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Effectiveness of Cognitive Rehabilitation as Memory Intervention for Elderly Adults with Dementia

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Abstract

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Luzviminda Salamat Morrow

MS, Walden University, 2009

BS, University of Santo Tomas, 1981

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Although cognitive rehabilitation is not a new field of intervention, as it dates back to the treatment of brain-injured soldiers during World War I, the use of cognitive rehabilitation intervention therapies for individuals with dementia and mild cognitive impairment has yet to draw definite conclusions about its effectiveness. Based on the conceptual framework of biopsychosocial theoretical model, this study explored to what extend cognitive rehabilitation intervention was effective in improving the memory and mood functioning of elderly adults with mild cognitive impairments. An archived data set of 216 elderly adults collected at a midwestern agency in the United States during the period of May 2012 through December 2013 was used. Wilcoxon matched pair tests were used to assess elders' changes in memory and mood functioning. Results indicated that there were no significant changes in memory skills or mood functioning found after the elderly individuals participated in the cognitive rehabilitation program within the 18-month period of continuous intervention training. Several limitations could explain these results including a small sample size of 88 participants that finished the 18-month program; the quality of the assessment process; and the lack of further information on the archived data such as demographics, patients' medication regimen, or type of family support. Health care professionals, families, and caretakers may use these results to understand the importance of closely monitoring the training and checking for positive results and adjusting the intervention as needed. Results of the study also highlighted the importance of focusing on promoting a take-charge collaborative approach to awareness and life satisfaction which is a salient implication for positive social change.

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Chapter 1: Introduction to the Study

Introduction

Several researchers of memory and aging have gathered different cognitive intervention strategies to age-related memory decline of people with dementia and mild cognitive impairment over the past decade. However, the effects of such interventions were still open to questions and doubts. My objective with this study was to focus on one form of memory intervention, that is, cognitive rehabilitation. This study was based on archived data of one of the psychological agencies in the Midwestern United States that conducted this particular cognitive intervention to individuals diagnosed with dementia and mild cognitive impairment with a purpose of determining the effectiveness of such intervention in relation to their memory and mood functions. From the archived data set, I extracted the cognitive and mood profiles from the results of the two test measurements used in the study, the Montreal Cognitive Assessment (MOCA) and the Patient Health Questionnaires-9 (PHQ-9). The results determined whether people with dementia and mild cognitive impairment improve their memory and mood functions after a program of cognitive rehabilitation (CR) training. The results of this study might have the potential to inform the development of CR programs to assist this vulnerable population.

This chapter will began with the research background and a general review of the scientific problem related to Alzheimer's disease. A statement of the problem will follow, indicating the length of time of application, relevance, and the significance of the study. I will provide the purpose and aim of this study, including the research questions, and then introduce the theoretical foundation relating to the study and its conceptual framework. In

Chapter 1, I will also confirm the quantitative design used; the key terms applied; as well as the study's assumptions, delimitations, and limitations. To conclude this chapter, I will discuss the study's potential benefit for positive social change and implications for psychoeducation and social policy.

Background of the Study

In the United States alone, an estimated 5.2 million people have been diagnosed with Alzheimer's disease (AD), and this number is expected to increase another 40% by 2025 (AD Association, 2014). AD is manifested by a marked decline of both visuo-spatial and audio-verbal memory as well as difficulty in reasoning and deduction (Casinello, Mestre, & Ballesteros, 2009). Within this spectrum, memory difficulties were the main symptoms experienced by people diagnosed with early stage AD (Kurz, Pohl, Ramsenthaler, & Sorg, 2009) or dementia (Clare & Wood, 2004). For a person in the early stage of dementia, cognitive deficits can impact more than one cognitive domain and the effects can be severe enough to affect daily functioning (Hughes, 2010; Kurz et al, 2009). Researchers have indicated that these compromised memory skills may caused major impact on self-esteem, social interaction, and overall quality of life (Clare & Wood, 2004). In the literature I reviewed for this study, I examined the deleterious impact on the quality of life for seniors experiencing early stage dementia or AD and the potential benefit of applying CR techniques to this vulnerable population. Given the increasing numbers of the aging population, it was necessary to take into account the range of various cognitive strategies that can enhance the memory functioning of this aging and increasingly vulnerable population. Bowes, McCabe, Wilson, and Craig (2012)

surmised that cognitive strategies, called *brain training tools*, might have the effect of keeping the brain active in later life. However, their study found that the effect of such interventions remained inconclusive, particularly for elderly individuals diagnosed with dementia. In addition, in this study I also focused on a form of memory intervention called *CR training*. This form of intervention was referred to as "one of [the] non-pharmacological interventions" for people with dementia (Mimura & Komatsu, 2007, p. 138).

The purpose of CR training was not only to maximize the memory functioning of elderly adults with early stage dementia, but also to improve their emotional well-being and social adaptation skills. Woods and Clare (2008) identified CR as an approach that was intended to help optimize and prolong the remaining memory abilities in people with early stage dementia. They discussed the use of various brain training tools, which are exercises built upon the theory that the brain can develop new connections with proper stimulation. Kurz et al. (2009) explored the benefits of CR in 18 patients with mild cognitive impairments (MCI) and 10 patients with mild dementia in a 4-week program. The findings of their study showed significant improvements on their daily activities, mood, verbal, and nonverbal episodic memory. However, their study was small and the components of intervention were not established upon a solid theoretical background. In addition, the study lacked follow-up assessments to determine if any improvements could be made or if the use of this technique could prevent or slow down cognitive decline between the two test groups (Kurz et al., 2009). Had there been post assessments done, their study could have shown more positive findings. In spite of these limitations, Kurz et

al.'s study indicated that CR intervention could be an effective approach to enhancing the functional and cognitive ability of people with early stage dementia.

CR also has drawn on the concept of neuroplasticity i.e., the ability of the brain to change according to stimulation in an enhanced environment (Dince, 2006). CR relied on the concept that these neuroplastic processes can maintain or improve memory functioning of individuals with MCI (Dinse, 2006; Mahncke et al., 2006). Looking to gain more insight into the structural changes occurring within the brain and the cognitive deficits associated with dementia, Finn and McDonald (2011) conducted a study and found improved cognitive performance when given repeated practice on computerized brain exercises. In determining the positive effects of CR training alone, their study still needed to delve more into critical issues such as the sequencing of training (i.e., participants adhere to a preset treatment schedule). However, most participants usually took longer than anticipated to complete training and practicing everyday memory tasks rather than enhanced virtual exercises (Finn & McDonald, 2011).

After taking into account the limitations and successes of previous studies, it was critical for me to identify relevant goals for these patients and to develop pragmatic strategies that result in the improvement of patients' physical, psychological, and social functioning in an everyday context (see Mimura & Komatsu, 2007). This process suggested that a one-on-one form of intervention might provide a positive impact on the well being of a person with dementia (Wilson, 1997). Hence, in this project, I addressed the limitations of the previous literatures.

Statement of the Problem

CR has been explored by previous researchers in neuropsychology; however, despite numerous studies, evidence has remained inconclusive as to whether this form of rehabilitation can be effectively applied as a treatment for elderly people with MCIs (Huckans et al., 2013; Vidovich & Almeida, 2011). Over the last decade, most researchers have drawn from various cognitively-based techniques (Hautamaki & Laatsch, 2010) and strategies that seem to be clinically significant (Kinsella et al, 2009; Rapp et al., 2002; Troyer et al., 2008). Previous researchers' overall findings indicated the potential for memory and mood improvement as well as that of cognitive plasticity. However, Huckans et al (2013) argued that long-term treatment outcomes (e.g., longer than 3–6 months postintervention) should be evaluated so as to determine whether the memory functioning of these individuals with MCI had improved or declined given the appropriate intervention techniques and a guided theoretical model.

My review of literature on CR intervention for individuals diagnosed with early stage dementia or MCIs did not reveal a way of measuring the improvement of memory functioning on a longer term treatment using a theoretical model. As such, in this study, I asked: How effective was CR intervention to the memory and mood functioning of individuals diagnosed with early stage dementia or MCI during the 18-month period of intervention? With this study, I addressed that gap by exploring the archival data in the 18-month period of a CR intervention study by measuring its strength related to the memory and mood functioning.

Purpose

The purpose of this research project was to evaluate the effectiveness of CR

intervention for persons diagnosed with early stage dementia or MCI. CR intervention involves an individualized, goal-oriented approach that uses memory exercises and aids such as calendars, brain games, and other brain tools (Clare, 2004). Another goal of CR is to enhance emotional wellness via the personal successes achieved during intervention (Mimura & Komatsu, 2007). Hence, my aim with this study was to find out whether CR intervention can make the most of the remaining memory abilities of these individuals diagnosed with early stage dementia or MCI. By using a biopsychosocial theory, I designed this study to both evaluate cognitive impairments and conceptualize the process of AD and dementia while determining how to maximize the potency of CR in improving memory and mood functioning.

My intent with this research was to assess whether the memory and mood functioning of elderly individuals with dementia can improve through CR intervention through the use a quantitative approach. The results of the assessments helped validate current findings. Further, it also allowed a more nuanced understanding of the gap between an ideal outcome and the existing shortfalls of CR intervention.

Research Questions and Hypotheses

I developed the following two research questions (RQs) to guide this study.

RQ1: Do memory skills among people with dementia improve after participating in a CR program?

$H_0$1: The memory skills as measured by MOCA of people with dementia will not have significant increase after participating in the CR program.

$H_1$1: The memory skills as measured by MOCA of people with dementia will have significant positive increase after participating in the cognitive rehabilitation program.

RQ2: Does the mood among people with dementia improve after participating in a CR program?

$H_0$2: The mood functioning as measured by PHQ-9 of people with dementia will not have significant improvement after participating in the CR program.

$H_1$2: The mood functioning as measured by PHQ-9 of people with dementia will have significant improvement after participating in the CR program.

Theoretical Framework

The biopsychosocial model was an approach initially established by George Engel stemming from a medical model that was built around systems theory that used complex systems to explore behavior patterns and other nuances of the human experience (Tyreman, 2014). This integrative model suggested that every aspect of life including biological, physical personal, interpersonal, familial, and societal affects every level of a person's life (Frankel, Quill, & McDaniel, 2003). In other words, when applied to the field of health care, this model can be used to examine how the interpersonal interactions between the patient, the patient's family, and the physician are associated not only with the biological health but also the functional status and well-being of the patient.

In adopting the biopsychosocial model to individuals with early stage dementia and MCI in this study, this theoretical framework served as my lens through which to understand the role of memory intervention as influenced by the biological and psychosocial workings of this vulnerable population (see Datillo, 2007; Woods & Clare, 2008). This theory can also be applied to the function of memory training in people with dementia by emphasizing the anatomical and structural description of a disease that affected biological functioning while also addressing the psychological, social, and behavioral changes affecting these individuals' well-being and quality of life (Datillo, 2007; Engel & Romano, 1980). In this study, I applied the approach to the context of CR as it relates to the nature of impairment and the need to address the cognitive difficulties and emotional state of these individuals in a holistic way and to take into consideration their life experiences bringing in its social relationship (see Prigatano, 1999).

Nature of the Study

In an effort to bridge the rationale from the past literature reviews and this research study, I used a quantitative method that focused on a pre- and posttest, quasi-experimental design. Since the study was aimed to evaluate the efficacy of CR interventions, a quasi-experimental design was ideal to use in order to demonstrate the association between intervention and outcome. A quasi-experimental design is a good approach for studies in which outcomes are examined over time in the process of intervention (Cook & Campbell, 1979).

Definition of Terms

Cognitive rehabilitation (CR): A type of nonpharmacological intervention that uses strategies or techniques that can help in ameliorating cognitive deficits of people with brain injury and with early stage dementia. Its approach is person centered, as it requires an understanding of the person's current level of functioning and awareness reflecting the significance of cognitive changes and well-being (Woods & Clare, 2008).

Dementia of the Alzheimer's type: A gradual cognitive disorder that involves continuing memory decline and impairment in social and occupational functioning (American Psychiatric Association, 2013).

Memory: The ability of the mind to retain or restore past sensations, thoughts, and knowledge and be able to use this information in the present (Kirshner, 2000).

Mild cognitive impairment (MCI): One of the earliest stages of dementia. It is referred to as a transitional state between normal aging and the dementia of Alzheimer's type wherein an individual's cognitive functions decline, daily living activities become limited, and apparent mood changes (Hughes, 2010).

