NURSE RECOGNITION OF DELIRIUM SUPERIMPOSED ON DEMENTIA IN
HOSPITALIZED OLDER ADULTS

A Dissertation in
Nursing
by
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ABSTRACT

Background: Delirium is an acute, fluctuating confusional state that is potentially preventable and treatable, especially when recognized early. Unrecognized delirium in older adults results in increased risk for poor health outcomes. Persons who experience delirium in addition to dementia have a two-fold increase of death within one year.

Purpose: To explore acute care nurses’ recognition of delirium in hospitalized older adults with dementia and to describe how nurses manage their patients using the Recognition in the Context of Nurse-Patient Interactions framework to guide this study.

Methods: This study was a secondary analysis of data from a previous study that followed 140 hospitalized older adults with dementia, followed by a retrospective chart review of the nurses’ documentation.

Results: In the original study by Fick, research assistants assessed the patients daily using the Confusion Assessment Method to determine if they experienced delirium or not. This study sample consisted of two groups of hospitalized older adults (≥65 years) (Dementia-Only and Delirium Superimposed on Dementia). Analysis of nurses’ documentation included qualitative content analysis, descriptive statistics, logistic analysis with repeated measures and logistic analysis and multinomial logistic regression. The most significant finding was that there were no patient days (n=116) on which acute care nurses recognized delirium in this population.

Conclusion: The absence of recognition may lead to improper or ineffective nursing management of the patient experiencing delirium, potentially increasing the risk of poor
health outcomes. Implications of these results include the need for comprehensive education of acute care nurses.
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Chapter 1

Introduction

Delirium is an acute, fluctuating confusional state that is potentially preventable and treatable, especially when recognized early. Unrecognized delirium in older adults results in increased risk for poor health outcomes, including complications during hospitalization, increased lengths of stay, nursing home placement, and death (Andrew, Freter, & Rockwood, 2006; Marcantonio, Ta, Duthie, & Resnick, 2002; McAvay, et al., 2006; McCusker, Cole, Dendukuri, Belzile, & Primeau, 2001; O'Keeffe & Lavan, 1997; Pitkala, Laurila, Strandberg, & Tilvis, 2005; Trzepacz, 1996). Persons who experience delirium in addition to dementia are twice as likely to die within one year (Bellelli, Speciale, Barisone, & Trabucchi, 2007).

In the older adult population, delirium is a common occurrence (Fick, Agostini, & Inouye, 2002). The prevalence of delirium upon admission to the hospital has been reported to be from 14 - 24% (Agostini & Inouye, 2003; Inouye, 1998) and the incidence of developing delirium during hospitalization has been reported to be from 6 - 56% (Agostini & Inouye, 2003; Inouye, 1998). The incidence of delirium developing in a community-dwelling population of older adults with dementia has been reported at more than 13% (Fick, Kolanowski, Waller, & Inouye, 2005). The economics of this problem are compelling as the annual costs of caring for identified cases of those with delirium are conservatively estimated at $38 billion (Leslie, Marcantonio, Zhang, Leo-Summers, & Inouye, 2008).
Delirium is a syndrome consisting of a complex set of symptoms. The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) (American Psychiatric Association, 2000) is considered the gold-standard or model of excellence for definitions of mental health illnesses in health care. According to the DSM-IV-TR (American Psychiatric Association, 2000), delirium has four components: 1) disturbance of consciousness with decreased ability to focus, sustain, or shift attention; 2) change in cognition or development of a perceptual disturbance that is not better accounted for by a preexisting, established, or evolving dementia; 3) development of the disturbance over a short period of time with a tendency to fluctuate during the course of the day; and 4) evidence that the disturbance is directly caused by the effects of a medical condition.

In contrast, dementia is the term affixed to a group of symptoms that includes memory loss and at least one of the following cognitive disturbances: aphasia, apraxia, agnosia, or a disturbance in executive functioning. Dementia negatively impacts the person in social and occupational situations (American Psychiatric Association, 2000). Experts estimate that more than 4.5 million older adults currently experience dementia, and those numbers are expected to rise (Hebert, Scherr, Bienias, Bennett, & Evans, 2003).

Persons with dementia are already vulnerable to adverse outcomes and face more risk when they develop delirium on top of an existing dementia. Delirium superimposed on dementia (DSD) is complicated and difficult to recognize (Fick, Hodo, Lawrence, & Inouye, 2007b). Delirium is often first noticed as an acute change in the mental status of
a person with dementia and should be recognized as an important clinical change requiring immediate assessment and intervention (Fick, et al., 2002).

This study targeted a population of older adults in acute care with DSD. The purpose was to explore acute care nurses’ recognition of delirium among hospitalized older adults with dementia. This study was a secondary analysis of the Fick DSD study followed by a retrospective chart review of the nurses’ documentation. The Fick study enrolled 140 hospitalized older adults (>65 years of age) and 140 proxy or family members. The patient participants were enrolled within 24 hours of admission to the hospital and were followed daily by a trained research assistant (RA) assessing their mental status and environmental factors. This researcher was the project coordinator and one of the primary RAs for the Fick study.

Statement of Problem

Early recognition of DSD is crucial because, delirium may be reversed or minimized if recognized and treated early. In the hospital setting, nurses are in a key position to recognize delirium (Foreman, 1986). Research has revealed that nurses often do not recognize delirium in their older patients especially those who have dementia (Eden & Foreman, 1996; Fick, et al., 2007b; Inouye, Foreman, Mion, Katz, & Cooney, 2001; Voyer, Richard, Doucet, Danjou, & Carmichael, 2008).

Various methodological approaches to better understand nurses’ recognition of delirium have been utilized including interviewing the nurse, standardized case vignettes,
and retrospective chart reviews. Steis and Fick (2008) systematically reviewed research on nurse recognition of delirium in older adults. Studies commonly gave credit to nurses for recognizing delirium when the nurses documented only partial symptoms without describing delirium. In an early study of nurse recognition of delirium, the researchers asked specific leading questions with a choice of responses (Bowler, et al., 1994). For instance, the nurses caring for the study patients were asked whether in their opinion the patient had experienced a psychiatric condition, and if so, did they think it was organic (dementia or delirium) or functional (depression, other) (Bowler, et al., 1994). The nurses had a tendency to label delirium as dementia. In other research utilizing a case study, six nurses were interviewed (Eden & Foreman, 1996). Half of the nurses documented awareness of symptoms of delirium exhibited by their patient, but most reported levels of alertness and orientation when describing mental status (Eden & Foreman, 1996). Two other studies used a structured interview format asking specifically about each feature of delirium according to the DSM definition to determine if the nurses recognized delirium in their patients (Inouye, et al., 2001; Morency, Levkoff, & Dick, 1994). One study that used an interview format only asked the nurses one question: “based on your clinical judgment and observations, how do you rate the resident’s overall mental status: 1) as usual, 2) more alert than usual, 3) more confused then usual, or 4) in delirium” (Voyer, Richard, et al., 2008, p. 10). Another researcher measured nurse recognition of delirium by presenting five standardized case vignettes and asking them to identify the patients’ condition by choosing the answer from multiple choices (Fick, et al., 2007b).
The medical record is an obvious source to explore how nurses describe what their patients are experiencing. The methodological decision of which documented terms to accept as evidence of nurse-recognized delirium varies from study to study. For instance, Gustafson and colleagues (1991) looked for explicit statements on acute confusional state and/or documentation of rapid changes in the patient’s cognitive functioning including disorientation and/or memory impairment. The nurses often documented that the patient was confused and rarely documented that the patient was experiencing acute confusion followed by actions related to the mental state. Similarly, Laurila and colleagues (2004b) searched for the terms delirium or confusion or at least two signs of a confusional state such as restless, unresponsive, shouting, wandering, or aggressiveness. In another chart review, the researcher concluded that the nurse recognized delirium if nurses documented any key terms or descriptors as well as documentation of evidence of acute onset or change in the patients’ symptoms (Inouye, et al., 2005). In another recent study on the prevalence and incidence of delirium researchers reviewed medical records to assess documentation on risk factor awareness for delirium as evidence of the recognition of delirium or acute confusion (Iseli, Brand, Telford, & LoGiudice, 2007). Another study reviewed the medical charts of hip fracture patients and searched for one or more synonyms of delirium to determine nurse recognition of delirium (Milisen, et al., 2002). The methods used thus far to measure nurse recognition of delirium have been inconsistent and lack rigor. This may be due to the lack of a theoretical definition of nurse recognition in the scientific literature.
The conceptualization of recognition in the context of nurse-patient interactions posits that once the nurse assesses the patient’s symptoms, makes a conclusion and thereby applies a label (recognition), the nurse is prompted to act on the recognition (Steis, Penrod, Adkins, & Hupcey, in press). Recognition leads to the response of the nurse or action on behalf of the patient. If the label (recognition) is not accurate and specific, the response by the nurse may not be beneficial to the patient (Steis, et al., in press). The Recognition model emphasizes the importance of specifically measuring whether the nurse recognizes delirium or is simply aware of the exhibited symptoms. If the label is inaccurate or inconsistent, this could lead to inappropriate health care interventions and negative patient outcomes (Cheevakasemsook, Chapman, Francis, & Davies, 2006).

To summarize, delirium is a complex disturbance manifest in a set of symptoms that, if recognized early, may be preventable and treatable. A low rate of nurse recognition of delirium in patients with dementia further impacts this already vulnerable population who are at risk for poor outcomes. This study is important because 1) past research aimed at exploring nurse recognition of delirium did not explicate the concept of nurse recognition, resulting in inconsistent methods of measuring nurse recognition, 2) unless nurses recognize the occurrence of delirium in their older patients with dementia, nurses may not assess and manage their patients’ care appropriately, and 3) unrecognized delirium is associated with poor outcomes.
Purpose of Study

This study explored nurse recognition of delirium in hospitalized older adults with dementia and described how nurses managed their patients with DSD as compared to a control group of patient with Dementia-Only (D-O). It was hypothesized that the nurses would recognize delirium in their older patients with dementia less than 20% of the time. A secondary objective was to further advance the conceptualization of recognition in the context of nurse-patient interactions.

Conceptual Framework

The conceptualization of recognition in the context of nurse-patient interactions was chosen to guide this study (Steis, et al., in press). In the planning of the concept analysis, the importance of this concept increased as key elements of phenomena of interest appeared to hinge on nurses’ recognition of patient cues. For example, one group member was interested in how nurses’ recognition of delirium could change the course of management and, potentially, patient outcomes (Steis & Fick, 2008). Others discussed projects exploring how recognition of subtle signs of distress in family caregivers or in pre-term infants could prompt interventions that could change the course of care. As perspectives were shared, the significance of the concept of recognition as a pivotal link between assessment and intervention became obvious. The following section explains the process of principle-based concept analysis as well as the result of the conceptualization of recognition in the context of nurse-patient interactions.
Recognition Conceptualization

The model of recognition conceptualization (Figure 1.1) proposes that recognition is dependent upon the interpretation of patient-based evidence, resulting in the recognition and labeling of the patient’s symptoms. Recognition is pivotal, prompting the nurse to act or not to act on this labeling of the phenomenon-based or patient specific pattern (Steis, et al., in press).

The recognition process begins with the interaction between a patient and a nurse within an organizational culture (i.e., a hospital, physician office, nursing home, or community setting). The model identifies pre-conditions (knowledge, expertise, moral agency and presencing) that affect the subsequent accuracy and specificity of the outcome. Recognition describes the process of the nurse reading and interpreting the evidence, reaching a conclusion. This awareness results in affixing a label. The nurse may also fail to recognize resulting in potential patient consequences. The product of recognition leads to the response of the nurse or action on behalf of the patient (may also be inaction). This process all leads to outcomes for the patient and the nurse.

If the nurse chooses to act, the action will likely be in response to the combination of the label applied to the patient’s symptoms and the nurse’s knowledge of how to manage said symptoms. Hence, the outcome of the process of recognition is related to the preconditions of nurse knowledge, presencing, moral agency, and the level of expertise of the nurse all influenced by the dynamic feedback feature of this concept.
Research Questions

The following research questions are derived from the gaps in knowledge identified from the literature and the guidance of the recognition conceptualization.

1. How do acute care nurses document about their patients with a) delirium superimposed on dementia and b) dementia-only? This was explained by conducting a content analysis of the nurses’ documentation.

2. What symptoms of delirium (disturbance of consciousness, change in cognition, acute onset and fluctuating course, and evidence of etiology) are revealed in acute care nurses documentation of patients’ with established cases of DSD? The documented words and phrases describing mental status and related behaviors were mapped to the features of

Figure 1.1. Recognition model.
delirium as stated in the DSM-IV-TR and the Confusion Assessment Method (CAM) (Appendix E).

3. What is the rate of nurse recognition of delirium or acute confusion as measured by comparing daily researcher ratings of delirium with acute care nurses documentation of delirium in persons with dementia? This question was answered by reporting the percentage of nurses who recognized delirium in their patients. It was hypothesized that the nurses would recognize delirium in their older patients with dementia less than 20% of the time.

4. What interventions do acute care nurses document in response to recognized signs and symptoms of DSD and dementia-only in their older adult patients’ mental status? This was accomplished by conducting a second content analysis of documented nursing interventions in the medical record. The cited nursing interventions were mapped to the pre-established categories of the Nursing Intervention Lexicon and Taxonomy (NILT) and analyzed (Grobe, 1990).

Theoretical Definitions

The following definitions were used in this study:

**Delirium**: a condition characterized by a disturbance of consciousness and a change in cognition that develops over a short period of time. Delirium has four components: 1) disturbance of consciousness with decreased ability to focus, sustain, or shift attention; 2) change in cognition or development of a perceptual disturbance that is not better accounted for by a preexisting, established, or evolving dementia; 3) development of disturbance over a short period of time and tends to fluctuate during the course of the day; and 4) evidence that
the disturbance is directly caused by the effects of a medical condition (American Psychiatric Association, 2000). The DSM-IV-TR has been shown to be the best criteria on which to base assessment when striving to recognize new cases of delirium (Laurila, Pitkala, Strandberg, & Tilvis, 2004c).

**Dementia**: A chronic progressive condition characterized by the development of multiple cognitive deficits, including memory impairment, and at least one of the following cognitive disturbances: aphasia, apraxia, agnosia, or a disturbance in executive functioning. The result must be enough impairment to negatively impact social or occupational situations and must be a decline in functioning from a previous point in time (American Psychiatric Association, 2000).

**Delirium Superimposed on Dementia**: delirium occurring in a person with pre-existing dementia (Fick, et al., 2002).

**Demographic Variables**: the characteristics or attributes of the sample such as age, sex, diagnosis, number of years of education, and race (Polit & Hungler, 1995).

**Incident Delirium**: an occurrence of delirium that interrupts the normal flow of the hospitalization for the patient.

**Nursing Intervention Statement**: nurses’ deliberate, cognitive, physical or verbal activity intended for the health maintenance or improvement of the person (including family and caregivers) who are the focus of the nursing care (Grobe, 1993).

**Patient Days**: Patient days were derived from the Fick study participants’ hospital days. Since each patient could be visited multiple times across several days and each nurse could have visited multiple patients, these data were not independent. To account for this non-
independence in the statistical analysis, the data set was recoded so that patient days were the unit of measurement. This recoding accomplished two things. First, it eliminated the repeated measures across individual nurses. Second, it aligned the DSM and CAM delirium categories with the Research Assistant (RA) ratings (delirium or no delirium). This was important in this data set because the research assistants used information from across the entire day to make their classification of delirium or not.

**Precipitating Factors:** Conditions or circumstances that trigger the development of delirium, ex. infection, bladder catheterization (Inouye, Schlesinger, & Lydon, 1999; Michaud, et al., 2007).

**Predisposing Factors:** Baseline traits or conditions that render a person more at risk to develop delirium (Inouye, Schlesinger, et al., 1999; Michaud, et al., 2007).

**Prevalent Delirium:** Delirium that exists before hospitalization of the patient.

**Recognition:** the process in which a nurse, in interaction with a patient, reads the evidence and applies an accurate and specific label describing the patient symptoms (Steis, et al., in press).

**Risk Factors:** Conditions that increase the chance of someone to develop delirium (Inouye, Schlesinger, et al., 1999; Michaud, et al., 2007).

**Subsyndromal Delirium:** One or more symptoms without having the full syndrome of delirium (Cole, McCusker, Dendukuri, & Han, 2003).
Assumptions

The following assumptions were made for this study:

1. Delirium is potentially preventable, treatable, and reversible (Inouye, 2006).
2. Delirium is often not recognized by nurses (Steis & Fick, 2008).
3. In older adults, dementia is a risk factor to develop delirium (Fick, et al., 2007b; Laurila, Pitkala, Strandberg, & Tilvis, 2004a).
4. Delirium is more difficult to recognize in persons with dementia (Fick, et al., 2007b).
5. Hypoactive delirium is a risk factor for poor recognition of delirium (Fick, et al., 2007b).
6. ‘Nurse recognition’ has been used frequently in the literature but is poorly explicated as a concept (Steis, et al., in press).
7. When reading and processing the evidence yields an inaccurate assessment of the patient’s symptom(s) the result may be failure to recognize a patient state or condition (e.g. delirium) (Steis, et al., in press).
8. In the nurse-patient interaction, recognition is a pivotal moment that prompts the nurse to act or not to act on behalf of the patient (Steis, et al., in press).

Significance of Study

This study addresses the low rate of nurse recognition of DSD with the guidance of the conceptualization of recognition in the context of nurse-patient interactions. The current literature reveals that older adults experience a high rate of DSD and that nurses do not readily
recognize DSD in their patients. Greater understanding of this phenomenon is needed to address this gap in knowledge. With knowledge gained through findings from this study, researchers will be better equipped to focus on developing interventions to increase nurse recognition, prompting earlier detection and improved management of DSD. The significance of this research is its potential to impact the nursing care of older adults and ultimately, promote more positive health outcomes.

This study explored nurse recognition of delirium in hospitalized persons with dementia. The knowledge gained will facilitate understanding of how nurses describe and document signs and symptoms of DSD and dementia. Findings revealed what nurses communicate through their documentation and how communications compare to the gold standard definitions of DSD and dementia.

This study also described how nurses manage their patients with dementia and DSD. By accomplishing this aim, knowledge was gained about how nurses respond to perceived changes in their older patients’ mental status and related behaviors. This reinforces the need to further explore the significance of accurately naming a complex set of symptoms (i.e., DSD). The findings from this study will aid nurse educators to better prepare their students and practicing nurses to assess, document, and care for their older patients with DSD.

Study results could significantly impact patient outcomes by improving nursing education, practice protocols, and future research. Several experts agree that the use of mental status assessment is necessary to improve nurse recognition and management of DSD. The results of this study may support the promotion of the use of a standardized measurement tool/s for mental status and delirium assessment. Those in nursing will be further prepared to design
educational programs and future research to target deficits in knowledge, guidelines, and systems. Education of students and practicing nurses could be specifically targeted to explicate the importance of recognition of patient phenomena within nurse-patient interactions as well as the accompanying documentation.

A secondary objective of this study was to apply the findings related to nurse recognition to advance understanding of the concept. Specifically, the study evaluated the evidence of recognition and failure to recognize DSD, of actions taken in response to the recognition, and the rate of nurse recognition.

The premise of recognition is important because recognition is a pivotal point which prompts actions by nurses. The logical thought process associated with that premise is that the actions or interventions prompted by the recognition will be more accurate if the resultant label is also accurate and specific. The findings from this study may or may not support this premise. The results of this study may help to further refine research design of nurse recognition studies. This study seeks to advance the concept of recognition in the context of nurse-patient interactions by explicating portions of the recognition model, which may promote the use of the model in future research. The potential significance of advancing the concept of recognition is widespread since nurse recognition is central to nursing practice. Advancement of this concept may lead to interventions that could enhance the effectiveness of how nurses approach nurse-patient interactions in the future.
Summary

Research has shown that delirium is potentially preventable and manageable. However, nurses do not readily recognize delirium in their older patients, especially those with dementia. Nurses are at the front line of patient care in acute care settings. It is logical to expect nurses to recognize delirium and subsequently initiate nurse management protocols. Researchers have not consistently or effectively measured the concept of nurse recognition in past studies. This has resulted in a gap in knowledge about nurse recognition of delirium.

The conceptualization of recognition in the context of nurse-patient interactions guided this study. The results may affect the approach in nursing education, the architecture of delirium management guidelines, and the design of future research, and may advance the concept of recognition in the context of nurse-patient interactions.
Chapter 2

Literature Review

The purpose of this study was to explore nurse recognition of delirium in hospitalized older adults with dementia. Although nurse recognition of delirium has been studied using various research designs, the concept of nurse recognition has not been a major focus of that research. The findings of a concept analysis of recognition in the context of nurse-patient interactions (Steis, et al., in press) reveals the importance of the accuracy and specificity of the nurses’ assessment and subsequent label affixed to the symptom(s) recognized in the patient. Without specific and accurate recognition of patient problems, nurses may be prompted to act on behalf of their patient in a manner that may delay or prevent appropriate health care management.

