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2nd Place Research Paper: Effects of Cognitive Interventions on the Cognition of Patients Diagnosed With Dementia

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Comments

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Effect of Cognitive Interventions on the Cognition of Patients Diagnosed With Dementia

Senior Thesis

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Abstract

The aim of this literature review was to test the hypothesis: If a patient diagnosed with dementia participates in a cognitive intervention, then they will develop fewer cognitive deficits than a patient diagnosed with dementia who does not participate in a cognitive intervention.

Resent literature was systematically searched using several databases. A total of 20 empirical articles were included in this review. Inclusion criteria consisted of a diagnosis of dementia for each participating patient. Each study includes an experimental group of patients who participated in a cognitive intervention and a control group of patients who did not participate in a cognitive intervention. Various types of cognitive interventions were tested during these studies. The cognitive abilities of all patients were tested prior to and at the conclusion of treatment. The cognitive changes experienced by patients who participated in the cognitive interventions were compared to the cognitive changes experienced by patients who did not participate the cognitive interventions.

The findings of these studies varied in their relationship to the thesis hypothesis. Ten of these studies showed results that supported the thesis hypothesis, 7 studies refuted the thesis hypothesis, and 3 studies showed findings that both supported and refuted the thesis hypothesis.

The variance of results can be explained by the differing cognitive functions of focus of each cognitive intervention. Some of these interventions proved to have greater benefits on the cognitive abilities of patients diagnosed with dementia than others.

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I. Introduction

A. Background

1. History of Dementia

Dementia has a long history of occurrence in society, including ancient societies (Boller & Forbes, 1998). Ancient Egyptians recorded the first known accounts of a memory disorder that accompanied aging around the year 2000 B.C. (Boller & Forbes, 1998). Plato and Horatius also described aging as synonymous with senile dementia (Boller & Forbes, 1998). From the first century AD to the end of the second century AD, writers of the Hellenistic Empire, including Aulus Cornelius Celsus, Galen, and Aretheus of Cappadocia wrote about dementia. Aretheus described dementia as an irreversible impairment of cognitive functions (Boller & Forbes, 1998).

Philippe Pinel was the first to provide an adequate description of dementia. Although there is evidence that the term was been used as far back as 1381, Pinel has been credited with coining the term dementia (démence) in 1797 (Boller & Forbes, 1998).

The first edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM), published in 1952, did not use the term dementia, although it did include an Organic Brain Syndrome. This was described as chronic and more or less irreversible (Boller & Forbes, 1998). In the DSM II, published in 1968, a disorder with the name of Psychoses associated with organic brain syndrome describe Senile and Presenile dementia (Boller & Forbes, 1998). The DSM III, published in 1980, discarded the term organic brain syndrome and replaced it with dementia (Boller & Forbes, 1998).

2. Prevalence of Dementia in Society

In 1980, life expectancy was 70 years for men and 77 years for women in the United States (National Center for Health Statistics, 2012). In 2010, the life expectancy for men in the United States was 76 years and 81 years for women (National Center for Health Statistics, 2012). Currently the United States is home to 40 million individuals who are 65 years of age or older (Levine & Levine, 2013). In 2010, individuals at the age of 65 years accounted for 7.7% of the world's population (Matsuda et al. 2010). By 2030, an estimated 72 million individuals will be at the age of 65 years (Levine & Levine, 2013). As the population grows and technology and healthcare continue to progress, the numbers of elderly persons continues to grow as well. It is estimated that there are currently 36 million patients diagnosed with dementia worldwide. This number is expected to double over the next 20 years (Barnett et al., 2014).

As individuals reach the age of 65, their chance being diagnosed with dementia increases (Andersen et al., 2012). The possibility experiencing the symptoms of dementia increase as individuals continue to age (Levine & Levine, 2013). Dementia had an estimated prevalence of 14.7% in individuals 70 years of age or older in the United States in 2010 (Hurd, Martorell, Delavande, Mullen, & Langa, 2013). During this year around 5.1 million individuals were diagnosed with dementia in the United Sates alone (Hopper et al. 2013). Individuals aged 85 years of age and older have a 50% of being affected by dementia (Levine & Levine, 2013). The number of patients who are diagnosed with dementia will continue to grow as baby boomers continue to move into this age range (Herbert, Weuve, Scherr, & Evans, 2013).

3. Cognition and Dementia

The DSM IV defines dementia as a degenerative disease that is characterized by the development of multiple cognitive deficits. These deficits include memory impairment, deterioration of language functions, and disturbances in executive functions. Each of these deficits must exhibit a decline from a previously higher level of functioning and may become increasingly impaired with the progression of the disorder (DSM-IV-TR; American Psychiatric Association, 2000).

4. Autonomy and Healthcare Costs

As deterioration in memory and other cognitive domains is progressively experienced by a patient diagnosed with dementia, responsibility for one's self must be entrusted in a loved one or the staff of a care facility (Requena, Maestu, Campo, Fernadez, & Ortiz, 2006). A patient diagnosed with dementia experiences an increasing dependence on others as the disease progresses. Early symptoms of mild dementia may show only one cognitive domain impairment, though this impairment disturbs the patient's life substantially (DSM-IV-TR; American Psychiatric Association, 2000). Constant care for patients becomes increasingly necessary as the disease progresses and symptoms become more severe. The criteria for severe dementia include a loss of language skills, psychomotor abilities, ability to express emotion, and an apparent lack of communication between the brain and body (Requena et al., 2006).

Due to this progressive degenerative nature of dementia, costs of care rise for either the patient or those caring for the patient. An individual diagnosed with dementia or a family member of a patient will pay on average $33,329 more in health care costs than someone who is not diagnosed with dementia. The majority of this cost, 84%, is

attributable to the cost of care facilities (Hurd et al., 2013). Care for patients diagnosed with dementia creates a monetary cost of $600 billion in the Unites States each year. (Barnett et al., 2014). Medicare paid approximately $11 billion of this cost in 2010 (Hurd et al., 2013).

B. Problem

1. Pharmacological Treatments

Pharmacological treatments are the current accepted standard for treatment and help slow the rate of progression of the disease. These treatments have not shown an ability to prevent progressive decline (Hopper et al., 2013). The most popular are acetylcholinestrase inhibitors. The most commonly used of these is donepezil (Matsuda et al., 2010). The need that is left by the pharmaceutical treatments is a prevention of the progression of the disease (Requena et al., 2006). A method of increasing levels of abilities during cognitive decline or a method of slowing the rate of cognitive decline is a necessity that needs to be fulfilled with research (Matsuda et al., 2010).

2. Cognitive Interventions

Increasing amounts of research have been devoted to investigating the efficacy of cognitive interventions as treatments for dementia (Luttenberger, Hofner, & Graessel, 2012). Studies on cognitive interventions have shown these therapies provide improved global cognitive functioning, reduced behavioral disturbances, and positive effects on the quality of life of patients diagnosed with dementia (Buschert et al., 2011). Increasing amounts of literature have shown that benefits of cognitive interventions result from strengthened abilities that a patient diagnosed with dementia can apply in everyday life.

These benefits can enable a patient to have some control over their own well-being and gains from treatment. (Luttenberger, Hofner, et al., 2012).

C. Significance and Impact of Thesis

Recent literature has found that a positive relationship exists between increasing dependence and higher costs of health care. The increasing numbers of patients diagnosed with dementia will lead to a substantial increase in health and social care spending (Barnett, Lewis, Blackwell, & Taylor, 2014). Slowing down the rate of progression of the disease has the potential to reduce the burden of caregivers, lower the rate of hospitalization, and delay long-term admission into institutional care. A study by Gillespie et al. (2013) found that interventions that aim to improve patients' functional capacity and lessen their dependence on others have the potential to lower the costs of health care for patients and their families. Cognitive interventions focus on improving the cognitive-communication functioning for patients diagnosed with dementia. (Hopper et al., 2013). Resent literature has shown that cognitive interventions have the possibility to improve global cognitive functioning. Though the methods of each cognitive intervention differ (Hopper et al., 2013), each attempt to improve cognition so that abilities necessary for everyday activities will also be improved (Buschert et al., 2011). These interventions have the potential to benefit the lives of patients diagnosed with dementia and their family members.

D. Hypothesis and Operational Definitions

1. Statement of Hypothesis

If a patient diagnosed with dementia participates in a cognitive intervention, then they will experience less cognitive decline than a patient diagnosed with dementia who does not participate in a cognitive intervention.

2. Operational Definitions

a. Patients Diagnosed with Dementia

The Diagnostic and Statistical Manual of Mental Disorders, Fourth edition, defines dementia as the development of multiple cognitive deficits due to the direct physiological effects of a general medical condition, to the persisting effects of a substance, or to multiple etiologies. These deficits include memory impairment, impairment of language abilities, and disturbances in executive functioning. Impairments distress occupational and social functioning. Patients must experience a decline from a level of social functioning that was formerly higher. Memory impairment is experienced as an early symptom. The ability to learn new information and the ability to recall previously learned information is impaired (DSM-IV-TR; American Psychiatric Association, 2000).

Aphasia is one form of deterioration of language skills that is experienced by patients diagnosed with dementia. Individuals may experience an impaired ability to produce the names of people and objects. Both written and spoken language is impaired (DSM-IV-TR; American Psychiatric Association, 2000).

Impairment in executive functioning is also experienced as a symptom of dementia. Impairment in executive functioning is defined as the inability to produce abstract thoughts, to form plans, to perform movement sequences, to regulate complex behaviors, and to deter from complex behaviors. Patients diagnosed with dementia also experience spatial awareness deficits and dysfunctions in motor ability due to impaired executive functions. (DSM-IV-TR; American Psychiatric Association, 2000).

Memory impairment accompanied by aphasia, apraxia, agnosia, or executive function impairments are severe and cause impairment in social or occupational functioning. Individuals diagnosed with dementia may or may not be aware of these impairments (DSM-IV-TR; American Psychiatric Association, 2000).

