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# Impact of Caregiver Depression on Health of Family Caregivers of Individuals with Alzheimer's Disease

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IMPACT OF CAREGIVER DEPRESSION ON HEALTH OF FAMILY CAREGIVERS OF  
INDIVIDUALS WITH ALZHEIMERS DISEASE

By

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An Alternate Plan Paper Submitted in Partial Fulfillment of the Requirements for

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**“Praise the Lord o my soul!**

**I will praise the Lord as long as I live”.**

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## ABSTRACT

This study examines the health consequences of being a caretaker of someone with Alzheimer's disease. Alzheimer's disease (AD) is the most common type of dementia and is a significant public health problem that will intensify as the population ages. Caring for an individual with Alzheimer's disease is more stressful than caring for a person with a physical disability; they need increased levels of supervision and personal care as the disease progresses. The majority of care is provided at home by family caregivers. Caregivers often help people with Alzheimer's to manage various issues from activities of daily living to financial management and medical care. These changes are often the most challenging and overwhelming for family caregivers which further results in increased new or exacerbated health problems which might be related to depression; and depleted income and finances due, in part, to disruptions in employment, and paying for health care or other services for themselves and care recipients.

Data for this study were collected through an electronic databases: Academic Search Premier, Ageline, ProQuest, Psych INFO, CINHALL, and Google scholar. Included in this alternate plan paper is a brief overview of the epidemiology of Alzheimer's disease, tasks of family caregivers in managing the daily issues of Alzheimer's patient, health effects on family caregivers, a presentation of fifteen scholarly studies focusing on impacts of depression on health of family caregivers as well as discussion and conclusion of the finding. The conclusion drawn from the current study may help healthcare providers to develop better interventions for family caregivers in order to improve their health by reducing the impacts of depression.

## TABLE OF CONTENTS

Chapter I	Introduction	5
	Statement of the problem	5
	Need of the study	6
	Research Question	7
	Definition of the term	7
Chapter II	Literature Review	
	Epidemiology of Alzheimer's disease	9
	Family Caregiver's for Alzheimer's disease patients	11
	Family Caregiver's tasks	11
	Health effects on Family caregiver's of person with Alzheimer's disease	13
Chapter III	Methods	20
Chapter IV	Presentation of Findings	22
	Table I: Summary of Studies Reviewed	22
	Summaries of Individual Studies	26
Chapter V	Discussion and Conclusion	41
	REFERENCES	47

## CHAPTER- I

### INTRODUCTION

Caring for a person with Alzheimer's disease (AD) and other dementias is associated with significant risk to the caregiver's health and well-being (Richardson et al., 2013). According to Schulz and colleagues (2006), caregiving stress is linked with poor outcomes for caregivers such as depression, illness, and decreased quality of life. Further, research shows that caregivers report feeling isolated and experiencing pressure on their socio-economic life (Schoenmakers, Buntinx & Delepeleire, 2010). In addition, Schulz and Martire (2004) have revealed that family caregivers tend to suffer more from depressive symptoms than non-caregivers. Family caregivers have higher rates of depression, anxiety, weakened immune function, fatigue, poor physical health, and higher mortality rates (Glaser & Kiecolt-Glaser, 2005). Further, over 17% of caregivers have reported that their health suffered as a result of caregiving responsibilities, and between 40% and 70% of caregivers present with clinically-significant depressive symptoms (National Alliance for Caregiving and AARP, 2009). Similarly, caregivers for spouses with dementia experience greater risks of emotional stress, depression, and other health related problems or issues (Adams, 2008; Mills et al., 2009; von Kanel et al., 2008). Additionally, evidence suggest that caregiver depression may have negative impact on health and contributes to early death in caregivers (Rivera, 2009).

#### **Statement of the problem**

Caregivers of home-dwelling elderly patients with Alzheimer's disease report more physical and psychosocial burden than their peers of the same age and in the same living circumstances. Research shows that these caregivers suffer from depression more often, perceive

their workload as heavier, are in less good health, and take more medication than their peers (Schoenmakers, Buntinx & Delepeleire, 2010). Nikzad-Terhune and colleagues (2010) report that caregivers for AD and other dementia patients provide care for more years than other caregivers and many continue to assist the care recipient even after they are placed in an assisted living or nursing facilities.

According to Alzheimer's Association (2006), family members provide up to 80% of the in-home care needed by persons with dementia because most of the caregiving responsibility fall on family caregivers, such as a spouse, although other family members (siblings and children) are increasingly assuming this role. Literature has documented that more than 40 percent of family caregivers of people with dementia rate the emotional stress of caregiving as high or very high (Alzheimer's Association & National Alliance for Caregiving, 2004). In addition, increased levels of emotional stress among caregivers is also associated with higher patients' behavioral symptoms and cognitive impairment (Crespo, Lopez & Zarit, 2005). This risk persists over the many years of caregiving and even after caregiving ends with the death of the care recipient. Thus, identifying and reducing caregiver stress are an important healthcare issue (Etters & Barbara, 2008).

### **Need of the study**

A large share of care for person with Alzheimer's disease is undertaken by family caregivers and there is increasing evidence that providing care for people with dementia may lead to caregiving burden and depression (Papastavrou et al., 2015). Thus, depression and caregiving burden negatively impact the health of family caregivers in long-term. Considering the scope of this issue, there is a need to understand the relationship between depression and its impact on health of family caregivers in order to identify what methods or interventions could

help reduce or prevent depressive symptoms. Further, this study can assist in identifying major factors that impact the health of family caregivers of individual with AD in terms of physical, mental, emotional and general health. The findings may also help other disciplines to use appropriate strategies or interventions to improve the quality of life of family caregivers.

### **Research Question**

What are the impacts of depression on the health of family caregivers of individuals with Alzheimer's disease?

### **Definition of terms**

Alzheimer's disease (AD): Alzheimer's disease is the most common form of dementia. It is a progressive neurodegenerative disease characterized by cognitive decline and functional deficits, and behavioral and neuropsychiatric symptoms (Valimaki et al., 2014).

Caregiver: The person for example, a family member or a designated health care worker—who cares for a patient with Alzheimer's disease or some other form of dementia or chronic debilitating disease requiring provision of nonmedical protective and supportive care (Concise Dictionary of Modern Medicine, 2002).

Caregiver Burden: Caregiver burden is described as a multidimensional response to physical, psychological, social, and financial demands from caring for patients (Etters et al., 2008).

Caregiving: Caregiving refers to attending to another individual's health needs. Caregiving often includes assistance with one or more activities of daily living (ADLs), such as bathing and dressing, as well as multiple instrumental activities of daily living (IADLs), such as paying bills, shopping and transportation (Alzheimer's Association, 2016).

Care recipient: Care recipient is the person who receives the care from family members or health care organization for a serious health condition.

Depression: Depression is a mood disorder that causes a persistent feeling of sadness and loss of interest. Also called major depressive disorder or clinical depression, it affects how you feel, think and behave and can lead to a variety of emotional and physical problems. A person with depression may have trouble doing normal day-to-day activities, and sometimes may feel as if life isn't worth living (Mayo clinic, 2016).

Emotional health: A state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community (Segen's Medical Dictionary, 2012).

Emotional stress: A condition which occurs when a person is under stress affecting their emotions (Right diagnosis, 2016).

Family caregiver: A relative (spouse, significant other, parent, child, or other family member) who provides unpaid help to the patient incapable of performing the daily living tasks (The National Alliance of Caregivers, 2009).

Mental health: Mental health is "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community" ( CDC, 2013).

Physical health: Physical health is the overall condition of a living organism at a given time. It is the soundness of the body, freedom from disease or abnormality, and the condition of optimal well-being (Kurtus, 2013).

## CHAPTER- II

### LITERATURE REVIEW

The purpose of this study was to investigate the factors associated with caregiving roles and its impact on health of family caregivers of individuals suffering from Alzheimer's disease. In this chapter I will analyze the previous research available on issues related to caregiving, depression, and health impact on the family caregivers. Specifically, I will review the epidemiology of Alzheimer's disease, defining family caregivers for AD patients, caregiver tasks, health effect on caregivers, particularly physical health, emotional or mental health, general health, caregiver depression, depression and caregiver health risk.