This chapter begins with a discussion of the major concepts relevant to this particular research project including delirium, nurses’ terminology, delirium superimposed on dementia (DSD), delirium motoric subtypes, assessment, documentation, nurse recognition of delirium, outcomes, diagnostic reasoning, and guidelines for the assessment and management of delirium. This chapter concludes with an explanation of the conceptualization of recognition in the context of nurse-patient interactions.
The study of delirium is evolving. Researchers have identified risk factors and possible mechanisms of the etiologic pathophysiology of delirium. The literature discusses risk factors, predisposing factors, precipitating factors and causes of delirium. This discussion tends to be conflicting since the boundaries of these categorizations are blurred. Michaud (2007) reinforced the definitions presented by Inouye (1996, 1999) in past research. Risk factor is an overarching term that includes predisposing factors and precipitating factors. Predisposing factors are those baseline traits or conditions that render a person at risk of developing delirium. Precipitating factors are conditions that act as triggers to the development of delirium. Of conflicting note is that drugs are often listed as predisposing and precipitating factors.

**Predisposing Factors**

The most significant predisposing factor for older adults to develop delirium is dementia (Burns, Gallagley, & Byrne, 2004; Iseli, et al., 2007; Margiotta, Bianchetti, Ranieri, & Trabucchi, 2006; Mentes & Titler, 2001; Potter & George, 2006; Young & George, 2003). One study of 330 people reported that delirium developed in 59% of the people with dementia and in only 13% of the persons without dementia (Edlund, et al., 2006). Analysis of another study of 400 general medical inpatients in Sweden revealed that the following factors were independently associated with delirium on the first day of admission: age, neuroleptic drugs, impaired vision, male gender, and history of a stroke (Edlund, et al., 2006). Additional predisposing risk factors include functional impairment
and the administration of drugs (prescription, especially psychotropics, over-the-counter, alcohol) (Iseli, et al., 2007; Margiotta, et al., 2006; Potter & George, 2006).

Precipitating Factors

Inouye (2006) proposed the presence of a complex inter-relationship between a patient who is vulnerable and known precipitating factors in the development of delirium. Contributors to delirium include,

- Drugs (sedative hypnotics, narcotics, anticholinergics, polypharmacy, alcohol) (Inouye, 2006; Iseli, et al., 2007)
- Primary neurologic diseases (stroke, intracranial bleeding, encephalitis) (Inouye, 2006)
- Acute co-morbidities (infection, hypoxia, dehydration, metabolic abnormalities) (Inouye, 2006; Iseli, et al., 2007)
- Surgery (orthopedic, cardiac) (Inouye, 2006)
- Environmental issues (physical restraints, hospital admission, bladder catheter, pain, stress) (Inouye, 2006; Iseli, et al., 2007)
- Sleep deprivation (Inouye, 2006)
Pathophysiology

Research continues to seek a definition of the pathophysiology of delirium. Currently, the exact pathophysiology is unknown but could well be multifactorial. Although all current hypotheses need more research to justify drawing conclusions, several of the possible mechanisms are presented here. The first possible mechanism is that delirium may be caused by widespread brain dysfunction with a decrease in cerebral blood flow leading to cell death in the central nervous system (CNS). Neuroimaging is the assessment method of this premise. If the widespread brain dysfunction persists for a lengthy time period, the result could be brain damage and long term cognitive impairment (LTCI) (Gunther, Morandi, & Ely, 2008; Inouye, 2006). Sedative and analgesic drugs such as benzodiazepines and narcotics, are thought to be the leading cause of iatrogenic sources of patient transitions to delirium (Pandharipande, Constable, & Cotton, 2006; Pandharipande & Ely, 2006).

The second possible mechanism is that sepsis or systemic infection often accompanies delirium (Cunningham, et al., 2009; Gunther, et al., 2008; Inouye, 2006). Sepsis causes a deterioration of the blood-brain barrier as well as neuroinflammation. This action could lead to CNS dysfunction and subsequent brain damage. Sepsis may be causal or the correlation of sepsis and delirium may be causal. Unfortunately, specific biomarkers to identify sepsis as an isolated cause of delirium have not been found (Gunther, et al., 2008). Cunningham and colleagues (2009) showed that a single episode of delirium predicts an acceleration of cognitive decline in persons with dementia.
Other possible mechanisms include anticholinergic activity, stress hormones, and neurotransmitters, and that delirium may be a side effect of anesthesia or surgery (Gunther, et al., 2008; Inouye, 2006; Inouye & Ferrucci, 2006). Molecular genetics may hold answers as well. A variant of the gene apoliprotein E (APOE), APOE4, has been found commonly in Alzheimer’s patients (Gunther, et al., 2008; Inouye & Ferrucci, 2006).

The Terminology of Delirium

Since the research surrounding delirium is evolving, health care providers and scientists have varied labels for delirium. Recently health care providers and scientists have published pleas to prompt the initiative to use just one term, delirium. Most health care professionals consider the terms ‘delirium’ and ‘acute confusion’ to be interchangeable by definition although delirium is utilized when discussing the subtypes (hyperactive, hypoactive, and mixed). ‘Delirium’ is also the term chosen for use by the American Psychological Association (Eeles & Rockwood, 2008). In the past, ‘delirium’ was more commonly used by physicians and ‘acute confusion’ by nurses. In this study, ‘delirium’ was the primary term used in an effort to increase clarity.

Nurses use a variety of terms to describe delirium or symptoms of delirium. For instance, Gustafson and colleagues (1991) reported that nurses’ terminology was vague and inconsistent- in describing patients’ mental status. In a case study by Eden and Foreman (1996), nurses did not state recognition of delirium or acute confusion but instead, noted observations such as hyperactivity and sleep deprivation. Milisen and
colleagues (2002) explored documentation of delirium in hip fracture patients and reported that nurses used synonyms for delirium such as confusion and acute confusion. When researchers asked the nurses more in-depth questions regarding their understanding of confusion, researchers found no common understanding. They concluded that nurses’ documentation of the patients’ mental status in this study was seldom accurate.

Various health care professionals, not only nurses, use synonyms for delirium rather than the term delirium when referring to the syndrome of symptoms outlined in the DSM-IV-TR. Synonyms include acute confusional state, ICU psychosis, acute brain dysfunction, encephalopathy, acute mental status change, confusional state, confusion, brain failure, post-operative psychosis, and acute organic syndrome (Liston, 1982; Morandi, et al., 2008). In an effort to standardize and clarify the use of the word delirium internationally, Morandi and colleagues (2008) advocated standardizing the term delirium as described in the DSM-IV-TR. Reliance on terms such as ‘acute confusion’ contributes to the uncertainty of linguistic meaning of delirium. This uncertainty hinders research as well as contributes to clinicians’ confusion in understanding the nuances of delirium in their patients (Siddiqi, Stockdale, Britton, & Holmes, 2007). Several researchers concerned with older adults and delirium agree that alternate terminology should be avoided and delirium should be the label applied to this syndrome (Cheung, et al., 2008; Foreman, 1993; McGuire, Basten, Ryan, & Gallagher, 2000; Milisen, Lemiengre, Braes, & Foreman, 2005).
Delirium Motoric Subtypes

Three motoric subtypes have been identified: hyperactive, hypoactive, and a variant of the two - mixed delirium. Motoric subtypes are related to the fluctuating nature of delirium (Trzepacz, 1996). Hyperactive delirium is characterized by two or more of the following: increased psychomotor activity, loss of activity control, restlessness and wandering. Conversely, hypoactive delirium is characterized by at least two of the following (at least one of either amount of activity or speed of actions must be present): decreased speed of action, decreased awareness of surroundings, decreased amount of speech, decreased speed of speech, listlessness, decreased alertness and withdrawal (Meagher, et al., 2008). Persons experiencing a mixed delirium may exhibit dramatic shifts in increased and decreased psychomotor activity within the same twenty-four-hour period. Emotional disturbances may also accompany these various mental states. Persons with delirium may exhibit paranoid tendencies and depressive symptoms, and show irritability or anger. Fear and paranoia are common since the person most likely does not understand what is happening to them (American Psychiatric Association, 2000).

Although the acuteness of illness experienced by the patient in an acute care environment may predispose them to more of a hyperactive state and the non-acute environment of a long term care facility may predispose persons to hypoactive delirium, all three subtypes have been documented in both settings (Laurila, Pitkala, Strandberg, & Tilvis, 2003). The hypoactive subtype has been identified as a risk factor for poor recognition of delirium (Edlund, et al., 2007; Fick, et al., 2007b; Inouye, et al., 2001). A
recent study reported that in a group of medical inpatients, those who were hyperactive were more likely to recover from delirium than their hypoactive counterparts (Cole, McCusker, Ciampi, & Dyachenko, 2007). Conversely, researchers who studied post-operative hip fracture patients reported that the patients who exhibited signs of hyperactive delirium were more inclined to have a severe delirium, have more sedative medications administered, and have worse outcomes than those experiencing hypoactive delirium. In another study, hyperactive delirious patients were more apt to be transferred to a nursing home or die within one month of discharge from the acute care facility (Marcantonio, et al., 2002). But a more recent study of 400 general medical inpatients over the age of 70 found no differences between subtypes when assessing those who had died during the follow-up period (Edlund, et al., 2006). These studies illustrate the conflicting results researchers are reporting about delirium in older patients from varying settings and in varying circumstances.

Delirium has a fluctuating nature. Delirium motoric subtypes may be part of this fluctuation. Although patients may be more apt to experience one motoric subtype over another because of their baseline illness or environment, there is no certainty about which motoric subtype will or will not occur.

**Delirium Superimposed on Dementia (DSD)**

Older persons with dementia are considered a vulnerable population. The level of vulnerability rises when persons with dementia are further compromised by illness. Dementia is a risk factor for persons to develop delirium (Fick, et al., 2005). Prevalence
of DSD ranges from 19–89% in hospitalized and community-dwelling older adults (Edlund, et al., 2007; Fick, et al., 2002). One recent study of 1,460 community dwelling persons reported that there were 19.2 patients with DSD for each delirium only patient (non-dementia) (Vilalta-Franch, Llinas-Regla, Lopez-Pousa, & Garre-Olmo, 2008). Similarly, a study of older medical inpatients showed patients with dementia developed delirium 59% of the time compared to patients without dementia who developed delirium at a rate of 13% (Margiotta, et al., 2006). The DSM-IV-TR provides that persons with DSD most often exhibit an altered level of consciousness, perceptual disturbances, and disorganized thinking, while persons with delirium alone present with perceptual and motor disturbances, and disorientation (Laurila, et al., 2004a).

In a more recent study, when compared to delirium-only patients, DSD patients exhibited a history of delirium and were being treated with neuroleptics and analgesics. The trajectory of the DSD patients was described as including aggressive behavior, delayed response to verbal stimuli, restlessness, agitation, delusions, anxiousness, and hallucinations as well as a more fluctuating course than patients with delirium alone. The DSD patients also exhibited more of these symptoms during hours of darkness (Edlund, et al., 2007).

The predictive significance of the severity of the person’s delirium may be related to the severity of their dementia. Voyer and colleagues (2007) reported that persons with mild dementia would most likely experience a mild delirium and persons with a more severe level of dementia would experience a moderate to severe delirium. The severity of a delirium experience also was strongly linked to the Mini-Mental State Examination.
(MMSE) score at admission and the use of narcotic medications. Lower MMSE scores correlated with greater use of narcotics and lower levels of functional independence which were also strongly related to a more severe delirium (Voyer, et al., 2007). In a related study of 104 institutionalized older patients, the researchers hypothesized that the delirium severity scores would increase with the severity of cognitive impairment measured on admission. Their results supported their hypothesis and were statistically significant \( p=.002 \) (Voyer, McCusker, Cole, & Khomenko, 2006).

Laurila and colleagues (2004a) studied recognition of delirium in a group of patients with and without dementia in acute and long-term care facilities. They concluded that patients with dementia who became acutely ill were more likely to develop a swift decline in cognition and steadier path to delirium than those patients without dementia (Laurila, et al., 2004a). This literature review supports the finding that patients with DSD are a vulnerable population who clearly are at risk for poor outcomes. This is exacerbated by the complex fluctuating nature of delirium as well as the underlying condition of dementia. Without explicit knowledge and understanding of DSD and lack of use of standardized assessment methods, patients are at risk for continued lack of nurse recognition of DSD.

**Outcomes of Delirium**

Persons with delirium and DSD typically have poor outcomes. Measuring outcomes is one way to gauge the quality of health care. Delirium is a quality indicator for health care outcomes of older adults. When patients experience a delirium, it negatively impacts
the quality rating of the institution since delirium is potentially preventable (Inouye, 2006; Schofield, 2008). Long-term care placement and death are outcome measures reported frequently in relation to the occurrence of delirium in older adults. Two studies specifically examined frail older adults. Both reported a significant number of persons who died or were institutionalized within one year after a delirium episode (Andrew, et al., 2006; Pitkala, et al., 2005). Other studies have targeted a more general population of older adults with delirium. The following outcomes were common among these studies:

- misrecognition of delirium (Fick & Foreman, 2000);
- longer hospital stays (Edlund, et al., 2006);
- discharged from acute care before full recovery from the delirium (Fick & Foreman, 2000);
- long term care placement (Andrew, et al., 2006; Edlund, et al., 2006; McAvay, et al., 2006);
- increased functional decline (Andrew, et al., 2006; McCusker, et al., 2001);
- increased rate of re-admission to acute care (Fick & Foreman, 2000); and
- death within one year (Andrew, et al., 2006; Bellelli, et al., 2007; Edlund, et al., 2006; Kiely, Jones, Bergmann, & Marcantonio, 2007; Leslie, et al., 2005; McAvay, et al., 2006).
Utilization of services and costs of care are outcome measures that indirectly affect older adults. In a study involving a large managed care organization, data were analyzed from 76,688 persons age 65 and older. Costs and utilization of services were significantly more for the DSD group; costs were double for the DSD and delirium only groups compared to the control group and significantly more than the dementia only group (Fick, et al., 2005). Overall, the economics of this problem are compelling, as the annual costs of caring for those with delirium are conservatively estimated at $38 billion (Leslie, et al., 2008).

Laurila and colleagues (2004c) reported results from a study performed with 425 frail older adults (greater than 60% had dementia). The study aimed at assessing the two-year prognosis of participants with delirium and comparing the use of the DSM-IV criteria with the previous criteria (DSM-III, DSM-III-R, and ICD-10). The mortality range was 31.3–41.9% after one year and 57.8–65.1% after two years. Over half of those in the original population of community-dwellers were permanently placed in nursing homes by year two. Another study introduced controversy over whether the increased mortality in patients experiencing DSD was due to the condition or the treatment with antipsychotic medications that are often prescribed in these patients (Vilalta-Franch, et al., 2008). For instance, even a short duration of using an antipsychotic drug in an older person with dementia may result in outcomes leading to hospital admission or death (Rochon, et al., 2008).
One study differentiated sample patients by the presence or absence of dementia, the subtype of delirium, and the severity of their outcomes as well as their ability to recover from their delirium episode (Cole, et al., 2007). Namely, patients with a baseline of dementia who were less disoriented and experienced hyperactive delirium were more likely to recover. The researchers were able to identify three factors that differentiated those who were more likely to recover from those who were not: orientation to person, hyperactivity, and inattention (Cole, et al., 2007). Similarly, a study describing patients’ trajectories of recovery after an episode of delirium reported that patients with a baseline of dementia were slower to recover than their counterparts without a baseline of dementia (American Psychiatric Association, 2000; Sylvestre, et al., 2006). Poor outcomes such as these are significant and negatively alter the patients’ trajectories of life course.

**Nursing Documentation**

Documentation communicates what has been done, supplies legal evidence of the process, and notes the results of such actions as patient outcomes. Nursing documentation is essential to nursing practice by serving many purposes, including: 1) ensuring continuity and quality of care through written communication, 2) serving as legal evidence of the process and outcomes of nursing care, 3) supporting quality initiatives, 4) documenting the effectiveness of care, 5) serving as a database for the development of nursing knowledge, 6) establishing benchmarks in education and practice standards, and 7) ensuring proper reimbursement (Cheevakasemsook, et al., 2006).
Documentation by health care professionals is the basis of decision-making (Hayrinen, Saranto, & Nykanen, 2008; Karkkainen & Eriksson, 2003). Conversely, if nursing documentation is incomplete or inaccurate, it cannot be relied on by other health care providers who base their care decisions on it (Hayrinen, et al., 2008). Nursing care quality is evaluated retrospectively by chart review. Nurses are taught that only what has been recorded is what has been performed and that thorough documentation follows quality care (Karkkainen & Eriksson, 2003). Ultimately, quality of documentation impacts patient care, research, statistical accounting, and health policy (Hayrinen, et al., 2008).

Perception of the quality of documentation in the electronic medical record (EMR) in comparison to the paper record varies from study to study. The variables that tend to swing the perception between positive and negative are newness of the electronic system in place, comprehensiveness of the system (number of disciplines using it), and quality of the EMR system itself (Hayrinen, et al., 2008). DesRoches and colleagues (2008) reported on a national survey of 1,392 registered nurses (RNs). RNs using EMRs reported higher rates of nursing excellence and quality initiatives at their respective hospitals. Interestingly, those RNs who reported using EMRs were more likely to work at a hospital in some stage of achieving the Magnet status. In another study measuring the effectiveness of the implementation of an EMR at an obstetric unit in Oregon (Eden, et al., 2008), the researchers reported more complete patient information and activities related to direct patient care documented with the use of the EMR compared to the former paper record.
Legally, nursing documentation is supposed to show that nurses can think critically, use common sense, and capitalize on their professional intuition for patient care, but Alford (2003) noted common documentation errors consistently made by nurses. The first is failure to use the nursing process when documenting behaviors. Interestingly, the example she offers is of a nursing note stating that the patient “yelled and screamed all shift.” Nurses have a duty to address a documented behavior by recording the nursing care provided to the patient in response to the distressing behavior (Alford, 2003). The second relevant error she offered is that nurses fail to interpret raw data. Alford pointed out that professional standards mandate that nurses make a nursing diagnosis and provide care based on that diagnosis. Failure to interpret raw data coincides with one of the findings in the Steis and Fick (2008) systematic review of nurse recognition of delirium. Several studies in this review showed that while nurses recorded symptoms of delirium, they failed to record the diagnosis of delirium. Nurses are to document the care they provide for various relevant reasons. Doing so lessens doubt about the completeness and quality of nursing documentation as a whole. The assumption is that what is recorded is what was performed. Nurses perceive that their documentation is beneficial to them and their patients. Nurses perceive their documentation increases patient safety so that documentation is an important part of their role (Bjorvell, Wredling, & Thorell-Ekstrand, 2003). Barriers to nursing documentation are time and work organization (Bjorvell, et al., 2003).

Quality of Nursing Documentation
Studies reporting on the quality of nursing documentation exist for multiple specialties and disease processes. Cheevakasemsook and colleagues (2006) evaluated 35 patient records over a three-day period and reported that the quality and quantity of completeness were both less than 50%. They noted inappropriate charting that consisted of repetitions and included information unrelated to the patient illness.

Souder (2000) compared nursing documentation of mental status to researcher ratings for 42 patients in a hospital setting. The researchers reported no documentation of impaired cognitive status although every record had several entries of “alert and oriented x 3.” The researcher ratings reported that several of the patients had suffered cognitive impairment and concluded that nurses do little to assess mental status.

In a newly published study, Voyer and colleagues (2008) reported on the accuracy of nursing documentation of 227 patients who experienced delirium. Patients who experienced a hyperactive delirium (as opposed to hypoactive), had increased severity of delirium, and were physically restrained were associated with better documentation of delirium by the nurses. Steis and Fick (2008) completed a systematic review of nurse recognition of delirium and found that nurses were documenting assessments but the assessments were not detailed or accurate enough to report on the patients’ mental status.

To summarize, the literature agrees that nurses are not accurately documenting the care provided, especially in the area of mental status assessment. This has a direct link to quality of care since the health care team relies on the documentation to make health care decisions.
Clinicians typically use a variety of analytical and non-analytical methods of reasoning when assessing a patient’s medical status. Analytical reasoning involves assessing the patient’s signs and symptoms and then employing the biomedical knowledge gained in the clinician’s educational process. Through this process, one or more hypotheses of potential diagnoses are generated to further deduce the actual diagnosis. The clinician proceeds to search for more data that will either confirm or refute the hypothesis. This process eventually results in a diagnostic label (Charlin, Boshuizen, Custers, & Feltovich, 2007; Mamede, Schmidt, Rikers, Penaforte, & Coelho-Filho, 2007; Norman, Young, & Brooks, 2007).

