

An Integrative Literature Review on the Implementation of Chair Yoga Versus Standard  
of Care to Improve Mobility in Older Adult Dementia Hospitalized Patients at Risk for  
Falls

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## Abstract

Older adults with dementia present a higher risk for falls than their healthy counterparts due to disease-related cognitive and physical changes and deconditioning from low mobility during hospitalization. Deconditioning can compromise the ability to perform activities of daily living (ADL) after hospitalization leading to poor recovery outcomes, loss of independence, and decreased quality of life from increased dependence on caregivers.

As the aging population continues to grow globally so does the need to address gaps in scientific literature regarding mobility of hospitalized older adults with dementia. Chair yoga has shown promise as an intervention to address low mobility for this vulnerable population. The purpose of this project, an integrative literature review of original randomized control trials (RCTs), is to assess the current evidence of implementation of chair yoga versus standard of care to provide recommendations for interventions and guidelines to improve mobility in hospitalized older adults with dementia who are at risk for falls. To date no RCTs have been conducted utilizing chair yoga as an intervention to improve mobility for hospitalized older adults with dementia who are at risk for falls. The use of yoga as intervention is still considered in its infancy stage in the scientific literature; thus, further research is recommended to investigate chair yoga for hospitalized older adults with dementia to build a greater body of knowledge and evidence.

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## CHAPTER 1

### Introduction

#### Background

Dementia affects nearly 24 million people worldwide and that number is expected to double every 20 years (Qiu, De Ronchi, & Fratiglioni, 2007) along with the global population of adults aged 60 years and older. The projected estimates are that this population will increase from 688 million in 2006 to 2 billion by 2050 (World Health Organization [WHO], 2007). In the United States the Centers for Disease Control (CDC) and the National Center for Health Statistics (NCHS; 2011) revealed that by 2050 1 in 5 individuals will be age 65 or older. The US National Institute of Aging's (NIA; 2010) report on Alzheimer's dementia (AD) estimated the number of new AD cases among individuals between the ages of 65 and 90 will double every 5 years, increasing the number from 5.5 million to 19 million by 2050.

With the population of 60-95 year olds being the fastest growing in the US, the need for clinical practice to keep pace with the rising health care needs of older adults becomes crucial (Force, 2005). The advent of evidence-based practice (EBP) in health care directs providers to utilize current treatments and interventions based on scientific research and summaries of recommendations in scientific literature (Melnik & Fineout-Overholt, 2011). Yet, despite the significant statistical projection for the aging population there continues to be a lack of scientific research specifically including older adults with dementia as participants (Park, Delaney, Maas, & Reed, 2004; Taylor, DeMers, Vig, & Borson, 2012). Notably less research has been conducted on older adults with dementia in the hospital setting than in the long-term care and community settings (Härlein,

Dassen, Halfens, & Heinze, 2009; Park et al., 2004). The consequences of excluding hospitalized older adults with dementia in scientific research include limited representation of this population in the body of scientific knowledge (Taylor et al., 2012) leading to knowledge gaps in addressing conditions and illnesses specific to cognitively impaired older adults using evidence-based clinical practice.

Dementia is a disease process that occurs predominantly in the brains of older adults and manifests as debilitating neurological and behavioral symptoms caused by chemical and structural changes (Nazarko, 2011). These changes are organic, terminal, and progressive as in AD, which is characterized by plaque buildup, death of neuronal cells, and blood vessel degeneration in the brain (NIA, 2010). Symptoms of neurological dementia in older adults can range from an inability to interpret and perceive the surrounding environment to impaired communication and reasoning (Nazarko, 2011). Along with the normal aging process, neurological changes progress in advanced stages of dementia and profoundly impact physical mobility in variable length of stride, tremors, and rigidity as a result of extrapyramidal symptoms and contractures (Härlein et al., 2009). Some researchers have noted the direct role cognition plays in gait (Allali, van der Meulena, & Assala, 2010). Gait impairment is common in individuals with dementia and severity of impairment increases with the severity of the disease (Thomas, Vandenberg, & Potter, 2002). Thus an older adult with dementia can be observed as having both cognitive and physical mobility challenges resulting from these changes in the brain.

Due to cognitive impairments and physical limitations, obtaining a clear picture of the aging population's health may be challenging. Older adults with dementia less frequently self-report injuries, which suggests the rate of falls among this population may

be higher than estimated (van Doorn et al., 2003). Limitations in cognition can prevent older adults living in the community from seeking medical services to maintain general health, thus contributing to a greater risk for injury and health impairment (Chaabane, 2007), hospitalization when health conditions become critical, and repeated hospitalization in more severe conditions.

Older adults historically utilize more hospital services than younger adults, are likely to have longer hospitalization stays (Warshaw et al., 1982), and are more vulnerable to fall incidents. Falls have also been identified as a cause of morbidity and mortality among the older adult population (Cameron, Murray, Gillespie, Robertson, Hill, Cumming, & Kerse, 2010; Howe, Neil, Skelton, & Ballinger, 2011). Yet, regardless of the setting, all falls cannot be prevented (Bueno-Cavanillas, Padilla-Ruiz, Jiménez-Moleón, Peinado-Alonso, & Gálvez-Vargas, 2000; Nnodim & Alexander, 2005). The seemingly inevitability of a fall requires the constant attention of health care providers and caregivers to reduce adverse outcomes such as fractures, prolonged hospitalization, and mortality. In adhering to hospital safety goals, identification of existing reversible fall risk factors in this population is important. A hospitalized older adult with a previous history of falls can be deemed higher risk for future falls than a hospitalized older adult with no history of fall (Vassallo, Vignaraja, Sharma, Briggs, & Allen, 2004).; thus, once a hospitalized older adult has been identified as at risk for fall, preventative and corrective evidence-based interventions should be implemented to reduce the risk of future falls (Oliver, 2004).