#### **Epidemiology of Alzheimer's disease**

The average human life expectancy has been progressively prolonged over the last few decades, with a consequent rise in the prevalence of chronic degenerative disorders, one of which is Alzheimer's disease (Fazio et al., 2015). Alzheimer's disease is a progressive neurodegenerative disease posing a tremendous burden for patients, caregivers, and health care systems. Disease symptomatology includes, most notably, impaired cognition (for example, memory difficulties), as well as impairments in daily activities and increasing functional dependence (Goren et al., 2016). As of 2016, an estimated 5.4 million Americans of all ages have been diagnosed with Alzheimer's disease. This number includes an estimated 5.2 million people age 65 and older and approximately 200,000 individuals under age 65 who have younger-onset Alzheimer's (Alzheimer's Association, 2016). Almost two-thirds of Americans with Alzheimer's are women. Of the 5.2 million people age 65 and older with Alzheimer's in the United States, 3.3 million are women and 1.9 million are men (Alzheimer's Association, 2016).

Although there are more non-Hispanic whites living with Alzheimer's and other dementias than people of any other racial or ethnic group in the United States, older African-Americans and Hispanics are more likely than older whites to have Alzheimer's disease and other dementias. Alzheimer's Association (2015) predicts that the number of Americans with Alzheimer's disease and other dementias will grow each year because the number and proportion of the U.S. population age 65 and older is increasing. By 2025, it is predicted that the number of people aged 65 and older with Alzheimer's disease is estimated to reach 7.1 million. This is a 40 percent increase from the 5.2 million people age 65 and older affected in 2016. By 2050, the number of people age 65 and older with Alzheimer's disease may nearly triple, from 5.2 million to a projected 13.8 million, barring the development of medical breakthroughs to prevent or cure the disease (Alzheimer's Association, 2016). Alzheimer's Association (2016) proposes that projection of total number of Americans age 65 and older with Alzheimer's in the state of Minnesota will be 120,000 in the year 2025, an increase from 91,000 in the year 2016. The percentage increase in 2025 compared to 2016 is projected to be close to 31.9%. The increasing number of individuals with Alzheimer's suggests a considerable strain on families, society and the systems of care. A number of behavioral changes such as impairments in judgment, orientation, the ability to understand, and communicate effectively are common in dementia, often presenting challenges for staff and family involvement in care. These symptoms are acknowledged to be linked with negative psychological and physical distress for the family caregiver (Losada et al., 2010). These symptoms also present challenges for health care professionals and family caregivers in providing quality of care and quality of life for people living with dementia.

## **Family caregivers for AD patients**

Family caregivers (FCs) usually manage the main responsibility for home care of persons with Alzheimer's disease (Valimaki et al., 2015). Family caregivers are most often immediate family members, but they also may be other relatives and friends. Family caregivers of people with dementia are more likely to assist with living activities (ADLs and IADLs) including preparation of meals, household chores, transportation, medications, bathing, dressing, and feeding (Richardson et al., 2013).

Alzheimer's Association (2016) found that eighty-three percent of the help provided to older adults in the United States comes from family members, friends or other unpaid caregivers. In 2015, caregivers of people with Alzheimer's and other dementias provided an estimated 18.1 billion hours of informal (that is, unpaid) assistance, a contribution to the nation valued at \$221.3 billion. Approximately two-thirds of caregivers are women. More specifically, over one-third of dementia caregivers are daughters. On average, female caregivers spend more time caregiving than male caregivers. For example, daughters provide, on average, 102 hours per month whereas sons provide 80 hours per month (Alzheimer's Association, 2016). According to the 2014 Alzheimer's Association Women and Alzheimer's Poll, more than twice as many women caregivers as men caregivers reported spending 21 to 60 hours per week providing care, and two and a half times as many reported living with the person with dementia full time.

## **Family caregiver's tasks**

The care provided to people with Alzheimer's disease and other dementias is wide-ranging and in some instances all-encompassing. Dementia caregivers tend to provide more extensive assistance (Alzheimer's Association, 2014). The care of people with dementia occurs

over years and the caregiving role is shouldered primarily by spouses, adult children, and children's spouses. These caregivers provide assistance for people with Alzheimer's disease in all aspects of daily living activities (ADLs) and instrumental activities of daily living (IADLs). Caregivers assist with personal activities of daily living (ADLs), such as bathing, dressing, grooming, feeding and helping the person walk, transferring from bed to chair, using the toilet and managing incontinence. Helping with instrumental activities of daily living (IADLs), includes such as completing household chores, shopping, preparing meals, providing transportation, arranging for doctor's appointments, managing finances and legal affairs, and answering the telephone. Other caregivers' roles includes managing behavioral symptoms of the disease such as aggressive behavior, wandering, depressive mood, agitation, anxiety, repetitive activity and night-time disturbances. Also, caregivers might perform tasks like making arrangements for paid in-home, nursing home or assisted living care. Moreover, caregivers also assume the additional responsibilities that are not necessarily specific tasks, such as providing overall management of daily life, and addressing family issues related to caring for a relative with Alzheimer's disease. This also includes communication with other family members about care plans, decision-making and arrangements for respite for the main caregiver (Alzheimer's Association, 2016).

Data from National Alliance for Caregiving and AARP (2009) indicates that over half the caregivers of people with Alzheimer's or other dementias report providing help with getting in and out of bed and about one-third also provided help getting to and from the toilet, bathing, managing incontinence and feeding. In addition to assisting with ADLs, almost two-thirds of caregivers of people with Alzheimer's disease and other dementias advocate for their care recipient with government agencies and service providers (61 percent) and manage finances (65

percent). Moreover, close to half of caregivers arrange for outside services (45 percent), and nearly four of five communicate with health care professionals (79 percent) (National Alliance for Caregiving and AARP, 2015).

### **Health effects on family caregivers of person with AD**

Brodaty and colleagues (2009) mention that caregivers face many obstacles as they balance caregiving with other demands, including child rearing, career, and relationships. They are at increased risk for caregiving burden, stress, depression, and a variety of other health complications. The effects on caregivers are diverse and complex, and there are many other factors that may exacerbate or ameliorate how caregivers react and feel as a result of their role. Numerous studies reported that caring for a person with dementia is more stressful than caring for a person with a physical disability (Richardson et al., 2013; Eters and Barbara, 2008). Similarly, Ornstein & Gaugler (2012) have also noted that caring for a person with Alzheimer's or another dementia poses special challenges. For example, people in the middle to later stages of Alzheimer's disease often experience losses in judgment, orientation and the ability to understand and communicate effectively. Family caregivers often help people with Alzheimer's manage these issues. The personality and behavior of a person with Alzheimer's is affected as well, and these changes are often among the most challenging for family caregivers. Moreover, individuals with Alzheimer's also require increasing levels of supervision and personal care as the disease progresses. As symptoms worsen, the care required of family members can result in increased emotional stress and depression, new or exacerbated health problems, and depleted income and finances due in part to disruptions in employment and paying for health care or other services for themselves and their care recipients (Alzheimer's Association, 2016).

Mausbach and colleagues (2007) have noted that caregivers are also at greater risk of developing multiple health problems that range from hypertension to cardiovascular disease and other co-morbid conditions. Caregivers are also found to be at higher risk of mortality than non-caregivers of their age as caregiving has been associated with acceleration of immune decline (Glaser & Kiecolt-Glaser, 2005). One study found that caregivers whose spouse was hospitalized and had AD were more likely to die in the following year than caregivers of spouses who were hospitalized but did not have dementia (Christakis & Allison, 2006). Caregivers have been shown to have poor health compared with non-caregivers in a variety of domains, including slowed wound healing, altered immune functioning and poorer response to vaccination (Glaser, Sheridan, Malarkey, MacCallum, & Kiecolt-Glaser, 2000; Mills et al., 2004). Caregivers also show signs of metabolic dysregulation (that is, increased fasting insulin levels) compared to non-caregivers. Caregivers exhibit worse self-reported health, worse general health, report more illness symptoms, and have increased health care utilization compared with non-caregivers (Vitaliano, Zhang, & Scanlan, 2003). Alzheimer's disease and dementia caregivers have higher health care costs than non-caregivers, a difference totaling \$10.2 billion in 2015 (Alzheimer's Association, 2016).