Mood: The pervasive and persistent emotional feeling of an individual's experience (Zuckerman, 2010).

Neuroplasticity: The ability of the brain to regenerate the connective neurons when damaged due to aging or atrophy and reestablish new connections through cognitive training (Vance et al., 2010).

Assumptions

I held the following assumptions in this study. First, I assumed that the instruments chosen to conduct cognitive and mood assessments were reliable measures of the constructs. Second, I assumed that the clinicians administered the cognitive and mood assessments according to standardized procedures and had input accurate and appropriate score responses. Third, I assumed that the participants responded honestly and were willing to engage in the program intervention.

Scope, Limitations, and Delimitations

The scope of this study was to explore to what extent the fundamental tenets of CR intervention were successfully integrated into the lives of elderly individuals with dementia. Consequently, this study consisted of secondary data analysis extracted from a psychological agency in Midwestern United Stated that conducted this particular cognitive intervention to individuals diagnosed with dementia and MCI with a purpose of determining the effectiveness of such intervention in relation to their memory and mood functions. I collected data between May, 2012 and December, 2013. In reviewing the data collected from those patients who completed a CR treatment program over the course of 18 months, I examined the responses and individual scores of each cognitive domain (e.g., executive function, attention, self-esteem, and memory functions among others) so as to relate how these scores influenced their overall memory functioning. As only totals scores were provided, this study was delimited to a data set that contained only the overall responses and scores of these cognitive and mood assessments.

Furthermore, considering the vulnerability of the type of population being studied, several additional limitations must be acknowledged. First, the age of participants was not included in the data collection provided by the agency to me. Second, due to health conditions and other inevitable circumstances surrounding their day-to-day activity, some participants were not able to consistently take the assessments in a timely manner (e.g., one participant missed taking the assessment because of being admitted in the hospital, so the assessment was rescheduled to the following month). Therefore, findings may have been subjected to various interpretations based on factors affecting participants' responses.

Further limitations arose from the nature and demographics of the population itself, which were not supplied to me. As stated previously, the data I gathered were limited geographically to patients in only one region of the country. These factors made generalizability a pertinent hurdle to address. Due to the geographic limitations of the study, the findings from the sample population were not reflective of the full range of issues affecting those who suffered from AD or early onset dementia. Further, the lack of demographic, gender, and age data limited the ability of these findings to be applied to the study of AD and dementia in ethnic and racial minority communities or gender-specific studies. Lastly, the lifestyles impacted on the completion of the therapy may have been significantly different had the sample been taken in a larger or more diverse urban center.

Significance

Given the results of previous empirical studies, in this project I addressed existing gaps to better ascertain the scope of the CR intervention, the function of memory aids and activities being used, and their effectiveness in improving memory functioning and mood. The findings of this study have the potential to be the model of intervention development as the focus may have established new treatment pathways that can serve as a guide for developing the learning and relearning of skills for people with dementia. Along these lines, the results of this study have direct implications that impact the tools and techniques used not only by family and caregivers, but also by educators and the patients themselves. The techniques used and developed in this study have the potential to give family and caregivers a means of actively managing the consequential burdens of early stage dementia or MCI that significantly impact their loved ones.

In regard to medical professionals and patients, the results of this study may provide a guide to developing more individualized *brain fitness programs* that were designed to promote education on dementia and brain health. By this same token, the findings from this study also have the potential to initiate positive social change through promoting a take-charge approach to health, social adjustment, and quality of life to our aging population. Overall, a result of evaluating and defining successful aspects of the CR approach and its potential effectiveness was the development of more pragmatic and stimulating strategies that enhanced the everyday functions of the elders with early stage of dementia. This individualized approach to care allowed the patients' families and caregivers to gain essential insight when it comes to managing the myriad effects of the disease affecting their loved ones.

Summary and Transition

In this study, I examined the effectiveness of CR intervention, as previous studies indicated that such an approach may play a significant part in the memory and mood functioning of people with dementia. The purpose of this research project was to explore if CR intervention was effective in improving elderly patients' memory and mood functioning skills. As such, the results of this research project provided a more grounded understanding of the benefits associated with this kind of intervention, while also bridging the existing gap in the field by investigating why some cognitive strategies succeeded and others failed.

In Chapter 1, I introduced the study by explaining the background of the study, defining the research questions and hypotheses, and providing the research method and design. I also presented the purposes and significance of the study in this chapter to provide information on how the rehabilitation intervention developed at the site has the potential for effective future application. Further, I explored how this approach may possibly help not only the patients, but also their family members and caregivers in managing mood behaviors and memory decline.

In Chapter 2, I will review the past relevant literatures pertaining to CR and dementia population. I will also focus on the historical background of CR and its development as an effective intervention for people with dementia. Further, in Chapter 2 I will also provide operational definitions and characteristics of AD, dementia, and MCI as described by the American Psychological Association (2000). In this chapter, I will

also focus on how CR intervention and the brain functioning such as neuroplasticity relate to the memory and mood functioning of the individuals with dementia.

In Chapter 3, I will illustrate the research method and design, instruments used, data collection methodology, and the analysis procedures for evaluating the effectiveness of CR intervention to the memory and mood functioning of individuals with dementia.

Chapter 2: Literature Review

Introduction

In 1900, only 3 million people were aged 65 years and older in the United States (Brody, 1992). By the 1970s, this population had increased to 9.8% of the total U.S. population (Ortman, Velkoff, & Hogan, 2014). Brody (1992) predicted that by the year 2030, 21% of the total population of United States will be 65 years of age and older. However, there was already an estimated 5.3 million Americans of all ages that have AD as reported in 2015 (National Center for Biotechnology Information, 2015). This number included an estimated 5.1 million people age 65 and older and approximately 200,000 individuals under age 65 who have early onset of AD (Gaugler, James, Johnson, Scholz, & Weuve, 2015). Due to these ever-increasing numbers, there has been a growing scientific interest in aging populations and the challenges that would face such a populace.

The aging process corresponds with changes in the central nervous system, making it more vulnerable to neurodegenerative diseases (Scherder, 2011). These neurodegenerative diseases cause inactivity, which together with the effects of aging, contributes to changes of various level of sensory systems (e.g., physical activity) (Scherder, 2011). Of note, there is growing evidence that the level of mental workout and physical activity of individuals is associated with their level of cognitive function (Maci et al., 2012). More specifically, the lower level of mental and physical activity, the higher was the risk of AD (Cassinello, Mestre, & Ballesteros, 2009; Rovio et al., 2005). Swaab et al. (1998) emphasized that aging coincided with an atrophy of the brain that implies

shrinkage of neurons. These shrunken cells have a reduced metabolism, and as such become more vulnerable for neurodegenerative diseases such as AD (Casinello et al., 2009).

I divided this literature review into nine sections. In the two major sections, I will address the subjects of dementia due to AD and CR, while also providing the historical and theoretical contexts of each. Subsections will include the operational definitions of CR; how cognitive processing operates in early stage dementia (specifically, in elderly people with MCI); and how plasticity works in the brain, while emphasizing restoration and rehabilitation of cognitive centers. In considering the effectiveness of CR, it was not possible for me to mention all cognitive domains; hence, I investigated two main variables affecting the everyday functioning of this vulnerable population: memory and mood functioning. These components provided insights that can inform and explain the potential efficacy of CR for people with early stage dementia.

Search Strategy

Literature relevant to cognitive rehabilitation and dementia provided me with the development of the conceptual framework for this study. The resources I searched included the university and local community libraries and the EBSCO , PsycInfo, Academic Search Complete, Sage Premier, ProQuest, Google Scholar, Medscape, DSM, Thoreau, and Walden University dissertations databases and search engines. Other than the resources mentioned, I also reviewed various publications and science-founded newsletters to acquire more information and context regarding the historical events influencing cognitive rehabilitation and dementia. Keywords used to guide the search

included *cognitive stimulation, cognitive training, memory, mood, Alzheimer's disease, dementia,* and *mild cognitive impairment.*

Theoretical Foundation

The theoretical foundation in this study was based on a biopsychosocial model (Frankel et al., 2003) that focused on the influence of genetics, psychological, and social factors in a person's life as well as the changes that affected a patient's health and illness. This theoretical approach emphasized the role of in-depth, patient-clinician communication as key to gaining a thorough understanding of the biological and psychosocial components of the patient's health and well-being (Engel & Romano, 1980).

In essence, the biopsychosocial model was first introduced by Engel, an accomplished physician who proposed that this general system theory be integrated into medical practice as this model pointed to how the biological systems of memory and cognition were impacted (Datillio, 2007). In addition, using a biopsychosocial theory allowed for the inclusion and review of the anatomical and molecular surfaces of the disease as well as its effects on the biological functions of the individual (Datillio, 2007). The psychological system pointed to the contributions of developmental factors, motivation, and personality as a result of the person's life experience, while the social system emphasized the environmental and familial influences on the person's feelings and expressions of their illness (Frankel et al., 2003).

Considering the established centrality of cognitive impairments caused by

dementia, there had been a great deal of focus in theoretical and empirically-based rationale that addressed the application of CR. Halligan and Wade (2005) proposed that a holistic, individualized approach, in conjunction with targeted intervention, established a flexible model for the development of a person-centered application within the field of dementia care. Based on a biopsychosocial model, rehabilitation posited a collaborative approach that includes family members in the development of current functional goals for the patient with early stage dementia (Clare & Woods, 2004). Additionally, Mullins, Chaney, and Frank (1996) previously asserted that the biopsychosocial approach in rehabilitation provided a constantly developing comprehension of the processes involving the change. They stated that this occurs at both biological and behavioral levels of cognitive impairment, and therefore, allows for further insights into probability of slowing or preventing the progression of dementia.

In this paradigm, the field of rehabilitation was based on a theory of brain functioning and how the brain and behavior interacted with each other (Hughes, 2010). It was in this manner that such intervention-related changes to both psychosocial function and neural activity may account for improvements assumed to be relatable to CR (Garland & Howard, 2009). In other words, the concept of neuroplasticity did not only influence the neurobiological processes but also altered the understanding of the structure of the adult brain and what causes increases in neurons, enhanced synaptic connectivity, or creation of new neural tissue (Vance et al., 2010). From the growth of neurons, a novel sensory experience or new behaviors may appear, exposing the adult brain to a variety of experiences (Garland & Howard, 2009). However, the important component of

rehabilitation in dementia was the whole human experience, which was influenced by more than neurobiology and genetics (Garland & Howard, 2009). Additionally, it was important to determine what deficits were receptive to rehabilitation interventions and which were not along within the context of psychosocial functioning.

Clare et al. (2012) conducted a study about awareness and its functional ability of the person with dementia relating to the relevance of biopsychosocial model. . Awareness was an important aspect of human experience that became essentially salient to a person with a neurological condition or illness (Clare, Markova, & Morris, 2011). Both groups of researchers suggested that the indices of awareness contributed to several factors such as memory, daily functional ability, mood, and other situations that challenged their sense of continuity to restore or improve their current status (Clare et al., 2011; Clare et al., 2012). Therefore, in this literature review, I adopted a biopsychosocial perspective that was more consistent with how biological, psychological, and social factors can be interrelated to the current functional ability, cognitive process, and psychological well-being of people with dementia (see Clare et al., 2011; Clare et al., 2012; Engel, 1977).

Novack and Barker (2011) reviewed and supported the book of Wilson (2009) about integrating intervention techniques and memory disorders. In their review, they discussed the importance of using various rehabilitation techniques to address diagnostic issues which can contribute to the success factors of a CR intervention program. Wilson (2009) found that memory disorders can lead to other deficits that may influence a person's capacity to participate in rehabilitation. Wilson also suggested that the emotional well-being of a person with dementia must be taken into consideration for the

rehabilitation to be a success. In addition, Clare and Woods (2007) surmised that once memory impairments and other issues have been addressed, the biopsychosocial framework underlying these deficits can be used to determine if remediation was a possibility or developing other compensatory strategies such as using memory aid to maintain daily functionality and quality of life.