A single fall incident in the hospital setting can result from a variety of factors that occur simultaneously or prior to the actual fall (Cameron et al., 2010; Chang & Ganz,

2007; Kressig, Bridenbaugh, & Gschwind, 2010). Based on a review of literature Kressig et al. (2010) identified decreased muscle strength, previous fall history, and deficits in balance and gait as common risk factors for falls. In a systematic literature review, Oliver et al. (2007) examined hospitalized patients to determine specific fall risk factors and noted instability of gait, weakness of lower limbs, toileting needs such as incontinence and frequency, history of fall, confusion and agitation, and the use of particular medications such as sedative hypnotics. Similarly, Härlein et al. (2009) conducted a systematic literature review and identified eight categories of fall risk factors for older adults with dementia or a cognitive disorder: a) motor impairments related to disease, b) severity of dementia, c) disturbances in behavior, d) impaired vision, e) impaired functioning, f) history of fall, g) neuroleptics, and h) low levels of bone mineral density.

Despite the multiple risk factors identified in the scientific literature, Cameron et al. (2010) noted the complexity of factors that contributed to falls and the difficulty in isolating one factor as the main cause of a fall. Thus, as no single intervention completely addresses falls and the various risk factors present, the approach to implementing fall prevention programs becomes multifaceted. Cameron et al. (2010) recommended that implemented best practices be based on scientific evidence that considers the hospitalized patients' safety and the effective use of health care providers' time and resources.

One method by which falls are categorized is determination of extrinsic or intrinsic precipitating factors (Brown & Edelstein, 2000; Bueno-Cavanillas et al., 2000). Extrinsic factors leading to a fall refer to environmental considerations for the individual such as inappropriate footwear, defective equipment, insufficient lighting, poor room structure, and floor quality (Boltz, Capezuti, Fulmer, & Zwicker, 2012).

Intrinsic factors point to patient characteristics related to physical conditions either acute (e.g., hip fracture, stroke) or chronic (e.g., hypertension, chronic renal disease), the use of certain psychotropic medications including benzodiazepines, and cognitive, behavioral, and psychiatric impairments (Boltz et al., 2012). Categorization of factors serves as a means of assessing fall risk that may be present in the patient or environment. Identifying intrinsic or extrinsic factors provides a method of distinction to understand the context of risk factors by highlighting specific needs and to guide recommendations for appropriate interventions (Boltz, Capezuti, Shabbat, & Hall, 2010).

Bueno-Cavanillas et al. (2000) conducted a prospective cohort study comparing 190 adults aged 65 and older from two geriatric centers to differentiate between extrinsic and intrinsic factors involved in falls. The authors found that intrinsic factors played a larger role, citing a combination of overall poor health and the presence of medication (e.g., antidepressants, neuroleptics, and digitalis) as potential culprits. Other identified intrinsic risk factors included history of previous falls, diagnosis of dementia, diabetes, altered balance and gait, and age. The authors also stated that intrinsic precipitating factors are much more preventable through appropriate health care provider screening and interventions (Bueno-Cavanillas et al., 2000). For example, by identifying a patient with altered balance and gait during initial assessment the health care provider is able to immediately initiate measures that address this condition when a patient needs assistance ambulating. Framing fall risk factors within the context of expected disease-related changes in older adults with dementia allows for a comprehensive clinical picture.

The combination of cognitive and physical changes predisposes the older adult with dementia to be more vulnerable to a fall incident (Chaabane, 2007). Compared to

their cognitively intact counterparts either in the community or hospital setting, older adults with cognitive impairments are two to three times more at risk for falling (Härlein et al., 2009; Oliver, 2004; Oliver et al., 2007; van Doorn et al., 2003). In a prospective cohort study conducted by van Doorn et al. (2003), the rate of falls in individuals with and without dementia were compared by analyzing two years of data from 59 nursing homes and 2,015 participants over the age of 65. The study revealed dementia as an independent risk factor contributing to twice as many fall incidents (van Doorn et al., 2003). Although the study did not cover the hospital setting, the results provided a glimpse into the need to differentiate individuals with dementia from those without cognitive impairments in a specific setting.

Hospitalized older adults with cognitive impairments present a higher risk for falls than those hospitalized without cognitive impairments (Titler, Shever, Kanak, Picone, & Qin, 2011; Tzeng, 2010). Chaabane et al. (2007) identified specific variables in the hospital environment contributing to increased falls for these patients: communication challenges, change in environment, change in routine, disorientation, lack of usual stimuli, lack of privacy, varied noise and activity level, and separation from family and familiar others. For example, an older adult with dementia may not recognize the meaning of hospital symbols or understand what signs such as “*Wet Floor*” communicate. Unfamiliarity with physical surroundings can lead to confusion and those with perceptual impairments may have difficulty maneuvering through the environment. Inconsistent daily schedules and various noises, alarms, or interruptions from individuals unrecognizable to the patient can cause distress, anxiety, and restlessness. A decreased ability to concentrate may ultimately contribute to a potential fall incident in a hospital

setting (Chaabane, 2007). Understanding the different needs of hospitalized older adults with cognitive impairments requires tailoring fall prevention interventions specifically to the patient and settings (Boltz et al., 2010).