Non-analytical reasoning is described as an alternative way of knowing. It involves pattern recognition, encapsulated knowledge, or scripted knowledge, all of which are enhanced by experiential knowledge. Non-analytical reasoning has been observed to be an automatic, swift, and sometimes, unconscious process (Charlin, et al., 2007; Mamede, et al., 2007; Norman, et al., 2007).

Studies have reinforced the sense of many researchers and educators that clinicians often utilize a variation of both analytical and non-analytical reasoning when approaching a diagnostic decision (Norman, et al., 2007). Some have proposed that too much reliance on non-analytical reasoning could potentially result in error (Norman, et al., 2007). Conversely, past research asserted that if the correct diagnosis was considered within the first 5 minutes of assessment, it was correct 95% of the time; if not, there was a 95% chance that the correct diagnosis would be missed (Charlin, et al., 2007).
One recent study utilized university psychology students who had no previous experience with electrocardiography (ECG) diagnosis. The study involved three phases: training, practice, and testing. After preliminary education on the basics of ECG diagnosis, the students were randomly assigned to either a ‘combined instruction’ group or a ‘no instruction’ group. The ‘combined instruction’ group was encouraged to use analytic and non-analytic reasoning strategies when considering each of the ECG problems presented to them. The ‘no instruction’ group was given no instructions. After the participants produced their conclusion on the ECGs, they were given feedback including the correct diagnosis and which features determined the correct diagnosis. The group that was encouraged to use combined reasoning methods were more accurate in their diagnoses (Eva, Hatala, & Brooks, 2007). This study showed that accuracy may be increased by combining the forms of reasoning utilized. This conclusion matches the consensus of the literature.

**Nurse Recognition of Delirium and DSD**

Before nurses can act upon the recognition that their patient is experiencing delirium, they must recognize the delirium. Nurse recognition of delirium has most commonly been studied in acute care settings such as emergency departments or critical care, peri-operative, or medical surgical units and less commonly, in long-term care facilities and the community. The variety of study designs and chosen methods of defining nurse recognition of delirium has complicated the reporting of this data.
Risk factors for underrecognition of delirium in older adults have been reported consistently by nurse researchers as the presence of hypoactive delirium, age 80 and older, vision impairment, and dementia (Fick, et al., 2007b; Inouye, et al., 2001; Milisen, et al., 2002). In a study by Inouye and colleagues (2001) when all four risk factors were present, the risk of under-recognition was increased by twenty-fold. In addition, Inouye (2005) reported that when patients had a baseline of dementia, the nurses often attributed symptoms of delirium to the patients’ known diagnosis of dementia. In Fick and Foreman’s study (2000), 88% (seven of eight) of the acute care inpatients who were experiencing DSD were not recognized as so by the nurses or physicians. Upon interview, there was an obvious lack of knowledge of dementia and delirium as well as poor assessment practices. Other research has suggested that certain co-morbidities may pose a risk of misrecognition such as a history of psychiatric conditions (Swigart, Kishi, Thurber, Kathol, & Meller, 2008), including depression (Armstrong, Cozza, & Watanabe, 1997; Farrell & Ganzini, 1995; Swigart, et al., 2008). In the Armstrong and colleagues (1997) study, gender differences were also found. Almost equal numbers of both genders were misdiagnosed but the women were more often diagnosed as having depression and the men were more often not diagnosed at all. Women exhibited more hypoactive delirium which was a possible explanation because hypoactive delirium is the least recognized subtype of delirium.

Direct measurement of nurse recognition of delirium was achieved by comparing nurses’ assessments to researchers’ assessments. Nurse recognition rates ranged from 13–83%. Retrospective chart reviews to compare nurses’ documentation with
assessments made by the research teams revealed nurse recognition of delirium at 18% (Friedman, Qin, Berkenstadt, & Katzenelson, 2008), 26% (Inouye, et al., 2005; Young & George, 2003), 35% (Spronk, Riekerk, Hofhuis, & Rommes, 2009), 38% (Gustafson, et al., 1991), 56% (Bowler, et al., 1994), and 83% (Laurila, et al., 2004b). Paired ratings by nurses and researchers yielded nurse recognition of delirium at 31% (Inouye, et al., 2001). A case study set in an intensive care unit comparing interviews of nurses, chart audits, and patient observations, concluded that 50% of the nurses recognized delirium (Eden & Foreman, 1996).

Alternate designs to measure nurse recognition of delirium included methods such as by hospital day, domains of delirium, and use of case vignettes. Milisen (2002) reported nurse recognition of delirium after hip surgery, ranging from 87.5% on the first post-operative day to 50% on the twelfth post-operative day. Morency, Levkoff and Dick (1994) reported the level of recognition according to each domain of delirium,

- 41% for the perceptual domain;
- 51% for the speech domain;
- 56% for fluctuating behavior;
- 61% for disturbance in levels of consciousness;
- 64% for a difference in level of psychomotor activity;
- 67% for a disturbance in the sleep-wake cycle; and
- 81% for the disorientation domain.
In another study, presentation of case vignettes to nurses in a classroom setting yielded 41% nurse recognition of hypoactive delirium alone, 54% nurse recognition of hyperactive delirium alone, and 21% for nurse recognition of hypoactive delirium superimposed on dementia (Fick, et al., 2007b). No relationship was revealed between correct responses on the case vignettes and years of experience, their specialty, or their education.

In two more recent studies, the study aims were specifically to measure nurse recognition of DSD in older adults. First, Fick and colleagues (2007b) investigated nurse knowledge and recognition of DSD and delirium subtypes using standardized case vignettes. A majority of the nurses were able to recognize dementia alone (83%) but only 41% correctly identified hypoactive delirium alone. Of greater interest, nurses only recognized hypoactive DSD 21% of the time. Hyperactive delirium alone (52%) and hyperactive DSD (59%) were recognized more often than hypoactive delirium alone or with dementia. The second study involved long-term care residents with dementia (Voyer, Richard, et al., 2008). Data were collected at two time points, one week apart. At time one, only 13% of the residents with DSD were recognized while at time two (seven days later), only 18.7% of the residents with DSD were recognized by the nurses as exhibiting delirium (Voyer, Richard, et al., 2008).

One of the difficulties with studying this phenomenon is the use of varying methods to measure nurse recognition of delirium indicating the lack of conceptual clarity about nurse recognition. This is a methodological issue but is a major concern in this area of research. In the following studies, measurement of nurse recognition of delirium was
approached using varying methods, none of which defined the concept of nurse recognition nor measured it consistently.

Voyer (2008) devised a multiple choice question to poll nurses caring for patients with delirium. The question asked the nurses to rate the patients’ overall mental status as: 1) usual, 2) more alert than usual, 3) more confused than usual, or 4) in delirium. The researchers then used answers 2, 3, and 4 to indicate whether the nurse had recognized delirium in their patients even though 4 was the only choice explicitly stating delirium. Voyer measured nurse recognition of delirium at two time points, one week apart, and determined that nurses recognized delirium in less than 20% of the patients who were determined to have delirium by the research assistants (RAs). The RAs observed the patients for seven hours and then completed the Confusion Assessment Method (CAM) to document the presence or absence of delirium. Similarly, Spronk and colleagues (2009) asked ICU nurses to choose one of these statements as a result of their assessment: 1) patient has signs of delirium, 2) no delirium, or 3) too sedated to assess for delirium. Trained research assistants evaluated the patients at the same time using the structured CAM-ICU tool. It was noted that the nurses did not use any structured assessment tools. The nurses only chose choice one (patient shows signs of delirium) 34.8% of the time.

In seven studies, researchers accepted less than a definitive statement of delirium or acute confusion as satisfactory evidence that nurses recognized delirium. Eden and Foreman (1996) accepted awareness of symptoms of delirium; Gustafson and colleagues (1991) accepted clear statements or indicative notations on acute confusional state; Inouye and colleagues (2005) accepted any key terms or descriptors that were present and
evidence of acute onset or acute change in symptoms; Laurila and colleagues (2004b) accepted the word delirium or confusion or at least two signs of confusional state such as restlessness, unresponsiveness, shouting, wandering, or aggressiveness; Milisen and colleagues (2002) looked for a diagnosis of delirium or a reference to delirium using one or more synonyms (e.g. confused, combative, disoriented) or by a description of the patients’ behavior; Friedman and colleagues (2008) accepted ‘confused’ or ‘delirious,’ and Voyer and colleagues (2008) gave credit for recognition of delirium if the nurse chose any of the following: the patient is more alert than usual, more confused than usual, or is delirious.

Steis and Fick (2008) reported that the concepts of nurse knowledge of delirium, nurse recognition of delirium, and how nurses assess and document delirium in older adults, although related, are different. Current literature does not explicitly define how nurse recognition of delirium is measured (Steis, et al., in press). The awareness of symptoms of delirium without the accurate and specific recognition that the phenomenon is delirium is insufficient and leaves a gap in this body of literature.

Nurse Assessment

The nursing process guides nurses to first assess patients. Several studies report inadequate nursing assessment and documentation of mental status evaluation. Steis and Fick (2008) reported that a commonality among studies exists—that is, although nurses assessed their patients, they did not perform a detailed enough evaluation and subsequent documentation to accurately report their patient’s cognitive status. This notion is
supported with a systematic review of the outcomes of nursing diagnostics by Muller-Staub, Lavin, Needham and Achterberg (2006) who offer that neither nursing diagnoses, nor effective descriptions of signs, symptoms or etiologies are documented effectively by nurses.

Dahlke and Phinney (2008) reported on a qualitative study that explored how twelve acute care nurses assessed, prevented and treated delirium in older patients. The interview data had three main categories of approaches to care: 1) ‘taking a quick look’, 2) ‘keeping an eye on them’, and 3) ‘controlling the situation’. ‘Taking a quick look’ reflects the increased workload in the acute care setting. ‘Keeping an eye on them’ refers to nurses describing their care once they have identified a patient as at risk for or experiencing delirium. The nurses understood the need to monitor these patients closely but described it as burdensome. They reported actions taken to facilitate monitoring as moving patients into hallways or nurses stations and using one-on-one monitoring. Nurses reported using information gained from the observations to decide whether they needed to intervene. ‘Controlling the situation’ refers to the nurses’ reports of when they made the decision to intervene. Safety, attempting to control behavior threats and as a time management strategy were reasons nurses used for intervening. Examples of control measures are pharmacological and physical restraints and one-on-one monitoring of the patient.
**Confusion Assessment Method (CAM)**

The most widely used measure to specifically detect the presence of delirium is the Confusion Assessment Method (CAM) (Wei, Fearing, Sternberg, & Inouye, 2008). The CAM was first introduced in 1990 as an instrument designed for clinicians other than psychiatric experts to screen for the presence of delirium (Inouye, et al., 1990) and has since been widely adopted and adapted, being translated into ten languages (Wei, et al., 2008). Delirium was not differentiated from dementia by the American Psychiatric Association until 1980 with the development of the DSM-III criteria (Laurila, et al., 2003). The CAM is based on the DSM-III and DSM-III-R criteria. Health care professionals had some difficulty interpreting the DSM-III and DSM-III-R criteria. The work group that designed the DSM-IV criteria based their work on new larger data sets than were used in the development of the original DSM definition (Laurila, et al., 2003). The intention of the work group was to improve the sensitivity of the criteria for delirium in the DSM-IV in the acute care setting and with patients with dementia (Laurila, et al., 2003, 2004a). Laurila et al. (2004a) offered that the value of the updated DSM-IV criteria is in being simplified.

**Guidelines for Nursing Management of Delirium**

There are numerous guidelines for nursing management of delirium in the literature. There are commonalities with all and some are more detailed. This section highlights the guideline Inouye published in 1999 (Inouye, Schlesinger, et al., 1999). Guidelines published since then are very similar and most cite it including a recent delirium
intervention study with promising results (Kratz, 2008). Guidelines for the nursing management of delirium begin with assessment. Consistent assessment is advocated in an effort to recognize delirium using the criteria set forth by the DSM-IV-TR. Brief or screening assessment of cognitive function is advocated in all patients. A more in-depth cognitive assessment is indicated when signs of confusion surface from the screening assessment. It is imperative that the patient’s cognitive, and preferably, functional status prior to admission be ascertained from the family or caregiver. Nurses need to be knowledgeable about predisposing risk factors such as dementia, advancing age, functional decline, and sensory impairment (Margiotta, et al., 2006; Potter & George, 2006). Nurses also need to be cognizant of precipitating risk factors such as acute illnesses, surgery, environmental issues such as physical restraints, catheters and location changes (e.g., hospitalization).

Suggested management practices include regular reality orientation as well as the use of calendars and clocks. Inviting family or close acquaintances to visit and provide familiar personal belongings may help the patient with orientation. Safety is a major concern when caring for patients with delirium. Environmental factors are important such as: proper lighting according to the time of day, controlling unexpected and irritating noise, utilizing a gentle approach with the patient, minimizing transfers within the hospital, increasing mobility, engagement with family and avoiding restraint use. It is important to ensure that the person has use of their sensory devices such as glasses and properly functioning hearing aids to decrease deficits. Care should be taken to provide instructions in small increments and to explain all activities. Preserving the person’s self
esteem and dignity should be kept in mind throughout their care. In general, nursing management of delirium involves non-pharmacological intervention of vigilance as well as promotion of safety and healing.

Theoretical Discussion

The conceptualization of recognition in the context of nurse-patient interactions was analyzed using the Principle-based Concept Analysis method (Penrod & Hupcey, 2005). This method uses four philosophical principles to guide analysis and is advantageous for multiple reasons. First, use of these principles helps identify the strengths and weaknesses in the current state of the concept; second, analysis using the philosophical principles aids the researcher in planning future research with methods appropriate to advance the concept. Other advantages of the principle-based method include the scientific and thorough method of selecting the literature; the conceptually driven sampling method; and conduct of analysis by principle, as well as by and across disciplines (Penrod & Hupcey, 2005).

The goal was to analyze the concept and define it as it currently exists in the scientific literature. The first step in the process was to collect the data. The data are the scientific literature from appropriate disciplines. Appropriate disciplines are those disciplines that may enhance the understanding of the concept to nursing. In the case of recognition, a broad search of the literature was performed using PubMed, CINAHL, and PschInfo using the search term recognition. This resulted in references to a broad array of literature unrelated to the concept of interest. The search was eventually narrowed to the databases
PubMed and CINAHL with the search terms recognition and nurse-patient interaction (Steis, et al., in press). In this concept analysis, a single discipline was used because the concept of interest dictated this once the broad search was completed. The narrowness of the literature search was driven by the content of the scientific literature, not the researcher’s desire for a shortened process. This in turn, determined the sample.

The conceptually driven sample consisted of 132 unique articles. The search parameters included publication from 1997 to December 2008 and English language. All articles were read and re-read for the general use of the concept and for the appropriateness of the articles to the dataset. Articles were eliminated that focused on the recognition of nurses for a ‘job well done’ (n=13), patient recognition of phenomena (n=3), Magnet status recognition (n=2), and other non-relevant topics (n=17) were eliminated. The final dataset consisted of 97 articles that addressed recognition within the context of nurse-patient interactions (Steis, et al., in press).

The Four Philosophical Principles

After initial readings of the articles, they were read again through the lenses of each of the principles. The philosophical principles of this method are epistemological, pragmatic, linguistic, and logical.
**Epistemological Principle**

The epistemological principle refers to how well defined the concept is within the scientific literature and how distinct it is from other concepts. Although implicit meaning of nurse recognition was common, none of the articles that served as data explicitly defined nurse recognition. Examples of implicit meaning in the data include that knowledge enhances recognition, recognition is process-oriented and needs-driven, and the moment of recognition is pivotal, prompting a response. The conceptual boundaries of nurse recognition are not currently well defined. For these reasons, the epistemological analysis of this concept is not well delineated (Steis, et al., in press).

**Pragmatic Principle**

The pragmatic principle leads the researcher to evaluate whether the concept is useful in explaining phenomena within the discipline, nursing, in this case. Even though the concept of recognition is only defined with implicit meaning in the literature, it is used meaningfully across cultures, age groups and settings (Steis, et al., in press).

**Linguistic Principle**

The linguistic principle leads the researcher to evaluate the consistency of the use of the concept throughout the literature. How well does it hold across contexts? Does the concept retain the same meaning? In the recognition literature, recognition was often
used as a noun indicating that acknowledgment or awareness had occurred (Steis, et al., in press). Although there was relatively broad usage of the concept of recognition across the dataset, there was an implication that the ‘process of recognition’ is complex as opposed to simple and direct (Steis, et al., in press).

Logical Principle

The last principle is the logical principle, which guides the researcher in analyzing the data to determine how well the concept holds its boundaries when integrated with other concepts. The boundaries are expected to remain clear and tight (Penrod & Hupcey, 2005). Recognition was not well defined in the literature rendering it unprepared for current theoretical utility. In one article, the researcher listed four competencies nurses need to recognize phenomena in their patients (Schoot, Proot, Ter Meulen, & De Witte, 2005). They did not offer a definition of nurse recognition but they did state that nurse recognition involves more than a passing glance or simply ‘noticing’ the patient phenomena.

Theoretical Definition of Nurse Recognition

The product of Principle-Based Concept Analysis is a theoretical definition of the current state of the concept within the scientific literature (Penrod & Hupcey, 2005). The following theoretical definition emerged from the data, rendering it evidence-based:
Recognition is the process in which a nurse, in interaction with a patient, gathers patient-based evidence, interprets patterns related to meaning of the patient experience against pre-existing knowledge and experience, and consciously labels the phenomenon-based or patient-specific pattern. This process is bound by contextual preconditions, including personal and professional attributes of the nurse, attributes of the patient as a person in a compromised state of health, and the organizational culture wherein nurse-patient interactions occur. The experience of recognition presents a pivotal point since labeling of a pattern prompts a response by the nurse, whether a behavioral response initiating an intervention or an internal, affective response. The specificity and accuracy of collected data, interpretation, the subsequent label, and resultant response will impact the qualities of outcomes for the patient, the nurse, and, at times, the organization. Outcomes dynamically feed back into pre-conditions in a cyclical process that potentiates change (Steis, et al., in press).
**Dynamic Feedback**

**Figure 2.1. Recognition model**


The model of recognition conceptualization provides guidance by showing us that evidence perceived through nurse-patient interactions is processed by the nurse using cognitive and pre-cognitive ways of knowing that result in the recognition of the patient’s symptom(s). The depth of the nurse-patient interaction may either constrain or enhance the culling of the evidence. The accuracy of the conclusion is related to the nurse’s knowledge base. The conclusion results in the label being affixed to the perceived symptom(s) of the patient. The scope and depth of the recognition and label are dependent on the preconditions.

Recognition facilitates movement of a prior identification of a pattern to the forefront of the nurse’s consciousness. The point of conscious recognition is a pivotal moment
resulting in the application of a label and the prompting of a choice to act or not to act. Pre-conditions influence the decision to act. Responsive action is primarily a cognitive thought process, although pre-cognitive or intuitive knowing influences the course of action. Recognition moves the status of the phenomenon to another level.

The outcome of the recognition process may range from a failure to recognize the phenomenon of interest to appropriate and effective action in response to accurate and specific recognition and labeling of the phenomenon of interest. Actions range from specified sets of interventions, such as guidelines to manage patients with delirium, to bearing witness to a suffering patient. When the nurse feels constrained by organizational culture or personal/professional attributes, a choice not to act may serve a protective function (i.e., shielding) or it may result in moral distress. All outcomes feed continuously into the contextual features in a dynamic, flowing course of events. As nurses experience this cycle over time, there is potential for enhanced clinical expertise personally and an enhanced image among nursing peers, moving toward expert.

In summary, the model of recognition conceptualization includes the nurse as a whole person entering into interactions with a patient, reading the evidence and processing it. The quality and accuracy of the outcome is directly related to the wholeness of that nurse. The ways of knowing in nursing, the person-centeredness of the nurse and the level of knowledge and experience all influence the quality of the outcome. This model is comprehensive. It allows for the dynamic nature of nursing practice as well as the realization that if all of the pieces are not present in the interaction, the nurse may fail to recognize what is happening with the patient.
**Theoretical Integration**

The conceptualization of recognition was the guiding framework for this research. Established theoretical models/frameworks authored by four notable nursing scholars helped inform this conceptualization: Barbara Carper, Christine Tanner, Patricia Benner, and Margaret Newman. An overview of each model/framework and evidence of their congruence with the recognition conceptualization follows.

