlocutory, sometimes with an altered rate of speech with reduced regard to the content

Saxena & Law, 2009, Postgrad Medical Journal

Altered Levels of Consciousness

- Patients may be lethargic with a reduced arousal or may be hyper-alert with increased arousal
- The LOC may fluctuate between extremes in the same patient or alternatively may present with more subtle signs such as mild drowsiness or an impaired level of attention

Disturbance of Perception

- Hallucinations, misperceptions, illusions, and delusions are reported to occur in at least 40% of cases of delirium and can accompany hypoactive and hyperactive delirium
- Hallucinations are usually visual (dangerous animals, bizarre images, etc.)
- Less frequently auditory hallucinations or those involving taste and smell can occur
- Delusions are often paranoid or persecutory in nature (example-suspicion of being poisoned or fear of intended harm by nursing staff)

Saxena & Law, 2009, Postgrad Medical Journal

Disturbed Sleep-Wake Cycle

- There is disruption of the day-night cycle leading to increased drowsiness during the day and being more alert/awake at night

- There is a disturbance of the circadian sleep cycle

Saxena & Law, 2009, Postgrad Medical Journal

Other Features of Delirium

- Emotional disturbances can be prominent: intermittent and labile symptoms of anxiety, fear, irritability, anger, depression, or euphoria may be noted. It is not unusual for suicidal thoughts, or grandiose ideas to be expressed
- Disturbance of orientation: is common and poor memory usually represents an inability to register recent information because of inattentiveness, but retrieval of stored information may also be disturbed
- Higher integrative functions may also be affected such as a decreased ability to plan, problem solve and disrupted ability to rise or walk (leading to falls and injuries)

Saxena & Law, 2009, Postgrad Medical Journal

Diagnosis of Delirium: Non-Detection

- The lack of obtaining an adequate history
- Ageist attitudes toward older people with an "expectation" of confusion
- Systems and communication challenges (multiple unit transfers, and shift patterns of working)
- Clinical diagnosis and understanding the clinical features is crucial to the diagnosis

Saxena & Law, 2009, Postgrad Medical Journal

Diagnosis of Delirium: Non-Detection

- Non-identification in the elderly is frequently due to the prevalence of the more common "**hypoactive**" form of delirium which can be easily missed on bedside evaluation and also in patients on surgical units and intensive care units.
- Other reasons for non-detection of delirium are due to the fluctuating nature, its overlap with dementia, lack of formal cognitive assessment and failure to consider the possibility of the condition or it's consequences

Saxena & Law, 2009, Postgrad Medical Journal

Management of Delirium

- Identify all older patients (> 65 years with cognitive impairment)
- Consider delirium in all patients with cognitive impairment and at high risk (severe illness, dementia, fracture neck of femur, visual and hearing impairment, etc.)
- Identify the cause of delirium if present from the history, examination and investigations and treat underlying cause(s)or causes

Conley, 2011, Urologic Nursing

Management of Delirium

In patients with (or at high risk) for delirium **DO** the following:

- ✓ Provide frequent orientation (clocks, calendars, keep blinds open during the day)
- ✓ Ensure continuity of care (same caregivers)
- ✓ Encourage mobility (up in chair for all meals and ambulate in hallway several times a day)
- ✓ Reduce medication but ensure adequate analgesia
- ✓ Ensure hearing aids and glasses are available and in good working order

Management of Delirium- DO the following:

- ✓ Maintain a good sleep pattern (allow uninterrupted sleep at night, adjust noise and lighting levels)
- ✓ Maintain good fluid intake
- ✓ Involve relatives and caregivers-ask them to stay with patient when possible
- ✓ Avoid constipation
- ✓ Avoid complications (immobility, pressure ulcers, over sedation, falls, incontinence)

Management of Delirium

In patients with delirium and patients at high risk of delirium: **DON'T** do the following:

- ✓ Urinary catheterization
- ✓ Use restraints
- ✓ Sedate routinely
- ✓ Argue with the patient

Providing Environmental and Supportive Measures

- Ensure adequate nutrition (prevent dehydration)
- Provide good skin care
- Mobilize the patient (up in chair for meals, walk in hallway with assistance)
- Coordinate schedules for drug dosage
- Minimize relocating patient to another unit
- Private room if possible
- Temperature control and use of warm blankets

Medications that Induce Delirium

High Risk	Moderate Risk	Low Risk
Antidepressants	Alpha-blockers	Anti-asthmatics
Antipsychotics	Anti-arrhythmias	Anti-bacterials
Dopaminergic agents	Beta-blockers	Anticonvulsants
Opioids	Digoxin	Calcium Channel Blockers
Benzodiazepines	NSAIDs	Diuretics
Corticosteroids	Postganglionic blockers	H_2-antagonists
Lithium		

Haldol (Haloperidol)

- Haldol is the most frequently used drug in the management of delirium
- Although it is a "typical" antipsychotic, it has few anticholinergic side effects, minimal cardiovascular side effects, is less sedating, and therefore less likely to worsen delirium
- Haldol may cause excessive falls, especially in higher doses, so caution must be exercised