With respect to treatment planning, the family member or caretaker and the health professional collaborate to carry out an individualized intervention plan that addresses the patient's meaningful goals to enhance cognitive functioning (Clare, 2004)

When the health professional (e.g., licensed social worker or psychologist) completes the evaluation, a treatment program plan is generated with specific recommendations that addresses the individual patient's cognitive impairment (Clare, 2004). Based on this model, the treatment plan can be conceptualized in terms of using compensatory strategies such memory aids or brain manual exercises. For example, tangrams have been used as a means of enhancing perceptual reasoning skills (Frutos-Pascual, Garcia-Zapirain, & Mendez-Zorilla, 2012). Other examples such as scrapbooks, a life storybook, photographs, and music have been utilized to catalyze reminiscence through their senses and promote social interaction (Cotelli, Manenti, & Zanetti, 2012).

Overall, Clare et al. (2012) posited that the biopsychosocial model in CR for people in early stage of dementia must clearly focused on individual disability; generate evaluation information; ensure flexible adaptation to individual needs and contexts; and be based on a person-centered, holistic approach.

Alzheimer's Disease

AD, as defined by the *Diagnostic and Statistical Manual of Mental Disorder* (American Psychiatric Association, 2000), is a steadily progressive neurodegenerative disease characterized by gradual decline of memory and learning in the dearth of delirium, which leads to significant impairments in the activities of daily living and other noncognitive symptoms such as affecting mood and behavior. AD is the most common form of dementia (Maci et al., 2012). Nonetheless, Swaab and Swaab et al. (1991, 1998) noted that, despite of the ravaging degenerative processes of this disease, regeneration was still possible. Research findings showed that loss of neurons during the aging process and even in AD can be neutralized by stimulating them through an enriched environment and mental exercises and that it may be possible to slow down the progression of the neurodegenerative diseases and initiate regenerative processes in aging and AD (Coleman & Flood, 1987; Moniz-Cook, 2006).

These findings have led many scientists to search for magic bullets to "fix" brain aging in lieu of care and prevention. However, it is a known fact that brain aging was not something that can be cured as the cognitive decline that accompanies old age is inevitable; nevertheless, people can find ways to reduce the gravity and deleterious impacts of these cognitive challenges (Yuill & Hollis, 2011). In CR, the struggles of AD can be taken as an opportunity for personal transformation during the natural process of aging rather than an unrelenting battle against a degenerative adversary (Halligan & Wade, 2005). In other words, the degenerative struggles of a person with AD may be extended beyond traditional medical care by integrating the whole aspect of his or her

being to include cognitive, emotional, and psychosocial functions of the individual (Halligan & Wade, 2005). Halligan and Wade (2005) considered this form of intervention CR.

CR as a field or intervention is relatively new to people with dementia (Camp, Bird, & Cherry, 2000; Clare & Woods, 2001). With the limited availability and efficacy of current pharmacological therapies for older adults with early stage dementia (Qaseem et al., 2008; Raschetti et al., 2007), the impact of CR is likely to increase. Clare et al (2000) conducted a number of CR interventions for early stage dementia that focused on targeting memory problems and daily living skills. Their single case experimental study gained significant positive results, suggesting that CR intervention should be a part of the early intervention program in this population. However, in 2012, Clare et al. replicated the study using a group of 12 individuals with early stage dementia with the intent of investigating what kind of mood and memory changes were expected before *and* after the interventions. Understanding these changes was equally important if the medical field is to increase and improve strategies for the independent function of the elderly who struggled with early stage dementia, while also helping families and caregivers gain new perspectives in managing various effects of the disease affecting their loved ones.

Given the existing empirical studies, in this study I addressed the gap to better understand the span of the rehabilitation intervention, the memory aids and brain activities being used, and their effectiveness in improving memory and mood functioning. Consequently, new pathways of intervention models were explored both to serve as a guide for establishing a care model for learning and relearning information and

skills when it came to treating individuals with dementia. Further, my use of the CR approach in this study can contribute to positive social change by moving treatment goals toward wellness, social adjustment, and life satisfaction.

Historical Perspectives of AD

Cognitive neuroscience was developed by Alexander R. Luria; as such, he was recognized as one of the fathers of this discipline (Luria, 1966). Luria established a union of psychology and neuroscience that gained increasing eminence over the past few decades. From that time on, there has been a 'blurring' that has closed the understanding of differences between "diseases of the brain" and "diseases of the soul" in neuropsychology (Christensen, Goldberg, Bougakov, 2009, p.18). The closing of this gap has expanded into geriatrics and neuropsychiatry (Luria, 1966).

To define this statement in a contemporaneous clinical entity, Christensen, Goldberg, and Bougakov (2009) stated that the cognitive and thought processes were no longer regarded as a uniformed occurrence for a person in the initial stage of dementia due to memory impairments or memory loss. Further, because of memory impairments, there have been corresponding fluctuations with their individual strengths and weaknesses, thus, affecting their quality of life.

In the realm of cognitive changes, the abilities most significantly affected by dementia include attention, learning, language, and speed of information processing (Carter et al., 2012). Deficits in attentional processes included executive functioning; perceptual speed; difficulty dealing with multiple tasks and distractibility that were then identified as consequences of AD as early as 1907 (Cummings, 2004). During that

period, a German psychiatrist and neuropathologist, Dr. Alois Alzheimer treated a case of a 51-year old woman with paranoid delusions, progressive memory impairment, and progressive aphasia. The woman's autopsy revealed a presenile condition characterized by brain atrophy. This event laid the foundation for Dr. Alzheimer's study on subclinical phase of dementia and subsequently, the disease was named in his honor. AD became the most common neurodegenerative disorder and one of the most common diseases in the aging population. Unfortunately, it is now listed as the fifth most common cause of death (Alzheimer's Association, 2010). Because of this historic and unprecedented growth of age-related cognitive decline, understanding the link between neuropathology and neuropsychology was the key to resolving the cognitive deficits of AD in its early stages (Carter et al., 2012).

Definition of Dementia due to AD

The term *dementia* originated from the Latin word meaning *"*devoid of the mind*"* (Apostolova, et al., 2012). Apostolova et al. (2012) stated that it was a state where there was a persistent and serious cognitive, functional, and emotional decline of an individual from a preexisting higher level of functioning. Dementia was a group of symptoms caused by the gradual death of brain cells and results in the depletion of cognitive abilities; impairments in memory; reasoning; planning, and behavior. The typical dementia syndrome of AD was distinguished by salient episodic memory dysfunction, with secondary deficits in word-finding skills, spatial cognition and executive functions (Karantzoulis & Galvin, 2012). Thus, these cognitive dysfunctions and deterioration in daily functions made up the core features of the dementia syndrome. Additionally,

dementia can result in sudden, significant brain damage episodes such as strokes, trauma, and infectious or metabolic disorders. The most common of these was AD, a progressive neurodegenerative disorder. AD was the most common cause, followed by vascular or multi-infarct dementia (World Health Organization, 2001).

Over the past decades, research has documented a vast array of neurodegenerative disorders manifested by people diagnosed with dementia syndromes (American Psychological Association (APA), 2000). While the prevalence of dementia was difficult to assess, partly due to differences in definition among various studies, it also established a declining trend in functional abilities that was associated with age. The experts recommend the use of the American Psychiatric Association's Diagnostic Statistical of Mental Disorder (DSM) criteria (the most recent being the DSM-V) for establishing the diagnostic criteria of dementia syndrome (APA, 2000).

Mild Cognitive Impairment (MCI).

One of the earliest stages of dementia was a state called MCI. The most common sequelae of MCI occurred between normal aging and dementia of the Alzheimer's type [DAT] (Apostolova et al., 2012). During this transitional state, the cognitive functions of the individual may present slight deficits of episodic memory, some limitations on the activities of daily living, and mood changes (Apostolova et al., 2012). However, the symptoms can quickly change to intermediate stage such as impairments of episodic memory, limitations on complex activities of daily living as well as changes in mood and behavior. These limitations may then progressed to AD or a nonAD syndrome (Apostolova, 2012; Kurz, Pohl, Ramsenthaler, & Sorg, 2009). Typically, the symptoms

appear in 16-41% of elderly patients with MCI within a one-year period (Amieva et al., 2005).

Given the domains of cognition, behavior/mood, activities of daily living, and functional ability, the American College of Physicians (ACP) and American Academy of Family Physicians developed a guideline stating that not all pharmacologic therapies are effective for the treatment of dementia (Kurz et al., 2009; Qaseem et al., 2008). In 2010, Gentile conducted a study on utilizing a pharmacological intervention, particularly the use of second-generation antipsychotic (SGA) drugs. The findings suggest that these drugs have been associated with intensified risk of developing chest infections, increased cognitive decline and other adverse reactions.

In light of the above-mentioned studies, a nonpharmacological intervention, as in CR approach, may help maintain existing abilities or reduced excess disability as opposed to cure or recovery (Cooper et al., 2012; Reifler & Larson, 1990).

The term excess disability refers to the significant deleterious impact of dementia or other memory-related impairments on the self-confidence of the individual; these difficulties may lead to depression, anxiety, and withdrawal from social activities. Cooper et al. (2012) evaluated a study on the validity of nonpharmacological interventions among people with dementia who were living in care homes and/or with family care takers. The findings concluded that these types of individualized interventions might have the potential to improve quality of life of individuals with early stage dementia and MCI as long as there were tailored activity components and support from caretakers was present.

AD with Early Onset Dementia

As mentioned, AD was originally and historically classified as a form of pre-senile dementia. Then, it was classified as Senile dementia of the Alzheimer's type (SDAT) and AD during the 1980s. Currently, it is known as DAT (Miyoshi, 2009). Despite variations in classification, the defining feature for the diagnosis of dementia was that memory impairment must be present in addition to a deficit in any of the other cognitive domains. These deficits must be severe enough to interfere with daily mood functioning, although this criterion can be difficult to examine.

Miyoshi pointed out that at the early onset of AD (i.e., before the age of 65), rapid progression of cognitive impairment usually appeared along with neuropsychological syndromes and neurological symptoms (such as spastic signs and convulsions). However, it was also noted that the manifestations and developments of the disease vary depending on the person's genetic abnormalities as these can easily accelerate the illness and its symptoms. Hence, the disease was considered clinically heterogeneous (Carter et al., 2012; Emre, 2009; Miyoshi, 2009). Heterogeneity means that the manifestations and developments were not the same whether symptoms appeared before or later than 65 years of age. Nevertheless, memory impairment and mood functioning remain as the core deficits (Carter et al., 2012).

Therefore, the intention of this study was to present the rationale and relevance of CR intervention as it related to aiding memory difficulties and mood functioning in this particular early stage of dementia.

Memory Functioning in Dementia

Carter et al.(2012) surmised that episodic memory dysfunction, followed by semantic cognition, attention and executive dysfunction were the initial pathological symptoms manifested by a person with mild AD. It must to be noted however, that memory was a complex cognitive function involving many anatomical systems in the brain. As such, terminologies and definitions of memory were not always interchangeable. Episodic memory includes the memory storage for personal experiences while semantic memory were defined as the knowledge of general and world information (e.g., tiger has stripes or Washington DC is the capital of United States). But Carter et al. (2012) added that, even though AD was a heterogeneous syndrome as the symptoms may have come in different and varied degrees and characteristics, memory tasks were still the earliest deficits to manifest.

Taken together, all these cognitive impairments in the areas of attention, visuospatial function, learning and memory gave rise to problems in everyday functioning. These can be manifested through mood changes and a declining quality of life (Maci et al., 2012). In other words, these abrupt changes may have contributed to psychological stressors like the refusal to take sedative drugs to reduce anxiety and showing little to no interest in physical or mental welfare (Apostolova, 2012). The degeneration of faculties experienced by these elderly patients established a vicious cycle in which intervention efforts became paramount. Within this framework, intervention efforts directed toward rehabilitating cognitive deficits have required a clearly defined focus on specific impairment, mental exercise/activity. In this study, my focus is based on the limitations of the individual. I include the participation restriction and emphasis on

evaluating outcome measures appropriately by adhering to the terms of the chosen focus for treatment of specific impairments and disabilities (Gates et al., 2011). For example, if the assessment of an elderly patient indicates that his or her remote memory still remains intact at the early stage of dementia, a mental reminiscense exercise with the use of photographs, music, and other aids may help to reduce anxiety and improve attention span (Cotelli, Manenti, & Zanetti, 2012).