**Carper**

Carper authored the “Fundamental Patterns of Knowing in Nursing” in 1978. After performing a conceptual and symbolic analysis of nursing knowledge, she found four ways of knowing in nursing: 1) empirics, the science of nursing, 2) esthetics, the art of nursing, 3) the component of a personal knowledge in nursing, and 4) ethics, the component of moral knowledge in nursing (Carper, 1978). Most importantly, Carper asserted that no pattern or way of knowing should alone be considered sufficient. She also asserted that the ways of knowing in nursing are not mutually exclusive (Carper, 1978). Another important tenet of Carper’s work is her acknowledgment that nursing knowledge is complex and diverse. She stated the obvious—nurses need to assess the subjective evidence and interpret what they perceive. Nurses need to critically think through each situation and determine their resultant actions (Carper, 1978).

Nursing and nursing care are not robotic or just a listing of prescribed steps in a process. “The obligation to care for another human being involves becoming a certain kind of person…” (Carper, 1978, p. 22). In the recognition conceptualization, the nurse’s
theoretical and clinical knowledge base as well as nurse as clinician are influenced by the level of clinical expertise in addition to the nurses’ attitudes, personal values, and willingness to engage in self-exploration in an attempt to expose personal biases that may impair a therapeutic connection with patients (Steis, et al., in press). This description of a portion of the pre-conditions of the nurse in the recognition conceptualization is congruent with Carper’s tenets.

Lastly, Carper asserted that nursing knowledge is not static (Carper, 1978). Each new experience potentially adds knowledge and creates new questions. This is congruent with the feedback loop incorporated in the recognition conceptualization and as evidenced in this portion of the theoretical definition: “All outcomes feed continuously into the contextual and interactive pre-conditions of nurse, patient, and organization in a dynamic, flowing course of events. As nurses experience this cycle over time, there is potential for enhanced clinical expertise since thoughtful recognition builds the nurse’s experience and allows the nurse to process incoming evidence against a new background of knowledge and experience” (Steis, et al., in press).

**Benner**

Benner’s work is based on the Dreyfus Model of Skill Acquisition. Skilled performance is based on experience and education (Benner, 1982). Benner’s model provides a basis for clinical knowledge development and career progression in clinical nursing. The clinical levels are novice, advanced beginner, competent, proficient, and expert (Benner, 1982). These levels reflect changes in two aspects of performance: movement from reliance on abstract principles to use of past, concrete experience as
paradigms and change in perception and understanding of situations from a holistic
stance (Benner, 1982). Lastly, experience is not just the passage of time or the logging in
of hours worked in nursing; it is the refinement of preconceived notions and theory by
‘experiencing’ many situations in caring for others (Benner, 1982).

The recognition conceptualization is congruent with Benner’s tenets of the influences
of nursing experience when describing the contextual features of nurse as clinician.
Similarly, the pre-condition of the nurse-patient interaction is the interactive component
of the model in which the nurse actively gathers evidence regarding the patient, processes
an interpretation of the evidence, and organizes conclusions (Steis, et al., in press).

Newman

Margaret Newman (1999) authored a paper entitled, “The rhythm of relating in a
paradigm of wholeness.” In this paper she focused on the patient experience and how the
nurse can help the patient rise to a level of a new normal. She spoke to a paradigm shift
in which the patient sees himself/herself from a new perspective (Newman, 1999). The
paradigm shifts from looking at ‘parts’ to recognizing the ‘whole.’ This also signifies the
shift from the paradigm of thinking one must achieve health to achieve wholeness, one in
which the concept of health is the absence of disease. Newman proposed that health is
the pattern of the whole. Becoming ill does not take away from one’s wholeness; instead,
the pattern of the person takes a different form. She maintained that the pattern is a
characteristic of wholeness. One’s pattern is a dynamic relatedness with one’s
environment. Nurses have a responsibility to partner with patients as their patterns are
disturbed by illness or other events. Newman (1999) reminded us that it is easier to walk
away from another who is in partnership with uncertainty. Being in sync with another is easy when their pattern is repetitive, recognizable, and predictable (Newman, 1999). But when someone is unstable and has a disrupted pattern, it is challenging or even uncomfortable to stay with them. This is often when the nurse first encounters the patient. Newman urged nurses to understand that the ‘brokenness’ of the situation is only a point in the process leading to a higher order. “We need to join in partnership with clients and dance their dance, even though it appears arrhythmic, until order begins to emerge out of chaos” (Newman, 1999, p. 228). She encouraged nurses to ‘know’ or have faith that a higher level of organization will emerge out of this situation (Newman, 1999).

Newman’s tenets, as stated in the previous paragraph, are congruent with the pre-contextual conditions of the nurse as clinician in the recognition conceptualization. From the recognition paper, “Beyond baseline knowledge, nursing expertise … is characterized by decisions and actions based on knowledge about a specific patient” (Steis, et al., in press). “The adequacy of the evidence, the accuracy of its interpretation, and quality of subsequent conclusions are influenced by the contextual pre-conditions of the nurse’s knowledge base and level of nursing practice expertise” (Steis, et al., in press).

Newman (1999) also stated that people who shield themselves from situations of instability in order to preserve their own equilibrium do not appear to move ahead to higher states of consciousness. Applying this to nurses translates to a slowing of learning due to missed experiences (Newman, 1999). This is reflected in the recognition conceptualization with the feedback loop, enabling nurses to learn and ‘evolve’ from each nurse-patient interaction.
Tanner

The purpose of Tanner’s Clinical Judgment Model was to aid in teaching clinical judgment to student nurses. The Clinical Judgment Model includes four steps: noticing, interpreting, responding, and reflecting (Tanner, 2006). Tanner maintained that clinical judgment is influenced more by what the nurse brings to the situation than the objective data about the situation itself. Tanner presented her model as a description of how experienced nurses make clinical judgments. She allowed for a variety of nurse experiential levels stating that the experienced nurse uses more intuition while the beginner nurse relies more on analytical thinking. She also offered that nurses’ personal attitudes and values potentially influence their actions (Tanner, 2006). These tenets are congruent with the pre-conditions of the nurse in the recognition conceptualization.

Tanner stated that sound clinical judgment includes knowing the patient and their typical pattern of responses, as well as engagement with the patient (Tanner, 2006). This is similar to Newman and the recognition conceptualization. Tanner’s model does not allow for a patient’s altered pattern during times of disturbance or illness. Tanner did make allowances for the context of the nurse-patient interaction. The context of the environment and the culture of the organization are acknowledged as potentially influencing the interaction as well as the specific patient details (Tanner, 2006). This is congruent with recognition conceptualization. The organizational context is a pre-condition acknowledging that the organizational culture which the nurse-patient interaction occurs may influence the recognition process (Steis, et al., in press).
Reasoning patterns used by nurses are addressed in Tanner’s model (Tanner, 2006). She asserted that nurses use at least three interrelated patterns of reasoning: analytical, intuitive, and narrative thinking. This is also congruent with recognition conceptualization in which analytical thinking and intuition are considerations of the nurse advancing through the levels of beginner nurse to experienced nurse (Steis, et al., in press). Narrative thinking, although not mentioned explicitly in recognition conceptualization, is part of the pre-conditions of nurse as clinician and how he/she engages with the patient within the interaction as well as the communication effectiveness within the interaction (Steis, et al., in press).

Chapter Summary

The purpose of this chapter was to highlight the literature supporting the research study. Present research has shown that delirium is potentially reversible and treatable if recognized early. Nurse recognition of delirium in older persons with dementia is an important research area because nurses do not routinely recognize delirium; enhancing nurse recognition of delirium could improve patient outcomes.

The model of the conceptualization of recognition needs further testing but was appropriate to guide this study. This model focuses on explaining the process of recognition, a phenomenon that was explored through an examination of nursing documentation.
Nurse knowledge of delirium in older adults is also lacking. The terminology nurses use to describe their older adult patients with dementia and those with DSD are important. Nurses use a variety of terms to describe delirium, usually noting orientation and behavior. Researchers have reported this inconsistency in the use of terminology as well as in the methodology of measuring nurse recognition in exploring these types of phenomena. Although using retrospective nursing documentation to measure the process of recognition is limited since there is no retrospective measure to evaluate what the nurse was thinking during the nurse-patient interaction and subsequent decision-making process, this study explored the nurses’ language.

This research study addressed these gaps in the nursing science literature by: 1) exploring nurse recognition of delirium in hospitalized persons with dementia, and 2) describing how nurses managed their patients with dementia and DSD, as well as a secondary objective to further advance the concept of recognition in the context of nurse-patient interactions.
Chapter 3

Methods

This research study explored nurse recognition of delirium in hospitalized older adults with dementia. The study design incorporated both an exploratory chart review and a secondary data analysis of a prospective cohort study that enrolled and followed 140 older adult participants daily while they were hospitalized. An equal number of proxy/family members were also enrolled.

The recognition process was highlighted by the labeling of the patient phenomenon, a pivotal point (according to the conceptual model of recognition) prompting action by the nurse on behalf of the patient. Tenets of the recognition model include, the quality of the outcome is dependent upon the accuracy and specificity of the label applied to the phenomenon; the appropriateness of the label increases the likelihood that nursing interventions are appropriate; and that once recognition occurs, it prompts action. This study not only explored how nurses described their patients with DSD and dementia-only, but also how they described the interventions they employed. These actions were compared to an approved guideline for nurse management of delirium.

Original Study by Fick

This study was based on an original study by Dr. Donna Fick (Principal Investigator). Fick’s study was funded by the National Institutes of Health/National
Institute on Aging (NIA) (R03#AG023216). The aims of the study were to identify risk factors associated with delirium in hospitalized persons with dementia; and to describe the immediate and post-hospital (one and three month) trajectory of cognitive decline and associated outcomes in persons with dementia who developed delirium.

*Fick Sample*

Fick conducted a sample size analysis using risk factors and primary outcomes. A sample size of 125 was necessary to achieve a power of 0.80 at an alpha of 0.05. This calculation considered various risk factors and their rates of occurrence. To account for attrition and other losses, given the age and vulnerability of people in this group, the planned sample increased to 165. Although 152 patients were actually enrolled, the final analysis included data from 140 patients (after drop outs and excluded enrollments were eliminated). Descriptive data of the sample is presented in Table 3.1. This study sample also consisted of 140 proxies or family members for patient participants. The proxy was the power-of-attorney for most of the patient participants. The proxy was required to fully consent to and complete the family interview unless they chose to designate another person to complete the interview (i.e., significant other of patient who may no be the power of attorney).
Table 3.1
Descriptive Statistics for Fick Study Sample (n=140)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percent</th>
<th>Mean (Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td>83.48 (65-99)</td>
</tr>
<tr>
<td>Years of Education</td>
<td></td>
<td></td>
<td>12.24 (7-17)</td>
</tr>
<tr>
<td>Sex: Female</td>
<td>84</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>56</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Race: White</td>
<td>140</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>56</td>
<td>40.58</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>66</td>
<td>47.83</td>
<td></td>
</tr>
<tr>
<td>Live Alone</td>
<td>36</td>
<td>26.28</td>
<td></td>
</tr>
<tr>
<td>Live with Spouse</td>
<td>44</td>
<td>32.12</td>
<td></td>
</tr>
<tr>
<td>Live with Other Relative</td>
<td>19</td>
<td>13.87</td>
<td></td>
</tr>
<tr>
<td>Live with Paid Caregiver</td>
<td>15</td>
<td>10.95</td>
<td></td>
</tr>
<tr>
<td>Housing/Community</td>
<td>48</td>
<td>35.82</td>
<td></td>
</tr>
<tr>
<td>Housing/Institution</td>
<td>86</td>
<td>64.18</td>
<td></td>
</tr>
</tbody>
</table>

All patient participants in the study were followed daily while hospitalized. The proxy/family members were interviewed at enrollment using several measures to ascertain the patients’ mental status (Table 3.2). The Confusion Assessment Method (CAM) and Mini-Mental State Examination (MMSE) were completed daily by trained research assistants (RAs). The RAs also reviewed nursing documentation, medication administration records and laboratory test results. The nurses were briefly interviewed to ascertain if the patient exhibited any confusion, fluctuation in mental status, history of confusion, or any change in mental status since caring for the patient during this hospitalization.
Table 3.2
Measurement Time Line for Fick Larger Study (R03#AG023216)

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Administered at Enrollment</th>
<th>Administered Daily</th>
<th>Administered at Follow Up</th>
<th>Administered to Patient</th>
<th>Administered to Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified Blessed Dementia Rating Scale</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Informant Questionnaire on Cognitive Decline (IQCODE)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confusion Assessment Method (CAM)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Mini-Mental State Exam (MMSE)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Clinical Dementia Rating Scale (CDR)</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Charlson’s Co-Morbidity Index</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Inclusion and Exclusion Criteria

Inclusion criteria for the patient sample were persons of at least 65 years of age with dementia who were on one of the selected medical-surgical units, were English speaking, and had been hospitalized for 24 hours or less at the time of screening. Persons were excluded from enrollment if they had any significant neurological or neurosurgical disease associated with cognitive impairment other than dementia, such as Parkinson’s disease, Huntington’s disease, normal pressure hydrocephalus, seizure disorder, subdural hematoma, head trauma, or known structural brain abnormalities. Persons were excluded if they were non-verbal, aphasic, intubated, or terminal, or were unable to communicate
due to severe dementia, defined with a Mini-Mental State Examination (MMSE) score of 0. Persons were also excluded from enrollment if there was no family or caregiver available or willing to be interviewed.

Setting

The patient participants were inpatients of a 200-bed community hospital in central Pennsylvania. This facility has three medical-surgical units and two intensive care units. At the start of the study in 2006, 39% (4,261 of 10,910 total) of the hospital admissions were older adults, age 65 and above. During this same period of time, there were 403 patient admissions with the diagnosis of dementia (measured by the ICD-10 code).

Measures

This section explicates the operational definitions as well as the methods or instruments of measurement used in the original study by Fick. A table displaying the results of the study participants’ measures follows this section (Table 3.3).

Dementia.

The study confirmed dementia with two measurements as well as documented symptoms of dementia over at least a six-month time period. The Modified Blessed Dementia Rating Scale (MBDRS) (Blessed, Tomlinson, & Roth, 1968) identifies
dementia with a score of greater than 3 and the IQCODE (Short Form) (Jorm, 1994) of 3.3 or greater. The MBDRS and the IQCODE have successfully screened for preexisting cognitive impairment in older adults in past research (Brodaty, et al., 1998; Pisani, Inouye, McNicoll, & Redlich, 2003). These measures were included in the family/proxy interview.

*The Modified Blessed Dementia Rating Scale (MBDRS).*

The MBDRS is an 8-item measure that correlates with the pathological assessment of dementia, discriminates between demented and non-demented persons, correlates well with objective patient measures of dementia, and is used by delirium and dementia experts to establish pre-morbid cognitive functioning (Juva, et al., 1997; McLoughlin, Cooney, Holmes, & Levy, 1996; Pisani, et al., 2003). The MBDRS prompts assessment of memory, ability to handle finances, familiarity with home and surroundings and ability to perform household tasks (Blessed, et al., 1968).

*IQCODE.*

The IQCODE (short form) has 16 questions designed to measure cognitive impairment. A correlation of 0.54–0.75 has been reported for the IQCODE and expert judgments of dementia in the clinical setting (Jorm, 1994; Jorm & Jacomb, 1989). In development and cross-validation studies of community-based patients, an IQCODE score of greater than 3.3 had a sensitivity of 79% and a specificity of 82% for the diagnosis of dementia.
Delirium.

Persons with either prevalent or incident delirium were considered for enrollment in the study. The Confusion Assessment Method (CAM) (Inouye, et al., 1990) was administered within 24 hours of hospital admission and daily through discharge.

Confusion Assessment Method (CAM).

The CAM is a validated instrument for screening and diagnosis of delirium (Siddiqi, et al., 2007). A positive CAM indicating delirium includes: 1) acute onset, 2) fluctuating course, 3) inattention, and either 4) disorganized thinking, or 5) altered level of consciousness (Inouye, et al., 1990). Delirium was recorded by the RAs as positive, negative or subsyndromal (partial). The CAM is a standardized diagnostic algorithm allowing persons without formal psychiatric experience to be trained and accurately identify delirium. Validation of the CAM against the DSM-III-R showed sensitivity between 94-100% and specificity between 90-95% (Inouye, et al., 1990; Pompei, Foreman, Cassel, Alessi, & Cox, 1995; Wei, et al., 2008), positive predictive accuracy from 91–94%, and negative predictive accuracy from 90–100% (Wei, et al., 2008). The utility of the CAM to capture delirium has been demonstrated in multiple studies (Bowler, et al., 1994; Fick & Foreman, 2000; Inouye, et al., 2001; Milisen, et al., 2002).

Leung et al. (2008) investigated the effectiveness of the CAM compared to the DSM-IV criteria in a sample of 100 hospitalized older adults. Of the 25 patients (11 had dementia) whom psychiatrists determined to have delirium using the DSM-IV criteria, 19 had delirium according to the CAM. For the 75 patients whom the psychiatrists
determined to not have delirium, the CAM agreed. Therefore, the positive predictive value was 1 and the negative predictive value was .93. Of the 6 patients about whom the psychiatrists using DSM-IV and the CAM did not agree, 5 were either ‘subacute delirium’ or ‘resolving delirium’. Leung et al. (2008) determined the CAM to be an effective measurement of detecting delirium in the older adult population. Interestingly, the data analysis showed a higher sensitivity of the CAM in DSD patients than in those patients without dementia.

Delirium Superimposed on Dementia (DSD).

Delirium superimposed on dementia is operationally defined as occurring in a participant who met the guidelines for the full dementia diagnosis at baseline and who met the CAM criteria for delirium, either at enrollment or at some point during hospitalization.

Severity of Dementia.

The Clinical Dementia Rating scale (CDR) was used to stage the dementia of the participants in the study. The CDR was administered during the family/proxy interview.

Clinical Dementia Rating Scale (CDR).

Using the CDR, the RAs rated the participants level of cognitive functioning by evaluating six areas: 1) memory, 2) orientation, 3) judgment and problem solving, 4) community affairs, 5) home and hobbies, and 6) personal care. Possible scores range from 0 – 3. The rating should be a combination of cognitive and functional abilities. The first level or no dementia is 0; the second level is questionable dementia or 0.5; the
third level is mild dementia or 1; the fourth level is moderate dementia or 2; and the fifth level is severe dementia or 3 (Hughes, Berg, Danziger, Coben, & Martin, 1982). The CDR is a valid and reliable tool. Morris (1997) reported that the overall agreement between researchers and the gold standard definition of dementia was 83%.

**Charlson’s Co-morbidity Index (CCI).**

The CCI was used to obtain a baseline measurement of the enrollees’ co-morbid illnesses. The CCI is a weighted index of the number and severity of a person’s comorbid conditions (Charlson, Pompei, Ales, & Mackenzie, 1987). The information is easily tabulated and accessible in patient records. Researchers validated the predictive value of the CCI in a sample of cancer patients undergoing surgery. The CCI was effective in predicting the patients who would potentially experience complications post-surgery (Birim, et al., 2003). More recently, researchers determined that the CCI was the best single predictor of mortality rates in a group of older inpatients with dementia. The CCI was compared to socio-demographic characteristics, cognitive status, functional status, and nutritional status (Zekry, et al., 2008).

**Folstein’s Mini-Mental State Exam (MMSE)**

The Mini-Mental State Examination (MMSE) (Folstein, Folstein, & McHugh, 1975) was used with the patient sample to compare the mental status of participants’ from day-to-day and then from hospitalization through the one and three month follow-up. The MMSE measures orientation to time and place, registration, recall, language, repetition, reading, writing, and drawing. The test-re-test reliability of the MMSE ranges from 0.56-
0.98, and the inter-rater agreement has not been less than 0.82 (Crum, Anthony, Bassett, & Folstein, 1993; Folstein, et al., 1975; Tombaugh & McIntyre, 1992).

Table 3.3

*Fick Sample Measurement Results*

<table>
<thead>
<tr>
<th>Baseline Variables</th>
<th>Inclusion Criteria</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified Blessed Dementia Rating Scale (MBDRS)</td>
<td>&gt; 4.0</td>
<td>8.29 (3.21)</td>
</tr>
<tr>
<td>Charlson Co-morbidity Index (CCI)</td>
<td>-</td>
<td>2.37 (1.52)</td>
</tr>
<tr>
<td>Informant Questionnaire on Cognitive Dementia (IQCODE)</td>
<td>3.3 or higher</td>
<td>4.28 (0.64)</td>
</tr>
<tr>
<td>Clinical Dementia Rating (CDR)</td>
<td>-</td>
<td>1.42 (0.86)</td>
</tr>
</tbody>
</table>

*Demographic Data*

Key patient demographic data were analyzed in the Fick study. Demographic data included age, sex, educational level, length of stay, and living status (home or institution). Length of stay or days of hospitalization were defined as all days in the hospital including day of admission but not the day of discharge (National Center for Health Statistics, 2007). The average length of stay was 6.64 days.