**Caregiver's emotional and mental health:** Based upon literature reviewed the psychological health of the family caregiver is negatively affected by providing care. Higher levels of stress, anxiety, depression and other mental health effects are common among family members who care for an older relative or friend (Family Caregiver Alliance, 2006). Richardson and colleagues (2013) found that caregivers are at higher risk of developing depression and experiencing social isolation, loneliness, and disturbance in sleep, which can potentially contribute to cognitive decline including loss in short-term memory, attention and verbal IQ.

Moreover, cognitive decline may interfere with a caregiver's ability to provide care and may create an unsafe environment if judgment is impaired (Vitaliano et al., 2009).

According to Alzheimer's Association Women and Alzheimer's Poll (2014), fifty-nine percent of family caregivers of people with Alzheimer's and other dementias rated the emotional stress of caregiving as high or very high. In the 2009 NAC/AARP survey, it was reported that caregivers who were women, older people, residing with the care recipient, and White or Hispanic caregivers were most likely to indicate stress and these caregivers often believed that there was no choice in taking on the role of caregiver. The demands of caregiving may intensify as people with dementia approach the end of life and caregiving can be extremely stressful during this time. One study of end-of-life care found that of 217 family caregivers 72 percent said they experienced relief when the person with Alzheimer's disease or another dementia died. (Schulz et al., 2003).

**Caregiver's Physical health:** The stress of caregiving has been shown to have negative effects on the physical health of caregivers (Richardson et al., 2013). Evidence suggests that the stress of providing dementia care increases caregivers' susceptibility to disease and health complications (Alzheimer's Association, 2016). Specifically, family caregivers of people with dementia may experience greater risk of chronic disease, physiological impairments, increased dependence on health care, and mortality than those who are not caregivers (Alzheimer's Association, 2013). Richardson and colleagues (2013) state that this decline in physical health may be due to physical exertions of caring for the family member with dementia, less time available for exercise and preparing healthy meals, and stress related physiological changes. As Pinquart and Sorensen (2007) also noted, some of the variables such as care-recipient behavioral problems and cognitive impairment, duration of caregiving, higher caregiver burden, higher

caregiver depression, older age and lower socio-economic status are associated with poorer physical health among dementia caregivers.

**Caregivers general health:** Alzheimer's disease caregivers have reported their general health as fair to poor (Vitaliano, Zhang, and Scanlan, 2003). Caregiving was thought to be a reason for their worsening health (NAC & AARP, 2009). According to Behavioral Risk Factor Surveillance System (BRFSS) survey (2009 and 2010), it was found that seven percent of AD or other dementia caregivers, as opposed to two percent of other caregivers, said that the greatest difficulty of caregiving is that it creates or aggravates their own health problems (Alzheimer's Association, 2013). Overall, evidence suggests that caregiving tasks are responsible for negative health consequences for dementia caregivers.

**Physiological changes:** The chronic stress of caregiving is associated with physiological changes that indicate risk of developing chronic conditions. For example, a series of studies found that under certain conditions, some AD caregivers were more likely to have elevated biomarkers of cardiovascular disease risk and impaired kidney function risk than those who were not caregivers (Gouin et al., 2012; von Kanel et al., 2012). In addition, one of the physiological changes associated with caregiver stress is also increased levels of cortisol. Cortisol not only contributes to impaired cognitive function, but also contributes to developing other risk factors associated with cognitive impairment, such as obesity, hyperinsulinemia, and inflammation (von Kanel et al., 2012). Higher levels of C-reactive protein (von Kanel et al., 2012; Gouin et al., 2012; Vitaliano et al., 2003) and interleukin-6 (Gouin et al., 2012; Vitaliano et al., 2003) inflammatory mediators are also seen in dementia caregivers. Overall, due to the increases in various health symptoms related to stress, caregivers experience a higher level of stress than others, putting their health at risk.

## Caregiver depression

The most widely studied aspect of psychological health related to the family caregiving experience is depression. Caregiver depression, in particular, was commonly found among those who care for patients with Alzheimer's disease and related dementias (Papastavrou et al., 2007). Literature reviewed also defines several factors which correlate with levels of negative mental health outcomes such as depression. Factors such as self-esteem, caregiving stress, caregiver burden, and emotion focused coping are significantly correlated to levels of depression among family caregivers of individuals with Alzheimer's disease (Crespo, Lopez, & Zarit, 2005). The extent of care required by family members is also the major factor influencing levels of depression in family caregivers (Au et al., 2009). For example, a greater number of hours spent providing care directly increases levels of depression among family caregivers. Personal sense of control or mastery may be significant for explaining the variability in family caregivers' abilities to handle the continuous demands of caring for a loved one with Alzheimer's disease. Caregivers who perceive their ability to manage these demands as inadequate are at greater risk for increased depressive symptoms (Au et al., 2009).

According to findings of one study reviewed, the prevalence of depression in family caregivers for patients with dementia approached 40%-50% for clinically significant depression and approximately 20%-25% for major depression (Shultz et al., 2003). Similarly, another study indicated 68% of assessed caregivers were highly burdened, with 65% displaying symptoms of depression (Papastavrou et al., 2007). As well as, a study conducted by Taylor and associates (2008), reported one-third of caregivers as symptomatic for depression. Furthermore, in a recent study, Joling and colleagues (2010), found that spouses caring for dementia patients are four times as likely to have depression compared to non-caregivers and twice as likely to receive

antidepressant treatment. Higher levels of stress are related to more depressive symptoms.

Lastly, family members, usually adult children of dementia patients who require hospitalization, experience depression with greater severity.

**Depression and Caregivers health risk:** Caregivers experiencing emotional distress or depressive symptoms may be at increased risk for negative health effects such as coexisting anxiety disorders, substance abuse or dependence, chronic disease and acute illness. Reviewed research supports the assertion that depressive symptomatology is significantly associated with reduced physical well-being among family or unpaid caregivers of persons with dementia or Alzheimer's disease (O'Rourke et al., 2007). Several possible mechanisms may explain the influence of depression on physical health. For example, caregivers with depression are less likely to engage in consistent self-care and activities of daily living. In addition, lack of motivation and interest as well as social withdrawal also impede the willingness and capacity of individuals with depression to engage in health-enhancing behaviors that help to manage the illness (O'Rourke et al., 2007).

O'Rourke and colleagues (2007), further suggest that depressive symptoms may also exacerbate the immunologic declines contributing to increased inflammation in caregivers. During the inflammation process there is an increase in inflammatory markers (that is, IL-6 and CRP) which lead to greater risk for cardiovascular disease (CVD) in caregivers than people who are not caregivers (Gouin et al., 2012). Greater depressive symptoms in dementia caregivers over a three year period have also been linked with platelet hyper activation, which may also be associated with increased risk for cardiovascular events (Aschbacher et al., 2009). Furthermore, Mausbach and colleagues (2007) found that both depressive symptoms and emotional reactivity to care recipient problem behaviors predicted shorter time to CVD diagnosis in dementia

caregivers. Also depressed caregivers are more likely to visit the hospital or emergency room, although the reason for hospital visits may vary widely (Schubert et al., 2008). Overall, reviewed research suggests that depressive symptoms may be an important correlate of health and illness in caregivers.