### **Functional Condition and Mobility**

*Functional condition, functional status, and functional mobility* have been the terms traditionally used to define an older adult's ability to maintain activities of daily living (ADLs; Liu, Rainey, Zabel, Quiben, Kehayov, & Boswell, 2007; Warshaw, Moore, Friedman, Currie, Kennie, Kane, & Mears, 1982). Roy (2008) identified the ability of an older adult to carry out various ADLs (eating, bathing, transferring from bed to chair, and toileting) as a basic physiological need wherein an individual obtains the necessary physical stress on the body to promote growth and development. Functional activities are required for survival and any impairment in ability to accomplish these tasks becomes a health threat. For the purpose of this project the term *functional condition* will be used to reference the ability to maintain ADLs.

A decline in functional condition can occur as a result of time spent recovering during hospitalization and as such has been the subject of studies examining outcomes of functioning post-hospitalization (Boltz et al., 2010; Boyd et al., 2008). The ability to maintain and preserve functional condition during hospitalization is an important issue to older adults, as there is a direct correlation to independence and the ability to care for oneself after discharge. In a qualitative study conducted by Boltz et al. (2010), 24 adults between the ages of 70-94 were identified and interviewed post-hospitalization. One of the themes that emerged from the focus groups was immobility as prescribed by health care providers wherein participants referred to being kept in bed. Fear was expressed as

older adults relayed concern about leaving the hospital in worse physical condition than when they entered. An impaired physical condition can lead to loss of independence and decreased quality of life as self-care (bathing, toileting, eating, etc.) becomes limited and the patient is dependent on caregivers after discharge..

One necessary element needed to carry out ADLs and maintain functional condition is mobility. For the project, mobility will be analyzed in levels, categorized as low, med, and high, including immobility. The descriptive method of categorizing mobility is based on subjective scales used by health care providers by observing the older adult and assessing mobility. Once assessed, mobility can be achieved through interventions related to physical activities and exercise during hospitalization.

## **Yoga**

Yoga is a feasible intervention for improving mobility of older adults with dementia (Krucoff, Carson, Peterson, Shipp, & Krucoff, 2010). The National Institute of Health's (NIH) National Center for Complementary and Alternative Medicine (NCCAM) (2008) recognized yoga as a practice under the mind-body category of complementary and alternative medicine (CAM). A recent analysis revealed an increase in the number of randomized controlled trials and other scientific research involving the clinical application of yoga as a therapeutic intervention in the last three decades (Chandratreya, 2011; Khalsa, 2004). Despite being an ancient discipline of body, mind, and spirit with origins from Eastern philosophies, Western health practitioners have increasingly relied on yoga as a complementary intervention to conventional medicine. Interestingly, yoga is perceived to yield benefits in illness prevention and treatment despite lack of rigorous evaluation in the scientific literature (Birdee, Legedza, Saper, Bertisch, Eisenberg, &

Phillips, 2008; Khalsa, 2004; Raub, 2002). A recent study found that adults with neurological conditions frequently used mind-body therapies such as yoga when conventional treatments were deemed ineffective (Wells, Phillips, & McCarthy, 2011).

Yoga can be defined as a combination of practices that include various postures (*asanas*), exercises in breathing (*pranayama*), mantras and meditation, as well as spiritual beliefs and rituals (Birdee et al., 2008). Changes in lifestyle are also considered, including aspects of diet, hygiene, and sleep (Birdee et al., 2008). The root of *yoga* is the Sanskrit word *yug*, meaning “union,” which in a spiritual context refers to the union of the human mind with the divine intelligence of the universe (Raub, 2002). The aim of yoga practitioners is to liberate themselves from the conflicting duality of mind and body and the influence of universal energy present in living things also known as *gunas* (Raub, 2002). Yoga utilizes the practice of regulated deep breathing during meditation while focusing on more physical isometric postures than aerobic fitness (Khalsa, 2004).

In a bibliometric analysis of published research studies that included yoga as a therapeutic intervention, Khalsa (2004) found that out of 181 publications identified only 39.8% were RCTs; 48.1% were uncontrolled studies and 12.2% incorporated a control group without using randomized subject assignment. Yoga specialty journals published less rigorous studies while non-yoga journals published most of the RCTs, although they were smaller studies. Standardization becomes difficult due to the multiple variations of yoga practiced because no single practice is likely to ever emerge. In addition, yoga intervention in the literature encompasses a wide range of techniques, modifications, and diverse applications from individual to group sessions (Khalsa, 2004).

Research on the use of mind-body therapies in adults with cognitive or

neurological conditions is considered in the infancy stage with much of the studies published of low quality, small sample size, and lack of adequate control groups (Khalsa, 2004; Wang, 2009; Wells et al., 2011). The standard to determine the best evidence for intervention effectiveness is from large, well-conducted RCTs and meta-analysis of smaller trials (Gillespie, Gillespie, Robertson, Lamb, Cumming, & Rowe, 2009); thus, it has been recommended that researchers conduct larger, more rigorous RCTs to investigate the outcomes of yoga for hospitalized older adults with dementia.