*Admitting Diagnosis*

Each patient’s admitting diagnosis was collected during study enrollment. In addition to the admitting diagnoses, all patients had a diagnosis of dementia per the study screening. Both prevalent and incident delirium cases were included in this study population. The top six diagnoses for subjects with DSD were urosepsis/urinary tract
infection, dehydration, mental status changes/delirium, pneumonia, cardiovascular
disease, atrial fibrillation and hip or lower extremity fracture. Almost 13% were admitted
with prevalent delirium and 53% with subsyndromal or partial delirium. Thirty-six
percent of the patients developed (incident) delirium while hospitalized and 81%
developed a subsyndromal or partial delirium while hospitalized.

Procedures

Training.

Research assistants (RAs) were third and fourth year psychology or nursing students. The project coordinator was a doctoral nursing student and served as an RA (this researcher, MRS). All study staff completed the Health Insurance Portability and Accountability Act (HIPAA), institutional review board (IRB) Protection of Human Subjects Training as well as the CAM and other instruments by self-study, didactic sessions, paired sessions of interviewers (mock interviews) with inter-rater assessment, and paired ratings of patients observed by a trained interviewer. After training was completed and throughout the duration of the two-year data collection phase, the Principal Investigator (PI) performed at least quarterly reliability checks to assure consistency with the CAM, MMSE and other measures among the four RAs. The PI also periodically visited newly enrolled study participants and reviewed enrollment procedures to assure the consistent following of study protocols. She conducted regular
educational and practice sessions throughout the data collection phase of the study. The inter-rater agreement ratings were consistently between 90-100% congruent.

Enrollment.

Screening for enrollment was performed daily by trained RAs. The RAs had access to a scripted report specifically designed in cooperation with the hospital and approved by both the IRBs of the university and the hospital. The report provided limited information to the RAs of persons of at least age 65 years who had been admitted to the hospital. By reviewing this report and then querying the nurses, the RAs approached potential enrollees for screening and subsequent enrollment, as appropriate.

Full enrollment into the study included informed patient consent and/or assent as well as family/proxy consents. The proxies were most often the subjects’ designated powers of attorney. After being consented, the proxy had the option of designating another person to complete the caregiver/proxy interview.
Data Collection

Collected data were initially recorded with pen-and-ink into a study booklet comprised of the study measures. Once completed, the data were entered into a Filemaker Pro database (version 9.0) by a trained data manager. The data entry was performed by the same person, the data manager, throughout the length of the study. The data manager was included in team meetings and was encouraged to communicate any inconsistencies or omissions in data collection immediately to the team. She was trained in IRB Basic Training on the Protection of Human Participants, HIPAA, and Filemaker Pro (the database software), and was briefed on the principles of data integrity. She entered all data into the Filemaker Pro database on a desktop personal computer in a locked office at the university, never removing data from the office.

Protection of Human Subjects

During the course of planning, enrollment, follow-up and data entry, the PI made a great effort to protect the rights of all subjects (both patients and family/proxies) who participated in the study. The first concern was gaining access to screen patients. A partial HIPAA waiver was approved by both IRBs. The purpose of the waiver was to gain access to a report listing newly admitted patients age 65 and over to screen for enrollment. Minimal information was on this computer generated list. RAs reviewed the list daily and approached patients for screening. Patient charts were not viewed until the patient had consented.
Dr. Fick showed regard for consent of persons with dementia by acknowledging the ethics principles non-malificience (do no harm) and autonomy. It is important to perform research that includes persons with dementia to advance the science involving their care. All persons with dementia are encouraged to participate in studies in which they are at minimal risk (Alzheimer's Association, 1997). RAs were encouraged to watch for signs of dissatisfaction and were instructed to gain assent daily. If a participant indicated they did not want to participate, the RA walked away.

All subjects were informed of the purpose and procedures of the study. Participants (patients and family/proxies) were also well informed that their participation in the study was voluntary and that they could withdraw at any time without fear of reprisal. They also were informed that their refusal would not influence the care received while hospitalized. After verbal understanding and assent was assured, participants signed informed consent forms.

Information about study participants was kept confidential and managed according to the requirements of HIPAA. HIPAA was explained in the consenting process as well as included on the consent document. Participant confidentiality was maintained by recording their names, medical record numbers and contact information in one file which was locked in a cabinet in an office at Penn State. Upon enrollment, the participants were immediately labeled with an identification number (ID) (ex. R03-123). This ID was used to identify participants on paperwork and verbally among research study staff.

The computer software used by the host hospital was MEDITECH. Computer access to the patient information was limited to those who needed the access. MEDITECH
access was also limited by the passwords granted by the Information Technology department at the hospital. The passwords of the staff would only allow them to enter fields deemed necessary. This decision was part of the planning process before the actual initiation of study enrollment.

Data entry of the study data was limited to the data manager. She was the only person with access to the electronic database. When the PI needed to access the data for preliminary data analysis and beyond, Dr. Fick accessed a copy of the data file.

As discussed earlier, Dr. Fick planned and implemented several integrity checks for her study. If any discrepancies or areas of confusion regarding data collection were discovered during the course of the study, they were discussed during the weekly research team meetings. The team meetings were also utilized to discuss any situations or concerns team members were having during enrollment or follow-up. The data manager used the team meetings to communicate any concerns or inconsistencies she noticed while entering data. Dr. Fick also used the team meetings as opportunities to provide ongoing education to the research staff (i.e. pain assessment in a person with dementia).

Although the Fick study population was vulnerable and high risk (DSD), potential risks to participants were minimal. Participants were free to refuse to answer or refuse to participate at any point during the study. Dr. Fick included her cellular telephone number on the consent form to assure the participants that they would have access to her if they had any questions. Participants were made aware of this during the explanation of the consent during enrollment. Participants were encouraged to telephone her with any
questions. If participants appeared agitated or uncomfortable during daily assessments, RAs were instructed not to coerce patients and to back away.

Steis Study

Design

A retrospective chart review of 232 patient days (108 patient participants) was conducted for this study. The researcher was blinded from knowing whether the patient experienced DSD or dementia-only. Determination of the mental status of patients (positive or negative delirium) originated from the RA ratings in the Fick study.

Study Sample

The unit of analysis was patient days. Patient days were derived from the Fick study participants’ hospital days. The 140 patients in the Fick study had a total of 861 patient days. Fifty-four patients scored a positive CAM (delirium) on at least one hospitalized day. The total positive delirium patient days were 116 (54 patients). Seventy-four patients did not score a positive CAM any time during their hospitalized patient days. Of these 74 patients, there were 290 patient days when participants scored a negative CAM (no delirium). Patient days when a subsyndromal or partial delirium was measured were not considered in this study in an effort to create two distinct groups, a Dementia-Only group and a DSD group. All patient participants were determined to have dementia on enrollment by the RAs. The study groups were derived from 1) the 116 patient days (54
patients) when patients scored a positive CAM (delirium) and 2) the 116 patient days randomly chosen from 54 patients who never scored a positive CAM (no delirium) (Figure 3.1). These were mutually exclusive groups of hospitalized patient days.

Research question three is a dichotomous question about whether the nurses recognized delirium in their patients in comparison to the RA ratings from the original study. Since there were 116 days in which patients had positive delirium ratings, this sample was fixed at 116. In an attempt to verify whether this sample size had enough power to effectively answer this question, a power analysis was completed (Browner, Newman, & Hulley, 2007, p. 74). The proportion of nurses expected to recognize delirium was 0.10. This is a low expectation. In the literature, nurse recognition of DSD

Figure 3.1. Derived patient sample.
has been reported at or about 10–40%. In this study, the definition of what terms were accepted as evidence of recognition of delirium was considerably more restricted than past studies. Therefore, the expected proportion of recognition was low. The width of the confidence interval was 0.10. A confidence level between 90-95% dictates a sample size between 98 and 138. Although fixed, this sample of 116 had enough power to answer this question.

**Nurse Data**

This study consisted of an aggregate group of nurses who cared for the patients in the hospital units involved in the Fick study. Although nurses were not considered participants, nurses’ documentation was analyzed. The identity of the nurses was coded immediately and was not retained. No identifying data was collected on nurses. Nurses were blinded to the Fick study aims. Aggregate demographic data on the nurses was provided by the host hospital. The aggregate data request included: number of employed licensed practical and registered nurses, educational breakdown, average age, use of agency and travel nurses, and number of nurses with specific certifications.
Measures

Confusion Assessment Method (CAM)

In this study, participants with a subsyndromal or partial delirium were excluded from analysis to create clearly defined groups. A positive CAM (delirium) indicated an acute change in mental status from the patient’s baseline as well as fluctuation of the severity of the change, inattention, and either disorganized thinking or evidence of an altered level of consciousness. A negative CAM (no delirium) indicated one or none of the previous symptoms (Inouye, et al., 1990).

Nursing Interventions

Nursing intervention analysis involved the use of the Nursing Intervention Lexicon and Taxonomy (NILT) classification system (Grobe & Hughes, 1993). NILT includes seven taxonomy categories of nursing interventions. The categories are reflective of the concept of care. NILT categories are inter-related and designed to be reliable and applicable to various sources of nursing documentation containing nursing intervention statements. The categories and their conceptual definitions are fully explained and displayed in Appendix C (Grobe, 1996).

In this study, the unit of analysis for nursing interventions was verb and associated noun phrase statements that described a single nursing action or the nursing intervention statement (Grobe & Hughes, 1993). Grobe (1993) defined the intervention
statement as the nurses’ deliberate, cognitive, physical or verbal activities intended for the health maintenance or improvement of the person (including family and caregivers) who are the focus of the nursing care. At times, more than one intervention was documented in the same sentence. To avoid overlap or omission of documented nursing interventions, statements were reduced, as appropriate, to discrete coding units before analysis (Hughes, et al., 2002). This decision is supported in the suggestion by Graneheim and Lundman (2004) to use a unit of analysis large enough to be considered a whole and small enough to allow for the context of the meaning unit. The initial phase of this data collection and analysis, was an extraction of nursing interventions from patient records resulting in a listing of nursing interventions.

Data Collection

A chart review of the nursing documentation of 108 patient records from the Fick study was conducted. There were 497 patient days on which participants either experienced a positive (116 days/54 patients) or a negative (381 days/109 patients) delirium as measured by the RAs. Days on which patients experienced a subsyndromal or partial delirium were not included in this study. This researcher was initially blinded to the CAM outcomes of the study participants; however, she may have recalled a number of participants as the researcher was one of the original study RAs. Although this was not expected to be a major threat, the following effort was designed to minimize the threat. The data manager listed all patient medical record numbers, admission dates
and specific days of the participants who had any positive CAM (delirium) results \((N=116)\). The data manager was the data entry person employed for the Fick study.

The comparison group of patient days was from patients who never scored a positive CAM (no delirium). The data manager randomly chose 116 patient days for 54 patients reflecting negative CAM results. To accomplish this, she eliminated the patient records that only had one CAM negative day \((9)\) and then randomly choose 116 days on which patients experienced no delirium, from the 54 remaining patient records.

The data manager provided an electronic list containing 232 patient days from 108 patient records listed by patient medical record numbers, dates of admission, and specific dates \((232)\) to be analyzed using an Excel spreadsheet. This protected the researcher from overtly knowing which patients had negative or positive CAM results during data collection. After data collection and initial content analysis, the blinded list was merged with a similar list containing the CAM results. Data analysis proceeded from this point.

A spreadsheet was developed for use in data collection using the Microsoft Word 2007 software program (Appendix A). Nurses provided documentation in the narrative portion of the record using free text narratives as well as in the assessment section by checking predetermined checkboxes.

Documentation of Patient Care

The study hospital used an electronic medical record (EMR) system for all nursing documentation. The specific product is MEDITECH \((2008)\). MEDITECH access was approved for the RAs as part of the Fick IRB approval process. The request for access to
the medical records was limited to enrolled participants. MEDITECH is an electronic
documentation system offering care providers interdisciplinary point-of-care
documentation. MEDITECH contains links within the system to support critical data
review during the assessments and outcomes documentation process.

Once the patient assessment is entered into MEDITECH, the Assessment Dictionary
is used to define the input screens that appear during the documentation of a particular
intervention from the worklist. It also generates a worklist and assessments, such as a fall
risk assessment. Assessments are then associated with interventions in the Intervention
Dictionary. The Intervention Dictionary is used to define functions, treatments, or tasks
that a care provider performs on behalf of the patient. Interventions are associated with
outcomes on the Plan of Care. The Problem Dictionary defines the nature of the patient’s
health disorder. Problems may be added independently to a particular plan or triggered
based on a response to an assessment query. The Plan of Care Dictionary includes the
group of problems, outcomes, interventions, and assessments associated with a particular
patient (MEDITECH, 2008).

Nurses insert documentation into various areas of the EMR. The following represent
the most common areas for nursing documentation.

- Interventions and assessments (from a worklist) which contain the interventions
  or tasks the nurse will perform.
- Spreadsheets used as tools for simultaneous data review and data entry to allow
  for documentation of assessments, intake and outputs, and medications as well as
  real time documentation.
• Free text notes and templates that may be linked to a problem, outcome, intervention or order.

• Medication Administration Record which relates medication documentation to comments, reasons medications were not given, dosage adjustments, etc.

Data Analysis

The information in this section of the chapter is organized by each study question.

Study Question 1 - How do acute care nurses document signs and symptoms of delirium superimposed on dementia and dementia only?

The analysis of the data collected for study question 1 began with this researcher accessing the EMR according to guidelines provided by the host hospital and approved by their IRB. The units of analysis were the words or phrases documented by the nurse to describe the participants’ mental status and any related behavior (Graneheim & Lundman, 2004).

Qualitative content analysis was conducted by analyzing the data originating from nurse documentation of their older adult patients in the acute care setting. Content analysis is analysis by topic (Morse & Field, 1995). The various topics are separated into categories by way of coding the data. The coding procedure is the process of breaking down the data, conceptualizing it, and joining it together again in a form suitable for theory building (Morse & Field, 1995; Strauss & Corbin, 1990). The different types of
coding are often performed in tandem with one another (Strauss & Corbin, 1990). The task of coding is to identify the words, phrases, or themes within the data that persistently appear (Morse & Field, 1995). This initial phase is broadly called open coding.

In open coding, the data are broken down into discrete parts, extracted, and closely examined for the purpose of identifying the concepts in the data. Next, the data are compared for similarities and differences. Once the researcher begins breaking down the data into broad categories, the categories need to be named. Names are often a word that stands for something in the data or words or phrases that have caught the attention of the researcher. Names should be memorable (Morse & Field, 1995; Strauss & Corbin, 1990). “In-vivo” category names are words or phrases used within the data and elevated to be used as category names (Strauss & Corbin, 1990). Categories are groups of content that share similarities. Category contents are homogenous and externally mutually exclusive between categories. No data can fit in more than one category or in between two categories (Graneheim & Lundman, 2004).

The result of this analysis was a comparison of how nurses document patients’ mental status and related behaviors among those who experienced DSD versus those with dementia-only. Content analysis focused on the occurrence of a word or phrase in the two groups.

*Study Question 2* - *What symptoms of delirium are revealed in acute care nurses’ documentation?*
In this analysis, the words or phrases nurses used to describe patients’ mental status and related behaviors were mapped independent and anonymous by three registered nurses to the symptoms of delirium as presented by the DSM-IV-TR and the Confusion Assessment Method (CAM). The nurse mappers were registered nurses (two were Masters prepared and one was a Certified Registered Nurse Assessment Coordinator and nurse manager of a long term care facility) unrelated to this study and had current clinical experience caring for older adults. The reason for having these independent nurses perform the mapping was to control for researcher bias and ensure reliability for the analysis. These nurses had no association with this study other than for this purpose. The nurse mappers were sent an electronic file containing instructions, mapping criteria, and an Excel file with the list of words and phrases nurses used to describe their patients’ mental status in this data set. The spreadsheet had a designated column for each nurse to enter the code indicating her opinion of which feature of the criteria the word or phrase should be mapped to. The nurse mappers were informed the PI (Steis) was available to answer their questions via telephone or email. Logistic regression analysis with repeated measures was used to analyze the features of delirium as presented by the DSM-IV-TR and the CAM.
Study Question 3 - What is the rate of nurse recognition of delirium or acute confusion as measured by comparing daily researcher ratings of delirium with acute care nurses documentation of delirium in persons with dementia?

This analysis compared of the words and phrases used by nurses to document their patients’ mental status, with the RA ratings from the original study. The documented terms ‘delirium’ and ‘acute confusion’ were considered evidence of the recognition of delirium by the nurses in this study.

A notation was made regarding which nurse had made each documentation entry. The nurses were coded (e.g., Jane Doe, RN = 111; Sue Smith, RN = 112). This enabled the researcher to determine, and subsequently report, whether multiple entries of nurse recognition were being made by the same nurse caring for multiple patients, or by different nurses.

The power analysis for question three was 0.999 with the sample size of 116, a standard deviation of 0.094 and an expected difference of 0.05. The data analysis for this question included the DSD group only.

Study Question 4 - What interventions do acute care nurses document in response to recognized signs and symptoms of their patients’ mental status?

The listing of nursing interventions was mapped to the Nursing Intervention Lexicon and Taxonomy (NILT) categories by the same three registered nurses who were independent of this study and performed mapping of categories for analysis for research
question two. The nursing interventions met the operational definition of NILT (noun-verb phrases). If they did not, the nursing intervention was not classified (Hughes, et al., 2002). Nursing interventions not classified in agreement by the nurse mappers were discussed as a group (nurse mappers and PI) to arrive at consensus. However, the nursing interventions were not forced to fit into the NILT categories. Inter-rater agreement of the three nurses performing the mapping was reported using the Cohen’s Kappa. The expectation was that the nurses would achieve an agreement of 0.80. A Cohen’s Kappa of 0.80 was achieved in a prior study using this method of analysis (Hughes, et al., 2002).

Once data collection and analysis was complete, this researcher reported the number of nursing interventions mapped to each category. Analysis involved comparing nursing intervention documentation between the DSD and Dementia-Only groups. Multinomial logistic regression was used to analyze the seven intervention categories.

Protection of Human Participants

The safeguards in place from the Fick study remained in place for this study. The following additional safeguards were implemented. First, this researcher was blinded to the CAM outcomes of the study participants. Second, the identity of the nurses was immediately converted to a code and not recorded from the medical record. The only data to be reported about nurses was aggregate data supplied by the host hospital.

IRB approval was granted by Penn State (Appendix F) and the host hospital (Appendix G). The three registered nurses invited to perform mapping of data for study
questions two and four were not informed of the aims of the study. They were educated about the DSM-IV-TR definition of delirium and the CAM criteria for study question two. Then, the nurses were educated about the NILT categories for study question four. They were thanked and paid with a cash payment of $25/hour for their time. No identifying patient information was shared with the nurses at any time.
Chapter 4

Results

Introduction

Initially, the sample characteristics and an overview of the analyses are presented in this chapter. Next, the results are presented in the order of the four research questions: 1) How do acute care nurses document signs and symptoms of delirium superimposed on dementia (DSD) and dementia-only? 2) What symptoms of delirium (disturbance of consciousness, change in cognition, acute onset and fluctuating course, and evidence of etiology) are revealed in acute care nurses’ documentation? 3) What is the rate of nurse recognition of delirium or acute confusion as measured by comparing daily researcher ratings of delirium with acute care nurses’ documentation of delirium in persons with dementia? 4) Is there a difference in what interventions acute care nurses document in response to recognized signs and symptoms of DSD and dementia-only in their older adult patients?

Sample Characteristics

The sample consisted of nursing documentation extracted from an electronic medical record (EMR). Specifically, extracted documentation described: patients’ mental status, related behaviors and subsequent nursing interventions. The sample consisted of two groups of hospitalized older patients. One group screened positive for dementia-only and one group exhibited DSD. The mental status (dementia or DSD) was determined by research assistants (RAs) in a previous study as described in the following section. The comparison group was
considerably larger than the DSD group (total number of patients and hospitalized days). To
create a more valid comparison, the same number of days from the same number of patients were
chosen to compose the comparison group \( (n=116 \text{ days/54 patients}) \).

Both study groups consisted of hospitalized older adults (65 years and older) with a baseline
of dementia, who were enrolled within 24-hours of hospital admission, and followed daily until
discharged. Although the demographic description of the patient groups is provided here (Table 4.1), the sample consisted of the nurses’ documentation of the patients’ mental status, related
behaviors and subsequent interventions.