The concept of cognitive reserve (Stern, 2006) was focused on constant mental activities throughout life indicating that this preemptive approach may reduce probability of acquiring dementia. From this concept, Stern (2006) hypothesized that people with higher education have a "better cognitive reserve capacity" than people with less education. Therefore, the cerebral and cognitive development of people with more education may tend to delay clinical manifestations of dementia in later life (Amieva et al., 2005). Because of this riveting notion, Bowes, McCabe, Wilson, and Craig (2011) used a survey to explore whether this concept using brain training tools can assist in keeping the brain active and sustain memory intact later in old age. Survey results indicated that brain training tools were not the sole solution to delaying cognitive decline but the motivation to maintain brain health was the key in determining whether or not the individual was likely to develop the condition in the future. Motivation has included enjoyment, relaxation, and engagement in activities on a regular basis. In addition, knowledge and attitudes concerning the disease and cognitive decline were also motivational factors.

Mood Functioning in Dementia

While aging was associated with a slow cognitive decline, the extent of this decline varied significantly especially among individuals diagnosed with early dementia. Older adults with early stage dementia may also manifest symptoms of depression, sadness, or guilt, and other somatic symptoms such as fatigue, decreased appetite, and muscle pain (Kim, Stewart, Shin, & Yoon, 2002). Santos et al. (2013) concluded that the mood of individuals with dementia was a strong determinant that has impacted their cognitive performance. For instance, a happy, positive mood may motivate them to engage in cognitively stimulating activities.

Additionally, various researchers have studied the level of awareness and coping as determinants of treatment goal. Clare et al. (2004) examined the relationship between awareness of deficits and the efficacy of CR to individuals with early-stage AD. The findings showed that higher levels of awareness were related to better learning performance on intervention-related variables. Because MCI was the target population for this particular intervention, it was imperative that level of awareness of individuals with MCI be adequately assessed and documented. That being the case, Clare et al. (2005) undertook a follow-up study in order to validate and explore this concept of awareness and coping associated with the emotional difficulties experienced. The study was comprised of 12 individuals with early-stage AD and its findings suggested that their expression of awareness directly impacted their coping style. These results indicated that whatever extent of changes they were experiencing, individuals suffering from MCI vary in their responses to the decline; some of them explicitly confronted it while others ignored it, e.g. preferring to not to think too much about their current situation or the

future. Thus, it is within these two contexts that this elderly population of patients chooses to make practical adjustments to their daily activities. However, even in this respect, these responses changed over time. Given the role of memory in AD, Clare et al. (2005) surmised that these individuals' styles of coping were affected over time and recognized the variables of a maintained or decreased sense of self. Therefore, from this perspective, it was a contention that cognitive function plays a role in the level of awareness of a person with dementia at any given time. This study in particular, demonstrated that a potential therapeutic intervention was needed to increase level of awareness and decrease emotional difficulties.

Notably, positive mood not only stimulated cognitive capacity and motivation, but also promoted in the increase of awareness when elderly adults with early stage dementia engaged in interesting and challenging activities (Schnizspahn et al., 2014). Two separate studies done by Modrego and Fernandez (2004) and Santos et al. (2013) assessed interrelationships between aging, cognition, mood, and socio-demographic characteristics in elderly patients. Post assessments showed that depression was associated with inadequate memory and mental adjustability especially in women who was a stronger candidate to have mild cognitive impairment and dementia. Interestingly, both findings suggested that a low mood was a continuous variable that can negatively impact the individual's capacity to cope with age-related cognitive decline.

Neuroplasticity

A. J. Luria may have developed the concept of neuroplasticity but it was Raisman (1969) and Bjorklund et al. (1971) who demonstrated the first evidence of regeneration

within the central nervous system during the late 60s into early 70s. Neuroplasticity research started with animal research studies. These studies provided the interesting discovery that the brain was capable of growing and expanding due to the reorganization and development of new neurons (neurogenesis). Further, they established that this was likely to happen in the adult brain when it was exposed to the appropriate stimuli and environment (Dong & Greenough, 2004; Ming & Song, 2005).

In the adult brain, Erikson et al. (1998) found out that learning new behaviors or novel experiences can trigger neuronal growth. For practical example, a neural growth in the somatosensory cortex can occur to a violinist who practices their fingering hands for hours or a cab driver can develop or improve spatial relationship by memorizing constantly or repetitively complex streets and avenues at work (Maguire, et al., 2000). These mechanisms of neuroplasticity, therefore, suggested that learning and challenging experiences can lead to the development of new brain tissues (Garland & Howard, 2009).

Given the components of neuroplasticity, the implication of its role in CR has referred to the processes by which biological changes occur in the brain as it is responding to sensory stimuli (Vance et al., 2010). Hence, the brain adapts to environmental pressure, experiences, and challenges even whilst brain damage is present (e.g., stroke). Vance et al. (2010) posited that the biological changes, such as dendritic branching between neurons, support a person's cognitive reserves; which constitute billions of connections between neurons that, when stimulated, may allow for cognitive abilities to be maintained or regenerated. Thus, the more considerable size of connections between neurons, the stronger one's cognitive reserve will be. However, in the case of a

person experiencing cognitive decline, neural connections are weakened due to atrophy or disease (dementia). As such, the neural pathways have difficulty transmitting information to other areas of the brain, which in turn, reduced the efficiency in processing information.

Recovery of abilities after a person suffered from a permanent brain injury was the evidence on which the theory of plasticity was based (Garland & Howard, 2009). Evidence from the reviewed studies supported the hypothesis that physical illness has affected neural pathways but also intervened with recovery from mental illness (e.g., depression, anxiety). This evidence suggested that appropriate rehabilitation intervention might have played a key role in enhancing these processes in the short and long term. Therefore, the mechanism underlying these phenomena is related to psychosocial interventions (Ilg et al., 2008). As such, both psychosocial function and neural activity may be impacted by neuroplastic changes to the brain.

Several studies have been conducted with the goal of determining whether cognitive rehabilitation treatment was capable of enhancing the cognitive reserve capacity or plasticity of a person's brain with early stage dementia or MCI (Cassinello, Mestre, & Ballesteros, 2009; Orrell, Spector, & Woods, 2010; Johansson, 2011). Casinello et al. (2009) conducted an experimental study of 26 participants with mild stage AD to determine whether this group of people showed improved cognitive performance after participating in a psycho-stimulation treatment program for a 6-month period. Assessments were also given out to test cognitive plasticity by means of the Battery for the Assessment of Learning in Dementias. This assessment tool consists of four subtests

but only three were selected for this study: visuo-spatial memory, audio-verbal memory, and verbal fluency. Overall, findings suggested that after 6 months of treatment, the participants diagnosed with mild stage AD significantly improved their learning capacity in verbal recall and verbal fluency components. In addition, the psycho-stimulation program fostered these patients to relearn what they have learned. Therefore, Casinello, et al. (2009) concluded that it was possible to increase cognitive reserve or improve learning potential to patients with mild stage AD.

From this perspective, Garland and Howard (2009) surmised that the neurobiological structure of the brain was integrative, inclusive, and holistic. As such, it represented a whole phenomenological experience as well as a full dimension of the biopsychosocial and neuroplasticity paradigm.

Treatment of Dementia

Because functional and cognitive impairments were the main consequences of dementia, non-pharmacological therapies were also being promoted along with drug therapies in the treatment of AD (Edgecombe, Pavawalla, Howard, Howell, & Rueda, 2009). Most clinicians speculated the possibility that behavioral or psychological consequences were the factors that primarily affect individuals with MCI or, otherwise, at the preclinical stage of developing dementia. Clinicians, including Douglas, James, and Ballard (2004), suggested that using nonpharmacological interventions might represent an optimal approach. These three researchers carried out an extensive review on the standard nonpharmacological interventions (e.g., validation therapy, reminiscence therapy, reality orientation, and behavioral therapy) for dementia. However, all the

interventions that these researchers reviewed pointed to one common feature and were directed to a systemic perspective. This perspective recognized the need of working with the patients' existing support systems; including family, caretakers, agency staff, and health organizations with emphasis on a person-centered context. Essentially, this form of intervention acknowledged that using standard therapies might not be suited for people with the same diagnosis and symptoms. For example, one agitated person may need a relaxing, calming massage while the other person may be agitated because of personal space or confinement, thus, highlighting the need of an individualized approach of intervention.

Computer CR training was another method of treatment that draws on the concept of neuroplasticity. This technique focused on the use of computerized brain exercises on different tasks that may stimulate the growth of new neuron brain cells, thus improving cognitive functioning for people with MCI or early stage dementia (Finn & McDonald, 2011). In the hope of further understanding the structural changes within the brain and delaying cognitive decline, Finn and McDonald conducted a randomized control trial (RCT) study to examine the effects of computerized training program in a group of 27 adults with MCI; 12 of whom randomly assigned in the treatment group and 13 to the waitlist group. The treatment group began training immediately while the other group started 6 to 8 weeks after. Both groups obtained post assessments at the completion of training. Assessments were provided by Lumosity, Inc. and consisted of 30 training sessions with four to five cognitive exercises each session, provided through the computer cognitive training package. Overall, findings indicated significant improvement

in patients when they repeatedly practiced on computerized cognitive exercises. However, issues with the sequencing of training and variations in practical daily tasks should be taken into consideration, as the results did not indicate that the participants benefit from memory strategies for specific everyday tasks. Nonetheless, the type of cognitive training used in this study seems to enhance the capacity of the participants' learning ability.

Cognitive Rehabilitation

Mimura and Komatsu (2007) referred to CR training as one of the nonpharmacological, memory interventions for people with dementia. CR training has the potential to effectively restore the highest level of physical, psychological, and social functions that can be recovered by the patients with memory difficulties (Clare, 2004). Clare (2004) added that it was an approach to help persons with cognitive dysfunction through the use of various brain training tools based on the notion that the brain can develop new connections with proper stimulation. This approach necessitated that health care professionals be involved as they were the ones to identify relevant goals for these patients and to develop strategies or techniques so as to achieve the optimum goal of improving patient's functioning in an everyday context (Mimura & Komatsu, 2007). Thus, this process suggested one-on-one intervention as it may have provided a good impact on the well-being for the person with early stage dementia.

Wilson (1997) defined cognitive rehabilitation as "an intervention strategy or technique that intended to enable clients or patients and their families to live with, manage, by-pass, reduce, or come to terms with deficits precipitated by injury to the

brain" (p. 488). Clare (2004) also pointed out that this intervention was person centered; requiring an understanding of the person's current level of awareness and then developing effective cognitive strategies (e.g., memory aids) to enhance memory functioning (Clare, 2004).

Historical Perspective of CR

The history of cognitive rehabilitation was closely tied to the history of modern medicine, particularly neurosurgery. The initial framework for the field of CR began in 1924 when Sheppard Ivory Franz, a trained psychologist and physiologist, considered the role of reeducation (the first term used for CR) into recovery after brain insult. At that time, Franz was primarily interested in long term changes made by stroke patients after they had been retrained with activities from the perspective of repetition and practice. There was a firm belief that the higher brain functions should be given enough time for recovery even if the process can be slow and arduous. Similarly, Lashley's (1938) work made a valuable impact on the theories of brain organization and the problem of recovery as well as positing that functional losses may be secondary to the disturbances, disruptions, and other physiological inactivity in normal brain regions. Therefore, it was the influence of these two men, which further led to the development of CR, and the recognition that these underlying assumptions about appropriate rehabilitation might have essentially improved the treatment of cognitive deficits.

The need of rehabilitation for patients with brain injuries and disabilities resulting from major wars, starting from World War I to the conflicts in Iraq and Afghanistan, paved the way to the christening of CR (Cifu et al., 2010). Early efforts to organize CR

began to increase survival rates of these wounded soldiers. The works of Poppelreuter (1917) and Goldstein (1942) were explicitly remarkable. Poppelreuter's work broke new ground as he touched on a classical approach of applying experimental methods to the understanding of visual disturbances and how it influenced the retraining activities as well as the recovery process of these brain-injured soldiers. However, it was Goldstein's holistic and pragmatic approach that included the therapeutic setting, and the development of specific interventions that were helpful for these patients. Goldstein's work also emphasized the coordination between families and staff in providing services brought to the "practical reality" for these patients' entire quality of life. Due to the encompassing nature of the Goldstein's approach, he was recognized as "The Great Precursor" of cognitive and neurological rehabilitation (Newcombe, 2002). Unfortunately, the legacy of Goldstein's approach and its efforts to connect cognitive rehabilitation to "real world" activities as opposed to specific cognitive deficits did not flourish; due to his Jewish heritage, he had to seek refuge out of Germany (Ben-Yishay, 1996). However, his prime influence on cognitive rehabilitation soared to touch Western medicine in a far more impactful way.