### **Significance of the Problem**

Addressing falls in older adults has become a global issue with many countries seeking evidence-based interventions to prevent fall incidents (Hauer, 2006). WHO (2007) defined a *fall* as the unintentional coming to rest on the floor or ground. Despite current efforts in prevention and risk reduction, unexpected falls still occur (Bueno-Cavanillas et al., 2000; Nnodim & Alexander, 2005). In a separate report, the NCHS (2011) consistently listed the fifth leading cause of death in the US from 2009-2010 as “unintentional accidents” that included falls. Therefore, as part of the Joint Commission National Patient Safety Goals, acute care facilities in the US strive to reduce the incidence of falls through inter-professional fall prevention programs aimed at reducing risk and improving patient safety (Boltz et al., 2012).

Understanding how hospitalization increases risk for falls is a necessary step in designing interventions to address fall prevention (Oliver, 2004). Despite positive outcomes noted to decrease fall risk using exercise programs in the community, limitations to integrate these types of programs in a hospital setting exist due to the short length of patients’ stays and the lack of benefit from long-term exercise programs (Banez

et al., 2008; Oliver et al., 2007). Tzeng (2010) noted the lack of consistent evidence on interventions in the literature of hospital falls, suggesting current fall prevention programs have yet to distinguish the different needs of cognitively impaired patients and cognitively intact patients. This may be in part due to the exclusion of participants with cognitive impairments and dementia from scientific studies (Taylor et al., 2012). Härlein et al. (2008) made a statement to this point after noting the lack of studies that addressed risk factors specifically for older adult patients with dementia.

The National Guideline Clearinghouse (2012) listed guidelines of the standard of care for hospital fall prevention programs that address patient mobility. Fall prevention programs may include physicians, nurses, and physical therapists. Although hospitals may have individualized standards of mobilization, most utilize a combination of the set standards. Mobility-related implementations include interventions that address both intrinsic and extrinsic factors: non-skid footwear, assistive devices (walkers, canes, elevated toilet seats, chair armrests), teaching and educational interventions on fall risk, ambulation and transfer assistance with high-risk fallers, and scheduled toileting. Guidelines are limited to early and regular ambulation and do not address recommended time, dosage, or amount of ambulation. Though fall rates were notably reduced through exercise no specific type of exercise or intervention is suggested in the guidelines.

Developing effective interventions for the growing number of older adults at risk for fall is a priority for health care providers (Hakim, Kotroba, Cours, Teel, & Leininger, 2010). The fact that no single intervention has been proven to reduce incidence of falls emphasizes the necessity for customized interventions to best meet patient outcomes (Rose, 2008). Therefore, understanding risk factors of specific vulnerable populations

becomes key to knowing how to customize interventions for the patient, and applying that understanding presents a challenge for the 21<sup>st</sup> century health care provider.

### **Nursing and Dementia**

Nurses are involved in the health of individuals and the collective society (Roy, 2008). With safety being the major focus of US health care institutions, the professional nurse is highly invested in the issue of falls in older adults with dementia (Härlein et al., 2009). Through an understanding of specific vulnerable populations and health needs, nurses are able to close gaps in the delivery and promotion of health (Roy, 2008). The nurse-patient relationship strategically positions the nurse on the hospital multi-disciplinary team to identify and address needs through evidence-based research and interventions (Boltz et al., 2012; Chaabane, 2007; Hoogerduijn, Schuurmans, Duijnste, de Rooij, & Grypdonck, 2007; Nayback, 2009).

Park et al. (2004) conducted a three-year analysis of secondary data using the Nursing Minimum Data Set (NMDS) of a US community hospital to describe characteristics of hospitalized older patients with dementia and determine trends in the North American Nursing Diagnosis Association (NANDA) diagnoses and Nursing Intervention Classification (NIC) interventions. Results showed impaired physical mobility as one of the more frequent nursing diagnoses given (Park et al., 2004). As one of the first health care providers to assess for level of mobility upon contact with the patient, the nurse must consider medically imposed restrictions as well as the patient's pathological limitations (i.e., paraplegia; Roy, 2008). Nursing standard of practice in fall prevention protocol includes promoting early mobilization of the patient through various measures if deemed medically appropriate and not contraindicated (Boltz et al., 2012).

Nursing knowledge expands by examining patterns of human behaviors within a particular environment during various stages of life (Roy, 2008). Thus, examination of factors related to motility for hospitalized older adults with dementia can contribute to the expansion of nursing knowledge. Challenges and expected outcomes for these patients are different than those for patients with normal cognitive functions and thus require interventions specifically tailored for the hospital environment (Park et al., 2004). Due to the limited research on cognitively impaired hospitalized older adults in scientific research, nurses must be cautious in drawing conclusions about nursing practice (Härlein et al., 2009). Building a knowledge base addressing mobility and falls for hospitalized older adults with dementia can contribute to the improvement of patient care interventions and the development of future health care policies regarding older adults (Park et al., 2004).

### **Statement of the Problem**

Despite supporting evidence in the literature indicating the direct impact of mobility on functional outcomes of older adults, no national standard of care currently exists addressing mobility for inpatient older adults with dementia (Boltz et al., 2010; Brown, Redden, Flood, & Allman, 2009; Zisberg, Shadmi, Sinoff, Gur-Yaish, Srulovici, & Admi, 2011). Decreased mobility during hospitalization that contributes to unintended deconditioning in physical function of older adults during and after hospitalization continues to be an under-recognized issue (Brown et al., 2009; Lazarus, Murphy, Coletta, McQuade, & Culpepper, 1991; Zisberg et al., 2011). The presence of upper and lower extremity muscle weakness is supported in research as a significant intrinsic factor in risk for falls (Moreland, Richardson, Goldsmith, & Clase, 2004). Physiological changes

unique to the older adult compounded with decreased levels of mobility during hospitalization increase vulnerability to falls (Chang & Ganz, 2007; Gillespie et al., 2009; Hauer, Becker, Lindemann, & Beyer, 2006; Vassallo et al., 2004). Understanding the relationship between these two factors provides a clearer approach to identifying evidence-based interventions and preventing adverse outcomes of hospitalization. Notably, interventions should be adapted to the needs and risk factors specific to older adults with dementia (Härlein et al., 2009).