**Table 4.1**

*Sample Characteristics for Source Patients (n=108)*

<table>
<thead>
<tr>
<th></th>
<th>DSD Group</th>
<th>Dementia-Only Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age (range)</td>
<td>85.4 (72-99)</td>
<td>81.5 (65-96)</td>
</tr>
<tr>
<td>Mean CDR Score before hospitalization</td>
<td>1.60</td>
<td>1.07</td>
</tr>
<tr>
<td>Mean Blessed Score before hospitalization</td>
<td>8.96</td>
<td>6.81</td>
</tr>
<tr>
<td>Mean IQCODE Score before hospitalization</td>
<td>4.49</td>
<td>4.07</td>
</tr>
<tr>
<td>Mean MMSE Score on Admission to Acute Care</td>
<td>12.7</td>
<td>20.3</td>
</tr>
<tr>
<td>Mean MMSE Score on Discharge from Acute Care</td>
<td>12.7</td>
<td>22.1</td>
</tr>
<tr>
<td>Mean LOS</td>
<td>8.73</td>
<td>6.41</td>
</tr>
</tbody>
</table>

*Note.* CDR=Clinical Dementia Rating scale; IQCODE=Informant Questionnaire on Cognitive Dementia;
LOS=length of stay; MMSE=Mini-Mental State Exam

Overall, the sample characteristics indicate the DSD group were a more vulnerable sample
than the D-O group. The DSD group had higher dementia severity scores on the CDR, Blessed
and IQCODE than the D-O group. The DSD group also had at least a seven-point difference
(lower) on the MMSE on both admission and discharge from acute care. And last, the mean
LOS was more than two days longer for the DSD group.
Nurse data were reported in the aggregate form. In the two groups, there were 203 RNs and 38 LPNs who were reporting documentation on medical records. Aggregate data on the nurses is presented in Table 4.2.

Table 4.2
Current Nurse Characteristics from Host Hospital

<table>
<thead>
<tr>
<th></th>
<th>RNs</th>
<th>LPNs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number Employed</td>
<td>374</td>
<td>33</td>
</tr>
<tr>
<td># with Specialty Certifications</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td>Average Age</td>
<td>39</td>
<td>48</td>
</tr>
<tr>
<td>Diploma Registered Nurse (RN)</td>
<td>71</td>
<td>-</td>
</tr>
<tr>
<td>Associate Degree RN</td>
<td>190</td>
<td>-</td>
</tr>
<tr>
<td>Bachelor of Science Degree RN</td>
<td>108</td>
<td>-</td>
</tr>
<tr>
<td>Master Degree RN</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td># Agency Hours Paid in FY2008</td>
<td>44309.75</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note. This information reflects current (May 2009) data provided by the host hospital—the data collection occurred from July 2006–September 2008.*
The study hospital was not able to provide detailed data regarding their employed nursing staff for the exact time period that coincided with the data collection. Also, there were agency and travel nurses who documented in this data set. Of interest, there are currently 33 LPNs employed while 38 LPNs documented in this data set.

Data Analysis

Qualitative content analysis was used to analyze how nurses document patients’ mental status. Then, three registered nurses (the same nurses who mapped previously) were asked to map the phrases in the narrative data used by nurses to describe their patients’ mental status to the features of delirium as presented in the DSM-IV-TR (DSM) and the Confusion Assessment Method (CAM). Descriptive statistics and repeated measures logistic regression were performed to further analyze the data. Mapping of data was again employed to analyze the nursing interventions in this data set. The same three registered nurses mapped noun-verb phrases describing nursing interventions related to the patients’ mental status to established categories in the Nursing Intervention Lexicon and Taxonomy (NILT) classification system (Grobe, 1990). Multinomial logistic regression was used to analyze the nursing interventions documented in response to the patients’ mental status and related behaviors. The Statistical Package for the Social Sciences (SPSS) 17.0 for Windows was utilized to analyze the data from this study.

The exclusive source of the data was the EMR. Within the EMR, there were two forms of documentation: free text narratives and structured categories of body system assessments with predefined checkboxes. Documentation from both formats were extracted. All free text narratives by nurses were extracted while extraction of the structured format was limited to the
neurological, pain, and psychosocial sections. After reading and re-reading the collected data, the PI (Steis) decided (supported by the dissertation advisor) to exclusively analyze the narrative data in this study. Since the purpose of this study was to explore how nurses documented information on older patients with dementia-only and DSD, data from predefined checkboxes did not support this stated purpose.

Logistic regression with repeated measures determines the importance of the independent, or predictor variables and is used when the dependent variable has two categories (delirium vs. no delirium). This is determined by odds ratios. Logistic regression does not have many assumptions. There does not need to be a linear relationship between the independent and dependent variables, a normal distribution does not need to be assumed for the dependent variable, and there does not need to be constant variance. However, the non-independence of the data needs to be accounted for. This data had several types of repeated measures: each patient may have been visited multiple times across several days and each nurse may have visited multiple patients. Statistically, this means that the observations in the data were not independent. In other words, observations of patient 1 on day 1 were more similar to observations of patient 1 on day 2 (because the observations came from the same patient) then they were to observations of patient 2. The results of the logistic regression conducted to explore the odds of a DSM category being documented differed for the Dementia-Only group and the DSD group. The outcome variable was delirium or no delirium. The results of the data analyses are presented by addressing each research question.
Research Question One:

How do acute care nurses document signs and symptoms of delirium superimposed on dementia? The purpose of this question was to explore how nurses described their hospitalized older patients’ mental status. Content analysis was performed on the narrative documentation for the two groups of patients. The content analysis process began with an initial reading of the narrative documentation. Categories emerged from the data. Further synthesis of the data resulted in categories with mutually exclusive criteria. The categories are displayed in Table 4.3 followed by a description of the categories as they were portrayed in each of the study groups. Inclusion criteria for defining the categories can be referenced in Appendix B.

Categories

The inclusion criteria for each category are presented in Appendix B. Comparisons of the categories from the two groups are presented in Table 4.3. The data are described according to number of words/phrases in each category and by group with the respective percentage of total phrases in that group and then the percentage of overall phrases in parentheses, i.e., # (%) (%).
Table 4.3

Categories of Words or Descriptive Phrases that Emerged from the Narrative Data

<table>
<thead>
<tr>
<th>Categories</th>
<th>DSD</th>
<th>Dementia-Only Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (% group)</td>
<td>n (% group)</td>
</tr>
<tr>
<td></td>
<td>(% overall)</td>
<td>(% overall)</td>
</tr>
<tr>
<td>Orientation</td>
<td>133 (29) (20)</td>
<td>113 (54) (17)</td>
</tr>
<tr>
<td>Confusion</td>
<td>56 (12) (8)</td>
<td>24 (11) (4)</td>
</tr>
<tr>
<td>Agitation</td>
<td>49 (11) (7)</td>
<td>3 (1) (0)</td>
</tr>
<tr>
<td>Level of Consciousness</td>
<td>48 (11) (7)</td>
<td>7 (3) (1)</td>
</tr>
<tr>
<td>Cooperation</td>
<td>43 (9.5) (6.5)</td>
<td>16 (8) (2)</td>
</tr>
<tr>
<td>Behavior</td>
<td>40 (9) (6)</td>
<td>11 (5) (2)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>19 (4) (3)</td>
<td>7 (3) (1)</td>
</tr>
<tr>
<td>Affect</td>
<td>15 (3) (2)</td>
<td>10 (5) (1.5)</td>
</tr>
<tr>
<td>Fluctuation</td>
<td>11 (2) (2)</td>
<td>2 (1) (0)</td>
</tr>
<tr>
<td>Memory</td>
<td>9 (2) (1)</td>
<td>8 (4) (1)</td>
</tr>
<tr>
<td>Appropriateness</td>
<td>8 (2) (1)</td>
<td>3 (1) (0)</td>
</tr>
<tr>
<td>Delusions</td>
<td>4 (1) (1)</td>
<td>2 (1) (0)</td>
</tr>
<tr>
<td>Dementia</td>
<td>3 (1) (0)</td>
<td>1 (0) (0)</td>
</tr>
<tr>
<td>Hallucinations</td>
<td>3 (1) (0)</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Units of measurement are the words or phrase descriptions nurses used to describe their patients’ mental status in this data set. DSD total n=452; Dementia-Only total n=210; Overall total n=662.

Overall, there were more than twice as many words or phrases describing patients’ mental status in the nurses’ documentation of the DSD group compared to the D-O group. Although descriptions of orientation were frequent in both groups, the phrase, *alert and oriented* was much more common in the D-O group (n=67) than in the DSD group (n=19). Phrases specifically describing orientation to person, place and/or time were more common in the DSD group (n=59) than the D-O group (n=20), i.e., “Patient is alert to person only.” (Subject #116, Day Shift). The nurses in this data set did not consistently use terminology denoting assessment of orientation.
For instance, nurses frequently documented the term *alert or confused* when indicating the orientation status of the patient for instance, “alert to person and place,” (Subject #23, Day Shift) and “Patient confused to time/place/event,” (Subject #84, Night Shift).

Confusion was documented twice as often in the DSD group (*n*=56) than in the D-O group (*n*=24). Nurses’ documentation of mental status in the DSD group was often satisfied by using the general term *confused*, for instance, “Patient remains pleasantly confused,” (Subject #179, Night Shift).

Words or phrases indicating agitation were more common in the DSD group (*n*=49) compared to the D-O group (*n*=3). The term *agitation* was utilized, as well as other terms indicating agitation, including combative (Subject # 27, 59, 60, 116, 157) and argumentative (Subject #68).

Documentation indicating the patients’ level of consciousness was considerably more common in the DSD group (*n*=48) than in the D-O group (*n*=7). Examples include phrases such as, “Arouses to name, continues to be lethargic” (Subject #179, Evening Shift), “Lethargic/drowsy” (Subject #151, Day Shift) and “Pt awakens with stimuli” (Subject #96, Night Shift).

The categories Cooperation and Behavior were similar in that they were both more common in the DSD group (*n*=43 and 40 respectively) than in the D-O group (*n*=16 and 11 respectively). Nurses’ documentation of these categories was often used to elaborate on a phrase describing their orientation status such as, “Pt uncooperative. Pt pulling at monitor and gown. Pt alert to person only” (Subject #128, Day Shift) and “Pt noted to be oriented only to person, however she was following commands” (Subject #27, Evening Shift).
Summary

The content analysis of the narrative data in this study was narrow in nature since this study specifically explored mental status documentation. Overall, nurses documented 662 words or phrases describing patients’ mental status. The sources of the analyzed words and phrases originated twice as often from the DSD group \( (n=452) \). The two study groups, DSD and D-O, were described differently by the nurses. Nurses commonly described the mental status of the D-O group as “alert and oriented” (Subject #6, Evening Shift). Nurses described the DSD group largely by their orientation status, for instance, “pt disoriented,” (Subject #76, Day Shift), accompanied by related descriptive phrases such as “Pt with increased confusion. Pt pulled her IV out,” (Subject #35, Evening Shift) or “Pt confused and anxious, at times attempting to pull at items and get OOB, 1:1 sitter with pt at this time. Pt quiet at present but when disturbed to assess, becomes restless,” (Subject #73, Day Shift).

The nurses in this study described features of delirium such as fluctuation, “Pt confused at times this shift, needs lots of reorientation. Improvement from last night,” (Subject #8, Night Shift) and a change in the level of consciousness, “Intermittent periods of garbled inappropriate speech with increased lethargy noted,” (Subject #42, Day Shift). Noted to be absent from this data set were nurses’ documentation of caregiver input or the recognition of the symptoms culminating into a conclusion labeling the patient with hyperactive or hypoactive delirium.

Research Question Two:

What symptoms of delirium (disturbance of consciousness, change in cognition, acute onset and fluctuating course, and evidence of etiology) are revealed in acute care nurses’
The documented words and phrases describing mental status and related behaviors were mapped to the features of delirium as stated in the DSM-IV-TR (DSM) and the Confusion Assessment Method (CAM). The results of the mapping exercises yielded poor inter-rater agreement (DSM criteria: .391 [Nurse 1 vs. Nurse 2=.297; Nurse 1 vs. Nurse 3=.502; Nurse 2 vs. Nurse 3=.373], CAM criteria=.287 [Nurse 1 vs. Nurse 2=.212; Nurse 1 vs. Nurse 3=.298; Nurse 2 vs. Nurse 3=.352]). A nurse practitioner with 15 years experience and dually board-certified in gerontology and psychiatry performed adjudication only on areas of disagreement. The adjudicator was provided the mapping results from the three registered nurse mappers as well as the DSM-IV-TR and CAM delirium criteria. The following analysis consists of the adjudicated mapping.

The first exercise was to map each word or phrase to one of the DSM delirium criteria displayed in Table 4.4. Each criterion was assigned a number 0–4 that corresponded to each DSM delirium feature. The second exercise was to map each word or phrase to one of the CAM delirium criteria displayed in Table 4.5. Each criterion was assigned a number from 0–5 that corresponded to each CAM delirium feature.
### Table 4.4

**DSM-IV-TR Criteria used for Methodological Mapping**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td><strong>Does not map</strong> to any category</td>
</tr>
<tr>
<td>1</td>
<td><strong>Disturbance of Consciousness</strong> - (i.e. reduced clarity of awareness of the environment) with reduced ability to focus, sustain, or shift attention.</td>
</tr>
<tr>
<td>2</td>
<td><strong>Change in Cognition</strong> - (such as memory deficit, disorientation, language disturbance) or the development of a perceptual disturbance that is not better accounted for by a preexisting, or evolving dementia.</td>
</tr>
<tr>
<td>3</td>
<td><strong>Acute and Fluctuating</strong> - the disturbance develops over a short period of time (usually hours to days) and tends to fluctuate during the course of the day.</td>
</tr>
<tr>
<td>4</td>
<td><strong>Cause</strong> - There is evidence from the history, physical examination, or laboratory findings that the disturbance is caused by the direct physiological consequences of a general medical condition.</td>
</tr>
</tbody>
</table>

### Table 4.5

**CAM Delirium Mapping Criteria used for Methodological Mapping**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td><strong>Does not map</strong> to any category</td>
</tr>
<tr>
<td>1</td>
<td><strong>Acute Onset</strong> – Is there evidence of an acute change from the patient’s baseline?</td>
</tr>
<tr>
<td>2</td>
<td><strong>Fluctuating Course</strong> - Did the abnormal behavior fluctuate during the day, that is, tend to come and go or increase or decrease in severity?</td>
</tr>
<tr>
<td>3</td>
<td><strong>Inattention</strong> - Did the patient have difficulty focusing attention, for example, being easily distractible or having difficulty keeping track of what was being said?</td>
</tr>
<tr>
<td>4</td>
<td><strong>Disorganized Thinking</strong> - Was the patient’s thinking disorganized or incoherent such as rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable, switching from subject to subject?</td>
</tr>
<tr>
<td>5</td>
<td><strong>Altered Level of Consciousness</strong> – Overall, how would you rate the patient’s level of consciousness?</td>
</tr>
</tbody>
</table>

First, an exploratory analysis was performed to see if any of any nurses had a significant impact on any of the DSM delirium criteria. This was an important step preliminarily since the
data set would later be condensed to the day level for further analysis. This exploratory analysis was assurance that the documentation of the delirium features was evenly distributed across nurses and that no individual nurse was responsible for the majority of the observations. The results of this analysis are displayed in Figure 4.1. The same analytical process was performed for the CAM delirium criteria and is displayed in Figure 4.2. Both figures showed even distribution of documentation across nurses.

![Figure 4.1](image-url)  

*Figure 4.1.* Distribution of Nurse Documentation Across DSM Delirium Criteria; Count: number of documentations by each nurse; NurseID: 250 nurses engaged in documentation in this dataset. Not all their ID numbers could be displayed individually.
Figure 4.2. Distribution of Nurse Documentation Across CAM Delirium Criteria; Count: number of documentations by each nurse; NurseID: 250 nurses provided documentation in this dataset. Not all their ID numbers could be displayed individually.

The next step in this analysis addressed the non-independence of this data. Since each patient could be visited multiple times across several days and each nurse could have visited multiple patients, these data were not independent. To account for this non-independence in the statistical analysis, the data set was recoded so that patient days were the unit of measurement. This recoding accomplished two things. First, it eliminated the repeated measures across individual nurses. Second, it aligned the DSM and CAM delirium categories with the Research Assistant (RA) ratings (delirium or no delirium). This was important in this data set because the RAs used
information from across the entire day to make their classification of delirium or not. After the
data were recoded to the day level, each day level unit contained the total number of times each
patient was observed to exhibit each of the DSM and CAM delirium criteria.

Statistically, this research question addressed whether the nurses’ documentation of the DSM
and CAM delirium criteria coincided with whether the patient actually experienced delirium or
not on a given day. Crosstabulation results are displayed in Tables 4.5 and 4.6.

Table 4.6
Crosstabulation Results for DSM Delirium Criteria

<table>
<thead>
<tr>
<th>DSM Criteria #</th>
<th>Dementia-Only (D-O)</th>
<th>DSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Disturbance of Consciousness</td>
<td>10/82 (12%)</td>
<td>45/96 (47%)</td>
</tr>
<tr>
<td>2 Change in Cognition</td>
<td>27/82 (33%)</td>
<td>50/96 (52%)</td>
</tr>
<tr>
<td>3 Acute/Fluctuating</td>
<td>18/82 (22%)</td>
<td>28/96 (29%)</td>
</tr>
<tr>
<td>4 Cause</td>
<td>0/82 (0)</td>
<td>0/96 (0)</td>
</tr>
<tr>
<td>ANY DSM Criteria</td>
<td>42/82 (51%)</td>
<td>76/96 (79%)</td>
</tr>
<tr>
<td>3 or More DSM Criteria</td>
<td>2/82 (2%)</td>
<td>7/96 (7%)</td>
</tr>
</tbody>
</table>

NOTE: “10/82” indicates the number of days a nurse documented a disturbance in consciousness over the
total number of Dementia-Only patient days that included narrative documentation. “(12%)” indicates the
percentage of days on which nurses documented a disturbance of consciousness in the Dementia-Only
group.
Table 4.7

Crosstabulation Results for CAM Delirium Criteria

<table>
<thead>
<tr>
<th>CAM Criteria #</th>
<th>D-O</th>
<th>DSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Acute</td>
<td>0/82 (0)</td>
<td>3/96 (3%)</td>
</tr>
<tr>
<td>2 Fluctuating</td>
<td>22/82 (27%)</td>
<td>26/96 (32%)</td>
</tr>
<tr>
<td>3 Inattention</td>
<td>6/82 (7%)</td>
<td>15/96 (16%)</td>
</tr>
<tr>
<td>4 Disorganized Thinking</td>
<td>25/82 (30.5%)</td>
<td>55/96 (57%)</td>
</tr>
<tr>
<td>5 Altered Level of Consciousness</td>
<td>1/82 (1%)</td>
<td>22/96 (23%)</td>
</tr>
<tr>
<td>Positive CAM (features 1, 2, 3 &amp; 4 or 5)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ANY CAM Criteria</td>
<td>46/82 (56%)</td>
<td>76/96 (79%)</td>
</tr>
<tr>
<td>3 or More CAM Criteria</td>
<td>2/82 (2%)</td>
<td>12/96 (12.5%)</td>
</tr>
<tr>
<td>4 or More CAM Criteria</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**NOTE:** “3/96” indicates the number of days nurses documented acuteness over the total number of DSD patient days that included narrative documentation. “(3%)” indicates the percentage of days on which nurses documented acuteness in the DSD group.

In all criterion categories except *Fluctuation*, there were fewer delirium related notations in the D-O group than in the DSD group. The criteria that were most similar between the DSM and the CAM are consistent as well, i.e., *Acute and Fluctuating* and the *Change in Cognition*, and the *Inattention/Disorganized Thinking* criteria. The exception to this observation is the Level of Consciousness. Only 22 words or phrases were mapped in the CAM mapping exercise compared to the DSM exercise, for which 45 words or phrases were mapped. The meaning of this occurrence is unclear. Although, the specific questions provided with the criterion to prompt the user are different for each criterion. The prompts listed for LOC in the DSM criteria are, reduced clarity of awareness of the environment with reduced ability to focus, sustain, or shift
attention. The prompts listed for LOC in the CAM criteria are, overall, how would you rate this person’s LOC?