Some factors, such as prognosis, depend on the etiology of the disease. Dementia can be experienced as progressive, static, or remitting. The reversibility of a dementia depends on the underlying pathology and of the availability and time of application of treatment (DSM-IV-TR; American Psychiatric Association, 2000).

The International Classification of Diseases defines dementia as syndrome due to disease of the brain. This syndrome includes impairments of cognitive functions, such as memory, thinking, orientation, comprehension, calculation learning capacity, language, and judgment. Deterioration in emotional control, social behavior, or motivation usually accompanies and occasionally precedes cognitive impairments (World Health Organization, 2008).

Dementia can be experienced as early or late onset. Late onset is more common as 95% of cases of dementia occur after the age of 65. The chance of developing dementia doubles every 5 years after the age of 65 (Bhogal et al., 2013). The highest prevalence of dementia is of ages 85 years and older (DSM-IV-TR; American Psychiatric Association, 2000).

There are three categories of severity of dementia; mild, moderate, and severe dementia (Stellos et al., 2010). Memory impairment ranges from forgetting where a patient placed something to forgetting their own name in more severe stages. In severe

or advanced cases of dementia, the individual may become totally oblivious to his or her surroundings. (DSM-IV-TR; American Psychiatric Association, 2000).

A presumed etiology determines the specific dementia diagnosis (DSM-IV-TR; American Psychiatric Association, 2000). There are many different types of specific dementia diagnoses; Dementia of the Alzheimer's Type, Vascular Dementia, Dementia Due to HIV Disease, Dementia Due to Head Trauma, Dementia Due to Parkinson's Disease, Dementia Due to Huntington's Disease, Dementia Due to Pick's Disease, Dementia Due to Cruetzfeldt-Jacob Disease, Dementia Due to other General Medical Conditions, Substance-Induced Persisting Dementia, and Dementia Due to Multiple Etiologies (DSM-IV-TR; American Psychiatric Association, 2000). Dementia of the Alzheimer's Type (AD), is the most common cause of dementia with elderly patients. There are about 26 million people with this diagnosis worldwide (Stellos et al., 2010).

A diagnosis of dementia is established during a clinical interview. These interviews focus on the cognitive changes experienced by a patient. The onset, duration, and progression of cognitive changes are assessed (Mast, 2012). The Diagnostic and Statistical Manual of Mental Disorders (DSM) and the International Classification of Diseases (ICD) are the most commonly used systems for diagnosing dementia (Naik & Nygaard, 2008). Established tests are also used as assessment tools to make a diagnosis. The Mini Mental State Examination (MMSE) is the most commonly used assessment tool (Perfecto & Ahern, 2013).

b. Cognitive Intervention

For the purpose of this research, a cognitive intervention is described as any type of therapy technique that focuses on cognitive-communication functioning for patients

diagnosed with dementia. Methods used for cognitive intervention are cognitive training, cognitive rehabilitation, and cognitive stimulation (Hopper et al., 2013).

Cognitive training is defined as a type of therapy that focuses on enhancing specific cognitive functions (Buschert et al., 2011). This is a structured therapy and standard tasks are used to improve these cognitive functions. This type of therapy aims to improve cognitive processes that effect everyday tasks (Hopper et al., 2013). Errorless learning and memory training are therapy techniques that qualify as cognitive training therapy (Matsuda et al., 2010).

Errorless learning is a technique that can compensate for memory deficits and aid patients in the acquisition of new skills and abilities. It is commonly used to teach every day tasks to patients with differing severities of dementia by strengthening association accuracy. This type of therapy can be lead by a therapist or a computer program (Matsuda et al., 2010). The errorless learning aims to enhance each patient's correct procedures and to avoid wrong pattern memorization.

Memory training is intended to optimize remaining, specific cognitive abilities, to postpone the loss of autonomy and independence in daily living and thus, to enhance self-esteem and life quality (Berger et al., 2004). This type of training involves encouraging patients to use elaborate encoding processes. Learning methods such as hierarchal cuing and spaced-retrieval are used in memory training (Neely, Vikström, and Josephsson, 2009). In collaborative memory programs, the caregiver and the patient diagnosed with dementia work together to develop supportive memory strategies in their own home environment guided by an assistant. Collaborative training provides an additional social element to the training (Neely et al., 2009).

Cognitive rehabilitation is defined as a type of therapy that requires health professionals, the patient, and the patient's family to set specific goals for the patient. Personalized strategies are developed to aid the patient in achieving the set goals (Hopper et al., 2013). This therapy involves instruction and practice in the use of memory strategies and strategies to help maintain attention, concentration, and stress management (van Paasschen et al., 2013). This type of therapy also seeks to improve the thinking, pattern recognition, and counting abilities of patients (Chen, Wang, Zou, Jia, & Jiao, 2011). Activities are targeted at improving specific cognitive deficits, compensating for deficits, or developing adaptive methods to promote independence of the patient in activities of daily living (Hindle, Petrelli, Clare, & Kalbe, 2013).

Cognitive stimulation therapy is defined as a type of therapy involves activities that focus on improving general cognitive functions, such as memory and executive functions, and social functions in a non-specific manor (Buschert et al., 2011). This type of therapy typically involves guided practice on a set of standard tasks designed to reflect the cognitive and social functions of focus (Hopper et al., 2013). These activities are usually performed in groups. Reality orientation, learning therapy, and memory training qualify as types of cognitive stimulation therapies (Niu, Tan, Guan, Zhang, & Wang, 2010).

Reality orientation uses the presentation and repetition of orientation information to engage patients in orientation-related activities. This therapy can be executed either throughout the day or in groups meeting on a regular basis (Spector, Orrell, and Woods, 2010).

Multimodal therapies focus on improving cognition and other functions, such as motor function. Each of these therapies aims to improve different specific functions through varying methods. MAKS is one type of multimodal group therapy. This therapy consists of tasks organized into three categories; motor stimulation (M), activities of daily living (A), and cognition (K). This type of multimodal therapy is preceded by a spiritual element (S) (Luttenberger, Hofner, et al., 2012). Motor function is targeted through activities such as bowling, croquet, or balancing a tennis ball on a Frisbee and passing it to a neighbor. To improve activities of daily living, patients are engaged in activities such as preparing a snack, engaging in creative tasks, or gardening work. Improving the cognition of tasks can involve an array of activities such as pen and pencil exercises or group picture puzzles (Luttenberger, Donath, Uter, & Graessel, 2012).

Cognitive changes that are experienced by patients as results of cognitive intervention can be measured using various forms of standardized tests or tasks that are designed to measure outcomes of specific treatments (Hopper et al., 2013).

c. Cognitive Deficits

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 2000) cognitive deficits are defined as memory impairment, aphasia, apraxia, agnosia, or disturbances in executive functioning. Memory impairment results in inability to learn new information or recall previously learned information. Memory is formally tested by an assessment of an individual's ability to register, retain, recall, and recognize material. Lists of words are used to help assess these abilities. An individual is first asked to repeat a list of words.

They must then attempt to recall the list of words after a few minutes delay. They are also asked to identify the words previously learned from another list. Individuals with memory impairments are unable to recall or recognize words when given a prompt because the information was not learned initially. The individual's ability to recall personal information or information from past material can also be tested. Individuals with memory impairments will exhibit deficits in this ability. Memory deficits may also be tested by an examination of effects that a possible memory impairment have shown in an individuals functioning, such as ability remember how to return home, how to work, and how to shop (DSM-IV-TR; American Psychiatric Association, 2000).

Aphasia is a deterioration of language abilities that is experienced as a symptom of dementia. This can be experienced as a reduced ability to produce the names of people and objects. Spoken and written language skills decline. Aphasia can cause an individual to frequently echo what they hear others say or to repeat sounds or words. Aphasia is tested for by asking an individual to name an object in a room, follow a list of commands, and repeat spoken statements (DSM-IV-TR; American Psychiatric Association, 2000).

Apraxia is defined as an impaired ability to carry out motor function. Motor function must still be intact (DSM-IV-TR; American Psychiatric Association, 2000).

Agnosia is also experienced as a symptom of dementia. Agnosia is defined as the inability to recall the word associated with objects. Individuals experiencing agnosia may exhibit normal visual abilities, but may be unable to identify and name objects. With advancing cognitive decline, they may also become unable identify people (DSM-IV-TR; American Psychiatric Association, 2000).

Deficits in executive functioning are defined as an inability to think abstractly, to form plans for the future, to initiate behaviors, perform sequences of motor movements, to monitor behavior, and to cease complex behaviors. To test for deficits in executive functioning, an individual may be asked to recite the alphabet, name as many animals as they can in 1 minute, draw a line of m's and n's without picking up their writing utensil off of the paper, count to 10, and to solve addition and subtraction problems of an appropriate level of difficulty (DSM-IV-TR; American Psychiatric Association, 2000).

Standardized tests are used to verify a dementia diagnosis by measuring a patient's level of cognitive impairment. The Mini-Mental State Examination is one of the most common assessment instruments used in screening for dementia (Stein et al., 2012). This test assesses attention, registration, language, constructional praxis, recall, and orientation (Stein et al., 2012). This test is scored using a scale that ranges form 0 to 30 (Coelho et al., 2013). Increasing scores indicate higher cognitive function (Buschert et al., 2011). This test is often used to assess changes in a patient's cognitive status over time (Stein et al., 2012).

The Alzheimer's Disease Assessment Scale- Cognitive part (ADAS-Cog) is another assessment tool used in dementia diagnose. This test assesses the cognitive functions of language, visuo-spatial ability, ideational praxis, and memory (Adachi et al., 2013). This test is a more sensitive rating scale than the MMSE at measuring cognitive functions (Buschert et al., 2011). The scale of this tests ranges from 0 to 70 (Spector et al., 2010). Lower scores of this test indicate higher cognitive function

(Buschert et al., 2011). The entire ADAS consist of two parts, a section that assesses cognition and another section that does not (Spector et al., 2010).