The absence of physical function measures that include mobility from US administrative databases makes it difficult to identify and measure mobility outcomes (Boltz et al., 2010). Part of the challenge includes a lack of standardized tools for measuring and monitoring mobility. Despite the various tools currently available, there are disadvantages to each and there is no perfect technique for measuring mobility (Bussmann & Stam, 1998). For example, current mobility tests such as the Southampton Mobility Assessment (mobility score) and the Two Minute Walking Test (distance walked) are based on observation of the person administering the test and therefore may be subject to recall bias (Zisberg et al., 2011) and inconsistencies in measurement from one observer to the next.

Another challenge is that while research has shown a positive relationship between exercise and the reduction of falls in older adults, it has yet to conclude the type and amount of activity most effective based on the level of risk assessed (Burge, Kuhne, Berchtold, Maupetit, & von Gunten, 2012; Rose, 2008). Despite the lack of strong evidence in the literature to show how exercise can improve muscle strength in hospitalized older adults with dementia, the interpretation of these results should not be

that there is a lack of benefit from physical activity; rather, a more appropriate statement is that a lack of physical activity should be avoided for this population (Härlein et al., 2009).

### **Purpose Statement**

The purpose of this integrative literature review is to assess current scientific evidence on the implementation of chair yoga as an intervention to improve mobility of hospitalized older adults with dementia who are at risk for falls. This integrative literature review will identify recommendations for evidence-based interventions that address mobility of hospitalized older adults with dementia and add to the growing literature on the development of effective hospital fall prevention programs. This study contributes to the growing recommendation to include hospitalized older adults with dementia in more high-quality scientific research to develop the necessary guidelines for evidence-based interventions tailored to this population.

## CHAPTER 2

### **Literature Review**

Despite the emphasis in the literature about the importance of increased activity for ADLs, current practice has yet to fully bridge the gap between practice and research on the issue of mobility of the older adult population, specifically those with cognitive impairments. The consequence of deconditioning in hospitalized older adults due to low mobility has been a subject of discussion over the past 70 years (Lazarus et al., 1991). Researchers attempted to address this issue by looking at various activities and interventions that could improve mobility and prevent falls. Several systematic reviews and meta-analyses summarizing the findings of these RCTs have shown promising results and identified real challenges. This literature review aims to focus on articles related to mobility as well as research outcomes of RCTs to integrate current literature regarding chair yoga and older adults with dementia.

Previous research examined the effects of physical activity interventions in older adults with dementia to improve mobility. Pomeroy, Warren, Honeycomb, Briggs, Wilkinson, Pickering, and Steiner (1999) conducted a multicenter RCT to find out whether physiotherapy treatment was more effective than non-physical activity intervention during hospital respite admission to improve patient mobility. In the study 81 participants from 12 different sites that met criteria received 10 half-hour physiotherapy sessions conducted by a research physiotherapist. At the end of the study no statistical significance was found between the control group and the group that received the physiotherapy intervention.

Pomeroy et al.'s (1999) study utilized the Southampton Mobility Assessment and

Two Minute Walking Test as measurements for pre- and post-admission of randomized patients for either physiotherapy or activities. Specifically designed for older adults with dementia, the Southampton Mobility Assessment records an individual's ability to move from immobility to walking four steps (Pomeroy et al., 1999). During the Two Minute Walking Test participants are required to walk at a normal pace along a measured corridor for two minutes, which provides the observer a simple but sensitive measurement of everyday function and is applicable for the older adult population (Pomeroy et al., 1999).

Although the results of this study did not reveal statistical significance in the measured outcomes from the Southampton Mobility Assessment or the Two Minute Walking Test, the researchers raised questions about the challenges and limitations of conducting research in a setting such as a respite hospital. One limitation was the fact that national changes in the delivery of care in respite centers were occurring during the time of the study and were beyond the control of the researchers (Pomeroy et al., 1999). Other barriers faced during the study were variables of different respite care centers, low mobility contact time between nurse and patient, and a short treatment period of two weeks. Moving forward, Pomeroy et al. (1999) recommended the focus in measuring mobility be based on identified individual patient risks rather than a particular setting.

Forbes, Forbes, Morgan, Markle-Reid, Wood, and Culum (2008) conducted a meta-analysis of RCTs to determine the extent to which physical activity programs improve or maintain function compared with usual care, which includes ADLs and other outcomes in older adults with dementia. Of the 187 abstracts screened, only four met the criteria for quality of methodology (Forbes et al., 2008). Due to methodological

shortcomings,, the researchers determined a lack of significant evidence of the effectiveness of physical activity programs on the function of older adults with dementia.