Although Goldstein's work had a great part in the history of rehabilitation, it was A.J. Luria (1966) who put psychology and neuroscience together and it was his work that has gained prominence in further research over the past decades (Christensen, Goldberg, & Bougakov, 2009). Luria's approach was based on the restructuring of the functional systems of brain development, particularly the distribution of higher cortical functions (e.g., sensitivity, movements, and reflexes). Luria's concept of functional reorganization

was a four-step process that included “precise qualification of the psychological function by utilizing the 'intact' functions with the purpose of integrating and automatizing for ongoing evaluation and feedback” (Christensen, 1986, p. 17). Christensen (1986) emphasized that the “intact” areas were the focus of opening a new path to rehabilitation process, wherein the therapist worked with what was unaffected to compensate for what was affected. This brilliant shift in thinking and focus has become the most promising avenue of research and treatment in terms of preventing or delaying cognitive decline in various forms of dementia.

Luria’s work was left incomplete after he passed in 1977. Although Luria was not able to complete his work, he made great contributions to the CR and has since evolved. In the mid-1990's, forms of intervention expanded and improvements on formal psychometric measures were made (Prigatano, 1999). With the evolution of techniques, more research was geared toward the holistic perspective of focusing on cognitive deficits as well as establishing a therapeutic milieu where patients can live productively; cope effectively and develop adaptations or cognitive compensations that may help them re-enter the social world in a more functional capacity (Robert & Halligan, 1999; Wilson, 2002). This approach to CR was highlighted most clearly in the documentation written by Ben-Yishay (1996), Robert and Halligan (1999), Sohlberg and Mateer (1989), Wilson (1987). From then, the legacy of Goldstein and A. J. Luria continued on.

The Launch of CR training in Dementia

Although the concept of CR has existed since early 1900, its efficacy is still a concern, even today. Several authors have addressed this issue but their conclusions

remained equivocal and disparate (Rapp et al., 2002). Rapp et al. (2002) surmised that although cognitive training may improve memory abilities of an individual with MCI, it still depends on the motivation and self-efficacy of a person. Hence, a group of researchers such as Greenway et al. (2006) presented a study exploring a calendar and organizational system for individuals with MCI to improve memory loss. Results indicated that this type of external memory aids enhanced not only the memory of these individuals with MCI but increased self-efficacy and improved quality of life. However, despite of the encouraging results, Huckans et al. (2013) reviewed similar CRT studies and surmised that the efficacy results remained inconclusive. Huckans and his colleagues pointed out that the development of a more structured and well-designed brain manual was required to identify the targeted cognitive domains (e.g., attention, executive functioning, etc) during intervention and a guided theoretical model. Given the feasibility of using external memory aids, this Midwest agency designed a brain manual that consists of various mental exercises targeting different cognitive domains.

Summary and Conclusions

In this chapter, I reviewed the history of CR and its development as a method of intervention for people with dementia or MCI. I discussed the operational definitions of CR as well as how cognitive processing related to the plasticity of the brain in terms of restoration and rehabilitation. Next, memory and mood functioning were also discussed within the context of AD criteria. These two major areas have played significant roles in the aging process in terms of cognitive decline and impairment conditions associated with early- stage dementia patients. However, I reviewed various contemporary literatures

which indicated the struggles of people with dementia go beyond traditional medical care as they required integration of their cognitive, emotional, and psychosocial functioning level. In essence, I used the biopsychosocial theoretical model to support the etiology of memory and mood deficits and its relationship to the concept of CR intervention. Through this pre established theoretical framework, Clare and Woods (2007) surmised that rehabilitation strategies such as memory aids could be developed to slow the progression of memory decline, maintain daily functionality, and enhanced quality of life of these individuals with early stage dementia.

In exploring the memory and mood components of cognitive rehabilitation from the biopsychosocial perspective, this study was based on a rehabilitation program in the midwestern area of the United States. The agency's mission was to explore ways to help MCI patients with memory challenges and mood functioning using the CR intervention. Therefore, in this chapter, I conclude about how CR research was related to the changes of the two main variables, memory and mood functioning of individuals with dementia or MCI.

In chapter 3, I explored the design of the study, the setting and samples of population, instrumentation, data collection, and analysis. The archived data set used in this study presents people with AD and early stage dementia.

Chapter 3: Research Method

Introduction

In this study, I evaluated a CR intervention that involved the analysis of archival data collected between May 2012 and December 2013 by interdisciplinary professionals at a Midwestern agency in the United States. The clinicians in this organization worked to treat and address cognitive impairments and depression through monitoring patients as they completed simple and complex mental exercises. By using CR training, various mental exercises were administered by a therapist whose goal was to rebuild the neural networks that have been damaged within the brain. As such, this agency acquired referrals from geriatric physicians and care providers whose patients required therapeutic intervention services aimed at improving memory skills or slowing down memory decline. With written consent from their respective guardians, these patients became clients of the agency. The specific purpose of this study was to assess whether the CR intervention conducted at this agency successfully improved the mood and memory of individuals with early stage of dementia. In other words, I explored changes in mood and memory functioning skills of these patients diagnosed with early stage dementia. I was granted permission to use the secondary data collected between during the 18-month period: A copy of the permission letter provided to me can be found in Appendix A.

In this chapter, I will provide a description of the research method that includes the approach and design, setting and sample, data collection procedures and instruments used, data analysis, and protection of participants' rights.

Design of the Study

The core question that I addressed in this study was: How effective was CR intervention in association with a biopsychosocial model theory in elderly adults with MCI and early stage dementia. My first step towards answering this question was being granted use of archived data collected from the elderly adults who participated in the CR intervention program from May 2012 to December 2013. From the archival data, I pulled samples that allowed for the possibility of looking at significant effects or changes of the CR intervention in relation to the participant's memory and mood functions. Further, the archived data used for this study had the potential to establish more definitive conclusions about the long-term effects of CR intervention as they were related to the memory skills and mood functions of participants which had not been previously represented in previous studies of similar populations.

In this study, I used a quantitative method as I examined the relationships between and among variables to answer the questions and the hypotheses of the experiment (see Creswell, 2009). Additionally, I also recorded measures of a single group both pre- and posttest; hence, used a quasi-experimental single group interrupted series design.

Although a nonequivalent, quasi-experimental design that includes both an experimental and control group was a more popular approach (Cook & Campbell, 1979) as opposed to the single group time series used, I selected the former without random assignment because the experimental group was the only one that received treatment. The data collected measured a single group both before and after treatment (see Creswell, 2009), which made this technique more relevant and appropriate to use in this study.

Data Collection

This research study was based on my analyses of archival data taken from clinical assessments that were orchestrated and conducted by an agency in the midwestern part of the United States. This organization provided psychotherapy services to senior individuals who have been diagnosed with AD, dementia, and other related mental health diagnosis including, but not limited to, depression; anxiety; suicide ideation; posttraumatic disorder; adjustment disorders, and other problems related to losses, new living situations, or new lifestyles.

Method of Data Collection

To maximize the consistency of results during a patient's participation in the intervention program, an attending physician oversaw the intake process and noted diagnostic criteria. A written informed consent from the respective legal guardians of the patients were also procured prior to commencement of the training program. Once intake and insurance coverage had been processed, patients were assigned to the clinician that covered their area of residence to begin the intervention process. Clinicians were trained clinical psychologists, licensed social workers, or psychology interns. After receiving his or her assignment, the clinician conducted the one-on-one intervention twice per week for 30–45 minutes each session. The full length of treatment for the CR intervention continued for about 18 months, depending on the health and mental status of the individual and his or her insurance coverage. Cooperation and involvement on behalf of the patient's guardian and family members was also appreciated throughout the whole intervention program.

In general, the CR intervention consisted of various mental exercises or *brain calisthenics*. Once collected, the clinical data were sent in to the organization in 3–4-month intervals by each clinician and put into the database by me. The assessment data form used by the clinicians is included in Appendix B.

Procedure of Data Collection

Those patients able to participate in the testing process had to be formally assessed within the initial assessment phase (first 1–3 sessions). Clinician assignments were determined by a patient's geographic location. A clinician assigned to a given geographic area would then conduct a cognitive assessment (i.e., MOCA) and an emotional wellness assessment (i.e., PHQ-9) as a means of collecting the baseline data and informing how the clinician would tailor the services and treatment goals of each patient. For research purposes, subsequent formal assessments (MOCA and PHQ-9) were administered during months of April, August, and December. At the end of each month of assessments, the clinician sent in the gathered data and assessment results via and electronic data system using Care Cloud medical software. The assessment results form is included in Appendix B. Once clinicians uploaded the gathered data to the system, I then retrieved and logged participants' total scores of each assessment using Microsoft Excel. I chose this format as it shows diagnosis of each participant, the date when the assessment was taken, and the individual total scores of each assessment.

Overall, in this study, I measured the treatment group from their pretest scores of MOCA and PHQ-9, which were taken in May 2012, until to the posttreatment that ended in December 2013.

Setting and Sample

The clinical archival data started with 216 senior adults who agreed to receive CR services with informed consent from their assigned guardians/family members. These adults received intake assessments such as the MOCA) and the PHQ-9 upon admission to the aforementioned agency. However, among the 216 individuals, 124 of them completed the minimum 6-month program and 88 individuals completed the 18-month program. In this study, I only addressed data retrieved from those patients who completed the 6-month or the 18-month program.

To determine if the number of participants in the archival data set was sufficient for this study, I conducted power analysis using the G*Power 3.1.2 (Faul, 2011) application. To estimate the power of repeated measures analysis of variance, I had set the parameters to calculate the number of participants (n) at the medium ES of .25, an α of .05, and power of .95. The recommended size of the sample needed to detect the difference was 43.

I used the total scores from the cognitive and mood assessments (MOCA and PHQ-9 respectively) received from the 216 individuals to evaluate the outcome and effectiveness of the CR techniques. By calculating changes in scores on the neuropsychological tests from pre- to posttreatment and analyzing whether these changes were related, the findings showed that one variable (memory) affects the other variable (mood), thus supporting the theoretical model being explored.

The participants in the study were individuals who were 60-years-old and older who met the criteria for admission to the CR training program and who had medical

documentation of a pertinent diagnosis (i.e., AD or MCI) from their respective physician. Individuals with psychiatric or emotional illnesses were included provided their disturbances were controlled by medication at the time of admission. I did not participate in the referral and/or intake process of any participant.

Instrumentations

MOCA Version 7.1

The MOCA is a cognitive screening instrument that helps in detecting and evaluating individuals with MCI, a clinical stage that usually leads up to dementia (Nasreddine et al., 2005). The MOCA was developed by Nasreddine et al. (2005) to assist physicians in screening patients who were exhibiting mild cognitive dysfunctions but performed in the normal range on the Mini Mental State Examination. These researchers' initial version of MOCA consisted of 10 cognitive domains; however, it was revised a few years later to eight cognitive domains that allow for a more refined analysis of cognitive functioning.

The final version (7.1) of MOCA (as included in Appendix C) that I used in this study consisted of eight cognitive domains: short-term memory functions (5 points) involved a delayed recall of five nouns prior learned in two trials; the executive functions were assessed by alternating task from Trail Making B task (1 point), a phonemic fluency task (1 point), and two verbal abstraction task (2 points); the visuospatial abilities (4 points) were evaluated using clock-drawing task and a three-dimensional cube copy. Language skills (5 points) were tested by naming three low-familiarity animals, such as lion, camel, and rhinoceros, and repetition of two

syntactically complex sentences as well as phonemic fluency task. The attention, concentration, and working memory (6 points) were evaluated using a sustained attention task, digit forward and backward, and a serial subtraction task. Finally, time and place orientation (6 points) was tested by asking the participant to name the city she or he currently lived and the date at the time of the assessment (Nasreddine et al., 2005).

Scoring entails adding the points of each of the corrected tasks ranging from 0–30, with higher scores indicating higher performance (Frietas, 2011). Nasreddine et al. (2005) provided a version of the form that was accessible through the MOCA website with specific and clear instructions in administration and scoring. The total possible score result was 30 points, but 26 or more is considered normal (Nasreddine et al., 2005). For lower educated individuals (who have only attained 4–9 years of education), two points could be added to the total MOCA score, whereas for individuals with higher education, one point was added to the total MOCA score (Johns et al., 2010).

