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Predictors of Physician Use of the new NIA Alzheimer's Assessment Protocols

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This is to certify that the doctoral dissertation by

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Predictors of Physician Use of the new NIA Alzheimer's Assessment Protocols

by

Richard N. Schultz, Jr.

Masters, Chapman University, 2005

BS, Southern Illinois University, Carbondale, 2003

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

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Abstract

Consensus is lacking on early diagnostic criteria and the exact symptoms of Alzheimer's disease (AD). A new, in-office test may help physicians detect the early symptoms of AD, based upon new National Institute of Aging (NIA) criteria. However, a gap exists in knowledge regarding physicians' current use or intent to use the new protocols. Choreographing the descriptive AD terminology in the *Diagnostic and Statistical Manual of Mental Disorders IV-TR* and the International Classification of Diseases (ICD-10) is recommended. Thus, the purpose of this study was to understand possible contributing factors to physician's use or intent to use of the new NIA's diagnostic protocol. Data collected from 55 clinicians within 2 Northern California counties were analyzed using a bivariate test. The 2 dependent variables were physicians' use of, or intent to use, the NIA protocol; the 6 independent variables were number of years since graduating from medical school, area of specialty, percentage of patients over age 60 years, physician's gender, age, and knowledge about AD, as indicated by performance on the Alzheimer's Disease Knowledge Scale. The results of regression analyses indicated no statistical significant associations between the variables of interest ($p \geq .05$). This study is a first attempt at understanding physician attitudes toward, and usage patterns of, an important new in-office tool for early detection of AD. Further research using a larger sample size to increase power is needed. These findings have implications for positive social change by promoting an earlier detection of Alzheimer's disease, underscoring the need for additional training, and revising the terminology used in clinicians' desktop references.

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Dedication

I would be remiss if I did not thank God for answering my prayers! I dedicate this work to my wife, Cheryl I. DeFusco Schultz. She has been waiting for me to finish this project so we can enjoy some quality time together. I also recognize my parents, Richard N. Schultz Sr. and Amy R. Schultz, for encouraging me to earn a college education. My father passed away during the first year of my studies for my PhD and he is deeply missed. To my sisters Elizabeth Schmitz and Christina Ramirez, I appreciate you both! To my father-in-law Louis De Fusco for inspiring me to write a book about my wife and our therapy dog named Coco. Cheryl and Coco work with patients at local hospitals bringing good cheer, smiles and lots of love. Cheryl and Coco also work with local elementary schools and their reading programs. Coco loves to hear all types of stories, loves children, and makes for a great listener. Lou was very supportive and encouraging each day as he saw me working on my dissertation until 3 or 4 in the morning working on edits, research and so forth. To my brothers-in-law Duane Schmitz, Dave De Fusco, Mike De Fusco, and Macario Ramirez, I appreciate you and hope we can spend some quality time together soon. To our daughter Bethany and her husband Brian Seagrave, I thank you for the many conversations of motivation. To my son Richard N. Schultz III, I wish him continued success in his life choices and hope he reaches all of his goals. More importantly, I pray for my son and his happiness.

Acknowledgments

To my committee, I wish to thank Dr. Richard Jimenez for all the countless re-writes, phone calls, emails, and words of encouragement. I really believe that without God's intervention to put the two of us together I would have never completed my doctorate. To Dr. Stoodt, for her insight into this research and adding the second set of eyes that every wonderful project deserves. I appreciate you very much for joining the team through all the setbacks you saw me through! In addition, I value your background as a physician and your point of views as such contributed in countless ways. To Dr. Shen who served so very well as my University Research Reviewer and so much more than that – he approved work and consequently permitted me to conduct my oral defense!