The Consortium to Establish a Registry for Alzheimer's Disease-Neuropsychological Assessment Battery (CERAD-NAB) assesses aspects of verbal episodic memory. It is mostly used for advanced stages of dementia. It is used to measure a patient's ability to learn new information (Beck, Gagneux-Zurbriggen, Berres, Taylor, & Monsch, 2012). The CERAD-NAB is composed of five subtests derived from previously established tests. These tests include Verbal Fluency, Modified Boston Naming Test, Mini-Mental State Examination, Word List Memory, and Constructional Praxis. These five subtest scores of the individual subtests reflect function of specific cognitive domains, while the total score reflects an over all level of cognitive functioning. The scale of the test is 1 to 100, with higher scores reflecting a greater level of cognitive functioning. This score is calculated by the sum of the five subtests (Paajanen et al., 2010).

The Nurses' Observation Scale for Geriatric Patients (NOSGER) is used to measure overall severity of dementia symptoms. (Luttenberger, Donath, et al., 2012). The test consists of 6 dimensions, which measure different areas of cognitive impairment. These dimensions include memory, instrumental activities of daily living, mood, social behavior, and disturbing behavior. Each of these dimensions contains 30 observable items of behavior. Each dimension has a rating scale range of 5 to 25 points (Tremmel & Spiegel, 1993). Lower scores indicate greater cognitive function (Luttenberger, Donath, et al., 2012). The memory and instrumental activities of daily

living dimensions used together are similar to the Mini Mental State Examination in sensitivity to change (Tremmel & Spiegel, 1993).

The Montreal Cognitive Assessment (MoCa) is used to assess frontal cognitive functioning, especially executive functions and attention abilities (de Andrade et al., 2013). This test is also especially sensitive to visuospatial deficits (Ihara, Okamoto, & Takahashi, 2013). This test was specifically developed to screen for milder forms of cognitive impairment. This test measures the level of functioning of the major cognitive domains, such as executive function, short-term memory, languages abilities, and visuospatial processing. This assessment tool is used a screening devise for dementia (Freitas, Simoes, Alves, Vicente, & Santana, 2012).

The Clock Drawing Test (CDT) is also used to assess frontal cognitive function, especially executive function and attention (de Andrade et al., 2013). The main task involved in this test is drawing the hands of a clock for a specific time. Other tasks included in this test are drawing the entire clock and stating the time that a pre-drawn clock indicates (Riedel, Klotsche, Förstl, & Wittchen, 2013). This test is used to evaluate memory, executive function, and verbal comprehension. This test is used to screen for dementia in elderly patients (Colombo, Vaccaro, Vitali, Malnati, & Guaita, 2009).

The Frontal Assessment Battery (FAB) also assesses frontal cognitive functions, especially executive function and attention (de Andrade et al., 2013). This tool is a brief and specific tool used for the detection of early executive dysfunction in dementia (Gleichgerrcht, Roca, Manes, & Torralva, 2001). This test consists of six subtests. These subtests explore a patients ability to identify similarities, lexical fluency or

mental flexibility, ability to perform motor sequences, sensitivity to interference through conflicting instructions, inhibitory control through a go/no go test, and environmental autonomy. The score on each item ranges from 0 to 3 (Oshima et al., 2012).

The Hasegawa's Dementia Scale-Revised (HDS-R) is diagnostic tool used to test for dementia. The score scale of this test ranges from 0 to 30. Lower scores indicate greater severity of cognitive deficits. The cut off point for screening for dementia is between 20 and 21 (Matsuda et al., 2010). This test consists of nine questions including age, orientation in time, orientation in place, repeating three words, serial 7's, backward digit span, recalling three words, recalling five objects, generating names of vegetables. These questions measure orientation, memory, attention, calculation, and verbal fluency (Kim et al., 2005).

The Clinical Dementia Rating Scale (CDR) is a also a diagnostic tool used to measure severity of dementia. This tests includes questions related to memory, orientation, judgment and problem solving, community affairs, home and hobbies, and personal care. This scale of this test is 1 to 3. A scores of one indicates mild dementia, a score of two indicates moderate dementia severity, three indicates severe dementia severity (Lanctôt, Hsiung, Feldman, Masoud, Sham, & Herrmann, 2009).

The Rivermead Behavioral Memory Test II (RMBT-II) consists of 12 tasks that simulate everyday memory situations that may be problematic for persons with cognitive deficits. These tasks include remembering a person's first and last name, recalling a hidden belonging, remembering an appointment, face recognition, remembering a short story, picture recognition, remembering a new route, delivering a

message, and answering typical orientation questions. This test covers a variety of memory functions (Wilson, Cockburn, Baddely, Ivani-Chalian, & Aldrich, 1985-2003).

II. Results

There are a number of cognitive interventions that have been investigated to find the effect that each has on the cognition of patients diagnosed with dementia. Each of these interventions have shown different levels of benefits to the cognition of patients. To maximize an understanding of the most beneficial types of cognitive interventions, the empirical studies included are organized as supporting, refuting, or mixed results studies. These studies are then further organized by the strength of the study. Studies of greater strength appear first in each section, followed by studies of less impact.

A. Summary Results Table

Study/ Relation to Hypothesis	**Sample Size**	**CI Type**	**CG Treatment**	**Type of Test(s)**	**Results (Change from baseline)**
Giordano et al. (2010) Support	100	Reality orientation	Standard care	MMSE, ADAS-Cog	(MMSE) TG imporoved +2.5, CG improved +0.3 (ADAS-Cog) TG improved + 9.5, CG declined -2.8
Requena et al. (2006) Support	78	Cognitive stimulation therapy, Cognitive stimulation therapy and donepezil	Donepezil, No treatment	MMSE	TG1 imporved +1.5 TG2 improved + 2.45 CG1 declined -3.37 CG2 declined -6.28
Luttenberger, Hofner, et al. (2012) Support	52	Multimodal therapy	Standard care	ADAS-Cog,	TG improved +0.1 CG declined -5.2
de Andrade et al. (2013) Support	20	Cognitive intervention focused on executive function, attention, and language	Standard care	FAB, MoCa	(FAB) TG improved +4.3, CG improved +0.4 (MoCa) TG improved +3.4, CG declined -1.2
Toba et al. (2014) Support	212	Cognitive rehabilitation therapy	Standard care group therapy	MMSE, HDS-R	(MMSE) TG improved +3, CG declined -1.3 (HDS-R) TG improved +1, CG declined -0.3
Rabey et al. (2013) Support	22	Cognitive training	Sham treatment	ADAS-Cog	(6 weeks after treatment) TG improved +3.76, CG improved +0.47 (4.5 months after treatment) TG improved +3.52, CG declined -0.38

Study/ Relation to Hypothesis	**Sample Size**	**CI Type**	**CG Treatment**	**Type of Test**	**Results (Change from baseline)**
Orrell et al. (2014) Support	157	Cognitive stimulation therapy, Cognitive stimulation therapy and acetylcholi-nesterase inhibitor	Acetylcholi-nesterase inhibitor	MMSE	TG1 declined -1.29 TG2 declined -1.02 CG declined -4.23
Matsuda et al. (2010) Support	49	Cognitive stimulation therapy	Donepezil	HDS-R	TG improved +1.91 CG declined by -1.28
Luttenberger, Donath, et al. (2012) Support	139	Multimodal therapy	Standard care	NOSGER	(Memory subtest) TG improved +1.5, CG improved +0.03 (ADL subtest) TG improved +0.7, CG declined -0.5
Coelho et al. (2013) Support	27	Multimodal therapy	Standard care	FAB	(Similarities) TG improved +0.7, CG declined -0.4, (Lexical Fluency) TG improved +0.4 CG declined -0.3

Study/ Relation to Hypothesis	**Sample Size**	**CI Type**	**CG Treatment**	**Type of Test**	**Results (Change from baseline)**
Clare et al. (2010) Refute	61	Cognitive rehabilitation therapy	Relaxation therapy, No treatment	Verbal Fluency, RBMT-II	(Verbal Fluency) TG decline -3.35, CG_1 declined -5.79, CG_2 improved +3.72 (RBMT-II) TG declined -.015, CG_1 declined -1.13, CG_2 improved +0.2
Niu et al. (2010) Refute	22	Cognitive stimulation therapy	Standard care and sham treatment	MMSE, NPI-Motor	(MMSE) TG improved +0.81, CG declined -0.19 (NPI-Motor) TG no change, CG improved +0.06
Van Paasschen et al. (2013) Refute	19	Cognitive rehabilitation therapy	Acetylcholi-nesterase inhibitor	FNAT (Face-name association test)	TG declined -0.11 CG improved +1.92
Lee et al. (2013) Refute	19	Computerized errorless learning based memory training program, Therapist lead errorless learning based program	Waitlist, no treatment	MMSE, DRS	(MMSE) CELP improved +1, TELP no change, CG improved +1.71 (DRS) CELP declined -2.33, TELP improved +8.67, CG no change

Study/ Relation to Hypothesis	**Sample Size**	**CI Type**	**CG Treatment**	**Type of Test**	**Results (Change from baseline)**
Andersen et al. (2012) Refute	187	Cognitive stimulation therapy	Standard care	MMSE, CDT	(MMSE) TG declined -0.3, CG improved +0.4 (CDT) TG improved +0.1, CG improved +0.3
Akanuma et al. (2011) Refute	24	Group reminiscence and Reality orientation therapy	Supportive care	MMSE	TG improved +0.8 CG improved +0.8
Schecker et al. (2013) Refute	42	Cognitive stimulation therapy	Acetylcholi -nesterase inhibitor	MMSE, VC	(MMSE) TG_1 improved +0.25, TG_2 improved +0.25, CG declined -0.6 (Verbal Comprehension) TG_1 no change, TG_2 declined -0.2, CG improved +0.4