Ahmed, Jager, and Wilcock (2012) conducted a comparison study between MOCA and other cognitive tools to screen measures for MCI. These authors concluded that MOCA met the criteria in creating a concise clinical impression about a patient presenting MCIs. Ahmed et al. (2012) supported the use of MOCA, noting that it was useful in obtaining a profile of quantitative and qualitative information pertinent to the cognitive functioning of MCI. These authors further added that not only do subscales show heightened sensitivity and specificity but also that it was practical to administer the assessment to an elderly population as it was a paper-and-pencil task and required very brief administration time (only 10 minutes) compared to CANS-MCI, a

computerized battery test with a much longer and administration time of approximately 30 minutes. Koski, Xie, and Konsztowicz (2011) emphasized that MOCA can best utilized as a quantitative estimate of the overall cognitive ability of individuals as well as an indicator of global cognitive decline in patients in longitudinal monitoring studies (Frietas, Simoes, Moroco, Alves, & Santana, 2012), thus, certifying MOCA as a valid and reliable tool in identifying MCI and dementia for this particular study.

Reliability and Validity of MOCA test

In their original study, the authors (Nasreddine et al., 2005) created a cut-off score of 26 points that indicated MOCA holds an excellent sensitivity in the identification of MCI (90%) and AD (100%). In comparison with Mini Mental Status Examination, Nasreddine et al. (2005) found lower sensitivity in terms of identifying MCI and AD, which only counted 18% and 78% respectively. Therefore, MOCA was more suitable in discriminating between normal group, MCI, and people with AD, which was an indicator of good discriminant validity. Nasreddine, et al. (2005) also added that the measures of reliability in MOCA indicated a high test-retest reliability of 92% and good internal consistency of 83%.

Patient Health Questionnaire-9 (PHQ-9)

The PHQ-9 is a self-administered diagnostic instrument used for common mental disorders. The PHQ-9 (Kroenke, Spitzer, & Williams, 2001) has the 9-item depression module based on the diagnosis of DSM-IV depressive disorders (e.g. thoughts that you would be better off dead or of hurting yourself in some way). This feature discriminates the PHQ-9 from other “2-step” depression measures for which additional questions can

be asked when the scores are high in order to establish DSM-IV depressive diagnoses. For example, major depression was diagnosed if five or more out of the nine depressive symptoms are present and occur in more than half of the days for the past 2 weeks. A copy of the measure was included in the Appendix D.

Reliability and Validity

PHQ-9 is a valid measure to evaluate severity of depression. Test of reliability and validity for PHQ-9 was examined to distinguish patients with dementia and without dementia who have memory difficulties (Hancock & Larner, 2009). Over a 10-month period, 113 participants were recruited and assessed. Forty-nine individuals were assessed to be depressed for which the mode, median, and mean of the PHQ-9 scores were 0, 2, and 4.1+/- 5.4, respectively while the mode, median, and mean scores of the non-depressed group came out 0, 3.5, and 7.8 +/-7.9 respectively. These results indicate that PHQ-9 scores differed significantly between the two groups (t = 2.80, df = 111, P < 0.01) suggesting optimal accuracy for the differential diagnosis between two groups with 0.62 confidence interval. In other words, PHQ-9 proved to be an acceptable, valid and reliable measure to examine differential diagnosis of depression and dementia.

Analysis of Data

I developed the following two research questions (RQ) to address this study.

RQ1: Do memory skills among people with dementia improve after participating in a CR program?

$H_0$1: The memory skills of people with dementia as measured by Montreal Cognitive Assessment (MOCA) will not have a significant increase after participating in the CR program.

$H_1$1: The memory skills of people with dementia as measured by MOCA will have a significant positive increase after participating in the CR program.

RQ2: Does the mood among people with dementia improve after participating in a CR program?

$H_0$2: The mood functioning of people with dementia as measured by PHQ-9 will not have significant improvement after participating in the CR program.

$H_1$2: The mood functioning of people with dementia as measured by PHQ-9 will have significant improvement after participating in the CR program.

All the secondary data collected from May 2012 to December 2013 is coded and entered on a personal computer using Microsoft Excel format. This information was transferred to the Statistical Package for the Social Sciences (SPSS) software Version 21, which was used to calculate and run the analysis for this study. As described in the sample section, 124 participants completed the minimum of 6-month program and 88 participants completed the 18-month program.

The six primary dependent/criterion variables for this study were the three repeated measurements for memory skills and the three repeated measurements for mood

functions. Data screening included examining and removing implausible values as well as screening for normality using descriptive statistics such as frequencies and percentages along with means and standard deviations for continuous variables. However, to compare the changes in memory skills and mood functioning across the 18 months of time (baseline versus 6-months versus 18 months), Wilcoxon matched pairs were used instead of the more common paired *t* tests or repeated measures ANOVA tests due to small sample sizes and the non-normal distributions among some of the scores. .

Ethical Considerations and Human Rights Protection

The rights of participants were protected in various ways such as procuring the facility-derived agreements where every participant resided, informed consent from their respective family member who has power of attorney (POA), and other practices specified in the consent form which included debriefing, sharing of results, data anonymity, and confidentiality. The assigned clinician contacted the legal representative/guardian or family member by phone or e-mail for any concerns and updates about the study/intervention. Participation was voluntary which means that participants consented to participation when their respective guardians completed the Informed Consent Form. No signature or other indication of the participants' names was collected. After the consent forms had been completed and reviewed by their respective guardians, the participant was assigned to a clinician who explained the purpose and procedure of the intervention along with the potential benefits of the results. The assigned clinician had provided the guardians with updates and progress in the form of an e-mail on a quarterly basis throughout the course of the intervention. I retrieved the data as soon

as the clinician logged in the results in the database. The collected data have remained secured and only accessible by the student researcher and the clinical director through the EHR Care Cloud system. Data were collected and logged from April 2012 until December 2013. The data that were given to the student researcher would remain in a password-protected computer. All data would then be destroyed after 5 years of completion of this research study.

I was granted an approval by Walden Institutional Review Board (IRB) to proceed with final stage of the secondary data set analysis on 1/31/2017. The IRB approval number for this study is 01-31-17-0058121. A copy of the IRB approval letter was included in Appendix E.

Threats to Validity

The assessment of validity is the most important phase in all research studies, be it quantitative, qualitative, or mixed research study (Benge, Onwuegbuzie, & Robbins, 2012). There are two kinds of validity, internal and external (Creswell, 2009). Internal validity refers to the extent to which the independent variable can precisely be stated to produce the observed effect (Bordens & Abbott, 2005). Thus, internal validity is achieved if the effect of the dependent variable is only due to independent variable(s), and the degree of the result can be manipulated. In contrast, external validity is defined as to the extent to which the results of the study can be generalized beyond the sample and across populations, settings, outcomes, and treatment variations (Bordens & Abbott, 2005). Thus, external validity is aimed at obtaining information that can be generalized to directly apply to a real-world situation.

Internal Validity

In this study, the primary challenge in the internal validity was *mortality.* Mortality refers to the differential loss of participants from group in the study (Bordens & Abbott, 2005). In this study, the threat of mortality was between pre- and posttests that has fluctuated due to various reasons such as relocation, illness, family dispute, or insurance coverage. Thus, the nature of the sample changes was reflected as participants who were less motivated to begin with dropout. However, this also meant that the highly motivated participants continued to follow the intervention program.

External Validity

Similarly, the external validity posed a challenge in this study because it was conducted with a specific group of individuals who were elderly adults diagnosed with mild cognitive impairment and early stage dementia. In order to maximize the generalizability of the findings of this study, an attempt of replication could have been made to other locales.

Furthermore, since this study only used the data from the individuals who completed the 18-month intervention program, the findings may not have applied to individuals who dropped out before the intervention program was completed.

Summary

This chapter contained an overview of the research methods, including the design, theoretical approach, instrumentation, setting and sample, and the data collection procedures that were used to procure and analyze the data set forth in the purpose of this

study. In this chapter, I used quantitative methodologies to answer the presented research questions regarding the effectiveness of cognitive rehabilitation training when administered to elderly individuals with early stage dementia.

In this study, I proposed a quasi-experimental, pre- and post test research design as a means to examine the changes in memory and mood skills before and after intervention. Furthermore, this study included the archival data collected from May 2012 to December 2013 on a maximum of 216 cases, which serves to evaluate the changes in memory and mood among elderly patients with early stage dementia over a 6 or18-month period by using a specific battery of psychometric instruments. All data reviewed for analyses have been coded.

As mentioned in this chapter, in order to evaluate the changes between the two dependent variables, I have evaluated the differences between scores before and after intervention using Wilcoxon matched pair test.

Chapter 4: Results

Introduction

As I mentioned in the previous chapters, my intent with this research was to assess whether the memory and mood functioning of elderly individuals with dementia can improve through CR intervention. In this study, my hypotheses stated (a) that the memory skills of people as measured by MOCA will have significant increase after participating in the CR program and (b) that the mood functioning of people with dementia as measured by PHQ-9 will have significant improvement after participating in the CR program. I calculated the changes in their total scores on the neurological tests from pre- to posttreatment in order to analyze whether these changes were related. On the quest for the significant effects or changes, I searched if two variables, memory and mood, improved between the 18-month periods of CR training. In this chapter, I will present the results of the study. The chapter will begin with a description of the data collection procedures, then I will provide a detailed report of the findings of the statistical analysis pertaining to the RQs and hypotheses with figures and tables for supplemental clarification.

Data Collection

I gathered medical records for 216 patients for this study. I was granted use of this archived data by one of the psychological agencies in the midwestern part of the United States. Based on the data collection procedures and the methods that I described in Chapter 3, a clinician assigned to a geographic area would conduct the two assessments (i.e., the MOCA and PHQ-9) at 3–4-month intervals within the 18-month period (i.e.,

from May 2012 to December 2013). The clinicians would send in the data through the electronic data system using Care Cloud medical software. I retrieved and logged participants' total scores for each assessment using Microsoft Excel. The data set included the diagnosis of each participant, the date when the assessment was taken, and the individual total scores of each assessment. The demographics for gender and age were not available in the assessment data form (see Appendix B) sent in by the clinicians to me.

Preliminary Analyses

The Wilcoxon Sign test makes four important assumptions (Field, 2013). The data in this study met these four following assumptions:

1. Dependent samples: The two samples need to be dependent observations of the cases as the Wilcoxon Sign test assess for differences between before and after measurement, while accounting for individual differences in the baseline (Field, 2013).
2. Independence: The Wilcoxon Sign test assumes independence, meaning that the paired observations are randomly and independently drawn (Field, 2013).
3. Continuous dependent variable: Although the Wilcoxon signed rank test ranks the differences according to their size and is, therefore, a nonparametric test, it assumes that the measurements are continuous in theoretical nature (Field, 2013). To account for the fact that in most cases the dependent variable is binominal distributed, a continuity correction is applied (Field, 2013).

4. At least the ordinal level of measurement: The Wilcoxon sign test needs both dependent measurements to be at least of ordinal scale (Field, 2013). This is necessary to ensure that the two values can be compared, and for each pair, it can be said if one value is greater, equal, or less than the other.

Data Screening, Missing Data, and Outliers

For this archival dataset, I used the following procedures to maximize the quality of the data. I assumed that the MOCA and PHQ-9 were scored correctly; however, to avoid outliers and invalid data, only scores between 0 to 27 for the PHQ-9 and 0 to 30 for the MOCA were used. Missing data were problematic for this study. Inspection of Tables 1 and 2 shows that individual scores for the three administrations were: first (n = 216), second (n = 124), and third (n = 88). For the paired comparisons, the number of available respondents was smaller: first with second (n = 76), first with third (n = 45), and second with third (n = 85). Several possible explanations could explain this result, such as: (a) respondents starting and ending the program at different times; (b) respondents leaving the program either due to death or insurance coverage, and therefore, not being able to continue; (c) respondents so advanced in their cognitive decline that their family member/caregivers chose not to have them participate further in the program.