Next, logistic regression analysis with repeated measures was performed. Logistic regression is used when the dependent variable has two categories. This method of analysis determines the odds of an event occurrence. For example, in this circumstance, the odds ratio informed the researcher that the nurses were 6 times more likely to document about Level of Consciousness in the DSD group compared to the D-O group. The odds ratio = (45/51)/(10/72) or Yes vs. No (document about Level of Consciousness or not) in the DSD group compared to the D-O group = 6.35. The numbers do not match exactly to SPSS because SPSS corrects for the repeated measures (AR(1)) (SPSS = Odds Ratio of 6.037; Math problem = Odds Ratio of 6.35).
Table 4.8

Logistic Regression with Repeated Measures Results for DSM Delirium Criteria

<table>
<thead>
<tr>
<th>DSM Delirium Feature</th>
<th>p Value</th>
<th>Odds Ratio</th>
<th>Confidence Interval</th>
<th>Statistically Significant at .05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disturbance of Consciousness</td>
<td>.000</td>
<td>6.037</td>
<td>2.477 to 14.714</td>
<td>yes</td>
</tr>
<tr>
<td>Cognition Change</td>
<td>.026</td>
<td>2.266</td>
<td>1.102 to 4.661</td>
<td>yes</td>
</tr>
<tr>
<td>Acute &amp; Fluctuating</td>
<td>.300</td>
<td>1.456</td>
<td>.715 to 2.967</td>
<td>no</td>
</tr>
<tr>
<td>Etiology</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>At least 1 Feature</td>
<td>.002</td>
<td>3.413</td>
<td>1.599 to 7.285</td>
<td>yes</td>
</tr>
<tr>
<td>At least 3 features</td>
<td>.167</td>
<td>3.143</td>
<td>.620 to 15.920</td>
<td>no</td>
</tr>
</tbody>
</table>

*NOTE.* DSM= Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR); not enough data to run the regression on the Etiology variable. The Odds Ratio (OR) determined the odds of an event happening, i.e. the OR informed the researcher that nurses were 2.266 times more likely to document a change in cognition in the DSD group than in the D-O group. The p value of less than .05 and the Confidence Interval that does not cross over 1, indicate that this was a statistically significant OR.
Table 4.9
Logistic Regression with Repeated Measures Results for CAM Delirium Criteria

<table>
<thead>
<tr>
<th>CAM Delirium Feature</th>
<th>p Value</th>
<th>Odds Ratio</th>
<th>Confidence Interval</th>
<th>Statistically Significant at .05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fluctuating</td>
<td>.977</td>
<td>1.011</td>
<td>.488 to 2.092</td>
<td>no</td>
</tr>
<tr>
<td>Inattention</td>
<td>.225</td>
<td>2.052</td>
<td>.643 to 6.549</td>
<td>no</td>
</tr>
<tr>
<td>Disorganized Thinking</td>
<td>.003</td>
<td>2.966</td>
<td>1.449 to 6.070</td>
<td>yes</td>
</tr>
<tr>
<td>Altered Level of Consciousness</td>
<td>.002</td>
<td>23.462</td>
<td>3.129 to 175.901</td>
<td>yes</td>
</tr>
<tr>
<td>At least 1 CAM Feature</td>
<td>.007</td>
<td>2.822</td>
<td>1.327 to 6.001</td>
<td>yes</td>
</tr>
<tr>
<td>At least 3 CAM Features</td>
<td>.065</td>
<td>7.219</td>
<td>.886 to 58.806</td>
<td>no</td>
</tr>
</tbody>
</table>

**NOTE.** CAM = Confusion Assessment Method; not enough data to run the regression analysis on the Acute variable. The Odds Ratio (OR) determined the odds of an event happening, i.e. the OR informed the researcher that nurses were 2.966 times more likely to document disorganized thinking in the DSD group than in the D-O group. The p value of less than .05 and the Confidence Interval that does not cross over 1, indicate that this was a statistically significant OR.

Similarities exist between the DSM and the CAM logistic regression models. The statistically significant features from the DSM criteria are Disturbance of Consciousness, Cognitive Change and At Least One Feature. Similarly, from the CAM criteria, Disorganized Thinking, Altered Level of Consciousness, and At Least One Feature were statistically significant. The meaning of this analysis translates to nurses were more likely to document the statistically significant features for patients in the DSD group compared to the D-O group.
Research Question Three:

What is the rate of nurse recognition of delirium or acute confusion as measured by comparing daily researcher ratings of delirium with acute care nurses’ documentation of delirium in persons with dementia? The hypothesis was that nurses will recognize delirium in their older patients with dementia less than 20% of the time.

In this data set, there was no documentation from the nurses that involved use of the words ‘delirium’ or ‘acute confusion’ to describe patients’ mental status in either study group. Therefore, the stated hypothesis was supported; acute care nurses in this study failed to recognize delirium in their older adult patients with dementia.

Research Question Four:

What interventions do acute care nurses document in response to recognized signs and symptoms of DSD? Content analysis was performed using predetermined categories from the Nursing Intervention Lexicon and Taxonomy (NILT) classification system (Grobe, 1990). Nursing interventions related to patients’ mental status and related behaviors.

The narrative documentation in this data set was read and re-read to identify the nursing interventions that were documented in response to the patients’ mental status. When extracting the nursing interventions from the narrative text, enough text to show context was excerpted and deposited into a listing of nursing interventions on an Excel spreadsheet. Related information was purposefully not included, such as patient ID, date, documenting nurse, or CAM result (delirium or no delirium). The same three registered nurses described previously mapped the
nursing interventions to the seven categories in the NILT (see Table 4.9). The nurse mappers received electronic instructions as well as the Excel file to perform the mapping.

**Table 4.10**

*Nursing Intervention Lexicon and Taxonomy (Grobe, 1990)*

<table>
<thead>
<tr>
<th>NILT Category</th>
<th>Brief Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Care Need Determination</td>
<td>Information is gathered to reach a rational individualized decision that reflects what the patient needs</td>
</tr>
<tr>
<td>2 Care Vigilance</td>
<td>Ongoing observation &amp; monitoring of patients, &amp; remaining alert to improvements in the current state or a developing problem.</td>
</tr>
<tr>
<td>3 Therapeutic Care, General</td>
<td>Patient-specific procedures, therapies &amp; medications directed toward the maintenance or improvement of the patients’ health.</td>
</tr>
<tr>
<td>4 Therapeutic Care, Psychosocial</td>
<td>Psychologically based therapies directed toward support or improvement of the health &amp; psychological status of the patients.</td>
</tr>
<tr>
<td>5 Therapeutic Care, Cognitive</td>
<td>Promoting or enhancing decision-making to preserve the independence or control of individuals who are the focus of care.</td>
</tr>
<tr>
<td>Understanding &amp; Control</td>
<td></td>
</tr>
<tr>
<td>6 Care Environment Management</td>
<td>Interventions conducted to influence or evaluate the physical setting or environmental or familial context within which care occurs.</td>
</tr>
<tr>
<td>7 Care Information Provision</td>
<td>Activities of informing or teaching that assist patients to acquire &amp; use care information intended to maintain or improve the existing state or general condition &amp; maximize the response to therapy.</td>
</tr>
</tbody>
</table>

*NOTE.* More detailed descriptions of the categories are in Appendix C.

Interrater agreement on the mapping yielded a Cohen’s Kappa of .398 (Nurse 1 vs. Nurse 2=.656; Nurse 1 vs. Nurse 3=.266; Nurse 2 vs. Nurse 3=.270). The nurse mappers were then asked to meet as a group to discuss the nursing interventions that did not show agreement. After four nursing interventions (Appendix D) were eliminated from the list due to insufficient information on the context of the intervention, agreement among the nurses was 100% on the
mapped categories. Once this process was completed, there were 242 nursing interventions in seven NILT categories.

Figure 4.3. Histogram of Nurse Intervention Categories. Count refers to the number of times a nursing intervention was documented in each category and by study group.

As seen in Figure 4.3, considerably more nursing interventions were documented in relation to patients’ mental status and related behaviors in the DSD group than in the D-O group ($n=168$ vs. $n=74$). Care Vigilance and Care Environment Management were the categories of interventions most documented in both groups. Examples of Care Vigilance in this data set include: “…will continue to monitor,” “patient on 1:1 observation,” and “continue to make frequent rounds on patient.” Examples from the category Care Environment Management in this data set include: “fall precautions in place,” “bed alarm activated for patient safety,” and “doctor notified of changes.” In the DSD group, the category Therapeutic Care, General, was more prevalent than in the D-O group ($n=63$ vs. $n=30$). Examples of interventions in this category are:
“Patient remains agitated, restless, Ativan 1 mg IV given today several times with no effects,”
“Patient confused. Unable to follow directions and is very agitated. Patient medicated with
Ativan IV,” and “Patient in bed. Found patient had pulled IV out again. Pt had been OOB to BR
without assistance. Blood on floor and bed linens. Comfort bath given and linens changed.”

Multinomial logistic regression was performed with the NILT categories. Various categories
were used as the reference category but, statistically, no patient group (DSD vs. D-O) was more
likely to receive an intervention from one category than from another category. Overall, no
group had a statistically significant effect on the intervention that was documented ($p$-value is
.181).
Chapter 5

Discussion

Overview of Significant Findings

The purpose of this study was to explore nurse recognition of delirium among hospitalized older adults with dementia and describe how nurses manage their patients with dementia and delirium superimposed on dementia (DSD). The content analysis revealed that nurses documented their patients’ mental status by describing orientation. When using the DSM-IV-TR (DSM) and CAM delirium criteria for purposes of comparison, the nurses’ documentation consisted of change in cognition, disturbance of consciousness, disorganized thinking and fluctuation. No statistically significant difference in the category of nursing interventions was documented between the DSD and the Dementia-Only groups, although more nursing interventions were documented in the DSD group.

Rate of Nurse Recognition

This study was guided by the framework and model of the conceptualization of recognition in the context of nurse-patient interactions. The theoretical definition states:

Recognition is the process in which a nurse, in interaction with a patient, gathers patient-based evidence, interprets patterns related to meaning of the patient experience against pre-existing knowledge and experience, and consciously labels the phenomenon-based or patient-specific pattern. This process is bound by contextual preconditions, including personal and professional attributes of the nurse, attributes of the patient as a person in a
compromised state of health, and the organizational culture wherein nurse-patient interactions occur. The experience of recognition is a pivotal point, since labeling of a pattern prompts a response by the nurse, whether a behavioral response initiating an intervention or an internal, affective response. The specificity and accuracy of collected data, interpretation, the subsequent label, and resulting response will have an impact on the qualities of outcomes for the patient, the nurse and, at times, the organization. Outcomes dynamically feed back into pre-conditions in a cyclical process that potentiates change (Steis, et al., in press).

The most significant finding from this study was the absence of patient days on which nurses recognized delirium in this population of hospitalized older adults. The terms ‘delirium’ or ‘acute confusion’ were never documented by the nurses. The nurses did not assess for causes or etiologies and they did not act to reverse the delirium. In comparison to similar studies (Bowler, et al., 1994; Fick, Hodo, Lawrence, & Inouye, 2007a; Inouye, et al., 2001; Voyer, Richard, et al., 2008), these results reveal by far the lowest rate of nurse recognition of delirium. In this study, nurse recognition was strictly defined—no allowances were made that ‘assumed’ the nurses recognized delirium. Previous studies may have restricted the definition but not as discreetly. For instance, Friedman and colleagues (2008) reported an 18% rate of nurse recognition of delirium by accepting ‘confused’ or ‘delirium’ as evidence of recognition. By allowing ‘confused’ to equal recognition of delirium, the researchers did not ‘define’ delirium. ‘Confused’ is a term that nurses use commonly but do not define consistently (Milisen, et al., 2002). For instance, in this data set, nurses documented the term ‘confused’ 56 times in the DSD group and 24 times in the D-O group. There was no indication that the nurses’ use of the term ‘confusion’ communicated that the patient was experiencing delirium. This quote from the data
is one example: “Remains drowsy but answers questions with slight confusion. Tolerating diet
without problem. Denies pain. No edema. Assistance required for care,” (Subject #144, Day
Shift).

What do nurses document?

In this data set, nurses documented at least one symptom of delirium on 79% of the days on
which RAs determined patients experienced DSD. Collectively, nurses only recognized 3 of the
4 DSM delirium criteria 7% of the time. This result reflects the collective documentation from
the nurses since patient days was the unit of measurement. This tells us that not only did no
individual nurse document delirium conclusively; nurses collectively did not fully document the
symptoms of delirium on any of the patient days. But nurses are documenting individual
features of delirium. This is encouraging and will be useful when designing educational
interventions.

When exploring what nurses document to describe their older adults’ mental status, content
analysis showed that orientation status was by far the most common category documented for the
DSD group. Although their documentation may have been accurate, it is not helpful in
diagnosing delirium (Inouye, et al., 2001). It is also indicative of ineffective assessment. Past
research revealed use of vague and inconsistent terminology (Eden & Foreman, 1996; Gustafson,
et al., 1991) such as confusion (Milisen, et al., 2002), hyperactivity (Eden & Foreman, 1996),
aggressive behavior, restlessness, agitation, delusions and anxiousness (Edlund, et al., 2007). In
this data set, similar trends were found. After orientation, confusion, agitation, level of
consciousness, cooperation and behavior were documented by the nurses. These results are
similar to a qualitative study in which acute care nurses were interviewed about their experiences
in caring for patients with delirium (Dahlke & Phinney, 2008). Analyses of their data revealed three themes: increased vigilance, burden and increased workload for the nurses. Similar to this study, there was no evidence of structured mental status assessment or planned approach to care. In both the Dahlke and Phinney (2008) study and in this study, the documentation reflected nurse reaction and attempts to control the situation in response to patients’ mental status.

At times, nurses described hyperactivity or hypoactivity such as “Pt very confused, speech incomprehensible. Agitated and combative at times,” (Subject #116, Day Shift) or “…very sleepy, eyes do not stay open for very long,” (Subject #151, Evening Shift) but did not affix a label of hypoactive or hyperactive delirium.

Alford (2003) reported that nurses’ documentation does not fare well in the legal system due to nurses’ failure to interpret raw data. Steis and Fick (2008) reported similar findings in their systematic review of nurse recognition of delirium. While nurses recorded symptoms of delirium, they failed to record the diagnosis of delirium. Steis and Fick (2008) also reported that nurses documented findings but the assessments were neither nursing diagnoses nor effective descriptions of signs, symptoms or etiologies. In this study, there was no evidence that a screening tool or algorithm such as the CAM were utilized to facilitate assessment. There was consistent evidence that the nurses assessed patients’ orientation status accompanied by documentation of notable observed behaviors. This is evidence that nurses halted their mental status assessments too early.
Although more nursing interventions were documented for the DSD group than for the D-O group, nurses did not document caring for their patients with DSD differently than they documented caring for their D-O patients. Specifically, the nursing interventions were highly indicative of the nurses’ increased vigilance and implementation of safety interventions. But the nurses failed to manage their patients’ care. Their documented interventions reflected reaction to what they observed. The difference in quantities of nursing interventions is consistent with the difference in number of words and phrases describing the patients’ mental status from the content analysis. There were more than twice as many words or phrases describing patients’ mental status for the DSD group \((n=452)\) than for the D-O group \((n=210)\). The patients in the DSD group required more time, work and vigilance from the nurses. These findings are similar to those from Dahlke and Phinney’s (2008) on how acute care nurses reported treating their patients who suffered from delirium. Many of their nursing interventions were decisions rooted in efforts to keep the patient safe and from the nurses’ efforts to control the situation.

Some documented nursing interventions in this data set were among the Inouye and colleagues (1999) suggested interventions for nursing management of delirium. There were 14 notations of reality orientation and 59 documenting safety measures. There was an occasional (6) notation where a gentle approach was utilized and activities were explained to patients (4). Although overall, nurses did not document care in a manner that was consistent with published delirium management guidelines, there is evidence that nurses are on the right track.
Findings in Relation to the Recognition Model

Recognition in the Context of Nurse-Patient Interactions (Steis, et al., in press) was used to frame this study. One of the tenets of the recognition model is that the accuracy and specificity of the label affixed to the assessment conclusion, in this case delirium, is key to the efficacy and effectiveness of the outcome of the recognition process.

In this study, the conclusion and subsequent label were descriptions of the patients’ orientation status, level of consciousness and descriptions of their behavior. But the conclusion (label) was never documented as ‘delirium’ or ‘acute confusion’ and the actions (nursing interventions) the nurses documented in response to what they recognized did not differ between the two groups of patients. The nurses in this study failed to recognize (see Figure 5.1) delirium in their hospitalized older patients with dementia. There were no occurrences of the nurses documenting the term delirium or acute confusion. Nurses in this study did however, document individual features of delirium as defined by the DSM-IV-TR and the CAM. According to the recognition model, the quality of the outcome for the patient is influenced by the accuracy of the label the nurse affixes to the phenomenon being experienced by the patient. In this study, the categories of interventions documented by the nurses were not different when comparing the two
study groups.

**Figure 5.3.** Recognition model.

This study reinforces the value of assessment and the significance of accurately labeling the patient phenomenon which, according to the model, results in more appropriate management of the patient. Because of old paradigms of thinking and learning, nurses are reluctant to label a phenomenon they recognize in a patient (Allen, 1997). Nurses have been taught not to formulate medical diagnoses. But in order to implement appropriate interventions, nurses need a well defined label. In a recent study comparison of assessment tools to diagnose delirium in a critical care unit, use of assessment tools (Confusion Assessment Method for the Intensive Care Unit [CAM-ICU] [64%] and Intensive Care Delirium Screening Checklist [ICDSC] [43%]) resulted in higher levels of diagnosis than did physician assessment (29%) did (Eijk, et al., 2009). More
appropriate management includes following approved or data-driven nursing care guidelines for the prevention and management of delirium.

The recognition model was helpful in framing this study. By referring to the theoretical definition of recognition and the model, the implications of these research results are clear. The interventions targeted at educating nurses in the future need to be aimed at identifying who is at risk, exercising vigilance, the importance of gathering the evidence using thorough mental status assessment and the use of a critical thinking process to arrive at the most accurate and specific conclusion possible thereby affixing the label of delirium. The evidence from this study supports that nurses are not currently following this process beyond interacting with the patient and reporting their observations…not assessment, but observations. According to the recognition model, recognition prompts action. Future education should advise nurses to seek out evidence based guidelines to lead them in the care of their patients. Interventions should hone in on guiding nurses to perform mental status assessments. Although there is more work to do in the area of nursing management guidelines for delirium, the HELP (Inouye, Bogardus, Baker, Leo-Summers, & Cooney, 2000) and NICHE (Foreman, Mion, Tryostad, Fletcher, & Faculty, 1999) models show promise in this area.

**Implications of the Findings**

Most importantly, the rate of nurse recognition of DSD may be less than previously reported. Past researchers were more generous in their assessment of whether the nurses in their studies recognized delirium or not. In this study, the researcher, with the guidance of the recognition framework, strictly defined nurse recognition of delirium. The nurses failed to affix the label of delirium or acute confusion. They did not assess for causes or etiologies and they did not act to
reverse it. This implies that poor recognition, an already dire situation, may be worse than previously reported. This new information elevates the importance of addressing the under-recognition and therefore, the under-treatment of delirium in our older adult patients with dementia.

The information from this study will enhance the educational effort to inform nurses about identifying those acute care patients at risk for delirium, recognizing delirium and how to manage patients with delirium. For instance, nurses need to use critical thinking skills (Forneris, 2004) to bring together the symptoms the patient is exhibiting so they recognize delirium early and move forward to assess for causes. The educational effort should be universal and include advanced practice nurses, nursing faculty, students and practicing nurses in all settings. The educational effort should also extend to families of those who are known to be at higher risk of developing delirium. The opportunity exists to develop targeted educational literature to supplement and extend the educational efforts. For instance, the Hartford How to Try This (http://hartfordign.org/trythis) educational initiative could be expanded to include more delirium education to guide nurses to extend education to the families of those at risk for delirium.

In this study, it was found that the documented mental status assessments were insufficient to determine the status of the patients’ condition. There was no evidence of the use of assessment tools in this data set. Although the nurses did not document all of the DSM and/or CAM criteria for delirium, it is encouraging that nurses were more likely to document delirium symptoms for patients who were actually experiencing delirium than they were to document delirium symptoms for patients who were not experiencing delirium. Without the use of approved assessment tools, nurses stop short of effectively assessing the mental status of their patients. A
concerted effort should ensue to implement standardized mental status assessments, such as the CAM, in health care settings. These findings support the integration of assessment tools into the electronic medical record (EMR) to prompt nurses to fully assess their patients at risk for and who display signs of delirium. This may happen at various levels beginning with the individual nurses but could be successful if adopted at the institutional level.