To my editors, I wish to thank Tabbitha Zepeda for her help with my writing and switching my work over from APA 5 formatting and style to APA 6 during my many drafts. I wish to specifically thank Carey Little Brown my Dissertation Editor at Walden University. Carey you were instrumental in coordinating comments, remarks, ideas, concepts, and creating a perfect amalgamation of ideas and helping me craft an outstanding Proposal. I also appreciate the work and suggestions from Form and Style. Thank you very much – I appreciate you!

I wish thank the Stanislaus Medical Society (SMS) for their support, assistance and cooperation specifically with my survey instrument. The SMS was instrumental in reviewing, assisting with my pilot study, and subsequently sending out my survey instrument link to their members. I am eternally thankful for the direct assistance I received from Dr. Joseph Provenzano (past president) of the SMS, provider with Sutter

Gould Medical Foundation. Dr. Provenzano and I met and discussed my dissertation topic for many years and when it came time to deploy the instrument for initial review, panel review, pilot study, and then the full deployment of my instrument he was very cooperative.

I wish to express my thanks to everyone at Patriots Landing located in DuPont Washington a Continuing Care Retirement Community for initially inspiring me to start this journey. The experiences I witnessed and was a part of opened my eyes to a larger issue and enlightened me on possible ways I might leave this world in a better place. I thought if I could some how give back to humanity and especially our senior citizens then my desire to give back is then fulfilled. My experience living in Athens, Greece opened my eyes regarding how some countries view elders as they age. In Greece, seniors are warmly and lovingly invited into their children's homes to care for infants and toddlers alike – they are given a new purpose and a sense of helpfulness. In the United States we have various levels of healthcare where our most respected citizens (Tom Brokaw referred to these citizens as *The Greatest Generation*) either by their choice or circumstances are relegated to facilities for their remaining years—not always, but the options do exist for those that can afford such care with our robust healthcare industry in the United States.

Lastly, to the Walden University, faculty, staff, and everyone that touched my life either in classes or while attending residencies, and everyone taking time to take my phone calls – Thank you!

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Chapter 1: Introduction to the Study

Introduction

Dementia of the Alzheimer's disease (AD) type is reaching epidemic proportions globally Lindesay et al. (2010). Awareness of AD, early recognition of AD, and increased research on this type of dementia are causing this life-changing disease to rise as a significant concern and a healthcare priority Lindesay et al. (2010). Lindesay et al. (2010) reported that some physicians still use the term *senile dementia*, which contributes to the fallacy that dementia is a natural progression that comes with age. AD is not a normal part of aging. Researchers have identified a need to improve general practitioners' and primary care providers' skills in diagnosing AD patients, early diagnosis of dementia/AD, and referrals for additional evaluation of patients' symptoms (Lindesay et al., 2010; Schoenmakers, Buntinx, & Delepeleire, 2009).

There is a gap in knowledge regarding physicians' knowledge and use of the National Institute of Aging (NIA) criteria for all-cause dementia. Diagnostic tests within the office for the early detection of AD, such as the NIA criteria, are needed for the accurate diagnosis of early AD. These new criteria are described and discussed in Chapter 2. The purpose of this study was to explore the correlations between physicians' background characteristics and knowledge of AD and their intention to adopt or not to adopt the new criteria.

Chapter 1 includes a brief introduction, review of background to the research subject, discussion of the problem statement, purpose of the study, identifying the research questions and hypotheses, theoretical framework for the study, nature of the

study, definitions, assumptions, scope, delimitations, limitations and the significance of the research.

Background

Leifer (2009) reported that patients and/or family members caring for loved ones who exhibit symptoms suggestive of AD tend to seek help initially from their primary care physicians (PCPs). PCPs must be aware of AD symptoms and should screen aging patients for AD. In Leifer's study, family doctors (73%) and internists (11%) were the first physicians consulted regarding the concern about AD. After reporting symptoms to their family doctors, 62% of patients with AD remained undiagnosed (Leifer, 2009).