Limitations of the studies reviewed in the meta-analysis included small trial sample sizes, varied frequency, duration, period of time, type of physical activity, lack of homogeneity in diagnosis and severity of dementia, and varied levels of mobility of the participants. In addition, poor participant adherence to the activity programs was mentioned for several of the studies. Only one trial looked at the potential adverse effects of physical activity programs such as falls, fractures, and death. None of the trials reported on the difference between usual care participants and those receiving physical activity interventions along with usual care. Based on these findings, recommendations were that a) further research be conducted to determine which exercises were beneficial, and how long and often participants should engage in exercise, and that b) barriers be addressed to find better design methods to facilitate the studies, improve the adherence of participants, and control for the differences in severity of dementia (Forbes et al., 2008).

In a meta-synthesis of 62 RCTs on fall prevention interventions that included 21,668 older adults, Gillespie et al. (2009) noted the limited evidence comparing individually tailored interventions that target specific risk factors with individuals receiving standard of care. In their review of the RCTs, all of which were designed to decrease the effect, exposure, and risk factors for falls in older adults, the authors noted that focused interventions were effective when they specifically addressed and corrected identified risk factors. The authors concluded that fall prevention programs focus on risks that involve intrinsic and extrinsic (environmental) factors affecting the individual patient. Additionally, promising interventions included individualized muscle

strengthening and training in balance as well as a 15-week Tai Chi group exercise program (Gillespie et al., 2009).

Härlein et al. (2009) conducted a systematic review of cohort or case-controlled studies that analyzed fall risk factors in older people with dementia or cognitive impairment. A majority of the studies identified motor impairments in gait, balance, and muscle strength as a high risk factor for fall (Härlein et al., 2009). Other emerging categories were vision impairment, the degree of dementia, behavioral disturbances, impairments in function, history of fall, the use of neuroleptics, and low level of bone mineral density (Härlein et al., 2009).

Burge et al. (2012) conducted a critical review of RCTs that examined the outcome of physical activity interventions on ADLs for individuals with moderate to severe dementia. The researchers identified 303 articles during the search, but only five met selection criteria; of those, four were excluded due to low methodological quality. The remaining high quality study showed a small but statistical significance in the delay of ADLs deterioration as a result of physical activity intervention. Burge et al. (2012) noted lack of standardization of program and assessment tools. The authors recommended that future research seek to determine the ideal physical activity intervention as well as the duration and frequency of activity that would best address individuals with moderate to severe dementia. Standardization in type, duration, and frequency may provide guidance as to protocols most suitable to the patient population (Burge et al., 2012).

Yoga has been explored as an alternative type of physical activity intervention to improve physical conditions (Hagins, Moore, & Rundle, 2007). In an observational study,

the researchers examined the metabolic and heart rate responses of participants aged 18-65 years during a series of hatha yoga intervention. They intended to determine whether various postures of hatha yoga practice met the current recommendations for physical activity levels needed to improve and maintain cardiovascular fitness and health, establish the metabolic cost of yoga, and compare hatha yoga to walking on a treadmill (Hagins et al., 2007).

Based on the recommendations of the American College of Sports Medicine (ACSM) and the American Heart Association (AHA), healthy adults between the ages of 18 and 65 years require a minimum of 30 minutes of moderate to intense aerobic activity five days each week or a minimum of 20 minutes of vigorous to intense activity three days each week (Hagins et al., 2007). In the hatha yoga routine participants sat for 30 minutes and then were shown a 56-minute video of beginner-level hatha yoga; the routine ended with 10 minutes of walking on a treadmill. The study measured a) mean oxygen consumption (VO<sub>2</sub>), b) heart rate (HR), c) percentage predicted maximal heart rate (%MHR), d) metabolic equivalents (METs), and e) energy expenditure (kcal). The metabolic cost results revealed VO<sub>2</sub> of 0.6 L/kg/min, HR of 93.2 beats/min, %MHR of 49.4%, METs 2.5, and energy/min was 3.2 kcal/min (Hagins et al., 2007).

Hagins et al. (2007) concluded the average metabolic costs of the hatha yoga intervention was equivalent to walking on a treadmill at the speed of 3.2 kph and did not meet ACSM and AHA recommendations needed to improve and maintain cardiovascular fitness and health. Within a larger context, however, the researchers suggested that hatha yoga has the potential to provide beneficial health gains by the mere outcome of increased physical activity. This is in line with the ACSM acknowledgement that lower

levels of physical activity can be beneficial to those who may be categorized as physically unfit despite the insufficiency in cardio-respiratory gains. The study results relate the benefits of low activity for unfit individuals, which may be appropriate for older adults with dementia (Hagins et al., 2007).

More recently, Galantino et al. (2012) conducted a single arm pilot study consisting of 16 older adults between the ages of 68 to 97 years living in an assisted living facility and engaged in a structured chair yoga program twice a week for a total of eight weeks. The two tools chosen to measure mobility were Timed Up and Go (TUG) and the Short Physical Performance Battery (SPPB; Galantino et al., 2012). Both tools are objective in nature because the observer provides a score based on the patient's performance of specific activities (Galantino et al., 2012). The TUG observes patients as they move from a sitting position to standing, then walking a short distance. The higher the TUG score, the greater decrease in mobility of the individual. The SPPB is a total of composite scores that measures lower extremity functioning of older adults. The lower the SPPB score (0-4), the greater the individual's risk is for re-hospitalization; conversely, a higher score (8-12) can indicate better quality of life.