Saxena & Law, 2009, Postgrad Medical Journal

Benzodiazepines: Use Caution

- It is possible for the prescription of antipsychotic drugs or benzodiazepines to make delirium worse or exacerbate any underlying causes (ex- benzodiazepines may worsen respiratory failure)
- It is preferable to use one drug only, starting at the lowest possible dose, and using small increments, if necessary, after an interval of 2 hours
- Patients should be closely monitored for response and possible side effects

Saxena & Law, 2009, Postgrad Medical Journal

Medication Review

- During a hospital stay, it is essential to review prescribed medications regularly, but also to manage any ongoing risk factors for delirium
- Any management plan put into place, including the prescription of medication to treat behavioral complications of delirium, needs regular review and modification, at least once every 24 hours in order to reduce the risk of hospital acquired conditions such as pressure ulcers, incontinence, malnutrition and functional impairment

Saxena & Law, 2009, Postgrad Medical Journal

Delirium and the Patient's Family

- Delirium can be a psychologically traumatic event not only for the patient but for the family also and a careful explanation of the patient's diagnosis is essential
- The potential outcomes of delirium should be discussed realistically with the patient and their family; the symptoms may take a long time to resolve, with a lag between the resolution of the underlying physical health difficulties and an improvement in mental state, which can be days, weeks, or even months in duration

Delirium and Discharge Planning

- Delirium may herald the onset of dementia and may also reflect a severe underlying illness and comorbidity
- It is good practice to plan the patient's discharge from the hospital carefully, using a multidisciplinary team to involve the patient, caregivers or family, and other involved professionals
- It may also be beneficial to refer the patient to a geriatrician for follow up

Socioeconomic Implications of Delirium

- In 1999, there were 11.8 million elderly persons in the U.S., equating to health care costs ranging from $143 billion a year to $152 billion nationally (Inouye et al., 1999).
- Currently, there are 40.3 million people over the age of 65, which represents 13.0 percent of the entire population (U.S. Department of Commerce, 2010 Census Brief).
- We can expect the problem to increase over the next 20 years unless action is taken now.

Socioeconomic Implications of Delirium

- The costs associated with delirium are staggering with delirium complicating hospital stays for 20% or more of the elderly (Inouye, Schlesinger and Lydon, 1999).
- With the rapidly growing elderly population, measures must be taken by bedside nurses and the medical community to recognize this serious syndrome and to intervene to prevent adverse sequelae from occurring.

The Diagnosis of Delirium

- Studies suggest that up to 75% of delirium cases go unrecognized by bedside nurses

Rice et al, (2011). Clinical Nurse Specialist

Bedside Nursing

- Bedside nurses are in a pivotal position to identify patients at risk for or with delirium during an acute care stay since delirium is a bedside diagnosis
- Primary prevention is key
- Screening on admission and every shift is critical to identifying delirium and to assess for changes in this at risk patient population

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Appendix C: IRB Approval

9/15/15

Dear Ms. Denzik,

This email is to notify you that the Institutional Review Board (IRB) has approved your application for the study entitled, "Bedside Nurse Recognition of Delirium in the Medical-Surgical Setting."

Your approval # is 09-15-15-0484189. You will need to reference this number in your dissertation and in any future funding or publication submissions. Also attached to this e-mail is the IRB approved consent form. Please note, if this is already in an on-line format, you will need to update that consent document to include the IRB approval number and expiration date.

Your IRB approval expires on September 14, 2016. One month before this expiration date, you will be sent a Continuing Review Form, which must be submitted if you wish to collect data beyond the approval expiration date.

Your IRB approval is contingent upon your adherence to the exact procedures described in the final version of the IRB application document that has been submitted as of this date. This includes maintaining your current status with the university. Your IRB approval is only valid while you are an actively enrolled student at Walden University. If you need to take a leave of absence or are otherwise unable to remain actively enrolled, your IRB approval is suspended. Absolutely NO participant recruitment or data collection may occur while a student is not actively enrolled.

If you need to make any changes to your research staff or procedures, you must obtain IRB approval by submitting the IRB Request for Change in Procedures Form. You will receive confirmation with a status update of the request within 1 week of submitting the change request form and are not permitted to implement changes prior to receiving approval. Please note that Walden University does not accept responsibility or liability for research activities conducted without the IRB's approval, and the University will not accept or grant credit for student work that fails to comply with the policies and procedures related to ethical standards in research.

When you submitted your IRB application, you made a commitment to communicate both discrete adverse events and general problems to the IRB within 1 week of their occurrence/realization. Failure to do so may result in invalidation of data, loss of academic credit, and/or loss of legal protections otherwise available to the researcher.

Both the Adverse Event Reporting form and Request for Change in Procedures form can be obtained at the IRB section of the Walden website:
http://academicguides.waldenu.edu/researchcenter/orec

Researchers are expected to keep detailed records of their research activities (i.e., participant log sheets, completed consent forms, etc.) for the same period of time they retain the original data. If, in the future, you require copies of the originally submitted IRB materials, you may request them from Institutional Review Board.

Both students and faculty are invited to provide feedback on this IRB experience at the link below:

http://www.surveymonkey.com

Sincerely,

Office address for Walden University:
100 Washington Avenue South, Suite 900
Minneapolis, MN 55401

Information about the Walden University Institutional Review Board, including instructions for application, may be found at this link:
http://academicguides.waldenu.edu/researchcenter/orec