Study/ Relation to Hypothesis	**Sample Size**	**CI Type**	**CG Treatment**	**Type of Test**	**Results (Change from baseline)**
Yamagami et al. (2012) Mixed	54	Reality orientation and reminiscence combination therapy	No treatment	CRR-SB, TMT-A	(CRR-SB) TG declined -0.4, CG improved +0.8 (TMT-A) TG declined -6.7, CG declined -11.4
Neely et al. (2009) Mixed	30	Caregiver lead cognitive training, Therpaist lead cognitive training	No treatment	MTT, WRT	(MTT) TG_1 improved +2.5, TG_2 declined -0.9, CG declined -1.6 (WRT) TG_1 improved +0.4, TG_2 improved +0.7, CG improved +0.9
Chen et al. (2011) Mixed	134	Cogntive rehabilitation and chinese medicine, Cogntive rehabilitation and Chinese medicine with acupuncture	Chinese medicine with acupuncture, Piracetam	MMSE	TG_1 improved +1.02 TG_2 improved +2.1 CG_1 improved +0.98 CG_2 improved +0.9

ADAS-Cog = Cognitive subtest of the Alzheimer's Disease Assessment Scale; CELP = computer assisted errorless learning-based memory training program; CDR-SB = Clinical Dementia Rating Scale; CG = control group; CDT = Clock Drawing Test; DRS = Dementia Rating Scale; FAB = Frontal Assessment Battery; FNAT = Face-name association test; HDS-R = Hasegawa's Dementia Scale-Revised; MMSE = Mini Mental State Examination; MoCa = Montreal Cognitive Assessment; Multimodal = cognitive intervention of combined physical exercise and cognitive tasks; MTT = Memory tasks test; NOSGER = Nurses' Observation Scale for Geriatric Patients; NPI-Motor = the Motor abilities subtest of the Neuropsychiatric Inventory; RBMT-II = Rivermead Behavioral Memory test II; TELP = therapist lead errorless learning-based memory training program; TG = Treatment group, type of cognitive intervention; TMT-A = Trail Making Test A; VC = Verbal comprehension Test; VF = Verbal fluency test; WRT= Word recall test

B. Evidence supporting hypothesis

The most compelling research is a study conducted by Giordano et al. (2010) that tested a type of cognitive stimulation therapy, reality orientation therapy. The researchers tested the hypothesis: If a patient diagnosed with dementia due to Alzheimer's disease participates in reality orientation therapy, then they will show less cognitive decline at the end of the study than patients who receive only a donepezil treatment.

All participants were patients diagnosed with dementia due to Alzheimer's disease. The treatment group consisted of 62 patients who participated in reality orientation therapy. This therapy focused on the patients' attention to the month, day, date, year, and place. This therapy also included naming of objects. The 38 patients of the control group received only a donepezil treatment. All patients were tested prior to and after treatment using the MMSE and the ADAS-Cog.

The results supported the research hypothesis. On the MMSE, the post-treatment mean score of the treatment group showed an improvement of (M= 2.5) from the baseline mean score. On this test, the post treatment mean score of the control group showed and improvement of (M= 0.3). On the ADAS-Cog, the post-treatment mean score of the treatment group showed an improvement of (M= 9.5) from the baseline mean score. On this test, the post-treatment mean score of the control group showed a decline of (M= -2.8) from the baseline mean score.

The findings strongly support the thesis hypothesis. The group of patients who participated in the cognitive intervention, reality orientation therapy, showed a greater improvement from the group baseline mean score than the control group on both the Mini

Mental State Examination and the Alzheimer's Disease Assessment Scale. The findings of this study also showed that cognitive intervention reversed the cognitive decline of patients.

A study conducted by Requena et al. (2006) investigates the effects of cognitive stimulation therapy on the cognition of patients diagnosed with dementia. The researchers tested the hypothesis: If a patient diagnosed with Alzheimer's dementia participates in a combined treatment of donepezil and cognitive stimulation therapy, then they will experience less cognitive decline than a patient who participates in only a cognitive stimulation therapy, only a donepezil treatment, or no treatment.

The 78 participating patients were all diagnosed with Alzheimer's dementia. Patients were assigned to one of four groups. Group 1 included 14 patients who participated in a combination treatment of donepezil and the cognitive stimulation therapy. Group 2 consisted of 20 patients who only a received donepezil treatment. Group 3 consisted of 14 patients who participated in only the cognitive stimulation therapy. Group 4 consisted of 30 patients who did not receive treatment. The cognitive stimulation therapy, of which patients of both Group 1 and Group 2 participated in, was comprised of seven areas of cognitive stimulation. These areas included orientation, bodily awareness, family and society, caring for oneself, reminiscing, household activities, animals, people, and things. These types of simulations were presented to the patients who were then asked to answer questions about them. All patients were tested prior to the start and at the conclusion of the study using the Mini Mental State Examination (MMSE).

The results supported the research hypothesis. On MMSE, the post-treatment mean score of Group 1 showed an increase of (M=1.5) from the mean baseline score. The post-treatment mean score of Group 2 showed and decrease of (M-3.37) from the baseline mean score. The

post-treatment mean score of Group 3 showed an increase of (M= 2.45) from the baseline mean score. The post-treatment mean score of Group 4 showed a decrease of (M=-6.28) from the baseline mean score.

The findings supported the thesis hypothesis. Both groups of patients who received the cognitive intervention, cognitive stimulation therapy, showed less cognitive decline than the groups of patients who did not participate in a cognitive intervention. The findings of this study also provide evidence that cognitive stimulation therapy without the addition of donepezil provided greater positive benefits for the cognition of the patients than the combination treatment of cognitive stimulation therapy and donepezil.

A study completed by Luttenberger, Hofner, et al. (2012) compares the effects of a multimodal form of cognitive intervention to the effects of standard care on the cognition of patients diagnosed with dementia.

This study consisted of 52 participating patients diagnosed with dementia. All patients were tested prior to and at the conclusion of the study using the Alzheimer's Disease Assessment Scale (ADAS-Cog). The 30 patients of the treatment group participated in a multimodal form of cognitive intervention. This therapy used tasks organized into the categories of motor stimulation, activities of daily living, cognition, and a spiritual element (MAKS). The 22 patients of the control group received only standard care.

The results supported the researchers' predictions. The MAKS treatment group mean score after treatment showed an increase of (M= 0.1) from the mean baseline score. On this test, the mean score of the control group after treatment decreased by (M= -5.2) from the mean baseline score.

The findings support the thesis hypothesis. The treatment group showed less decline from the mean baseline scores after treatment than the control group on the Cognition subscale of the Alzheimer's Disease Assessment Scale.

A study conducted by de Andrade et al. (2013) investigated the effects of a multimodal form of cognitive intervention of the cognition of patients diagnosed with dementia. The researchers tested the hypothesis: If a patient diagnosed with dementia participates in a multimodal form of cognitive intervention, then they will experience greater cognitive improvement than patients who received only standard care.

The participants of this study included 30 patients diagnosed with dementia due to Alzheimer's disease. The treatment group consisted of 14 patients who participated in a multimodal form of cognitive intervention. This intervention targeted executive function, attention, and language abilities. The 16 patients of the control group received only standard care. All patients were tested prior to and after treatment using the Frontal Assessment Battery (FAB) and the Montreal Cognitive Assessment (MoCa).

The results supported the researchers hypothesis. On the FAB, the post-treatment mean score of the treatment group showed an increase of (M= 4.3) from the baseline mean score. On this test, the post-treatment mean score of the control group showed an increase of only (M= 0.4). On the MoCa, the post-treatment mean score of the treatment group showed an increase of (M= 3.4) from the baseline mean score. On this test, the post-treatment mean score of the control group showed a decrease of (M= -1.2) from the baseline mean score.

The findings strongly support the thesis hypothesis. The treatment group, who received the cognitive intervention, showed greater improvement from baseline on the Frontal Assessment Battery than the control group. The treatment group also improved on the

Montreal Cognitive Assessment from the mean baseline score, while the mean score of the control group declined. The findings show that patients who participated in the cognitive intervention showed fewer cognitive deficits than patients who received only standard care.

A study conducted by Toba et al. (2014) tested the effects of another form of cognitive intervention, cognitive rehabilitation therapy. The researchers tested the hypothesis: If a patient a diagnosed with dementia participates in cognitive rehabilitation therapy, then they will show less cognitive deterioration than patients who receives only standard care.

All participants included in this study were patients diagnosed with dementia. The treatment group consisted of 158 patients who received cognitive rehabilitation therapy. This treatment included reminiscence therapy, reality orientation, memory rehabilitation, occupational therapy, speech communication therapy, and learning activities. The 54 patients of the control group received only standard care. All patients were tested prior to and after treatment using the MMSE and the HDS-R.

The results supported the research hypothesis. On the MMSE, the post treatment mean score of the treatment group showed an increase of (M= 3.0) from the baseline mean score. On this test, the control group showed a decline of (M= -1.3) from the baseline mean score. On the HDS-R, the post treatment mean score of the treatment group showed an increase of (M= 1.0) from the baseline mean score. On this test, the post treatment mean score of the control group showed a decline of (M= -0.3) from the baseline mean score.

The findings support the thesis hypothesis. The patients of the treatment group, who received the cognitive intervention, showed improvement from the baseline mean score on both the Mini Mental State Examination and the Hasegawa Dementia Scale revised. The group of patients in the control group, who did not participate in the intervention, showed

decline from the baseline score on both tests. This study provides evidence that cognitive intervention can have greater positive effects on the cognition of patients than standard care.

Another study by Rabey et al. (2013) investigated the effects of another form of cognitive intervention, cognitive training therapy. The researchers investigated the hypothesis: If a patient diagnosed with dementia participates in cognitive training therapy, then they will experience a greater improvement of cognition than patients who do not participate in the cognitive intervention.