## **Summary**

This chapter describes the health effects on family caregivers of people with Alzheimer's disease. The vast majority of caregiving for AD and other dementia patients is provided by family caregivers. These caregivers are at increased risk for becoming physically and/or mentally ill, secondary to the stresses and demands of caregiving. Caregiving stress not only affect the caregiver's health but also lead to the depression. This literature review finding are mainly based on the chronic stress of caregiving which is associated with physiological changes that indicate risk of developing chronic conditions or susceptibility to disease and health complications, increased health care use, and mortality. Moreover, the literature reviewed found that depression is also one factor that increases risk for a variety of health consequences (including chronic, serious conditions such as CVD, as well as inflammation which is often viewed as a risk marker for CVD) among caregivers as compared to non-caregivers. Further, this literature review helps to understand the impact of depression on overall health of family caregivers of individuals with Alzheimer's disease.

## CHAPTER-III

### METHODOLOGY

#### **Research Question**

What are the impacts of depression on the health of family caregivers of individuals with Alzheimer's disease?

#### **Procedure:**

To learn more information about the impact of depression on the health of family caregivers of individuals with Alzheimer's disease, I conducted an in-depth literature review using English language, professional scientific journals from gerontology-related disciplines. I examined literature that has been published from 2001 and later. As the study is based on the secondary data, electronic databases were used to search the literature. I used the following databases: Academic Search Premier, Ageline, ProQuest, Psych INFO, CINHALL, and Google scholar. The literature review was limited to the following search terms:

- Alzheimer's disease or dementia
- Caregivers or family caregivers
- Depression or stress or burden
- Health (Physical health ,emotional health, general health)
- Longitudinal or Cross-sectional studies

When I found articles that met my criteria, I searched what other authors and articles were cited in their reference sections; this helped me a lot to find additional articles with similar information that might not have been found with my initial search criteria. Fifteen articles met the criteria. I

analyzed the literature in terms of impact of depression on the health of family caregivers of individual with Alzheimer's disease .I believe these findings will be very helpful for those who are developing the interventions for family caregivers to reduce the impact of depression.

## CHAPTER-IV

### PRESENTATION OF FINDINGS

After having read the 15 scholarly articles that met the criteria I established at the beginning of this project, I summarized each of them, focusing on the purpose, method(s) in which data were collected as well as results authors presented. Following the summary will be the direct comparison in relation to the purpose of this paper. Table I outlines these articles briefly including the author, title, methodology and findings. A brief narrative summary of each article follows the table.

**Table I. Summary of Studies Reviewed**

<b>Study</b>	<b>Author(s)</b>	<b>Title</b>	<b>Methodology</b>	<b>Finding(s)</b>
<b>Mental health effect</b>				
<b>S1</b>	Valimaki, Martikainen, Hallikainen, Vaatainen, & Koivisto (2015)	Depressed spousal caregivers have psychological stress unrelated to the progression of Alzheimer disease: A 3-year follow-up report, Kuopio ALSOVA study.	Family Caregivers and patients with AD were prospectively followed up to 36 months after AD diagnosis.	1). Even minor caregiver depressive symptoms at the beginning of caregiving are the most important predictors of psychological distress during extended caregiving. 2). Spousal and depressed caregivers experience more psychological stress than their non-spousal or non-depressed counterpart.
<b>S2</b>	O'Dwyer, Moyle, Gembeck, & Leo (2013)	Suicidal ideation in family caregivers of people with dementia: a pilot study.	Cross-sectional survey was conducted with 120 family caregivers.	1). 26% of caregivers had contemplated suicide more than once in the previous year. 2). In logistic regression, it was found that only depression predicted the

				presence of suicidal thoughts.
<b>S3</b>	Vitaliano, Zhang, Young, Caswell, Scanlan, Echeverria (2009)	Depressed mood mediates decline in cognitive processing speed in caregivers.	Caregivers for spouses with Alzheimer's disease (n = 122) were compared with demographically similar non-caregiver spouses (n = 117) at study entry.	1). Caregivers had lower digital symbol test scores and higher Hamilton depression scores at T1, T2, and T3 than non-caregivers. 2). Hierarchical linear modeling revealed that although caregivers started well below non-caregivers; they experienced a more rapid rate of decline than non-caregivers (p = .047). Caregivers declined 4.5 times faster than non-caregivers.
<b>S4</b>	Valimaki , Julkunen , Pietila & Pirttila (2009)	Caregiver depression is associated with a low sense of coherence and health-related quality of life.	The participants were recruited from April 2002 to September 2006.	Depression and distress are significantly associated with HRQoL and SOC in individuals providing care to their loved ones with Alzheimer's disease.
<b>Physical Health affect</b>				
<b>S5</b>	Cucciare, Gray, Azar, Jimenez & Thompson. (2010).	Exploring the relationship between physical health, depressive symptoms, and depression diagnoses in Hispanic dementia caregivers.	This study used a cross-sectional design.	1). Dementia Caregivers self-reported that their health tends to decline; associated with increase in depression. 2). Self-reported health indices are helpful in identifying Hispanic dementia caregivers at risk for clinical levels of depression.
<b>S6</b>	Schubert, Boustani, Callahan, Perkins,	Acute care utilization by dementia caregivers	Cross-sectional study was used to examine the	1). 24 % of the caregivers had at least one emergency visit or hospitalization in

	Hui & Hendrie (2008).	within urban primary care practices.	facets of dementia caregiving that impact caregivers' acute health care utilization.	the six months prior to enrollment. 2). Authors found that the caregivers' acute care utilization was associated with their depression, the patients' behavioral and psychological symptoms, and the patients' functional status as measured.
<b>S7</b>	O'Rourke, Cappeliez & Neufeld (2007).	Recurrent depressive symptomatology and physical health: A 10-year study of informal caregivers of persons with dementia.	Longitudinal Study; Both patients and caregivers were assessed at 3 points over a 10- year period.	This study found that depressive symptomatology significantly predicts the decline in health status of caregivers of persons with dementia.
<b>S8</b>	Rullier, Lagarde, Bouisson, Bergua, Torres, & Barberger (2014).	Psychosocial correlates of nutritional status of family caregivers of persons with dementia.	Cross-sectional study	1). Depressive symptoms were associated with poor nutritional status on both family caregivers and persons with dementia. 2). 37.5% of caregivers presented a compromised nutritional status (32.1% at risk of malnutrition and 5.4% malnourished) and 58.9% of elderly people with dementia were at risk of malnutrition and 23.2% were malnourished.
<b>S9</b>	Mausbach, Patterson, Rabinowitz, Grant, & Schulz (2007)	Depression and distress predict time to cardiovascular disease in dementia caregivers.	A longitudinal, prospective design was used. Over an 18- month period, caregivers free from a CVD diagnosis at	Greater depressive symptoms and distress were significant predictors of time to CVD diagnosis.

			baseline were assessed at 6, 12, and 18-month follow-ups for the onset of CVD.	
<b>S10</b>	Gouin, Glaser, Malarkey, Beversdorf & Kiecolt-Glaser (2012).	Chronic stress, daily stressors, and circulating inflammatory markers.	Cross-sectional study; Semi-structured interview used to assess the occurrence of daily stressors in the past 24 hours.	Caregivers were more likely to experience multiple stressors in the past 24 hours than non-caregiving controls, which lead to physiological changes that was larger than the increased reactivity associated with each stressor.
<b>S11</b>	Aschbacher, Roepke, von Känel, Mills, Mausbach, Patterson & Grant (2009).	Persistent versus transient depressive symptoms in relation to platelet hyper activation: A longitudinal analysis of dementia caregivers.	Longitudinal study; Depressive symptoms were assessed among 99 spousal dementia caregivers.	Findings demonstrate that persistent depressive symptoms (i.e., the enduring symptoms over three yearly assessments), were significantly related to increased platelet P-selectin expression in response to acute psychological stress among older dementia caregivers.
<b>S12</b>	Ranney & Aranda (2001).	Factors associated with depressive symptoms among Latino family dementia caregivers.	cross-sectional study; 97 Latino family dementia caregiver were examined.	Results indicates that poor self-report of physical health was associated with increased depressive symptoms.
<b>S13</b>	Chiua, Leeb, Wang, Changd, Lie, Hsu & Lee (2013).	Family caregivers' sleep disturbance and its associations with multilevel stressors	This study used a cross-sectional design.	1). Authors found that about two-thirds of family caregivers of people with dementia suffered from