AD is expected to become more prevalent as the elderly population in the United States increases. By the year 2040, more than 80 million individuals in the United States will be affected by AD (Forlenza, Diniz, & Gattaz, 2010; Leifer, 2009). A meta-analysis conducted in 2009 indicated the approximate prevalence of AD in the United States increased 1% at 65 - 69 years of age to 13 - 17% at 85 - 89 years of age and 24 - 31% at 90 - 94 years of age (Leifer, 2009).

Healthcare providers use AD as a diagnostic term or way of labeling or even attaching a disease term to patients and AD is only one of many forms of dementia (Bassil & Grossberg, 2009). (The other terminology and use of forms for AD are discussed in Chapter 2.) According to Jack et al. (2011), widely used criteria for the clinical diagnosis of AD were established in 1984 by the National Institute of Neurological Disorders and Stroke (NINDS) and the Alzheimer's disease and Related Disorders Association (ADRDA). Since the development of the NINDS and ADRDA

criteria, there have been many advances in AD research, which have led to new diagnostic techniques and thus to three stages for the classification of AD (Jack et al., 2011). These improvements in diagnostic testing, and a better understanding of pathology, have generated greater understanding of AD than is reflected in the NINDS and ADRDA criteria (Jack et al., 2011).

Over the past quarter century, various tests such as use of imaging equipment have been used to detect AD. Research is ongoing concerning imaging techniques and the use of biomarkers to detect AD at the earliest stage possible. Psychological testing has been accomplished through various tests as well as memory recall evaluations. The evaluation of the patient's medical history remains a central part of the AD evaluation process.

Yet, according to Jack et al. (2011), recent studies indicated that the early detection of AD does not require expensive imaging equipment or other equipment that evaluates cognitive domains beyond memory recall. If, formal cognitive testing of AD is not feasible, then cognitive functions can still be assessed through an in office test. For example, the clinician can ask the patient to learn an address during the interview and then ask the patient to recall the address a few minutes later. Or the clinician can ask the patient to name four items (e.g., a notepad, a stapler, a telephone, and a pen), place them in various locations around the room, and later ask the patient to recall the location of the items and their names. Additionally, Mini-Cog state exams and computer programs such as the Computer-Administered Neuropsychological Screen for Mild Cognitive Impairment (CANS-MCI), a self-administered touch-screen battery, may be used to

evaluate patients for AD Jack et al. (2011). These examples are in office exams for early detection of AD and may lead to other healthcare tests authorized by the provider when assessing a patient using the new NIA AD criteria.

The new NIA AD criteria may be used to detect AD in the early stages of the disease process. Central to these new evaluation criteria are (a) a history taking from both the patient and a knowledgeable informant, and (b) an objective cognitive assessment, which takes the form of either a bedside mental status exam (see the previous paragraph for an example) or neuropsychological testing and a combination of two or more cognitive or behavioral criteria Jack et al. (2011). What is not known is how providers' might adapt their knowledge, attitudes, and behaviors (KAB) to the new NIA AD diagnostic criteria (Aday & Cornelius, 2006).

Upon a noticeable decline in cognitive function and performance can not be reasonably explained by a known disorder, then a neuropsychological test is indicated after an examination of patient history and mental status cannot provide a diagnosis and suspicion of cognitive impairment is detected Jack et al. (2011). The cognitive or behavioral impairment of two or more domains constitute a diagnosis of all-cause dementia: Core clinical criteria. There are five domains which frame a diagnosis of AD and include: impaired ability to acquire and remember new information, impaired reasoning and handling of complex tasks, impaired visuospatial abilities, impaired language functions, and changes in personality from which two or more are indications of AD Jack et al. (2011).

Problem Statement

There is no consensus on the exact symptoms of AD that GPs can use to diagnose early, middle, and late stage AD in their patients. Research indicated that as of yet, no studies have been conducted to explore physicians' use or willingness to use the new NIA AD criteria (Jack et al., 2011).