All participants included in this study were patients diagnosed with dementia due to Alzheimer's disease. The seven patients in the treatment group participated in cognitive training therapy. This therapy consisted of tasks that focused on language, naming objects, and special memory. The eight participants of the control group received no specified treatment during the study. Patients were tested prior to and after treatment using the Alzheimer's Disease Assessment Scale (ADAS-Cog).

The results supported the research hypothesis. Six weeks after treatment, the mean score of the treatment group showed an improvement of (M= 3.76) from the baseline mean score. On this test, the mean score of the control group showed an improvement of only (M=0.47) from the baseline mean score. Four and a half months after treatment, the mean score of the treatment group showed an improvement of (M= 3.52) from the baseline mean score. On this test, the control group showed a decline of (M= -0.38) from the mean baseline score.

The findings of this study support the thesis hypothesis. The patients of the treatment group showed a greater improvement on the Alzheimer's Disease Assessment Scale than control group during both sessions of testing. These finding also showed that the cognitive

intervention reversed the cognitive decline of patients and showed maintenance of the improvement after treatment had stopped.

A study by Orrell et al. (2014) tested the long-term effects of cognitive stimulation therapy. The researchers tested the hypothesis: If a patient diagnosed with dementia participates in a cognitive stimulation therapy, then they will experience less cognitive decline after 6 months than a patient who does not participate in cognitive stimulation therapy.

All participating patients were diagnosed with either vascular dementia or Alzheimer's dementia. Group 1 consisted of 81 patients who participated in a cognitive stimulation therapy. Group 2 consisted of 42 patients who participated in the cognitive stimulation therapy and were taking an acetylcholinestrase inhibitor. Group 3 consisted of 34 patients who were taking an acetylcholinestrase inhibitor and did not participate in the cognitive stimulation therapy. All patients were tested prior to and six months after treatment with the MMSE.

The results supported the research hypothesis. The mean post treatment score of Group 1 showed a decline of (M= -1.29) from the mean baseline score. The mean post treatment score of Group 2 showed a decline of (M= -1.02) from the mean baseline score. The mean post treatment score of Group 3 showed a decline of (M= -4.23).

The findings supported the thesis hypothesis. Both groups of patients who participated in the cognitive stimulation therapy experienced less cognitive decline than the control group of patients who did not participate in the cognitive intervention.

A study by Matsuda et al. (2010) also tested the effects that cognitive stimulation therapy has on the cognition of patients. The researchers tested the hypothesis: If a patient diagnosed with Alzheimer's type dementia experiences a combination of both cognitive

stimulation therapy and the pharmacological treatment donepezil, then the patient will experience less cognitive decline than a patient who receives donepezil treatment only.

The 49 participants included in this study were all patients diagnosed with Alzheimer's dementia. The cognitive abilities of all participants were measured before and after treatment using the Hasegawa's Dementia Scale-Revised (HDS-R). The treatment group, which consisted of 31 patients, received cognitive stimulation therapy and donepezil. The activities of the cognitive stimulation therapy were based on an errorless learning paradigm. The activities targeted mental control, learning, and word fluency tasks. The learning activities included reading out loud and solving arithmetic calculations. Participants in the control group, which consisted of 18 patients, received only donepezil.

The results supported the investigators' hypothesis. The post treatment mean score of the treatment group increased by (M= 1.91) from the baseline mean score on the HDS-R. The post treatment mean score of the control group decreased by (M= -1.28) from the baseline mean score on the HDS-R.

The findings supported the thesis hypothesis. The treatment group that received the cognitive stimulation therapy showed less cognitive decline after treatment than the control group that received only donepezil on the Hasegawa's Dementia Scale-Revised. The findings of this study provide evidence that cognitive intervention is able to provide greater benefits to the cognition of patients than a current form of standard care, donepezil.

A study by Luttenberger, Donath, et al. (2012), also compared the effects of a multimodal form of cognitive intervention to the effects of standard care on the cognition of patients diagnosed with dementia. The researchers tested the hypothesis: If a patient

diagnosed with dementia participates in a multimodal MAKS therapy, they will show greater cognitive improvement than patients who only receive standard care.

All patients who participated in this study were diagnosed with dementia. The treatment group consisted of 71 patients who participated in the MAKS therapy. This therapy incorporated tasks organized into the categories of motor stimulation, activities of daily living, and cognition. Each session began with a spiritual element, such as singing a song. The control group consisted of 78 patients who received only standard care. All patients were tested prior to and after treatment using the Nurses' Observation Scale for Geriatric Patients (NOSGER).

The results supported the research hypothesis. On the Memory subscale of the NOSGER, the post treatment mean score of the MAKS group showed an improvement of (M= 1.5) from the baseline mean score. The post treatment mean score of the control group showed less improvement from the baseline mean score on this subscale with increase of (M= 0.03). On the Instrumental Activities of Daily Living subscale of the NOSGER, the post treatment mean score of the MAKS group showed an increase of (M= 0.7) from the baseline mean score. The post treatment mean score of the control group showed a decline of (M= -0.5) on this subscale.

The findings supported the thesis hypothesis. The patients of the cognitive intervention group showed less cognitive decline on the Nurses' Observation Scale for Geriatric Patients after treatment than the control group.

A study conducted by Coelho et al. (2013) looked at another multimodal form of cognitive intervention. The researchers tested the hypothesis: If a patient diagnosed with Alzheimer's dementia participates in a multimodal cognitive intervention, then they will

experience greater benefits to cognitive functions than patients who received only standard care.

The fourteen patients of the treatment group participated in the multimodal intervention. This intervention used tasks that combined physical exercise and cognitive abilities, such as motor sequencing, focused attention, and judgment. The thirteen patients of the control group received only standard care. All patients were diagnosed with Alzheimer's dementia and were tested before and after treatment using subtests of the Frontal Assessment Battery (FAB).

The results supported the research hypothesis. On the Similarities subtest, the post treatment mean score of the treatment group showed an improvement of (M= 0.7) from the baseline mean score. The control group showed a decline of (M= -0.4) from the baseline mean score. On the Lexical Fluency subtest, the post treatment mean score of the treatment group showed an improvement of (M= 0.4) from the baseline mean score. On this subtest, the control group showed a decline of (M= -0.3) from the baseline mean score. On the Series of Motor Movements subtest, the post treatment score of the treatment group showed an improvement of (M= 1.4) from the baseline mean score. On this subtest, the control group showed a decline of (M= -0.5) from the baseline mean score.

The findings supported the thesis hypothesis. The treatment group showed fewer cognitive deficits after treatment than the control group.

C. Evidence Refuting Hypothesis

A study by Clare et al. (2010) tested the effects of cognitive rehabilitation therapy against two other types of therapies. The researchers tested the hypothesis: If a patient diagnosed with dementia participates in cognitive rehabilitation therapy, then they will show fewer cognitive

deficits than patients who participated in relaxation therapy or received standard care only at the end of treatment.

The treatment group that participated in the cognitive rehabilitation therapy, Group 1, consisted of 21 patients. This therapy involved addressing meaningful goals, techniques for learning new information, and practice in maintaining attention and concentration. The 21 patients of the second treatment group, Group 2, participated in a relaxation therapy. This therapy involved muscle relaxation techniques and breathing exercises for stress management. The control group, Group 3, consisted of 19 patients who received standard care only. All patients were tested prior to and after treatment with a test of verbal fluency and the Rivermead Behavioral Memory Test II (RBMT-II).

The results refuted the research hypothesis. On the verbal fluency test, the post treatment mean score of Group 1 showed decline of (M= -3.35) from the baseline mean score. Group 2 showed decline of (M= -5.79) from baseline. Group 3 showed an improvement of (M= 3.72) from baseline. On the RBMT-II, Group 1 showed decline of (M= -0.15) from baseline. Group 2 showed decline of (M= -1.13) from baseline. Group 3 showed an improvement of (M= 0.2) from baseline.

The findings refuted the thesis hypothesis. Although the patients who participated in the cognitive rehabilitation therapy showed less decline after treatment than the patients who participated in relaxation therapy, they showed greater decline than the control group from the mean baseline score on both the test of verbal fluency and the Rivermead Behavioral Memory Test II.

A study by Niu et al. (2010) tested the effects of a cognitive stimulation therapy on the cognition of patients diagnosed with Alzheimer's' disease. The researchers tested the

hypothesis: If a patient diagnosed with Alzheimer's disease participates in a cognitive stimulation therapy, then they will experience greater benefits to cognitive functions than a patient who does not participate in the intervention.

All participating patients were diagnosed with Alzheimer's disease and all patients received doses of donepezil prior to and during the study. The 16 patients of the treatment group participated in a cognitive stimulation therapy that focused on reality orientation, verbal fluency, and episodic memory retrieval. The 16 patients of the control group did not participate in the cognitive stimulation therapy. Instead, they participated in non-structured activates such as learning about the progression of Alzheimer's disease and took part in conversations about current and life events. All patients were tested prior to and after treatment using the MMSE and the Motor subtest of the Neuropsychiatric Inventory (NPI).

The results refuted the research hypothesis. On the MMSE, the mean post treatment score of the treatment group showed an improvement of (M= 0.81) from the mean baseline score. The mean post treatment score of the control group showed a decline of (M= -0.19) from the baseline mean score. On the Motor subtest, the post treatment score of the treatment group showed no change from the mean baseline score. The control group showed an improvement of (M= 0.06) from the mean baseline score.

The findings refute the proposed thesis hypothesis. Both the patients who participated in the cognitive stimulation therapy and the patients who did not participate in the intervention showed a lack of change in cognitive functioning after treatment.

A study by van Paasschen et al. (2013) also tested the effects of cognitive rehabilitation therapy on the cognition of patients receiving stable doses of acetylcholinesterase inhibiting medication. The researchers tested the hypothesis: If a patient

diagnosed with dementia participates in a cognitive rehabilitation therapy while taking a acetylcholinesterase inhibitor, then they will experience greater benefits to cognitive functions than patients who receive only an acetyl-cholinesterase inhibitor.