Descriptive Statistics

I generate several descriptive statistics using SPSS software, Version 21 which include frequencies and percentages along with means and standard deviations for continuous variables. Table 1 displays the frequency counts for the MOCA scores at the

three points of time. At the first point of time, MOCA scores ranged from 0 to 30 (M = 16.59, SD = 6.98) with 6.9% having “normal” memory skills. At the second point of time, MOCA scores ranged from 0 to 29 (M = 15.30, SD = 8.03) with 8.9% having “normal” memory skills. At the third point of time, MOCA scores ranged from 0 to 30 (M = 17.05, SD = 7.54) with 10.2% having “normal” memory skills.

Table 1

Frequency Counts for MOCA Scores

Time period	Category	Raw score	*n*	%
First MOCA (*n* = 216) [a]				
	Severely impaired Alz	0 to 10	48	22.2
	Alzheimer's dementia	11 to 18	66	30.6
	Mild impairment	19 to 25	87	40.3
	Normal	26 to 30	15	6.9
Second MOCA (*n* = 124) [b]				
	Severely impaired Alz	0 to 10	39	31.5
	Alzheimer's dementia	11 to 18	34	27.4
	Mild impairment	19 to 25	40	32.3
	Normal	26 to 29	11	8.9
Third MOCA (*n* = 88) [c]				
	Severely impaired Alz	0 to 10	20	22.7
	Alzheimer's dementia	11 to 18	24	27.3
	Mild impairment	19 to 25	35	39.8
	Normal	26 to 30	9	10.2

Note. Sample sizes were based on all patients who had MOCA scores at that time period.
[a] First: *M* = 16.59, *SD* = 6.98.
[b] Second: *M* = 15.30, *SD* = 8.03.
[c] Third: *M* = 17.05, *SD* = 7.54.

Table 2 displays the frequency counts for the PHQ-9 scores at the three points of time. At the first point of time, PHQ-9 scores ranged from 0 to 21 (*M* = 4.95, *SD* = 3.82) with 51.2% having no depression (normal range). At the second point of time, PHQ-9 scores ranged from 0 to 27 (*M* = 5.70, *SD* = 5.12) with 50.0% having no depression (normal range). At the third point of time, PHQ-9 scores ranged from 0 to 27 (*M* = 6.83, *SD* = 7.02) with 46.6% having no depression (normal range)

Table 2

Frequency Counts for PHQ-9 Scores

Time period	Category	Raw score	*n*	%
First PHQ-9 (*n* = 213) [a]				
	No depression	0 to 4	109	51.2
	Mild	5 to 9	86	40.4
	Moderate	10 to 14	13	6.1
	Severe	15 to 21	5	2.3
Second PHQ-9 (*n* = 124) [b]				
	No depression	0 to 4	62	50.0
	Mild	5 to 9	36	29.0
	Moderate	10 to 14	17	13.7
	Severe	15 to 27	9	7.3
Third PHQ-9 (*n* = 88) [c]				
	No depression	0 to 4	41	46.6
	Mild	5 to 9	25	28.4
	Moderate	10 to 14	15	17.0
	Severe	15 to 27	7	7.9

Note. Sample sizes were based on all patients who had PHQ-9 scores at that time period.
[a] First: $M = 4.95$, $SD = 3.82$.
[b] Second: $M = 5.70$, $SD = 5.12$.
[c] Third: $M = 6.83$, $SD = 7.02$.

Results

RQ1 was: Do memory skills among people with dementia improve after participating in a CR program? The related $H_0 1$ was: The memory skills as measured by MOCA of people with dementia will not significantly increase after participating in the CR program. Table 3 displays the Wilcoxon matched pairs scores comparing the MOCA scores at three points in time that I used to test this. I used Wilcoxon matched pair tests instead of the more common paired *t* tests or repeated measures ANOVA tests due to the

small sample sizes and the nonnormal distributions among some of the scores. No significant changes in MOCA scores were found from the first to the second period (p = .59), the first to the third period (p = .11), or the second to the third period (p = .36). This combination of findings provided no support to reject the null hypothesis.

Table 3

Wilcoxon Matched Pairs Tests for MOCA Scores

Score	Time period	n [a]	M	SD	z	p
MOCA					0.54	.59
	First	76	15.82	7.28		
	Second	76	15.09	7.80		
MOCA					1.60	.11
	First	45	16.20	7.90		
	Third	45	17.49	7.72		
MOCA					0.92	.36
	Second	85	16.09	8.12		
	Third	85	17.21	7.45		

[a]Number of patients that had both sets of MOCA scores.

RQ2 was: Does the mood among people with dementia improve after participating in a CR program?" The related $H_0$2: The mood functioning, as measured by PHQ-9, of people with dementia will not have significant improvement after participating in the CR program. Table 4 displays the Wilcoxon matched pairs scores comparing the MOCA scores at three points in time, I used to test this. Almost significant changes in PHQ-9 scores were found from the first to the second period (p = .06) and the second to the third period (p = .06). A significant change was found from the first to the third period (p = .04). However, in each case, the depression scores were higher at the later

point in time, which was contrary to the intended hypothesis (depression scores would decline, thereby improving mood). These findings provided no support to reject the null hypothesis.

Table 4

Wilcoxon Matched Pairs Tests for PHQ-9 Scores

Score	Time period	*n*[a]	*M*	*SD*	*z*	*p*
PHQ-9					1.87	.06
	First	76	4.79	3.75		
	Second	76	6.20	5.37		
PHQ-9					2.01	.04
	First	45	4.44	3.33		
	Third	45	7.09	7.35		
PHQ-9					1.85	.06
	Second	85	5.60	5.63		
	Third	85	6.62	6.06		

[a]Number of patients that had both sets of PHQ-9 scores.

Summary

In summary, in this study I used archival data from 216 patients to evaluate the effectiveness of CR intervention for persons diagnosed with early stage dementia or MCI. Hypothesis 1 (improvement in memory skills) was not supported by the results (see Table 3). Hypothesis 2 (improvement in mood) was also not supported (see Table 4). In the final chapter, I will compare these findings to the literature in the field and draw conclusions and implications along with suggesting a series of recommendations.

Chapter 5: Discussion, Implications, and Recommendations

Introduction

The purpose of this study was to evaluate the effectiveness of CR intervention for persons diagnosed with early stage dementia or MCI. In this study, I assessed whether memory and mood functioning of elderly individuals with dementia improved through CR intervention. The following two RQs guided this study:

RQ1: Do memory skills among people with dementia improve after participating in a CR program?

RQ2: Does the mood among people with dementia improve after participating in a CR program?

As I discussed in Chapter 4, none of the data analyses directly related to the RQs were found to be significant. I found no significant changes in memory skills or mood functioning after individuals participated in the CR program within the 18-month period of continuous intervention training.

Interpretation of the Findings

In my literature review chapter, I discussed many studies on CR that produced significant changes on memory and mood functioning of people with MCI or dementia. For instance, Cooper et al. (2012) found that significant changes can be noted to individuals with early stage dementia if individualized intervention is provided along with support from care takers or family members. Similarly, Bahar-Fuchs, Clare, and Woods (2013) found that individuals who are at the early stage of dementia show meaningful and positive changes in their daily living activities as well as mood

functioning when family members or caretakers are involved with their memory training. However, Bahar-Fusch et al. emphasized that memory training tasks alone would not guarantee significant improvement to the cognitive functioning, mood, and daily living skills activities of these individuals with early stage dementia or MCI.

On the contrary, in this study, I found no significant improvements in using CR to participants' memory and mood functioning. While many authors shared significant improvements of these individuals with mild dementia on their CR training, I speculate that my insignificant results could have been due to limited or lack of support from caretakers to continue the activity of the interventions in between days of the week when clinicians were not there to do the intervention. Also, the schedule of when the participants' training starts and end at different times could have affected the results. Finn and McDonald (2011) found significant improvements in the CR when cognitive exercises have been repeatedly practiced.

The failure to find any significant improvement in memory skills, as I posited in the first hypothesis, can be explained by the need for intervention continuity and consistency during periods when clinicians were not doing the training themselves. In other words, the intervention efforts should not cease with the clinicians but should be followed through by caretakers. The biopsychosocial theoretical model validates the assertion that CR must include a collaborative approach between family members or caretakers in memory-related changes of people with early stage dementia (Clare et al., 2011; Clare et al, 2012; Datillio, 2007; Engel, 1977; Frankel et al, 2003; Halligan & Wade, 2005; Novack & Barker, 2011).

The nonsignificant finding on mood functioning in this study, as I hypothesized in the second hypothesis, was consistent with findings from Modrego and Fernandez (2004) and Santos et al. (2013). These authors assessed interrelationships between aging, mood, and sociodemographic characteristics in elderly patients that can be associated with inadequate memory and mental adjustability. Both sources suggested that a *low mood* is a continuous variable that can negatively impact the individual's capacity to cope with age-related cognitive decline. Santos et al. expanded that low mood is almost identical to depressed mood, in that the individual loses interest in activities that were once pleasurable with family and friends. Therefore, the fact that the results showed no significant improvement in mood functioning of the people who participated in the CR training in this study may have reflected the person's mood, which suggested an impact on the cognitive engagement of those individuals diagnosed with early dementia (see Santos et al., 2013).

While previous researchers have found that CR training is effective for this study's population (Ben-Yishay, 1996; Clare, 2004; Finn & McDonald, 2011; Greenway, et al 2006; Mimura & Komatsu, 2007), through the results of this study, I have found otherwise. However, possible external influences such as the clinicians' way of assessing and incorrect implementation of the reporting could have contributed to why there was no significant improvement in mood functioning for people with early stage dementia in this study. Therefore, I will further discuss the limitations of the study in the next section of this chapter.

Limitations of the Study

The archived data of this study was limited to the homogeneity and size of the sample. The study cohort started with 216 senior adults and from the initial intake assessments, 124 of them completed the minimum 6-month program and ended with only 88 individuals who completed the 18-month program. This further limited the statistical significance because of the overall small sample size. In addition, I was not supplied with the nature and demographics of the population. Therefore, these limitations decreased the ability to generalize the results, affecting the statistical significance of the study.

Another limitation was my accessibility to the records of the type and dosage of medication regimen that these individuals were taking while the CR intervention was given. Although the use of SGA drugs are linked to more adverse side effects such as cognitive decline and depression (Gentile, 2010), these drugs continue to have an essential, albeit limited, role in dementia care (Steinberg & Lyketsos, 2012). Bahar-Fuchs et al. (2013) contended that pharmacological therapy could potentially minimize the risk of excess disability or deleterious impact of memory-related impairments and enhance the efficacy of CR to people in the early stage of dementia. Therefore, interventions for people with mild dementia can be pharmacological, nonpharmacological, or both. When this fact is taken into consideration, the inaccessibility of the data on how medication was handled and its titration was another limitation to this study.

Furthermore, the benefit of CR intervention may have been obscured due to the progressive declines of health and ability of the study cohort. As mentioned in the literature, MCI is a transitional state wherein cognitive functions of the individual may quickly change to impairments of episodic memory and generate changes in mood and

behavior (Apostolova, 2012; Kurz et al., 2009). Hence, over the course of 18 months, the participants may have experienced a decline in cognitive function and mood functioning, which can increase burden of care. This factor may have concealed the effectiveness of the CR training program in decreasing the prevalence of some responses in the MOCA and PHQ-9 assessments.

As I noted in the previous section, there might have also been a limitation in the quality of the assessment process. In this study, the clinicians only entered the full scores of participants in each assessment. I did not have access to the true individual scores of each item in the assessment, which limited my ability to assess if the scoring was appropriately calculated.

Implications for Social Change

In the United States, it is projected that the number of Americans with dementia will increase up to 7.7 million by the year 2030 and approximately 16 million in 2050 (AD Association, 2014). Because dementia is a disease caused by various conditions and gradual death of brain cells (Apostolova et al., 2012) that affect the memory and mood functioning of these elderly individuals, it is important for the health care industry to conduct more drug trials to identify useful pharmacological strategies in order to improve the clinical condition of people diagnosed with AD. On the other hand, developing different strategies and techniques on the CR intervention is vital to maintain an optimal level of physical, psychological, and social functioning for individuals in the early stage of dementia and with MCI. It is well documented that using different strategies in CR intervention may help compensate or enhance the impaired area of memory that was

significantly affected (Gates et al., 2011). For instance, a mental reminiscence exercise can reduce anxiety and improve attention span (Cotelli et al., 2012). Therefore, publishing the results of this study pointed out the importance of including not only the total scores of assessment results but also the scores of each cognitive domain so it can better analyze which domain is impaired and needs enhancement or compensation.