In this quantitative study, I put forth the hypothesis that few physicians are aware of the new NIA diagnostic criteria for AD, and those who are aware may or may not use them. Inconsistencies and gaps in the literature over the past 8 years identify gaps in physicians' accurate recognition of the early signs and symptoms of AD, misuse of the phrase *Alzheimer's disease* to describe a condition in a living person (literature indicates that a diagnosis of AD is conducted at autopsy and discussed further in Chapter 2). Use of the new NIA criteria may help physicians detect the early signs of AD to align treatment plans more accurately and quickly to address the patients' level of needs.

While the NIA AD protocol has not been evaluated by clinicians (Jack et al., 2011), researchers and clinicians have agreed that a test (e.g., the NIA protocol) is needed to detect the early symptoms of AD and should be used by healthcare providers as an effective means of detecting AD in early stages (Christensen & Lin, 2007). In this study, I will explore correlations between (a) physicians' background characteristics and knowledge of AD and (b) their use of, intention to use, or intention not to use the NIA criteria.

The results of this study has the potential for effecting social change by providing physicians' a means for early detection of AD in an office setting and streamlining treatment plans to precisely address patients' level of needs. In other words, patients could receive earlier access to healthcare options for treating their symptoms and activation of insurance benefits for the treatment of AD symptoms. The way AD is diagnosed today physicians' depend on the Mini-Cog state exam and similar tests to evaluate cognitive status. Nevertheless, that may cause the disease to be underreported and misdiagnosed. The U.S. Preventive Services Task Force (USPSTF)) found insufficient data to recommend for or against routine screening for dementia in those aged 65 and over (Boustani, Peterson, Harris, & Lohr, 2003).

The results of this study may also advance current knowledge of the new diagnostic criteria for AD. It may advance physicians' knowledge of AD, earlier diagnosis of AD and treatments of associated symptoms, and identify the exact criteria doctors use to diagnose patients presenting with AD symptoms, and possibly change their attitude toward using the new NIA early detection criteria. The discussion in Chapter 2 will address the importance of early detection of AD and the need to use the NIA criteria.

Purpose of the Study

In January 2010, President Obama endorsed the National Alzheimer's Project Act. The Act is focused on improving AD research and services at all levels, as well as accelerating treatments to abate AD. The purpose of this research investigated physicians' use of the NIA protocol through a set of two primary research questions on the relationship between various physician background characteristics and their use of,

intention to use, or intention not to use the NIA criteria for all-cause dementia and the early detection of Alzheimer's disease. The data collected will be useful for descriptive and inferential statistical analysis to then examine the data, which may or may not authenticate the study's hypotheses.

The independent variables in this study were the number of years since graduating from medical school, area of specialty, percentage of patients over age 60 years, physician gender, physician age, and knowledge about AD, as indicated by performance on the Alzheimer's Disease Knowledge Scale (ADKS). In this study, there were three dependent variables (represented by the three primary research questions): use of the NIA protocol, intention to use the NIA protocol, and intention not to use the NIA protocol. The research questions described in this chapter and Chapter 3 may identify correlations, which will be discussed further in Chapters 4 and 5.

Research Questions and Hypotheses

The identified gaps are represented as three dependent variables and in turn represent two main research questions and hypotheses. Each main research question has six subquestions that relate directly to the independent variables in this study and that correspond to the survey instrument. The two primary research questions and associated subquestions are as follows:

Research Question 1: Are a physician's background characteristics and knowledge associated with the physician's use of the National Institute on Aging (NIA) criteria for the detection of Alzheimer's disease (AD)?

Subquestion 1A: Is the number of years since a physician graduated from medical school associated with that physician's use of the NIA criteria for the detection of AD?

H_0A: The number of years since a physician graduated from medical school is not associated with that physician's use of the NIA criteria for the detection of AD.

H_a1A: The number of years since a physician graduated from medical school is associated with that physician's use of the NIA criteria for the detection of AD.