Results from the pilot study showed improved SPPB (0.31 to 0.93,  $P = .021$ ) and decrease in TUG (22.57 to 18.97,  $P = 0.052$ ), indicating improved mobility of the participants (Galantino et al., 2012). Study limitations acknowledged were the small sample size as well as lack of a control group. The researchers concluded that chair yoga was a safe and feasible intervention to improve mobility for older adults, but for future studies they recommended the inclusion of a control group, a larger sample size, and the development of measures applicable to the community-living older adult.

Despite over 70 years of various research conducted on this topic, no clear consensus has been reached regarding a single intervention to measure and improve mobility (Lazarus et al., 1991). Historical and current literature clearly relates the connection between various aspects of mobility and older adults with dementia who are at risk for falls. One systematic review noted the lack of rigorous methodological studies that addressed older adults with dementia and physical activity interventions related to mobility (Forbes et al., 2008; Gillespie et al., 2009). Intrinsic risk factors for falls have been identified for older adults with dementia, yet various activities have demonstrated a positive connection between benefits of physical activity and improved mobility (Burge et al., 2012; Härlein et al., 2009). Perhaps the direction for the future is to identify multiple safe and feasible activities that health care providers can utilize to customize an individual approach to patient needs.

### **Theoretical Framework**

The Roy Adaptation Model (RAM) is the theoretical framework for the implementation of chair yoga as an intervention versus standard of care to improve mobility for hospitalized older adults with dementia. One of the underlying assumptions of the RAM is that individuals are holistic adaptive systems with coping abilities to promote health and integrity (Parker & Smith, 2010; Roy, 2008). Responses to internal changes or situations are classified by levels of adaptation as either integrated, compensatory, or compromised (Roy, 2008). Simplified, the RAM is a systems model illustrating human adaptation as a series of interactions through inputs (stimuli), outputs (behaviors), and control and feedback processes (Roy, 2008). The model further discusses how human systems are complex and nonlinear, meaning adaptation does not

occur from a single stimulus and response but rather from a complex series of interactions (Roy, 2008). This literature review will focus on the individual application of the RAM despite its broad use to groups of people as well.

In a hospital setting the older adult with dementia is faced with several adaptive challenges. First is the presenting medical problem that initiates hospitalization, which may stem from a wide range of causes requiring specific adaptation. Second, hospitalization in itself can present an opportunity for the older adult to adapt to in a different environment with physical limitations and restrictions. For example, traditional hospitals are viewed as places to heal and recover; therefore, patients are traditionally expected to be on bed rest. For the purpose of this study low levels of mobility can be viewed as the internal focal stimuli, the dementia and aging process as the contextual input, and the hospital environment, medication, and disease process as the residual input. Nurses recognize the rapidly changing situations of older adults with dementia during hospitalization that require continual assessment and reassessment, and they utilize the nursing process as the basis for determining the risk for immobility or low mobility (Roy, 2008). The RAM assumes that individuals are responsible for decision-making and are able to interact independently with others and the environment (Roy, 2008). The RAM also incorporates philosophical assumptions from nursing that state every individual is valuable and deserves respect and dignity, thus validating the further pursuit of identifying interventions to meet the health needs of vulnerable populations such as older adults with dementia (Roy, 2008). Pursuing such benefits for older adults with dementia can lead to the promotion of independence and quality of life, which are desired values expressed by older adults (Boltz et al., 2010).

According to the RAM, *health* is defined as the process of being and becoming integrated and whole, reflecting environmental and individual condition (Parker & Smith, 2010). An individual can be viewed as having integrity when all physiologic needs are met (Roy, 2008). One of the four RAM adaptive categories is the physiologic-physical adaptive mode, which consists of various physical and chemical processes needed for an individual to function (Roy, 2008). A compromise in adaptation occurs when physiological systems are unable to compensate for internal and external changes and require the initiation of an adaptation process (Parker & Smith, 2010). An individual with dementia who has a compromised medical condition can be considered poorly integrated due to both physiological and mental deficits. Adaptation may involve changing stimuli or strengthening coping abilities (Parker & Smith, 2010). The level of adaptation, according to the RAM, is based on the ability of the individual to respond positively to the current circumstance; therefore observing positive responses in adaptation becomes an important nursing goal to contribute to the restorative process through various interventions to achieve integration (Roy, 2008).

Roy (2008) identified five components of individual physiologic integrity: a) oxygenation, b) nutrition, c) elimination, d) activity and rest, and, e) protection. Activity is viewed in the RAM as the necessary means by which an individuals are able to move their physical bodies to accomplish daily tasks of daily living and protect themselves from injury and harm (Roy, 2008). This project will concentrate on the concepts of activity and rest under which mobility and sleep are listed as the two basic processes needed to maintain physiologic integrity balance (Roy, 2008).

*Mobility* is defined by the RAM as the process in which an individual moves or is

moved. Physical movement is a complex process involving the musculoskeletal system whereby various muscles acting through tension at the connecting point to bones are modulated by neurologic inputs from the central nervous system that guides activity and movement of the body (Roy, 2008). The compromised state of mobility, as a result of imposed medical restrictions, is termed by the RAM as *disuse syndrome* (Roy, 2008). Hospitalized older adults are more prone to disuse syndrome because of muscle atrophy, the result of medically imposed bed rest or lack of standard of care (Roy, 2008). *Deconditioning*, a term similar to disuse syndrome, is used in this project to describe the result of low levels of mobility or immobility.