		when caring for patients with dementia.		various types of sleep disturbance. 2). Fatigue and depressive symptoms were important predictors to develop synergistic effects on sleep disturbance in family caregivers.
<b>S14</b>	Aschbacher, Mills, von Känel, Hong, Mausbach, Roepke, Grant. (2008).	Effects of depressive and anxious symptoms on norepinephrine and platelet P-selectin responses to acute psychological stress among elderly caregivers	39 caregivers who had been providing in-home care since spouses had received the AD diagnosis 9 years previously and 31 gender-matched non-caregivers.	Caregivers have increased symptoms of depression and anxious symptoms. Greater depression and anxious symptoms were significantly associated with delayed norepinephrine recovery, increased P-selectin reactivity, and delayed PSEL recovery.
<b>S15</b>	Hashimoto, Washio, Arai, Sasaki, Mori, & Saito (2013).	Depression among family caregivers of patients with dementia attending to psychiatric dispensary in Northern Japan.	Cross-sectional study; 55 pairs of family caregivers and outpatients with dementia were recruited from 2006 to 2007.	45.5 % of caregivers were found to be depressed with the chronic diseases.

### **Mental health effects:**

**S1:** Valimaki, Martikainen, Hallikainen, Vaatainen, & Koivisto (2015) conducted a study to explore family caregiver (FC) long-term psychological distress after Alzheimer disease (AD) diagnosis in a family member. For this study they analyzed the data of 236 community-dwelling patient–caregiver dyads, who were recruited for the 5-year ALSOVA study from 3 Finnish

hospital districts between 2002 and 2006, within an average of 5 months after AD diagnosis (Valimaki et al., 2015).

In this study, FC psychological distress was evaluated using the 12- item General Health Questionnaire (GHQ), which is considered a suitable measure of general distress among FCs. The GHQ detects depression and social functioning as the main factors in the decline of psychological well-being, and the score range for the GHQ is 0 to 62, with higher scores indicating greater psychological distress. Furthermore, caregiver depressive symptoms and sense of coherence, along with AD patient measurements, were measured at baseline and annually. Generalized estimating equation models were applied to study associations of these baseline factors to caregiver GHQ (Valimaki et al., 2015). The result of the long-term longitudinal study found that, spousal caregivers (SCs) GHQ was significantly higher ( $P < .001$ ) than in the non-spousal caregivers (NSCs). The difference in GHQ scores was associated by depressive symptoms ( $P < .001$ ) at baseline, and the depressed SCs have more severe distress than NSCs over the observation period (Valimaki et al., 2015).

Valimaki et al. (2015) found that even minor caregiver depressive symptoms at the beginning of caregiving are the most important predictors of psychological distress during extended caregiving. Overall, the study highlights that depressive symptoms of caregivers are strongly associated with more severe psychological distress throughout the caregiving period.

**S2:** O'Dwyer, Moyle, Gembeck, and Leo (2013) collected data from 120 family caregivers to gather preliminary evidence on suicidal ideation in family caregivers of people with dementia. Family caregivers were given the "Revised Memory and Behavior Problems Checklist," "The Fortinsky Caregiver Self-efficacy Scale," "The Alzheimer's Disease Knowledge Scale," "The SF-12 Health Survey Version 2," "The Center for Epidemiologic

Studies Depression Scale,” “The Beck Hopelessness Scale,” “The Geriatric Anxiety Inventory,” “The Life Orientation Test,” “The Zarit Burden Scale,” “The Brief COPE,” “The Duke Social Support Index,” and “The Suicidal Behaviors Questionnaire-Revised” to measure suicidality, self-efficacy, physical health, depression, hopelessness, anxiety, optimism, caregiver burden, coping strategies and social support.

In this study, Cronbach’s alpha was calculated to check the internal consistency of the scales. Descriptive analyses were conducted for participant demographics, the number of participants contemplating suicide, the number reporting suicidal intentions to others, and the number likely to attempt suicide in the future. Independent t-tests were used to identify differences between suicidal and non-suicidal caregivers on the other scales. Where significant differences were identified, variables were entered as predictors into a logistic regression with suicidality (suicidal/non suicidal) as the outcome variable. Analyses were considered significant at  $p < 0.05$  (O’Dwyer et al., 2013). In the logistic regression mode, only depression was found as a significant individual predictor of suicidality ( $p = 0.003$ ). The results indicate that as depression scores increase, so do the odds of contemplating suicide.

In sum, O’Dwyer et al. (2013) study confirm that 26% of caregivers had contemplated suicide more than once in the previous year and almost 30% were likely to attempt suicide in the future while caring for the family member with dementia. This suicidal thought is mainly provoked by the depression.

**S3:** Vitaliano, Zhang, Young, Caswell, Scanlan & Echeverria (2009) investigated depression and its relationship to cognitive processing. Caregivers for spouses with Alzheimer’s disease ( $n = 122$ ) were compared with demographically similar non-caregiver spouses ( $n = 117$ ) at study entry (Time 1 = T1), T2 (1 year later), and T3 (2 years after T1). This study used digit

symbol test (DST) and Hamilton depression scale. DST is a “good screening tool that measures functions that are hallmarks of future cognitive impairment such as processing speed, attention, cognitive –motor translation, and visual scanning” (Vitaliano et al., 2009). Hamilton Depression Rating Scale is the 24 items based scale that is used to assess depressive symptoms. Hierarchical linear modeling was also used to analysis the potential mediation effects of depression on the association of caregiver status with DST decline.

The researchers concluded that caregivers had lower DST scores and higher Hamilton depression scores at T1, T2, and T3 than non-caregivers (all  $p < .05$ ). Hierarchical linear modeling revealed that although caregivers started well below non-caregivers, they experienced a more rapid rate of decline than non-caregivers ( $p = .047$ ). Caregivers declined 4.5 times faster than non-caregivers. Greater depressed mood at T1 ( $p < .01$ ) and T2 ( $p < .01$ ) predicted DST decline and mediated DST decline in caregivers vs. non-caregivers (Vitaliano et al., 2009).

Over all, it indicated that caregiver cognitive decline when caregiving to patient with Alzheimer’s disease and the mediator factor is depression to interfere in cognitive function.

**S4:** Valimaki, Julkunen, Pietila & Pirttila (2009) investigated the relationship between Sense of Coherence (SOC) and Health Related Quality of Life (HRQoL), and the factors that were associated with SOC at baseline in 170 spousal caregivers of patients with Alzheimer’s disease. The participants were recruited from April 2002 to September 2006. Caregivers were given Beck depression inventory (BDI), SOC scale, HRQoL15D questionnaire, and a visual analogue scale and general health questionnaire to measure depression, sense of coherence, health related quality of life, and extent of distress. In addition, the assessment of AD-related symptoms was made using Mini Mental State Examination, clinical dementia rating,

neuropsychiatric inventory, and functional performance using activities of daily living (ADCS-ADL) scale.

Valimaki and associates (2009) used descriptive statistics to summarize the variables studied and characteristics of the persons with AD and spouse caregivers. T-tests were used to compare SOC, depressive symptoms, HRQoL and distress between men and women. Through the analysis the authors revealed that the main predictor for low SOC was depression, with 37% of spousal caregivers reporting depressive symptoms. Women were found reporting more depressive symptoms and distress. Caregivers' HRQoL was as high as 0.8714, and a significant correlation was found between SOC and depression,  $r = -0.632$  and distress  $r = -0.579$ . Furthermore, significant correlations were found between HRQoL and depression ( $r = -0.572$ ) and distress ( $r = -0.568$ ).

In conclusion, Valimaki et al. (2009) found that depression and distress are significantly associated with HRQoL and SOC in individuals providing care to their loved ones with Alzheimer's disease. They also confirm that depression and feelings of being distressed lower the sense of coherence in caregivers which affects the health-related quality of life over time.