Subquestion 1B: Is a physician's area of specialty associated with that physician's use of the NIA criteria for the detection of AD?

H_01B: A physician's area of specialty is not associated with that physician's use of the NIA criteria for the detection of AD.

H_a1B: A physician's area of specialty is associated with that physician's use of the NIA criteria for the detection of AD.

Subquestion 1C: Is the percentage of patients over the age of 60 years in a physician's practice associated with that physician's use of the NIA criteria for the detection of AD?

H_01C: The percentage of patients over the age of 60 years in a physician's practice is not associated with that physician's use of the NIA criteria for the detection of AD.

H_a1C: The percentage of patients over the age of 60 years in a physician's practice is associated with that physician's use of the NIA criteria for the detection of AD.

Subquestion 1D: Is a physician's gender associated with that physician's use of the NIA criteria for the detection of AD?

H_01D: A physician's gender is not associated with that physician's use of the NIA criteria for the detection of AD.

H_a1D: A physician's gender is associated with that physician's use of the NIA criteria for the detection of AD.

Subquestion 1E: Is a physician's age associated with that physician's use of the NIA criteria for the detection of AD?

H_01E: A physician's age is not associated with that physician's use of the NIA criteria for the detection of AD.

H_a1E: A physician's age is associated with that physician's use of the NIA criteria for the detection of AD.

Subquestion 1F: Is a physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, associated with that physician's use of the NIA criteria for the detection of AD?

H_01F: A physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, is not associated with the physician's use of the NIA criteria for the detection of AD.

H_a1F: A physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, is associated with the physician's use of the NIA criteria for the detection of AD.

Research Question 2: Are a physician's background characteristics and knowledge associated with the physician's intention to use the National Institute on Aging (NIA) criteria for the detection of Alzheimer's disease (AD)?

Subquestion 2A: Is the number of years since a physician graduated from medical school associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0$2A: The number of years since a physician graduated from medical school is not associated with that physician's intention to use the NIA criteria for the detection of AD.

H_a2A: The number of years since a physician graduated from medical school is associated with that physician's intention to use the NIA criteria for the detection of AD.

Subquestion 2B: Is a physician's area of specialty associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0$2B: A physician's area of specialty is not associated with that physician's intention to use the NIA criteria for the detection of AD.

H_a2B: A physician's area of specialty is associated with that physician's intention to use the NIA criteria for the detection of AD.

Subquestion 2C: Is the percentage of patients over the age of 60 years in a physician's practice associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0$2C: The percentage of patients over the age of 60 years in a physician's practice is not associated with that physician's intention to use the NIA criteria for the detection of AD.

H_a2C: The percentage of patients over the age of 60 years in a physician's practice is associated with that physician's intention to use the NIA criteria for the detection of AD.

Subquestion 2D: Is a physician's gender associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0$2D: A physician's gender is not associated with that physician's intention to use the NIA criteria for the detection of AD.

H_a2D: A physician's gender is associated with that physician's intention to use the NIA criteria for the detection of AD.

Subquestion 2E: Is a physician's age associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0$2E: A physician's age is not associated with that physician's intention to use the NIA criteria for the detection of AD.

H_a2E: A physician's age is associated with that physician's intention to use the NIA criteria for the detection of AD.

Subquestion 2F: Is a physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0$2F: A physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, is not associated with the physician's intention to use the NIA criteria for the detection of AD.

H_a2F: A physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, is associated with the physician's intention to use the NIA criteria for the detection of AD.

Theoretical Framework for the Study

Rogers's (2003) diffusion of innovations (DOI) theory was chosen as the theoretical framework for this study because historically, his theory has been used to better understand the dissemination and implementation of interventions specifically within the healthcare community such as interventions for autism, HIV/AIDS, substance abuse, and conduct disorder (Dingfelder & Mandell, 2010). Rogers's DOI theory concentrates on describing how, why, and at what rate new technologies spread through social systems (Dingfelder & Mandell, 2010). The *diffusion of innovation* is the process by which a new practice or idea is vetted over time with collaborative members of a social system (Rogers, 1995, 2003).