All participating patients of this study were diagnosed with Alzheimer's disease or Alzheimer's disease and vascular dementia. The seven patients of the treatment group participated in the cognitive rehabilitation therapy and took an acetylcholinesterase inhibitor. The cognitive rehabilitation therapy involved teaching patients strategies for acquiring new information, including verbal and visual mnemonics, semantic elaboration, and expanding rehearsal. The 12 patients of the control group took only an acetyl-cholinesterase inhibitor. All patients were tested prior to and at the conclusion of the study using a face-name association test. This test required patients to match the pictures of presented faces to the correct names. The face-name associations were presented to patients during a prior encoding phase.

The results refuted the research hypothesis. The mean post treatment score of the treatment group showed a decrease of (M=-0.11) from the mean baseline score. The mean post treatment score of the control group showed an improvement of (M=1.92) from the mean baseline score.

The findings refute the proposed thesis hypothesis. The patients who participated in the cognitive rehabilitation showed no improvement in their cognitive ability to make face-name associations, while the group of patients who did not participate in the cognitive rehabilitation therapy showed a slight improvement. The results show that this cognitive intervention did not provide benefits to the cognition of the patients.

A study by Lee, Yip, Yu, and Man (2013) tested the two types of cognitive training. The researchers investigated the effects of a computerized errorless learning based memory

training program on the cognition of patients diagnosed with dementia compared to a therapist lead errorless learning based program and a waitlisted control group.

The participating patients were diagnosed with dementia due to Alzheimer's disease. Group 1 consisted of 7 patients who participated in a computer assisted errorless learning-based memory-training program. Group 2 consisted of 6 patients who participated in a therapist lead errorless learning-based memory-training program. Both of the errorless learning-based memory-training programs included tasks broken into components, overlearning of components through repetition and practice, training from simple to complex with a hierarchical training of gradation and features of early success, positive immediate feedback to reinforce learning and a nonthreatening approach with hints, and incorporating vanishing cues and spaced retrieval strategies. Group 3 consisted of 6 patients who were waitlisted for treatment. All patients were tested prior to and after treatment using the MMSE and the Dementia Rating Scale (DRS).

The results varied. On the MMSE, the post treatment score of Group 1 showed an improvement of (M= 1) from the mean baseline score. Group 2 showed no change. Group 3 showed an improvement of (M= 1.71). On the DRS, the post treatment score of Group 1 showed a decline of (M= -2.33). Group 2 showed an improvement of (M= 8.67). Group 3 showed no change from the mean baseline score.

The refuted the thesis hypothesis. Both groups that participated in the cognitive interventions showed less cognitive improvement than the control group on the Mini Mental State Examination. The control group showed greater improvement than the computer assisted errorless learning-based memory-training program group on the Dementia Rating Scale.

A study by Anderson et al. (2012) investigated the long-term effects of cognitive stimulation therapy on the cognition of patients. The researchers investigated the hypothesis: If a patient diagnosed with dementia due to Alzheimer's disease participates in a combination of cognitive stimulation therapy and donepezil, then they will experience greater benefits to cognition than patients who received only standard care.

All participants were patients diagnosed with dementia due to Alzheimer's disease. The treatment group consisted of 103 patients who participated in cognitive stimulation therapy. This therapy involved physical, cognitive, and sensory focused activities as well as social stimulation. The control group consisted of 77 patients who received standard care only. All patients were tested prior to and 12 months after treatment using the Mini Mental State Examination (MMSE) and the Clock Drawing Test (CDT).

The results refuted the research hypothesis. On the MMSE, the means score of the treatment group 12 months after treatment showed a decrease of (M= -0.3) from the mean baseline score. On this test, the mean score of the control group 12 months after treatment showed an improvement of (M= 0.4) from the baseline mean score. On the CDT, the mean score of the treatment group 12 months after treatment showed an increase of (M= 0.1) from the mean baseline score. On this test, the mean score of the control group showed a slightly greater increase of (M= 0.3) from the mean baseline score.

The findings weakly refuted of the proposed thesis hypothesis. The treatment group, who received the cognitive stimulation therapy, showed less improvement on both the Mini Mental State Examination and the Clock Drawing Test than the control group. The findings of this study show that a combination treatment of cognitive stimulation therapy and donepezil

may not be able to slow the rate of cognitive decline to a greater degree than standard care alone.

Another study conducted by Akanuma et al. (2011) tested a different type of cognitive stimulation therapy, a combination therapy of group reminiscence and reality orientation therapy. The researchers tested the hypothesis: If a that patients diagnosed with vascular dementia participates in group reminiscence and reality orientation therapy, then they will experience greater benefits to cognition than patients who received only supportive care.

All participants were patients diagnosed with vascular dementia. The treatment group, which participated in the group reminiscence and reality orientation therapy, consisted of 12 patients. This combination therapy aimed to reinforce recognition of orientation and to improve memory. Some activities that were included in this therapy were speaking about topics that pertained to the patients' pasts, such as past therapy sessions of the study, childhood events, and important events of the patients' lives. The control group, which received only supportive care, consisted of 12 patients. All patients were tested prior to and at the end of treatment using the Mini Mental State Examination (MMSE).

The results refuted the research hypothesis as both groups showed an equal amount of cognitive improvement. On the MMSE, the mean post treatment score of the treatment group showed an improvement of (M= 0.8) from the mean baseline score. The post treatment mean score of the control group also showed an improvement of (M= 0.8) from the mean baseline score.

The findings refuted the proposed thesis hypothesis. Both the treatment group, which participated in the cognitive intervention, and the control group, which did not participate in the cognitive intervention, showed the same amount of improvement on the Mini Mental State

Examination after treatment. The treatment group did not show fewer cognitive deficits than the control group.

A study by Schecker, Pirnay-Dummer, Schmidtke, Hentrich-Hesse, and Borchardt (2013) investigated whether two types of cognitive stimulation therapies would have greater cognitive benefits for patients diagnosed with dementia than an acetylcholinesterase inhibitor.

All patients were diagnosed with dementia due to Alzheimer's disease. Group 1 consisted of 12 patients who participated in a focus group type of CST. This therapy focused on supporting executive processing by engaging patients in discussions on sensitive topics. Group 2 consisted of 15 patients who participated in a training group type of CST. This therapy focused on improving working memory and executive functions. Group 3 consisted of 15 patients who received only an acetyl-cholinesterase inhibitor. All patients were tested prior to and after treatment using the Mini Mental State Examination (MMSE) and a Verbal Comprehension test.

The results varied. On the MMSE, the mean post treatment score of Group 1 showed an increase of (M= 0.25) from the mean baseline score. Group 2 showed an increase of (M=0.2) from baseline. Group 3 showed a decrease of (M=-0.6) from baseline. On the Verbal Comprehension test, Group 1 showed no change from baseline. Group 2 showed a decrease of (M= -0.2) from baseline. Group 3 showed an increase of (M= 0.4) from baseline.

The finding refuted the thesis hypothesis. On both the Mini Mental State Examination and the Verbal Comprehension test, the patients who participated in treatment groups and the patients in the control group showed no changes in cognitive function after treatment.

D. Evidence of Mixed Findings

A study by Yamagami, Takayama, Maki, and Yamaguchi (2012) investigated the effects of cognitive rehabilitation on the cognition of patients diagnosed with dementia. The researchers tested the hypothesis: If a patient diagnosed with dementia participates in a cognitive rehabilitation therapy, then they will experience greater benefits to cognition than patients who do not participate in the intervention.

All participating patients were diagnosed with dementia. The 28 patients of the treatment group participated in the cognitive rehabilitation therapy. This therapy incorporated reality orientation and reminiscence therapy. The focus of the therapy was to improve recall of procedural memory for patients. The 25 patients of the control group did not participate in the cognitive rehabilitation therapy. All patients were tested prior to and at the conclusion of treatment using the Clinical Dementia Rating Scale (CDR) and the Trail Making Test (TMT).

The results refuted the research hypothesis. On the CDR, the post-treatment score of the treatment group showed a slight decline of (M= -0.4) from the mean baseline score. The post-treatment mean score of the control group showed a slight improvement of (M= 0.8) from the mean baseline score. On the TMT, the post-treatment mean score of the treatment group showed a decline of (M= -6.7) from the mean baseline score. The post-treatment mean score of the control group showed a decline (M= -11.4).

The findings both supported and refuted the proposed thesis hypothesis. The patients who received the cognitive rehabilitation therapy showed less decline than the control group on the Trail Making Test. Though cognitive rehabilitation seemed to help patients retain psychomotor functions, the intervention did not have the same effect on global cognitive functions. The patients who participated in the cognitive rehabilitation therapy and the

patients of the control group showed the same lack of change on the Clinical Dementia Rating Scale.

A study by Neely et al. (2009) investigated two forms of cognitive stimulation therapy. These were two memory interventions. The researchers tested hypothesis: If a patient diagnosed with dementia participates in a collaborative memory intervention, then they will experience greater improvement to memory performance than patients who participate in a individual memory intervention and patients who do not participate in a memory intervention.

All participating patients were diagnosed with either Alzheimer's disease or vascular dementia. Group 1 consisted of 10 patients who participated in the of the collaborative memory intervention. This intervention focused on spaced retrieval and hierarchical cueing learning strategies. A face-name associations task and a table setting activity were used to exercise these learning strategies. Caregivers provided verbal assistance to the patients. Group 2 consisted of 10 patients who participated in the individual memory intention. This intervention involved an identical method as the collaborative memory task, with the exception of verbal assistance from caregivers. Group 3 consisted of 10 patients who did not participate in a memory intervention. All patients were tested prior to and after treatment using two measures. Test 1 measured the ability of patients to immediately recall previously presented random nouns. The goal of this test was to remember as many nouns as possible. Test 2 was exactly the same, except that patients could easily categorize the words presented.