### **Physical health effects:**

**S5:** Cucciare, Gray, Azar, Jimenez & Thompson (2010) conducted a study to examine the relationship between self-reported physical health, depressive symptoms, and the occurrence of depression diagnosis in Hispanic female dementia caregivers. Eighty-nine Hispanic female dementia caregivers were recruited for the study. Baseline depression and physical health data were collected from participants. In this study, physical health was assessed using the Medical Outcome Study Short Form-36 (SF-36), a one-item self-report health rating, body mass index,

and the presence or history of self-reported physical illness whereas Depressive symptoms were assessed using the Center for Epidemiologic Studies – Depression Scale (CES-D), and the occurrence of depression diagnosis was assessed using the Clinical Interview for DSM-IV Axis I Disorders (SCID) (Cucciare et al., 2010).

The study used multiple linear and logistic regression analysis. Through the analysis the authors indicate that perceived and objective physical health factors are significantly associated with increase depressive symptoms in dementia caregiver. They also found that medical problems reported by participants did predict depression diagnoses (Cucciare et al., 2010).

Overall, the results specify that dementia caregiver's self-reported health tends to decline, associated with increases in depression. Cucciare and others (2010) also claims that untreated depressive disorders can lead to increased medical morbidity and mortality. They concluded that it is important to identify and treat depression disorder early. Lastly, the authors suggest researchers and clinicians to make greater use of caregiver interventions and to further study the complex relationships among physical health, and mental health, in ethnically and linguistically diverse dementia family caregivers.

**S6:** Schubert, Boustani, Callahan, Perkins, Hui & Hendrie (2008), completed the cross-sectional study to examine the facets of dementia caregiving that impact caregiver acute health care utilization. One hundred and fifty three Alzheimer's disease patients and their caregivers attending two large, urban, university-affiliated primary care practices were enrolled in the study.

In this study, authors used two sample T-tests and Fisher's exact test to compare the demographic, neuropsychiatric inventory, and survey measures of caregivers with an Emergency Department (ED) visit or hospital admission to those without. Along with this, Schubert and

colleagues used multivariate logistic regression models to evaluate the impact of patients' overall medical comorbidity and dementia symptoms (functional, cognitive, behavioral, and psychological symptoms) on the caregiver acute utilization. Caregiver age, gender, education, and depression (PHQ-9 score) were specified for model inclusion regardless of p-value due to their clinical relevance and importance (Schubert et al., 2008).

Over all, it was found that 24 percent of the caregivers had at least one ED visit or hospitalization in the six months prior to enrollment. After adjusting for caregiver age, gender, and education, logistic regression model found that the caregivers' acute care utilization was associated with their depression as measured by the Patient Health Questionnaire-9( PHQ-9 )(OR 1.09, 95% CI 1.00–1.18), the patients' behavioral and psychological symptoms as measured by the Neuropsychiatric Inventory( NPI )(OR 1.04, 95% CI 1.01–1.08), and the patients' functional status as measured by the Alzheimer's Disease Cooperative Study-Activities of Daily Living Inventory( ADCS-ADL ) (OR 1.05, 95% CI 1.01–1.09).

**S7:** O'Rourke, Cappeliez & Neufeld (2007) conducted a study to examine changes in physical well-being in relation to depression status in a randomly derived group of caregivers of persons with dementia who were assessed 3 times over an extended period of about 10 years. Ninety-six patient- family caregiver's dyads were selected based on inclusion criteria over a decade. O'Rourke and colleague (2007) determined repeated measures of analysis of variance to compare the health of caregivers who were consistently asymptomatic for depression, of those symptomatic at 1 of 3 points of measurement, and of those symptomatic at 2 of 3 points. This study hypothesized that persistent depressive symptomatology will decline in health status over time. As hypothesized this study warranted that "caregivers presenting with elevated depressive

symptomatology at multiple points of measurement reported poorer and worsening physical health over time.”

In brief, the findings of this study supports the assertion that depressive symptomatology significantly predicts the decline in health status of caregivers of persons with dementia. O'Rourke and colleague (2007) lastly noted that collaborative efforts at treating depression can prevent major declining health status in family caregivers and premature patient institutionalization.

**S8:** Rullier, Lagarde, Bouisson, Bergua, Torres, & Barberger (2014), conducted a cross-sectional study to investigate the associations of individual characteristics of both family caregiver (including burden, anxiety, depression, emotional impact of behavior disorders, and functional status) and elderly people with dementia (including cognitive, functional, neuropsychiatric and nutritional status) with the nutritional status of caregivers. Fifty- six persons with dementia and 56 family caregivers were recruited for this study. Subjects who were persons with dementia were assessed with Mini-Mental State Examination (MMSE), Basic Activities Of Daily Living (ADL), Instrumental ADL (IADL), and Neuropsychiatric Inventory (NPI), and Family caregiver subjects were measured with the Burden Interview (Zarit scale), the State-Trait Anxiety Inventory (STAI Y-B), the Center for Epidemiologic Studies Depression Scale (CES-D), the emotional impact measure of NPI and the Autonomy, Gerontology and Group Resources scale (AGGIR scale). For both, nutritional status was evaluated using the Mini Nutritional Assessment (MNA).

Multiple linear regression analysis revealed that neuropsychiatric severity score of apathy of persons with dementia, dependency on AGGIR scale and CES-D score of caregivers were associated with caregivers' Mini Nutritional Assessment score. Researchers found depression as

the strongest variable associated with caregiver's mini nutritional assessment. The prevalence of poor nutritional status was very high in both the older people with dementia and their family caregiver. This finding indicates that 37.5% of caregivers presented a compromised nutritional status (32.1% at risk of malnutrition and 5.4% malnourished) and 58.9% of elderly people with dementia were at risk of malnutrition and 23.2% were malnourished (Rullier et al., 2014).

Overall, the study concluded that poor nutritional status is strongly associated with depressive symptoms among family caregivers. Rullier et al. (2014) lastly suggest that interventions should be developed to assist the community-dwelling caregiving dyad in order to improve their quality of life.

**S9:** Mausbach and associates (2007) conducted a longitudinal study and used cox regression analysis to assess the impact of depressive symptoms and distress from patient problem behaviors on time to developing a diagnosis of cardiovascular disease (CVD). Of 1,222 participants 643 participants met the criteria and were recruited for the study. Over an 18-month period, caregivers free from a CVD diagnosis at baseline were assessed at 6, 12, and 18-month follow-ups for the onset of CVD. The Center for Epidemiologic Studies–Depression scale was used to measure the presence of depressive symptoms and The Revised Memory and Behavior Problem Checklist was used to measure caregiver reaction to care recipient problem behaviors. After adjusting for sociodemographic and health factors (e.g., high blood pressure, age, smoking history), higher Depressive symptoms ( $p = .040$ ) and distress from patient problem behaviors ( $p = .034$ ) were significantly related to time of CVD onset. Over the length of the study, 32 participants (5%) reported a diagnosis of CVD.

Overall, authors found that increased depressive symptoms and reaction to the problem behaviors were independent significant predictors of time to developing negative health outcome, especially cardiovascular disease within 18 months.

**S10:** Gouin, Glaser, Malarkey, Beversdorf & Kiecolt-Glaser (2012) conducted a cross-sectional study to investigate whether greater exposure and reactivity to daily stressors may fuel overproduction of inflammatory biomarkers (CRP and IL-6) among family dementia caregivers. Fifty three caregivers and 77 non-caregiving controls were recruited for the study. Inclusion criteria include: caring for a spouse or a parent with dementia, and spending at least 5 hours per week in caring duties. A semi-structured interview and self-reported questionnaires were used to assess the occurrence of daily stressors. Along with this, a blood sample was drawn to test two inflammatory markers, CRP and IL-6 from the participants.