The survey instrument explored three dependent variables exploring knowledge, attitudes, and behaviors (KAB) (KAB; Aday & Cornelius, 2006). The KAB theoretical approach may help explain data and responses, for example, when a respondent selects either an "other" response or adds a narrative response in the survey instrument then the response may fit into one of the three categories of knowledge, attitudes, or behaviors (Aday & Cornelius, 2006). A detailed explanation of Roger's (2003) Diffusion of Innovations (DOI) theory and the theoretical application of both DOI and KAB to this research are presented in Chapter 2. A discussion of the application of DOI theory and KAB survey design to this study is discussed in Chapter 2.

In Figure 1, I adapted a figure from a study that explored the implementation of an autism intervention within the DOI framework (Dingfelder & Mandell, 2011). This study's use of the DOI theory is similar to mine, and I see the NIA protocol as analogous to the autism intervention. Figure 1 is an illustration of DOI theory as it was used in this study to explore how an innovation or new idea—in this case, implementing the new NIA criteria for all-cause dementia and early detection of AD—might be perceived by physicians/clinicians. DOI theory is well suited for exploring physicians' knowledge and use patterns related to the NIA criteria for all-cause dementia and early detection of AD because it offers a logical approach to implement the use of changes in healthcare, i.e., breast cancer treatment and procedures for implementing new procedures as discussed in Chapter 2.

Dissemination (New NIA Early detection of AD criteria) → **Adoption** → **Implementation** → **Maintenance**

Perceived characteristics of the innovation:
1. Relative advantage: innovation is perceived as better than the one it supersedes
2. Compatibility: innovation is perceived as consistent with existing values, past experiences, and needs
3. Complexity: innovation is perceived as difficult to use
4. Trialablity: innovation may be experiment with on a limited basis
5. Observability: results of innovation are visible to others

Key Terms:

1. **Innovation: an idea, practice or object that is perceived as new by an individual or organization.**
2. **Innovation-decision process: the process by which an individual or organization passes from (1) initial awareness of an innovation to forming attitudes about and deciding to adopt or reject the innovation, to implement and preliminary use, to consistent and committed use.**
3. **Dissemination: targeted strategies to make potential adopters aware of an innovation and encouraged to adopt it.**
4. **Adoption: commitment to begin using the innovation.**
5. **Implementation: when an individual or organization puts an innovation to use.**
6. **Maintenance: the degree to which an innovation in continued over time, particularly after attempts to diffuse the innovation end (Also known as "sustainability").**

Figure 1. DOI theory applied to the NIA criteria. Modification of figure from "Bridging the Research-to-Practice Gap in Autism Intervention: An Application of Diffusion of Innovation Theory," by H. Dingfelder and D. Mandell, 2011, *Journal of Autism & Developmental Disorders*, *41*(5), 597-609. doi:10.1007/s10803-010-1081-0

Nature of the Study

The study was a quantitative, cross-sectional survey designed to examine

physicians' use patterns of the NIA criteria for all-cause dementia and the detection of

AD. Via an online survey instrument, I gathered data from physicians responsible for

evaluating patients with signs of AD. The survey instrument contained items designed to

collect data related to the three primary research questions (RQs) and associated

subquestions based on KAB theory. The third research question was ultimately removed

the purpose for removing the third RQ is discussed in Chapter 4. The three dependent

variables (a) current use of the NIA protocol, (b) intention to use the NIA protocol, and

(c) intention not to use the NIA protocol). Again, (c) representing the third research

question was removed as the question and results were the inverse of RQ 2 or (b). The

six independent variables (years since graduating from medical school, area of specialty,

percentage of patients age 60 years and older, physician age, physician gender, and

knowledge of AD). The six independent variables may or may not have any noticeable

relationship to use of (or intention to use/not use) the NIA protocol, but were considered

for the purpose of exploring potential correlations to the dependent variables. Results

from the survey instrument were expressed as percentages; descriptive and inferential

analyses of the data are discussed in Chapter 3 and Chapter 4.