Policymakers are interested in how to enhance quality of care in acute care institutions. For instance, The Joint Commission 2008 National Patient Safety Goal #16 states, “Improve recognition and response to changes in a patient’s condition. The organization selects a suitable method that enables health care staff members to directly request additional assistance from a specially trained individual(s) when the patient’s condition appears to be worsening,” (Joint Commission, 2007). Similarly, Medicare instituted a Never Events Policy in 2008 (CMS Office of Public Affairs, 2008). This policy addresses ‘never events’ that may complicate a person’s hospital stay. Medicare will not pay the hospital for eight of these problems if they result from the person’s hospitalization. Falls and trauma are currently on the list of “never events.” Delirium greatly increases the chance of hospital complications including increased length of stay, which was documented in this study as well. This type of initiative highlights the importance of nurses to be aware of common complications that have great potential to threaten patient outcomes, such as delirium.

Finally, there was no significant difference in the category of nursing interventions employed by the nurses between the study groups. A lack of recognition of ‘delirium’ implies that the nurses were unlikely to reference nursing management of delirium guidelines to provide the best known care for their patients. Organizational support is vital to the success of nursing
management guidelines. Similar efforts have been successful such as efforts to reduce patient falls and to increase nurses’ assessment of pain.

*Study Strengths and Limitations*

The retrospective nature of the data source is a limitation to this study. The nurses consent was not sought during the original study by Fick. This was a limitation when designing this study. Nurse interviews would have enriched this data set. Conversely, the EMR was an asset. The documentation was easily accessible and legible.

The planned analysis for two of the research questions involved nurses mapping data (words or phrases) to features of delirium (question two) and mapping of nursing interventions to the NILT categories (question four). The process of mapping data was initiated electronically by sending the nurses the criteria and directions as well as the phrases to be mapped. Questions were individually answered as the nurses emailed the researcher. Once mapping was completed and electronically returned to the researcher, the results were disappointing. The percent agreement with DSM and CAM criteria was less than desirable. Although resolution was attained and the validity of the study maintained, in retrospect, this could have been at least partially avoided by bringing the nurses together for an initial meeting. This meeting would have served several purposes: it would have enabled explanation of the process to the nurses and assured that they had the same understanding of the delirium criteria and the NILT classification system; further, it would have provided an opportunity to ask questions, the answers to which would have informed all persons involved in the meeting.

One result of the mapping exercise was conflicting. Each of the delirium criteria has a Consciousness feature: CAM= Altered Level of Consciousness and DSM= Disturbance of
Consciousness. The result of the mapping was inconsistent between the sets of criteria for this feature. The results for the DSM criteria of Disturbance of Consciousness were that on 45 of the 96 patient days (47%), nurses documented this feature when the patient really did experience DSD. According to the results for the CAM criteria for Altered Level of Consciousness, on 22 of the 96 patient days (23%), nurses documented this feature when the patient really did experience DSD. One reason for this conflict may stem from the difference in the descriptions provided by each source. For instance, the DSM description of ‘Disturbance of Consciousness’ is ‘reduced clarity of awareness of the environment with reduced ability to focus, sustain, or shift attention’ (American Psychiatric Association, 2000). The CAM description of ‘Altered Level of Consciousness’ is ‘overall, how would you rate the patients’ level of consciousness?’ (Inouye, et al., 1990). In a recent paper, Voyer and colleagues (2009) evaluated prevalence rates for delirium in a population of nursing home patients using different diagnostic criteria. They found that 71 of 155 patients (45.8%) met the CAM criteria for delirium and 45 of 155 patients (29%) met the DSM-IV criteria for delirium. This conflicts with Laurila and colleagues’ (Laurila, et al., 2003) findings for hospitalized older adults. They reported that the DSM-IV delirium criteria were the most sensitive (34.8%) for hospitalized elders, while the DSM-III-R delirium criteria was the most sensitive for institutionalized elders (14.4%). Both suggested that researchers should consider the setting when choosing the source for delirium criteria in future studies. Further evaluation of the difference between delirium criteria may be warranted.

The limited generalizability of the findings from this study means that they should be viewed cautiously. The nurses originated from one community hospital in central Pennsylvania and the patients in this study were from a non-diverse population.
This study has several strengths. First, defining nurse recognition was a methodological strength. Past research in this area was weak. Next, the use of mixed methodologies to analyze the data enhanced the knowledge gained from this study. Third, the two groups-DSD and Dementia-Only-were both large enough to analyze and respect the results. Finally, these study results were stronger because of the use of the Recognition in the Context of Nurse-Patient Interactions framework and model.

Recommendations for Future Research

In future research on nurses’ recognition of any phenomenon, the recommendation is to define how the determination of recognition will be accomplished. In research, we need strong criteria to define phenomena. In this study, use of the Recognition framework, facilitated this task. Research designed to advance the concept of recognition will prove useful to strengthening future recognition projects.

Research in settings other than acute care is encouraged. For instance, home health nurses practice in isolation from other health care providers. They are expected to assess their patients and make conclusions based on short, intermittent visits aided by patient and family reports of occurrences between visits. Extending nurse recognition and delirium research beyond the acute care walls is imperative. Consideration must also be given to the inclusion of families of those at risk for developing delirium.
References


### Appendix A

#### Data Collection Tool Example

<table>
<thead>
<tr>
<th>Chart Section</th>
<th>Criteria</th>
<th>Entry Time:</th>
<th>0000</th>
<th>0415</th>
<th>0815</th>
<th>1657</th>
<th>2209</th>
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<td>NURSE</td>
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<td>227</td>
<td>227</td>
<td>227</td>
<td>208</td>
<td>208</td>
<td>208</td>
</tr>
<tr>
<td>Neuro</td>
<td>LOC</td>
<td>Sleeping</td>
<td>Sleeping</td>
<td>Sleeping</td>
<td>Awake, alert</td>
<td>Awake, alert</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oriented to</td>
<td>Person, place</td>
<td>Person, place</td>
<td>Person, place</td>
<td>X4</td>
<td>X4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Glasgow motor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Glasgow verbal</td>
<td>Oriented</td>
<td>Oriented</td>
<td>Oriented</td>
<td>oriented</td>
<td>Oriented</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neuro Symptoms</td>
<td>weakness</td>
<td>weakness</td>
<td>weakness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communication Ability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Express Lang Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>Pain Intensity</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Psychosocial</td>
<td>Behavior</td>
<td>coop</td>
<td>coop</td>
<td>coop</td>
<td>coop</td>
<td>coop</td>
<td></td>
</tr>
<tr>
<td>Mood/Affect</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narrative</td>
<td>Narrative:</td>
<td>VSS. LS DIM W/ FAINT CRACKLES IN BASES BIALT. PT VOIDING IN URINAL AT BEDSIDE. TRACE EDEMA IN LE BIALT. SL INTACT &amp; PATENT. PT STATED HAVING 2 OUT OF 10 PAIN IN HIS R HI, REFUSED PAIN MEDS. WILL CONTINUE TO MONITOR PT.</td>
<td>PT SLEEPING WELL. PT STATUS UNCHANGED. VSS. PT HAS NO COMPLAINTS AT THIS TIME. WILL CONTINUE TO MONITOR PT.</td>
<td>Alert/oriented. VSS. LS diminished, faint crackles in bases. 02 2L N/C. Abd soft, BS present. Trace edema noted to feet/+pedal pulses. C/O intermittent pain in R hip-repositioned no further c/o.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Inclusion Criteria for Categories

<table>
<thead>
<tr>
<th>Category Name</th>
<th>Inclusion Criteria for Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>Word or phrase denoting patients’ orientation status. Examples include, oriented, disoriented, needs reoriented, alert to name and place, alert, awake.</td>
</tr>
<tr>
<td>Confusion</td>
<td>Word or phrase stating confusion such as confused, no confusion noted, some confusion noted, confusion of place, time or event.</td>
</tr>
<tr>
<td>Agitation</td>
<td>Word or phrase stating agitation and related words or phrases such as combative, argumentative, tried to spit on staff.</td>
</tr>
<tr>
<td>Level of Consciousness</td>
<td>Words or phrases that state or describe level of consciousness such as arouses easily, awakens with stimuli, lethargic, slow to respond, unresponsive, drowsy, decreased level of consciousness</td>
</tr>
<tr>
<td>Cooperation</td>
<td>Words or phrases stating cooperation uncooperation or refusal.</td>
</tr>
<tr>
<td>Behavior</td>
<td>Words or phrases describing behavior related to mental status and not listed elsewhere such as incontinent of urine or stool, did not ring for help; compliance or noncompliance, pulled at foreign devices (hemovacs, IVs, foley</td>
</tr>
</tbody>
</table>
catheters, oxygen tubing), disturbing roommate, bed alarm sounded.

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>Words or phrases stating anxiety or anxious as well as restlessness.</td>
</tr>
<tr>
<td>Affect</td>
<td>Words or phrases indicating patients’ affect or mood such as calm, pleasant, impulsive, resting quietly, short attention span, flat affect.</td>
</tr>
<tr>
<td>Fluctuation</td>
<td>Words or phrases describing a change in the intensity or level of symptoms related to mental status such as worsening, improved since an earlier assessment.</td>
</tr>
<tr>
<td>Memory</td>
<td>Words or phases describing forgetfulness such as forgets easily, forgets to ring for help.</td>
</tr>
<tr>
<td>Appropriateness</td>
<td>Words or phrases stating appropriate or inappropriate actions or comments.</td>
</tr>
<tr>
<td>Delusions</td>
<td>Words or phrases describing a delusion such as patient thinks she is at grocery store and insists on getting out of bed to shop.</td>
</tr>
<tr>
<td>Dementia</td>
<td>Words or phrases indicating patient has dementia or has a history of dementia.</td>
</tr>
<tr>
<td>Hallucinations</td>
<td>Words or phrases that state patient experienced a hallucination.</td>
</tr>
</tbody>
</table>
### Appendix C

## Nursing Intervention Lexicon and Taxonomy

<table>
<thead>
<tr>
<th>NILT Category</th>
<th>Conceptual Definition</th>
<th>Main Concepts</th>
<th>Common Verbs</th>
<th>Prototypical examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care Need Determination (CND)</td>
<td>The deliberative, cognitive, physical or verbal activities in which information is gathered to reach a rational individualized decision that reflects what is judged necessary for individuals who are the focus of care. The information may reflect pre-existing or past health conditions, their effects, and lifestyle or role alterations adopted in response to them, potential health risks or contraindications to therapy, functional abilities, cognitive and behavioral characteristics, and/or baseline health state, health concerns, beliefs and values, habits, routine practices of daily living, and actual or preferred activities.</td>
<td>Preexisting or past health conditions and their effects. Functional disabilities. Habits or routine practices of daily living. Focused on deliberate activities of assessing, at any time during care, individuals’ and families’ functionality, and individuals’ or families’ patterns of normal functioning.</td>
<td>Assess (functionality, e.g. mobility, cognitive function, motivation, coping ability, normal functioning), investigate, ask (reason), seek (information), evaluate, determine knowledge of, take (history)</td>
<td>Assess need for teaching on 2 gm sodium diet, assess functional status, identify patient’s usual activities of daily living and schedule he/she keeps, investigate client’s sleep pattern, number of pillows, time, etc.</td>
</tr>
<tr>
<td>Care Vigilance (CV)</td>
<td>The deliberative, cognitive, physical or verbal activities performed to check functioning of therapeutic devices, to obtain indicators of physiologic status, and to determine the current physical, mental, emotional or behavioral state, general condition or response to therapy for the purpose of ongoing observation and monitoring of individuals who are the focus of care, and remaining alert to improvements in the current state or a developing problem.</td>
<td>Determination of current physical status. Determination of current mental status. Determination of emotional or behavioral status. Includes those ongoing therapeutic activities consisting of the observation and monitoring of individuals to remain alert to improvements in their current state or to remain alert to any developing problems.</td>
<td>Observe, monitor, auscultate, check, palpate, assess, identify, evaluate</td>
<td>Assess hydration status, check for rales, monitor effects of diuretics, palpate for edema, draw blood for fasting blood glucose level, and identify current emotional state.</td>
</tr>
<tr>
<td>Therapeutic Care, General (TCG)</td>
<td>The deliberative, cognitive, physical or verbal physically based activities that include patient-specific procedures, therapies and medications directed toward the maintenance or improvement of the</td>
<td>Administration of therapies. Performance f procedures. Administration of medications.</td>
<td>Administer, apply, assist, maintain, implement, perform, encourage, provide, explore, begin</td>
<td>Administer medications, apply lotion, perform dressing changes, give medications for pain as needed</td>
</tr>
<tr>
<td>Therapeutic Care, Psychosocial (TCP)</td>
<td>The deliberative, cognitive, physical or verbal activities that include psychologically based therapies directed toward support or improvement of the health and psychological status of individuals who are the focus of care.</td>
<td>Therapies that affect the feelings and emotions of clients: psychological support, emotional support and acceptance, psychological therapies.</td>
<td>Accept, discuss, reassure, ask, allow, communicate, encourage, give</td>
<td>Discuss feelings of loneliness, reassure about body changes, allow patient to verbalize feelings about losses</td>
</tr>
<tr>
<td>Therapeutic Care, Cognitive Understanding and Control (TCCU&amp;C)</td>
<td>The deliberative, cognitive, physical or verbal activities that enable individuals to care for themselves by promoting or enhancing decision-making to preserve the independence or control of individuals who are the focus of care.</td>
<td>Promote, enhance, or enable decision making. Preserve independence or control of individuals and families. Focused on deliberative cognitive, physical, or verbal activities that enhance individuals’ and families’ involvement in the care planning and decision-making aspects of therapy.</td>
<td>Allow, support, reassure, encourage</td>
<td>Support husband and wife in their decision making, allow patient to be as independent as possible, assist client to set realistic goals</td>
</tr>
<tr>
<td>Care Environment Management (CEM)</td>
<td>The deliberative, cognitive, physical, or verbal activities conducted to influence or evaluate the physical setting or environmental or familial context within which care occurs.</td>
<td>Influencing or evaluating the physical setting. Affecting the environmental context of care or the care setting. Influencing or evaluating the familial context. In textbooks, these are termed indirect care activities but nurse subjects have documented them as interventions.</td>
<td>Schedule, arrange, request, contact, refer, consult, document, record, report, obtain, provide, assess, involve, inform</td>
<td>Refer to social services, provide assistive devices, record neurologic assessments, schedule physical therapy, arrange for consults, request orders for diuretic, inform physician that stool softener is not effective</td>
</tr>
<tr>
<td>Care Information Provision (CIP)</td>
<td>The deliberative, cognitive, physical or verbal activities of informing or teaching that assist individuals who are the focus of care to acquire and use care information intended to maintain or improve the existing state or general condition and maximizes the response to therapy. (Category does include informing regarding condition or status, devices, resources, and services).</td>
<td>Informing about care or condition. Explaining care and its components. Teaching about required care that clients must perform. Instructing and demonstrating care procedures. Telling about the course of care and what to expect. Interventions focused on informing or teaching individuals about their care and their course of therapy.</td>
<td>Inform, teach, instruct, tell, demonstrate, suggest, advise, discuss, emphasize, recommend, reinforce, review</td>
<td>Inform patient about the nature of his condition, explain all treatments, and teach to administer insulin, demonstrate how to check blood glucose level, provide information about therapy</td>
</tr>
</tbody>
</table>
# Appendix D

## Nursing Interventions Eliminated During Content Analysis

<table>
<thead>
<tr>
<th>Nursing Intervention Eliminated</th>
<th>Reason for Elimination Determined by Group of Nurse Mappers and PI Steis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Caregiver at bedside most of shift</td>
<td>Intervention not initiated by nurse</td>
</tr>
<tr>
<td>2. Pt OOB in chair for dinner and most of evening.</td>
<td>Intervention not necessarily in response to patient's mental status.</td>
</tr>
<tr>
<td>3. OOB most of PM</td>
<td>Intervention not linked to mental status assessment.</td>
</tr>
<tr>
<td>4. Attempted to contact wife for patient.</td>
<td>Intervention not definitively linked to mental status assessment.</td>
</tr>
</tbody>
</table>
Appendix E

Confusion Assessment Method (CAM) Worksheet

1. **ACUTE ONSET AND FLUCTUATING COURSE**
   - Is there evidence of an acute change in mental status from the patient’s baseline?
   - Did the abnormal behavior fluctuate during the day, that is, tend to come and go or increase and decrease in severity?

2. **INATTENTION**
   - Did the patient have difficulty focusing attention, for example, being easily distractible or having difficulty keeping track of what was being said?

3. **DISORGANIZED THINKING**
   - Was the patient’s thinking disorganized or incoherent such as rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable, switching from subject to subject?

4. **ALTERED LEVEL OF CONSCIOUSNESS**
   - Overall, how would you rate the patient’s level of consciousness?

   - Vigilant (hyperalert)
   - Lethargic (drowsy)
   - Stupor (difficult to arouse)
   - Coma (unarousable)
   - Alert (normal)

Positive for delirium per CAM (based on above CAM) □ Yes □ No □ N/A

*If all items in Box 1 are checked and at least one item in Box 2 are checked; a diagnosis of delirium is suggested.

* If 2 or more checked, mark YES for a Subsyndromal Delirium

Appendix F

PSU IRB Approval

Date: November 26, 2008

From: Tracie L. Kahler, IRB Administrator

To: Donna M. Fick

Subject: Research Proposal - Modification (IRB #21198)
Approval Expiration Date: July 10, 2009
(Note: This date reflects the anniversary date of the actual submission approval date.)

"Delirium in Persons with Dementia"

The revision(s) to the above-referenced study has been reviewed and approved by the Biomedical Institutional Review Board (IRB). You may proceed with your study. Please continue to notify the IRB of any further changes to your study.

Comment: Approval, as per the modification request received on 10/26/08, is for the following: 1) change of personnel role of M. Steis from Project Coordinator to Co-Investigator; 2) approval for retrospective chart review.

On behalf of the IRB and the University, thank you for your efforts to conduct research in compliance with the federal regulations that have been established for the protection of human participants.

Please Note: The ORP encourages you to subscribe to the ORP listserv for protocol and research-related information. Send a blank email to: L-ORP-Research-L-subscribe-request@lists.psu.edu

TLK/Ilk
cc: Melinda R. Steis
    Jennifer Waller
Appendix G

MNMC IRB Approval

December 10, 2008

Donna Fick, RN, PhD
The Pennsylvania State University
201 Kern Graduate Building
University Park, PA 16802

Dear Dr. Fick:

The Institutional Review Board of Mount Nittany Medical Center met on December 5, 2008, and reviewed your request for revisions of the following:

Assessment of Mental Status in Hospitalized Older Adults (#21198)

It was the unanimous decision of the Board members to accept the revisions as presented and to continue approval of the use of the protocol in the Medical Center.

Please note that it will be your responsibility to notify the Board immediately of any adverse reactions with the use of this protocol and to provide an update at the time of the yearly review of all protocols by the Mount Nittany Medical Center’s Institutional Review Board.

Sincerely,

Jeanne A. Lumadue, M.D., PhD
Chairman, Institutional Review Board

cc: Melinda Stejs
Janet Schachtner, Senior VP for Patient Care Services
Melinda Roan Steis, PhD, RN

Home Address: 112 Rosewood Cove
   Bellefonte, PA 16823
   Email: mroansteis@live.com

EDUCATION:
2009      PhD in Nursing, Gerontology minor
            The Pennsylvania State University
            University Park, PA
2000      Master of Science, Community Health Nursing
            The Pennsylvania State University
            University Park, PA
1992      Bachelor of Science in Nursing
            Lycoming College
            Williamsport, PA
1980      Diploma Registered Nurse
            Williamsport Hospital School of Nursing
            Williamsport, PA

Professional licenses:
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<td>04/27/2006</td>
<td>04/30/2011</td>
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</tbody>
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PROFESSIONAL EXPERIENCE:
9/2009 -        Postdoctoral Research Fellowship, NewCourtland Center for Transitions
                and Health, University of Pennsylvania, Philadelphia, PA
1/2009 – 8/2009 Project Director, IMPACT-DSD study, Drs. Kolanowski and Fick, School
            of Nursing, The Pennsylvania State University, University Park, PA
2005 – 2009     Research Assistant, Dr. Donna Fick, School of Nursing, The
                Pennsylvania State University, University Park, PA
2005 – 2009     Staff Nurse and Community Educator, Gentiva Home Health Services,
                State College, PA
2001 – 2005     Administrative Director, Susquehanna Home Care & Hospice,
                Williamsport, PA
1991 – 2001     Home Health Nursing Director, Susquehanna Home Care & Hospice,
                Williamsport, PA
1985 – 1986     Nurse II, State Correctional Institution at Muncy, Muncy, PA
1980 – 1991     Staff Nurse - Night Shift House Supervisor, Williamsport Hospital,
                Williamsport, PA