For this study, a multinomial logistic regression model and hierarchical linear regression model was used. A multinomial logistic regression model evaluates daily stressors in both caregivers and non-caregivers. Hierarchical linear regression models were fitted with daily stressors and caregiving status as independent variables, and IL-6 and CRP as dependent variables to determine the effect on the groups (Gouin et al., 2012). A multinomial logistic regression model including age, sex, employment status, and marital status as covariates revealed that caregiving status was significantly related to the report of multiple stressors in the past 24 hours,  $\chi^2(1) = 7.43$ ,  $p = .006$ , as compared to the absence of a stressor. However, hierarchical linear regression models indicate that individuals who experienced multiple stressors in the past 24 hours had higher IL-6 levels and CRP than participants who reported no stressors or reporting one stressor.

Over all, Gouin et al. (2012) found that caregivers were more likely to experience multiple stressors in the past 24 hours than non-caregiving controls showing that daily stressors can increase inflammatory biomarkers, IL-6 and CRP in naturalistic settings. Gouin et al. (2012) noted that if inflammatory markers remain elevated up to 24 hours after daily stressors, exposure to multiple daily stressors for several consecutive days are likely to have a much greater impact on caregivers.

**S11:** Aschbacher, Roepke, von Känel, Mills, Mausbach, Patterson & Grant (2009) conducted a longitudinal study to investigate whether persistent depressive symptoms would relate to elevated platelet activation in response to acute psychological stress over a three-year period. Ninety-nine caregivers continuously providing in-home care to spouses with Alzheimer's disease were recruited. Brief Symptom Inventory (BSI) and Flow cytometry was used to index participant depressive symptom severity and examine the percentage of platelets expressing the cell adhesion molecule P-selectin (PSEL) as an index of platelet activation respectively (Aschbacher et al., 2009).

In this study, two models, one assessing persistent depressive symptoms and the other transient symptoms, were tested. The persistent model of depression provided stronger and more consistent associations with platelet activation than the transient model.

Aschbacher and associates (2009), found that persistent depressive symptoms (i.e., the enduring symptoms over three yearly assessments), were significantly related to increased platelet P-selectin expression in response to acute psychological stress among older dementia caregivers. Along with this, Aschbacher and associates concluded that the possibility of platelet hyperactivity mediated by depressive symptoms may be associated with accelerated atherosclerotic progression and increased risk of acute coronary events in the caregivers.

**S12:** Ranney & Aranda (2001) conducted a cross-sectional study that included 97 Latino family dementia caregivers. Utilizing Pearlin and colleagues' (1990) and Lawton and colleagues' (1989; 1991) stress process model of caregiving, the factors associated with depressive symptoms among Latino family dementia caregivers were examined. Variables used in analyses were self-reported health, average household monthly income, relationship to the dementia-affected person, cognitive status, and problematic behavior of the dementia-affected person.

In the study, physical health was assessed using a single-item subjective health rating to assess dementia caregivers' health status. Depressive symptoms were assessed using a 22-item screening tool based on the DSM-III-R criteria for depression. A hierarchical regression analysis was used to test the influence of independent variables on the depressive symptoms of the caregiver. The overall analysis tested explained about 25% of the variance in the self-reported depressive symptoms of Latino dementia caregivers (Adjusted R<sup>2</sup> = 24.7%,  $p < .05$ ) which was only significant. Therefore, results indicate that self-reported health has a positive relationship with depressive symptoms, thus, a higher score (that is, poorer health) was found to be associated with a higher level of depressive symptoms. These findings support that poor self-reported health is associated with higher depressive symptoms.

**S13:** Chiua, Leeb, Wang, Changd, Lie, Hsu & Lee ( 2013) did a cross- sectional study to test a stress process model of multilevel stressors on sleep disturbance for family caregivers (FCG) of persons with dementia (PWD). One hundred and eighty persons with dementia- family caregiver's dyads were recruited by purposive sampling from the participating sites by two well-trained research assistants using a standardized interview. PWDs' neuropsychiatric symptoms were assessed using the Chinese Neuropsychiatric Inventory (CNPI), FCGs' distress by CNPI Caregiver Distress Scale, physical fatigue by Visual Analogue for Fatigue Scale, mental fatigue

by Attentional Function Index, depressive symptoms by the Center for Epidemiological Studies Depression Scale – Short Form, and sleep disturbance by the General Sleep Disturbance Scale.

The authors used Pearson correlation coefficient and hierarchical regression models for analyses. The hierarchical model analyses suggested that the most important predictors associated with FCGs' sleep disturbance were FCGs' physical fatigue and depressive symptoms. Chiua et al. (2013) found that about two-thirds of family caregivers of people with dementia suffered from various types of sleep disturbance. The most prevalent sleep disturbance problems reported by FCGs were sleep quality problems (99.4%), dozing in daytime (97.8%), and waking up before the sleep cycle ends (67.8%).

Overall, the findings of this study indicate that fatigue and depressive symptoms interact with each other and develop synergistic effects to predict sleep disturbance in family caregivers.

**S14:** Aschbacher, Mills, von Känel, Hong, Mausbach, Roepke, & Grant. (2008) completed a study on 39 caregivers who had been providing in-home care since spouses had received the AD diagnosis 9 years previously and 31 gender-matched non-caregivers. This study is based on two main objectives: (1) to evaluate associations between negative affect (that is, depressive and anxious symptoms) with increased norepinephrine and P-selectin responses to an acute psychological stress task, and (2) to establish whether these associations are augmented among elderly spousal caregivers (CG) compared to non-caregivers (NC). Aschbacher et al. (2008) used Brief Symptom Inventory, catechol-o-methyltransferase (COMT), and Flow cytometry to assess Depressive (DEP) and anxious (ANX) symptoms, plasma norepinephrine levels (NE) and percent platelet P-selectin (PSEL) respectively. Here plasma norepinephrine level and percent platelet P- selection expression were assayed at three time-points: rest, immediately following a laboratory speech test (reactivity), and after 14 minutes of recovery.

Regression analyses revealed that caregivers have increased symptoms of depression and anxious symptoms. These greater depression and anxious symptoms were significantly associated with delayed NE recovery (that is, slower return to baseline), increased PSEL reactivity and delayed PSEL recovery while controlling for age, gender, aspirin use, antidepressant use, and preexisting CVD. Further Bivariate correlations showed delayed NE recovery was also associated with increased PSEL reactivity ( $r = .416$ ) and delayed PSEL recovery among caregivers but not non-caregivers (Aschbacher et al., 2008).

In conclusion, these researchers found that elderly caregivers of spouses with Alzheimer's disease who endorsed increased levels of depressive and anxious symptoms exhibit hyper-reactivity of platelet P-selectin expression and delayed norepinephrine recovery immediately following exposure to an acute psychological stressor. Further, this condition may lead to the development and evolution of atherosclerotic plaques, increasing the likelihood of atherothrombotic event and commonly cardiovascular risk.

**S15:** Hashimoto, Washio, Arai, Sasaki, Mori, & Saito (2013), conducted a cross-sectional study to investigate the factors related to depression among caregivers of patient with dementia. The participant includes 55 pairs of family caregivers and outpatients with dementia, who attended the psychiatric dispensary of Sapporo Medical University Hospital from 2006 to 2007. In this study caregivers were self-administered questionnaires in relation to their burden and caregiving situation, Burden was assessed by Zarit Caregiver Burden Interview (ZBI) and depression by Center for Epidemiologic Studies Depression Scale (CES-D).

A logistic regression analysis revealed that patients' behavioral problems were positively related to depression or perceived burden among family caregivers. Among 55 caregivers,

25(45.5%) of the caregivers were depressed and 41 (74.5%) had chronic diseases requiring medical treatment.

In conclusion, researchers found that chronic diseases under treatment was positively related with the depressive symptoms in caregivers and caregiver spend more money for patients' care (Hashimoto et al., 2013).

## CHAPTER-V

### DISCUSSION AND CONCLUSION

#### Discussion

This study was mainly conducted to analyze the impact of depression on health of family caregivers of individuals with Alzheimer's disease. A systematic review of 15 articles confirmed that depression have negative impact on mental and physical health of family caregivers of individuals with Alzheimer's disease.