The results both supported and refuted the thesis hypothesis. On Test 1, the post treatment mean score of Group 1 showed an improvement of (M= 2.5) from the baseline mean score. Group 2 showed a decline of (M= -0.0) from the baseline mean score. Group 3 showed a decline of (M=-1.6) from the baseline mean score. On Test 2, the mean post treatment mean

score of Group 1 showed an improvement of (M= 0.4) from the baseline mean score. Group 2 showed an improvement of (M= 0.7) from the mean baseline score. Group 3 showed an improvement of (M= 0.9) from the mean baseline score.

The findings both supported and refuted the proposed thesis hypothesis. The patients who participated in the collaborative memory intervention showed a greater improvement on the memory tasks test than the patients who participated in the individual memory intention and the patients who did not participate in either treatment. Both treatments groups and the control group of patients showed no change from the mean baseline score after treatment on the word recall test.

A study by Chen et al. (2011) tested the effects of a cognitive rehabilitation therapy on the cognition of patients diagnosed with dementia. The researchers aimed to gain information of the effects that cognitive rehabilitation, Chinese medicine, acupuncture, and Piracetam have on the cognition of patients diagnosed with dementia.

All participating patients were diagnosed with vascular dementia. Group 1 consisted of 32 patients who participated in a cognitive rehabilitation therapy and received Chinese medicine. Group 2 consisted of 33 patients who received Chinese medicine and acupuncture. Group 3 consisted of 37 patients who participated in the cognitive rehabilitation therapy, received acupuncture, and received Chinese medicine. Group 4 consisted of 32 patients who only took Piracetam during the study. All patients were tested prior to and at the conclusion of the study using the Mini Mental State Examination.

The post treatment mean score of Group 1 showed an improvement of (M= 1.02) from the mean baseline score. The post treatment mean score Group 2 showed and improvement of (M= 0.98) from the mean baseline score. The post treatment mean score of Group 3 showed

and improvement of (M= 2.1) from the mean baseline score. The post treatment mean score of Group 4 showed an improvement of (M= 0.9) from the mean baseline score.

The findings both support and refute the thesis hypothesis. The patients who participated in the cognitive rehabilitation therapy and received Chinese medicine showed no greater cognitive improvement than the patients in the two groups that did not participate in the cognitive rehabilitation therapy. The patients who participated in the cognitive rehabilitation therapy, received Chinese medicine, and received acupuncture showed cognitive improve greater than that of the patients who did not participate in the cognitive rehabilitation therapy.

III. Discussion

A. Summary of Findings

1. Articles Offering Support for the Thesis Hypothesis

The supporting evidence suggests that cognitive interventions not only cause patients to experience less cognitive decline than patients who do not participate in cognitive intervention, but also that these interventions have the ability to reverse cognitive decline to a degree.

All of the studies of which findings showed that cognitive intervention improved the level of cognitive functioning of patients, the patients who received standard care or no specified treatment during the study showed either cognitive decline or stabilized levels of cognitive function. All of the studies that showed that cognitive intervention stabilized levels of cognitive function of patients, also showed that patients who received only standard care or no specified treatment during the study experienced cognitive decline.

The most compelling research of this category was conducted by Giordano et al. (2010). This study investigated the effects a cognitive stimulation therapy, reality orientation therapy. This therapy focused on the patients' attention to the month, day, date, year, and place. This therapy also included the naming of objects. The findings showed that the overall cognitive function of patients who participated in the reality orientation therapy greatly improved, while the overall cognitive function of patients who received only a donepezil treatment significantly declined. The findings of this study show that cognitive stimulation therapy can reverse cognitive decline experienced by patients diagnosed with dementia. The findings also show the failure of donepezil, currently used as standard treatment for dementia, to stabilize the level of cognitive function of patients.

Another study conducted by Luttenberger, Hofner, et al. (2012) found that cognitive interventions can stabilize the cognition of patients diagnosed with dementia, while other treatments result in cognitive decline. This study investigated the effects of a multimodal form of cognitive intervention. This therapy used tasks organized into the categories of motor stimulation, activities of daily living, cognition, and a spiritual element. The patients who participated in the multimodal form of cognitive intervention experienced stabilized cognitive function over the course of the study, while the patients who received standard care experienced significant cognitive decline. This study also shows that cognitive interventions may offer greater benefits for patients diagnosed with dementia, than the current form of standard care.

Another study by Rabey et al. (2013) investigated the lasting effects of another form of cognitive intervention over a period of time. The researched tested the lasting

effects of cognitive training therapy on the cognition of patients diagnosed with dementia four and a half months after treatment. This therapy consisted of tasks that focused on language, naming objects, and special memory. The findings showed that patients who participated in the cognitive training therapy maintained cognitive improvement at four and a half months after the conclusion of the treatment. Patients who received no specified treatment during the study did not experience improvement of cognitive functions or cognitive decline throughout the course of the study.

2. Articles Offering Refutation of the Thesis Hypothesis

The refuting evidence suggests that cognitive intervention is equally as effective or less effective than other types of treatments for preventing cognitive decline of patients diagnosed with dementia. The evidence shows that patients who participated in a cognitive intervention showed a decline in cognitive function or stabilized cognitive function, while the patients who did not participate in a cognitive intervention showed improved or stabilized cognitive function.

A study by Clare et al. (2010) found that cognitive rehabilitation provided fewer benefits to the cognition of patients diagnosed with dementia, than standard care. The cognitive rehabilitation therapy involved addressing meaningful goals, techniques for learning new information, and practice in maintaining attention and concentration. The findings showed that patients who participated in the cognitive rehabilitation therapy experienced a decline of verbal fluency, while patients who received standard care improved over the course of the study. Both the patients who received cognitive rehabilitation and the patients who received relaxation therapy experienced stability of over all cognitive functions over the course of the study. The findings showed that

cognitive rehabilitation therapy was equally as effective as rehabilitation therapy and less effective than standard care.

A study by Niu et al. (2010) found that cognitive stimulation therapy had fewer benefits on the cognition of patients diagnosed with dementia than donepezil treatment. The cognitive stimulation therapy focused on reality orientation, verbal fluency, and episodic memory retrieval. The findings showed that patients who participated in the cognitive stimulation therapy experienced significant cognitive decline over the course of the study, while the patients who received donepezil treatment and did not participate in the cognitive intervention experienced stabilized cognitive levels function.

A study by Akanuma et al. (2011) found that cognitive stimulation therapy was not able to provide greater benefits to the cognition of patients diagnosed with dementia than supportive care. This cognitive stimulation therapy involved a combination of group reminiscence and reality orientation therapy. This combination therapy aimed to reinforce recognition of orientation and to improve memory. Some activities included in this therapy were speaking about topics that pertained to the patients' pasts, such as past therapy sessions of the study, childhood events, and important events of the patients' lives. The findings showed that both the cognitive stimulation therapy and the supportive care stabilized the cognition of patients diagnosed with dementia.

3. Articles Supporting and Refuting the Thesis Hypothesis

Although the majority of the studies collected clearly supported or refuted the thesis hypothesis, three studies presented evidence that both supported and refuted the

thesis hypothesis. A study by Neely et al. (2009) found a collaborative memory intervention to be more effective than an individual memory intervention and no treatment for slowing the rate of cognitive decline. The findings showed that patients who participated in the collaborative memory intervention experienced cognitive improvement, while patients who participated in the individual memory intervention and patients who received no specified treatment during the study both experienced cognitive stability over the course of the study.

A study by Yamagami et al. (2012) tested the effects of a cognitive rehabilitation that focused on improving recall of procedural memory for patients through incorporated reality orientation and reminiscence therapy. The findings of this study showed that patients who participated in the cognitive rehabilitation and patients who received no specified treatment during the study experienced stabilized levels of over all cognitive function over the course of the study. Patients who participated in the cognitive rehabilitation experienced less decline of psychomotor speed than patients who received no specified treatment during the study. The findings of this study show that cognitive rehabilitation may be more beneficial for the psychomotor abilities of patients diagnosed with dementia than no treatment. The findings also show that cognitive rehabilitation does not provide greater benefits to overall cognitive function than no treatment.

B. Strengths and Limitations of Findings

1. Strengths of Studies

a. Multiple Types of Cognitive Interventions Investigated

To understand the effects that cognitive interventions have on patients diagnosed with dementia, it is important to compare the effects of that they have on the cognition of patients diagnosed with dementia. The study by Lee et al. (2013) investigated the effects of two types of cognitive training therapies. One of the therapies was a computerized errorless learning based memory training program and the other was a therapist lead errorless learning based program. Both of the memory training programs involved to same tasks, though one was computerized and one was lead by a therapist. Another study by Neely et al. (2009) investigated two types of cognitive stimulation therapies. Both of these cognitive stimulation therapies were memory interventions. One was a collaborative form of the memory intervention and the other was a individual form of memory intervention. The tasks of each intervention were identical. The difference between the two was that the collaborative groups received verbal cues from a caregiver when tested and the individual group did not. Another study by Schecker et al. (2013) investigated the effects of two types of cognitive stimulation therapies. One of these therapies was a focus types of cognitive stimulation therapy. This therapy focused on supporting executive processing by engaging patients in discussions on sensitive topics. The second therapy investigated was a training group type of cognitive stimulation therapy focused on improving working memory and executive functions.

b. Inclusion of Multiple Types of Dementia Diagnoses

To understand the effects that cognitive interventions have on patients diagnosed with dementia, it is also investigate the effects that the interventions have on different types of dementia diagnoses. The study by Akanuma et al. (2011) investigated the effects of a cognitive stimulation therapy, a combination therapy of group reminiscence and reality orientation therapy, on the cognition of patients diagnosed with vascular dementia. The study by Clare et al. (2010) tested the effects of cognitive rehabilitation therapy on the cognition of patients diagnosed with Alzheimer's disease and mixed a diagnosis of Alzheimer's disease and vascular dementia.