Due in part to the fact that dementia is a debilitating disease, developing and implementing CR intervention can be a challenge. It requires scientific perspectives from various researchers and health professionals and most importantly, input from family members and caretakers. This connects the concept of CR with the essence of biopsychosocial model (Frankel et al, 2003; Mullins et al., 1996). As Wilson (1977) pointed out, the CR process is a one-on-one intervention wherein clinicians collaborate with the family members and caretakers in using various brain strategies to address memory difficulties and at the same time, to enhance the mood and behavior that interferes with the rehabilitative process. My study has salient positive social change implications to the family and caretakers in terms of the intervention training needing to be closely monitored to check for positive results and adjusting the intervention as needed.

Recommendations for Future Research

This quasiexperimental, pre-/posttest research design was limited in size and homogeneity of the sample. Because I used archived data that came from just one psychological agency in the Midwest region of the United States in this study, the sample size was relatively small at the final time series of the assessment; hence, the findings of

no significant benefits from the CR training were drawn. Therefore, future researchers may consider estimating a larger sample size given the high potential of external limitations (e.g., participant's health conditions and mortality) of this particular population.

On the same note, using the archived data I only examined total scores of assessment results. Future researchers may consider including each item score in the subscale of a cognitive assessment test. Apostolova et al. (2012) noted abrupt changes in any areas of cognitive functioning (e.g., attention, language, and visuo-spatial function) could contribute to psychological stressors. Hence, it is helpful to see any changes or improvement in specific cognitive areas so that clinicians can focus on the treatment of specific impairment. As I mentioned in the literature review, if the patient has impairment in his or her remote memory, a reminiscence exercise with the use of photographs and music may help in reducing anxiety and improve attention span (Cotelli et al., 2012). Furthermore, given the high need to demonstrate a more successful efficacy outcome in this type of research project, future researchers may want to consider using a mixed design. Collecting qualitative data may provide a better detail in the elements of each intervention used to the elderly patients with dementia.

Conclusion

My intention in this quantitative study was to bridge the rationale from previous researchers and verify the scope of the CR intervention and its function in improving the memory and mood functioning of the senior individuals. In this archived data study, I examined the efficacy of CR intervention to elderly patients diagnosed with dementia and

MCIs focusing on the pre- and post-CR treatments over the span of 18 months. In contrast to the work of previous researchers (Casinello et al., 2009; Johansson, 2011; Orrell, Spector & Woods, 2010), the results of this study indicated there were no significant improvements in the memory and mood functioning of elderly people with dementia and MCI who participated in the CR training. Therefore, these findings may contribute to bridging the gap in the literature on the effectiveness of CR intervention for the elderly individuals with cognitive deficits. These results also support the implementation of biopsychosocial model in CR-based programs to enhance quality of life of the elderly population with early stage dementia and MCI.

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Appendix A: Data Set Agreement Permission

Note: The actual agency's name and representatives' names were deleted to protect confidentiality.

DATA USE AGREEMENT

This Data Use Agreement (archived data), effective as of 3/12/14, is entered into by and between LUZ S. MORROW and The Agency. The purpose of this Agreement is to provide Data Recipient (named Luz S. Morrow) with access to a Limited Data Set ("LDS") for use in research in accord with the HIPAA and Family Educational Rights and Privacy Act of 1974 (FERPA) Regulations.

Definitions. Unless otherwise specified in this Agreement, all capitalized terms used in this Agreement not otherwise defined have the meaning established for purposes of the "HIPAA Regulations" codified at Title 45 parts 160 through 164 of the United States Code of Federal Regulations, as amended from time to time.

Preparation of the LDS. The Agency shall prepare and furnish to Data Recipient (Luz S Morrow) a LDS in accord with any applicable HIPAA or FERPA Regulations

Data Fields in the LDS. No direct identifiers such as names may be included in the Limited Data Set (LDS). In preparing the LDS, The Agency shall include the **data fields specified as follows**, which are the minimum necessary to accomplish the research (such as test scores of MoCA (Montreal Cognitive Assessment) and Ph-Q (Patient Health Questionnaire), data scores from August and December, 2013, diagnosis).

Responsibilities of Data Recipient. Data Recipient agrees to:

Use or disclose the LDS only as permitted by this Agreement or as required by law;

Use appropriate safeguards to prevent use or disclosure of the LDS other than as permitted by this Agreement or required by law;

Report to Data Provider any use or disclosure of the LDS of which it becomes aware that is not permitted by this Agreement or required by law;

Require any of its subcontractors or agents that receive or have access to the LDS to agree to the same restrictions and conditions on the use and/or disclosure of the LDS that apply to Data Recipient under this Agreement; and

Not use the information in the LDS to identify or contact the individuals who are data subjects.

Permitted Uses and Disclosures of the LDS. Data Recipient may use and/or disclose the LDS for its dissertation research activities only. No commercial use of data set will be allowed.

Term and Termination.

Term. The term of this Agreement shall commence as of the Effective Date and shall continue for so long as Data Recipient retains the LDS, unless sooner terminated as set forth in this Agreement.

Termination by Data Recipient. Data Recipient may terminate this agreement at any time by notifying the Data Provider and returning or destroying the LDS.

Termination by Data Provider. Data Provider may terminate this agreement at any time by providing thirty (30) days prior written notice to Data Recipient.

For Breach. Data Provider shall provide written notice to Data Recipient within ten (10) days of any determination that Data Recipient has breached a material term of this Agreement. Data Provider shall afford Data Recipient an opportunity to cure said alleged material breach upon mutually agreeable terms. Failure to agree on mutually agreeable terms for cure within thirty (30) days shall be grounds for the immediate termination of this Agreement by Data Provider.

Effect of Termination. Sections 1, 4, 5, 6(e) and 7 of this Agreement shall survive any termination of this Agreement under subsections c or d.

Miscellaneous.

Change in Law. The parties agree to negotiate in good faith to amend this Agreement to comport with changes in federal law that materially alter either or both parties' obligations under this Agreement. Provided however, that if the parties are unable to agree to mutually acceptable amendment(s) by the compliance date of the change in applicable law or regulations, either Party may terminate this Agreement as provided in section 6.

Construction of Terms. The terms of this Agreement shall be construed to give effect to applicable federal interpretative guidance regarding the HIPAA Regulations.

No Third Party Beneficiaries. Nothing in this Agreement shall confer upon any person other than the parties and their respective successors or assigns, any rights, remedies, obligations, or liabilities whatsoever.

Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

Headings. The headings and other captions in this Agreement are for convenience and reference only and shall not be used in interpreting, construing or enforcing any of the provisions of this Agreement.

IN WITNESS WHEREOF, each of the undersigned has caused this Agreement to be duly executed in its name and on its behalf.

DATA PROVIDER

Signed: _____

Print Name: _____

Print Title: Clinical Director

DATA RECIPIENT

Signed: _____

Print Name: Luzviminda S. Morrow Luzviminda S. Morrow

Print Title: Intern

Appendix B: Assessment Form

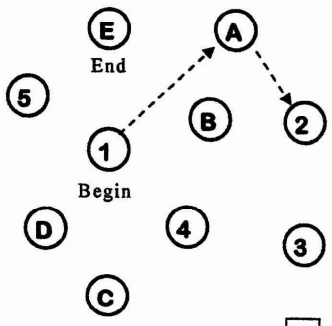
Name of Clinician:	Date:	
Name of Client	**Date Assessed**	**Assessment(s) Administed & Results**
Client(s) Not Assessed:	**Reason/ Comment:**	

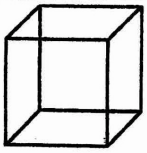
Appendix C: Montreal Cognitive Assessment

Montreal Cognitive Assessment (MoCA)
Provided by A WiserMind
303-946-5003 aWiserMind.com

Name:
Education: Date of Birth: Sex: Date:

Visuospatial / Executive





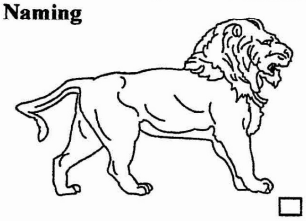
Copy cube ☐

Draw Clock (ten past eleven)

☐ Contour ☐ Numbers ☐ Hands

Points /5

Naming



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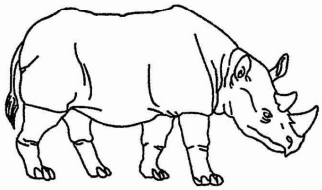

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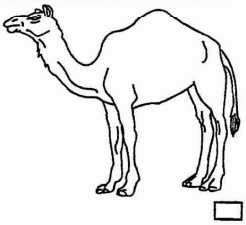

☐ /3

Memory Read list of words, subject must repeat them. Do 2 trials. Test recall after 5 minutes.

	Face	Velvet	Church	Daisy	Red
Trial 1					
Trial 2					

Attention Read list of digits (1 digit/sec)
Subject has to repeat digits in forward order [ ] 2 1 8 5 4
Subject has to repeat digits in backward order [ ] 7 4 2 /2

Read list of letters. Subject must tap with hand at each letter A. No points if more than 1 error.
[ ] F B A C M N A A J K L B A F A K D E A A A J A M O F A A B /1

Serial 7 subtraction starting at 100 [ ] 93 [ ] 86 [ ] 79 [ ] 72 [ ] 65
4 or 5 correct subtractions: 3 pts, 2 or 3 correct: 2 pts, 1 correct : 1 pt, 0 correct: 0 pts /3

Language Repeat: I only know that John is the one to help today. [ ]
The cat always hid under the couch when dogs were in the room. [ ] /2

Name maximum number of words in one minute that begin with the letter F [ ] ___ (1 pt if >10 words) /1

Abstraction Similarity between (e.g. banana :: orange = fruit) [ ] train :: bicycle [ ] watch :: ruler /2

Delayed Recall

	Has to recall words with no cue	Face [ ]	Velvet [ ]	Church [ ]	Daisy [ ]	Red [ ]	Points for uncued recall only
optional	Category cue						
	Multiple Choice cue						

/5

Orientation [ ] Date [ ] Month [ ] Year [ ] Day [ ] Place [ ] City /6

Administered by: **Normal > 25/30 (add 1 point if ≤ 12 yrs education)** /30

Based on version 7.0 Montreal Cognitive Assessment by Z. Nasreddine

Consider Brain Activation Therapy for scores < 26.

Appendix D: Patient Health Questionnaire Form

PATIENT HEALTH QUESTIONNAIRE (PHQ-9)

NAME:_____ DATE:_____

Over the last 2 *weeks*, how often have you been bothered by any of the following problems?
(use "✓" to indicate your answer)

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite — being so figety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself	0	1	2	3
	add columns	+	+	

(Healthcare professional: For interpretation of TOTAL, please refer to accompanying scoring card). TOTAL:

10. If you checked off *any problems*, how *difficult* have these problems made it for you to do your work, take care of things at home, or get along with other people?	Not difficult at all _____ Somewhat difficult _____ Very difficult _____ Extremely difficult _____

Appendix E: IRB Approval Letter

IRB <irb@mail.waldenu.edu>

Tue 1/31/2017 4:11 PM

To: Luzviminda Morrow <luzviminda.morrow@waldenu.edu>;

Cc: Susana Verdinelli <susana.verdinelli@mail.waldenu.edu>;

Dear Ms. Morrow,

This email is to notify you that the Institutional Review Board (IRB) confirms that your study entitled, "Effectiveness of Cognitive Rehabilitation Training as a Memory Intervention for Older Adults with Dementia," meets Walden University's ethical standards. Our records indicate that you will be analyzing data provided to you by A Wiser Mind as collected under its oversight. Since this study will serve as a Walden doctoral capstone, the Walden IRB will oversee your capstone data analysis and results reporting. The IRB approval number for this study is 01-31-17-0058121.

This confirmation is contingent upon your adherence to the exact procedures described in the final version of the documents that have been submitted to IRB@waldenu.edu as of this date. This includes maintaining your current status with the university and the oversight relationship is only valid while you are an actively enrolled student at Walden University. If you need to take a leave of absence or are otherwise unable to remain actively enrolled, this is suspended.

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

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

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

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

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

http://www.surveymonkey.com/s.aspx?sm=qHBJzkJMUx43pZegKImdiQ_3d_3d

Sincerely,
Libby Munson

Office of Research Ethics and Compliance
Email: irb@waldenu.edu
Fax: 626-605-0472
Phone: 612-312-1283

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

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