Caregivers of persons with Alzheimer's disease seems to experience higher level of depressive symptoms even in the early phase of the Alzheimer's disease trajectory which are strongly associated with more severe psychological distress throughout the caregiving period (Valimaki et al., 2015). In 2009, Valimaki and colleagues also confirm that depression and feelings of being distressed lower the sense of coherence in caregiver's which affect the health-related quality of life over time. In addition, Vitaliano and associates (2009) investigated depression and its relationship to cognitive processing. Through Hierarchical linear modeling they revealed that caregivers experience cognitive decline 4.5 times faster than non-caregivers when caregiving to patient with Alzheimer's disease and the mediator factor is depression to interfere in cognitive function. Further, cognitive decline interferes with a caregiver's ability to provide care and may create an unsafe environment if judgment is impaired (Willis et al., 1992). If caregivers experience decline, they are less capable of maintaining their care recipient at home and may experience difficulty performing complex activities of daily living and are less likely to engage in consistent self-care. In addition, lack of motivation and interest as well as social withdrawal also impede the willingness and capacity of individuals with depression to engage in

health- enhancing behaviors that help to manage the illness (O'Rourke et al., 2007). Moreover, it was also found that depressive symptoms provoked the thought of suicide in family caregivers (O'Dwyer et al., 2013). Further O'Dwyer and colleagues (2013), confirm that 26% of caregivers had contemplated suicide more than once in the previous year and almost 30% were likely to attempt suicide in the future while caring for the family member with dementia.

Reviewed research also supports the assertion that depressive symptomatology is significantly associated with reduced physical well-being among family caregivers of persons with Alzheimer's disease (O'Rourke et al., 2007). Several possible mechanisms explain the influence of depression on physical health. O'Rourke and colleagues (2007), found that depressive symptoms exacerbate the immunologic declines contributing to increased inflammation in caregivers. The inflammation process further increases the inflammatory markers that is, IL-6 and CRP (Gouin et al., 2012) which lead to greater risk for cardiovascular disease (CVD) in caregivers than people who are not caregivers (Mausbach et al., 2007). In addition, it was found that elderly caregivers of spouses with Alzheimer's disease who endorsed increased levels of depressive and anxious symptoms exhibit hyper-reactivity of platelet P-selectin expression and delayed norepinephrine recovery, linking caregivers to development and evolution of atherosclerotic plaques, increasing the likelihood of atherothrombotic events, increased risk of acute coronary events and commonly cardiovascular risk (Aschbacher, Roepke, von Känel, Mills, Mausbach, Patterson & Grant, 2009; Aschbacher, Mills, von Känel, Hong, Mausbach, Roepk, Dimsdale, Patterson, Ziegler, Israel, & Grant, 2008). Furthermore, Cucciare and others (2010) claim that untreated depressive disorders can lead to increased medical morbidity and mortality. Many of the literature reviewed concluded that depressed caregivers are more likely to visit the hospital or emergency room (Schubert et al., 2008); have poor nutritional

status such as malnutrition (Rullier, Lagarde, Bouisson, Bergua, Torres, & Barberger, 2014) and have sleep disturbance like sleep quality problems (99.4%), dozing in daytime (97.8%) and waking up before the sleep cycle ends (67.8%) (Chiu et al., 2013) which may lead to both mental and physical health problems such as confusion and increase in inflammatory biomarkers.

As the literature reviewed confirms that depression is an important correlate of health and illness in caregivers, this issue should be addressed to protect the family caregivers from serious health effects. Each piece of the article has connection in regards to the importance of evaluation or assessment of caregiver aspects of depression in the assessment and monitoring of Alzheimer's patient in order to recognize this disorder early in family caregivers to help them live a good quality of life and continue the care of their loved ones. Depression often strikes people caring for Alzheimer's patient. It affects different people in different ways and at different times. For example, someone may experience depression right after their family member has been diagnosed with Alzheimer's. Other caregivers may experience it as Alzheimer's progresses and the cognitive abilities of the person with Alzheimer's diminish. The best way to resolve this problem is through early investigation of depression in the caregivers. If one thinks that one might be depressed, then it is necessary to seek medical care as soon as possible. Likewise, the health care provider can also involve the assessment of caregivers when they accompany their loved one to physician appointments, following this procedure can help health care providers to use effective screening tools for early detection and early interventions to reduce the risk of depression and initiate appropriate treatment in a timely manner. This, in turn may help reduce the risk of developing other various health conditions.

Benefits of this study include:

- Health care providers will be aware of different impacts of depression in order to implement appropriate pharmacologic and non-pharmacologic treatments effectively in family caregivers.
- Researchers can get ideas to develop some interventions focusing on caregiver support that may reduce rates of caregiver depression and stress.
- Caregivers will be aware of the long-term side-effects of depression in their health which can encourage them to approach or see their doctor before the condition gets worse.
- Caregivers may be compelled to think about alternative methods like respite care and routine assessment of disorder to treat the condition in time.

The benefits listed are some of the possible benefits that individuals may experience by understanding the consequences of depression and taking the initial step to control it. Caregivers, health care professionals, and researchers may benefit from this literature analysis because it will allow for them to develop effective caregiver interventions to enhance the quality of life in the family caregivers and to further study the complex relationships among health, and mental health, in ethnically and linguistically diverse dementia family caregivers (Cucciare et al., 2010)

### **Limitations**

Many of the articles reviewed identified limitations within their research. Cucciare and colleagues (2010) explained that they did not examine depressive symptoms in the care-recipients. They said it is very important to examine the factors associated with depressive symptoms in care-recipients because they can play an important role in the occurrence of depression symptoms and diagnosis in dementia caregivers.

Another limitation was expressed by Mausbach and associates (2007). They stated that their study was limited to assessment of caregivers' depressive symptoms and reaction to care-recipient problem behaviors. These authors specify that caregivers of dementia patients not only experience depressive symptoms but also other multiple stressors so, it is recommended that future studies should include other measures of stress/distress; which may include measures of care recipient cognitive functioning and need for help with activities of daily living, and assessments of caregiver role overload, family conflict, deprivation of intimate exchange, caregiver burden, mastery, coping, and social support.

Further limitation was addressed by Chiu et al. (2013) in their study. They stated that their findings was influenced by the sample source, measurement and study design. They recommended that future studies should consider representative sample, reliability and validity of the measurement tool and longitudinal design that can investigate the in- depth relationship among fatigue, depressive symptoms, and the synergistic effect of depressive symptoms and fatigue on family caregivers' sleep disturbance.

## **Conclusion**

Caregiving for individual with AD is highly stressful and has significant negative consequences, including physical and psychiatric morbidity. More generally, caregiving stress has been associated with elevated symptoms of depression, where depression heightened platelet P-selectin (Aschbacher et al., 2009), increased cardiovascular risk (Mausbach et al., 2007), poor nutrition status, sleep disturbance and mortality risk (Schulz and Beach, 1999). Thus, it is essential to include an assessment of caregiver depression and recognize this risk group of caregivers since they may need and benefit from counselling, psychological support and even medication. Furthermore, it is hoped that this study shared new information on the impact of

depression on the health of family caregivers of individuals with AD. The findings may help future researchers to study and conduct research to improve health of family caregivers. The data collected in this study may help health-care providers and support groups to plan and develop better caregiver intervention for improving the health of family caregivers of persons with Alzheimer's disease through which they can continue to provide care for their loved one.

### **Future Recommendation**

There is always room for adjustment, additional investigation and more knowledge, therefore I would like to make some suggestions for future research. In my perspective, future studies should be done to view the effects of depression from various perspective such as reading the back and forth relationship between the depression and health of caregivers. Sometimes not only the depression effect the health, also some health condition can lead to depression in caregivers.

Likewise, it is also important that health care system should focus on recruiting someone who have psychosocial background and can involve the assessment of caregiver aspects of depression in order to recognize depression early in family caregivers to help them to live a healthy life and continue the care of their loved ones.

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