Many of the studies investigated the effect that cognitive interventions have on the cognition of patients diagnosed with dementia. One such study by Matsuda et al. (2010) investigated the effects of cognitive stimulation therapy on the cognition of patient diagnosed with dementia due to Alzheimer's disease. Another study by van Paasschen et al. (2013) investigated the effects of cognitive rehabilitation therapy on the cognition of patients diagnosed with dementia due to Alzheimer's disease.

c. Effects Over Time

To understand the effects of cognitive interventions on the cognition of patient diagnosed with dementia, it is also important to understand the effects of the intervention over time. The study by Anderson et al. (2012) investigated the effects of cognitive stimulation therapy on the cognition of patients 12 months after treatments. Another study by Rabey et al. (2013) investigated the effects of cognitive training therapy on the cognition of patients diagnosed with dementia. The researchers measured changes to cognition six week after treatment and four and a half week after treatment. It is

important to examine the effects of cognitive stimulation therapy over a period of time to gain information on how long the effects will last for the patient.

2. Limitations of Studies

a. Small Sample Sizes

The research was limited in part by the small sample size of some of the studies. One such study by de Andrade et al. (2013) included only 30 participating patients. The study by Lee et al. (2013) included only 19 participating patients. The study by Neely et al. (2009) included 30 participating patients. The study by Rabey et al. (2013) included only 15 participating patients.

b. Use of Tests Created by the Researchers

The research was also limited in part by the use of tests created by the researchers of two studies. A study by Neely et al. (2009) used an original test to measure the changes to cognition of patients participating in two memory interventions. The patients were tested using two tests. Test 1 measured the ability of patients to immediately recall previously presented random nouns. The goal of this test was to remember as many nouns as possible. Test 2 was exactly the same, except that patients could easily categorize the words presented. The study by van Paasschen et al. (2013) used an original test to measure the cognitive change of patients who participated in a cognitive rehabilitation therapy. This was a face-name association test. This test required patients to match the pictures of presented faces to the correct names. The face-name associations were presented to patients during a prior encoding phase. Using tests created by the researchers conducting the study limits the research as they have not been tested for efficacy. These tests may not give an accurate measure of the cognitive functions they are

meant to test. Another problem of these tests is that the results they yield cannot be compared to other tests, due to the lack of similar tests.

C. Conclusions and Impact

1. Conclusions

The results yield no clear support or refute of the thesis hypothesis. Nine of the 20 articles were in support of the thesis hypothesis; seven of the 20 articles refuted the thesis hypothesis; and 2 of the 20 articles had mixed finding. The articles in support of the thesis hypothesis showed that cognitive interventions are not only capable of stabilizing the cognition of patients diagnosed with dementia to a greater degree than other treatments, but also that they are capable of reversing previous cognitive decline to a greater degree than other treatments. The articles that refuted the thesis hypothesis contradicted these findings as they showed that treatments other than cognitive interventions had greater positive benefits for the cognition of patients diagnosed with dementia.

Multimodal forms of cognitive interventions were the only types of cognitive interventions found to be investigated only by articles in support of the thesis hypothesis and not in articles that refuted the thesis hypothesis. This evidence suggests that combination interventions involving both cognitive exercises and motor exercises may offer the greatest benefits for patients diagnosed with dementia.

The variety findings may be attributable to the differences between the cognitive interventions, as each intervention focused on different combinations of cognitive functions. The differences between the tests used to measure the changes of cognitive functions may also have had an effect on the results, as some of these tests are more sensitive to cognitive change than others.

2. Impact on Discipline

Although the findings yield no clear support or refute of the thesis hypothesis, the do yield information of importance to the discipline. Cognitive interventions are described as any type of therapy technique that focuses on cognitive-communication functioning for patients diagnosed with dementia. The types of cognitive interventions are cognitive training, cognitive rehabilitation, and cognitive stimulation (Hopper et al., 2013). The methods and goals of each of these cognitive interventions categorize them into one of the three types. The there are no standard tasks or activities for each types of cognitive intervention. This may have had an effect as some tasks and activities for each type of cognitive intervention have shown to be more effective than others. The findings also show that multimodal forms of cognitive interventions consistently have greater benefits for patients diagnosed with dementia than standard care.

The findings provide information on many types of cognitive interventions. They show the potential of cognitive intervention to stabilize or reverse the cognition of patients diagnosed with dementia through some methods. This information provides a clear direction for future research and the.

3. Impact on Society

Dementia is estimated to affect 36 million people world wide. The aging demographics of many nations will cause the prevalence of dementia to double in the next 20 years (Barnett, Lewis, Blackwell, & Taylor, 2014). This anticipated increase in prevalence will lead to substantial increases in health and social care spending unless changes to standard care are made (Knapp, Iemmi, & Romeo, 2013). Care for patients

diagnosed with dementia cost the United States more than $600 billion every year (Barnett et al., 2014).

Cognitive interventions have the potential to benefit society. A study by Gillespie et al. (2013) found that interventions that improve patients' functional capacity and lessen their dependence on others result in potential cost savings. A treatment that has the potential to slow down the progression of the disease will reduce the burden of care givers, lessen the rate of hospitalization and delay long-term admission into institutional care, where costs often increase dramatically (Knapp et al., 2013). Substantial economic as well as clinical benefits are potential results yielded by interventions that prolong or improve patient independence (Gillespie et al., 2013).

4. Impact on Patients diagnosed with dementia

Patients diagnosed with dementia experience progressive impairment in memory and other cognitive domains (Requena et al., 2006). These impairments disturb the patient's life substantially (DSM-IV-TR; American Psychiatric Association, 2000). In severe or advanced cases of dementia, the individual may become totally oblivious to his or her surroundings. (DSM-IV-TR; American Psychiatric Association, 2000).

There is currently no cure for dementia disease (Yamaguchi, Maki, & Yamagami, 2010) Treatments that slow down the progression of the disease allow patients to have a greater quality of life for a longer period of time. These treatments allow patients o live autonomously for greater period of time. This provides them with more quality time to spend doing things they enjoy, spending time with family, and spend time with friends. These treatment also allow patients to have control over their own well-being and their gains treatment (Luttenberger, Hofner, et al., 2012).

D. Future Directions

1. Discipline

The literature review examined studies that both supported and refuted the thesis hypothesis that if a patient diagnosed with dementia participates in a cognitive intervention, then they will develop fewer cognitive deficits than a patient diagnosed with dementia who does not participate in a cognitive intervention. The collected research provides current information on the efficacy of cognitive interventions as treatments for patients diagnosed with dementia. The results show the potential of cognitive interventions to reverse cognitive decline of patients. This is an important finding as it shows that cognitive interventions may provide substantial benefits for patients. Reversing cognitive decline may provide patients with improved memory, of language abilities, and executive functioning. These improved cognitive functions may provide them with increased ability to care for them-selves, complete activities of daily living, communicate effectively with family members and friends, and have a higher overall quality of life.

2. Proposal for Future Research

Future research should investigate the effects that cognitive interventions have on both mild and moderate forms of dementia. To accomplish this, a definitive study is proposed in which patients are assigned to groups categorized by dementia severity, with one group for mild dementia severity and one group for moderate dementia severity. This categorization is necessary to establish which types of cognitive interventions provide the greatest benefits for patients who meet the criteria of mild dementia severity the types of cognitive interventions that establish the greatest benefits for patients who meet the criteria of moderate dementia severity.

To establish which types of cognitive interventions provide the greatest benefits for patients diagnosed with dementia of each severity, the activities and task that aim to improve cognitive functioning for each types of cognitive intervention should be decided. The methods of each cognitive intervention should meet the qualifications that define them as each type of cognitive intervention. Cognitive stimulation therapy should focus on improving general cognitive functions, such as memory and executive functions, and social functions in a non-specific manor (Buschert et al., 2011). This type of therapy should involve guided practice on a set of standard tasks designed to reflect the cognitive and social functions of focus (Hopper et al., 2013).

The cognitive rehabilitation therapy should include a health professional, the patient, and the patient's family to set specific goals for the patient. A personalized strategy should be developed to aid each patient in achieving the set goals (Hopper et al., 2013). Instruction and practice in the use of memory strategies and strategies to help maintain attention, concentration, and stress management should be included in this treatment (van Paasschen et al., 2013). The set activities should seek to improve the thinking, pattern recognition, and counting abilities of patients (Chen et al., 2011). The activities should aim to improve specific cognitive deficits, compensate for deficits, or develop adaptive methods to promote independence of each patient in activities of daily living (Hindle et al., 2013). The cognitive training therapy should also focus on enhancing specific cognitive functions (Buschert et al., 2011). This therapy should be structured and the aim should be to improve cognitive processes that affect every day life (Hopper et al., 2013).

Patients of each of the dementia severity categories should be assigned to one of seven conditions. These conditions include each of the there types of cognitive interventions and

an achlyecholine inhibitor, each of the three types of cognitive interventions without an achlecholinestrase inhibitor, and an achylecholinestrase inhibitor without a cognitive intervention. The patients who participate in one of the cognitive interventions should complete the same activities and tasks that other participants assigned to the same cognitive intervention complete. This control will allow for clear results that show the most effective cognitive intervention for each of the dementia severities.

Patients should be tested prior to and after treatment with a standardized test. This should be a standardized test used to measure change of overall cognitive function of dementia patients. For example, the Mini Mental State Examination or the Hasegawa's Dementia Scale-Revised are appropriate tests for this purpose. This will allow for clear results of the effects that each of the cognitive interventions have of patients diagnosed with dementia of mild and moderate dementia with and without a paired treatment of an achylecholinestrase inhibitor.

The proposed future study will help gain definitive knowledge on the efficacy of each of the cognitive interventions for each of the dementia severities. The have the potential to lead results could lead to more beneficial treatments for patients diagnosed with dementia.

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