## CHAPTER 3

### Methods

This project is an integrative review of literature conducted by a Point Loma Nazarene University (PLNU) graduate nursing student with five years' experience as a registered nurse in an outpatient mental health clinic. To ensure relevance, original studies from 2007-2012 were considered as part of the inclusion criteria. A five-year adjustment was considered where a lack of articles was noted.

An extensive search of electronic academic databases included but was not limited to EBSCOhost, CINAHL Plus with Free Text, PubMed, Alt HealthWatch, Cochrane Database of Systematic Reviews, and PsycINFO. Ancestral archiving was performed and repeated to identify potential studies not included in the electronic databases until saturation of data was achieved. Experts in the fields of dementia and yoga were consulted to verify any missing pertinent articles. Keywords and search combinations used were *dementia, geriatric, psychiatry, older adults, seniors, mobility, falls, yoga, chair yoga, inpatient, hospital, literature review, mind-body, and alternative*.

Inclusion criteria included systematic RCTs from peer-reviewed English-language journals that observed hospitalized patients aged 65 and older diagnosed with dementia with possible underlying co-morbid disease. Also included were original studies that utilized various forms of chair yoga as a therapeutic intervention and reported data or statistics that measured mobility as an outcome.

Exclusion criteria were studies set in the community, residential facilities, and independent living or clubhouse settings with older adults in relative good health and

cognition. Studies utilizing variations of yoga other than chair yoga were excluded. Also excluded were periodicals and non-peer-reviewed journals.

All study abstracts that met inclusion criteria were reviewed for relevance; irrelevant articles were noted and discarded. Studies with questionable relevance were reviewed by a faculty advisor and a second reader. Final results of the literature review will be presented to a PLNU thesis review panel.

IRB approval is unnecessary for this literature review, as it involves no human participants. All data will be collected ethically and systematically, and all references cited according to American Psychological Association (APA) guidelines.

## CHAPTER 4

### Results

The following databases were accessed September 25-27, 2012: PubMed, EBSCOhost, CINAHL Plus, Alt HealthWatch, PsychInfo, and Cochrane Database of Systemic Review. The search terms used were *dementia, geriatric, psychiatry, older adults, seniors, mobility, falls, yoga, chair yoga, inpatient, hospital, literature review, mind-body, and alternative.*

No articles returned through the database search met the inclusion criteria. An archival search of the literature returned a study examining the feasibility and safety of chair yoga specifically as an intervention for older adults. Galantino et al. (2012) conducted a single arm pilot study of 16 older adults with a median age of 88 years who underwent 8 weeks of chair yoga intervention. Despite the focus on older adults, participants were excluded if they had a diagnosis of AD (Galantino et al., 2012).

There is limited evidence on the topic of chair yoga and few studies that include older adults with dementia despite statistical predictions about the increasing population of aging adults (Park et al., 2004; Taylor et al., 2012).

## CHAPTER 5

### **Discussion**

No RCTs were identified that examined chair yoga as an intervention to improve mobility for hospitalized older adults with dementia. One single arm pilot study (Galantino et al., 2012) reported promising results of a structured chair yoga program as a safe and feasible intervention for older adults but specifically excluded potential participants with dementia.

This study reflects the larger issue of the exclusion of older adults with dementia in scientific research. In a literature review of 434 articles covering 2008-2009, Taylor et al. (2012) noted that one-third excluded older adults with dementia or some form of cognitive disorder without presenting solid explanation for the exclusion. This continued practice of exclusion can present challenges in obtaining true results of the aging population of which older adults with dementia are a part.

The results of this project also reflect what is already stated in the literature about limited rigorous studies that examine yoga, specifically chair yoga, as an intervention for hospitalized older adults with dementia. This can be interpreted as a lack of focus on the specific subject of chair yoga with little being known of potential outcomes, risks and benefits. Complementary and Alternative Medicine (CAM), which includes yoga, is a growing field frequently utilized by older adults. In order to justify the implementation of CAM-based interventions, future studies should include a randomization process and larger sample sizes that include older adults with dementia. Future research should also focus on populations that would most benefit from yoga intervention and the types of yoga best suited for specific conditions (Birdee et al., 2008).

**Limitation**

The search was limited to English-language articles from electronic databases.

**Implications for Nursing**

As nurses care for the increasing population of adults 65 years and older, a greater body of knowledge will be needed to provide evidence-based interventions that are safe, effective, and cost effective. Health care professionals are faced with addressing the needs of the aging, and dementia places this population at risk for complications of poor health conditions. Hospitalization usually results from the lack of preventative and tertiary treatment of medical conditions; thus, older adults with dementia can face frequent and longer hospitalization.

Nurses can have a direct impact on outcomes of mobility during hospitalization. Mobility, which can decrease when physicians impose bed rest on patients, can lead to deconditioning, which can be a precursor to falls and result in morbidity and mortality. Finally, nursing research must continue to explore evidence-based interventions for the dementia population to help close the gap in the literature regarding the topic of chair yoga and mobility.

**Conclusion**

To date no RCTs address the implementation of chair yoga as an intervention to improve mobility of inpatients with dementia that are at risk for falls. Chair yoga can potentially be a safe and feasible intervention for hospitalized older adults with dementia, yet this is based on evidence found in a small one arm pilot study (Galantino et al., 2012). There is a lack of evidence to provide solid recommendations addressing low mobility of hospitalized older adults with dementia as most studies have excluded this population.

Further research that includes older adults with dementia is needed to contribute to the growing literature on the development of customized, effective, evidence-based interventions for this population.

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