Data was collected from qualified, voluntary, respondents via the survey

instrument. The data was statistically analyzed via the odds ratio, chi square, and P value

procedures. The data analysis plan and procedures are detailed in Chapter 3.

Definitions

Alzheimer's disease (AD): A terminal disease without known etiology, treatment, or cure, causing significant decline of cognitive skills, psychomotor skills, and primarily affecting those age 65 years old and older (Forlenza et al., 2010).

Amyloid beta (Abeta): A neurotoxic neuron that negatively affects brain tissue; widely accepted as the main biologic suspect in AD, causing early onset memory loss and/or death (Tiedeman et al., 2011).

All-cause dementia: Cognitive or behavioral impairment that involves a minimum of two domains, such as impaired ability to acquire and remember new information, impaired reasoning and handling of complex tasks, impaired visuospatial abilities, impaired language functions, and/or changes in personality (Frantz, 2011).

Classical Alzheimer's disease symptoms (CADS): The preclinical stage wherein the person demonstrates frequent memory loss (e.g., poor recognition of immediate family members, loss of appetite, lack of interest in social activities). A condition of a person alive with a combination of documented signs found in current literature describing dementia such as lack/loss of memory, loss of cognitive skills, as well as decreased psychomotor skills, and demonstrating early stages of what current literature describes as AD. Unlike what has also been referenced in some literature in specific reference to patients currently diagnosed with AD to describe the cause of death also described as *preclinical AD* by the Alzheimer's Association (Frantz, 2011).

General practitioner (GP): A licensed medical doctor who may have limited training to use current diagnostic tests to assess a patient presenting dementia or AD

symptoms, unlike a gerontologist (Schoenmakers et al., 2009).

International Classification of Diseases (ICD): ICD-10 was endorsed by the 43rd World Health Assembly in May 1990 and came into use in World Health Organization (WHO) Member States in 1994. The classification is the latest in a series that has its origins in the 1850s. The International Statistical Institute adopted the first edition, known as the International List of Causes of Death, in 1893. WHO took over the responsibility for the ICD at its creation in 1948 when the Sixth Revision was published and included causes of morbidity for the first time. The World Health Assembly adopted WHO Nomenclature Regulations in 1967 that stipulate the use of ICD in its most current revision for mortality and morbidity statistics by all Member States (Centers for Medicare & Medicaid Services [CMS], 2012).

Knowledge, attitudes, and behaviors (KAB) theory: KAB theory is a research style that has been used to explore respondents' knowledge, attitudes, and behaviors that may lead to an outcome. Knowledge will be measured by right and wrong answers from Part 2 of the survey instrument, which will explore respondents' knowledge of AD through the 30-question Alzheimer's Disease Knowledge Test (Carpenter et al., 2008). Physicians' attitudes will be assessed through the survey instrument, which will gauge their intent to either use or not use the NIA protocol. The examination of beliefs is beyond the scope of the current research, but future researchers investigating NIA protocol use could examine specific aspects of physicians' beliefs. A more detailed illustration is seen in Table 7 in Chapter 3, in which KAB theory is aligned to measurement, assessment, and references (Aday & Cornelius, 2006).

Magnetic resonance imaging (MRI): A type of medical imaging that uses the characteristic behavior of protons when placed in powerful magnetic fields to make images of tissues and organs. Certain atomic nuclei with an odd number of neutrons, protons, or both are subjected to a radiofrequency pulses, causing them to absorb and release energy. The resulting current passes through a radiofrequency receiver and is then transformed into an image. This technique is valuable in providing soft-tissue images of the central nervous and musculoskeletal systems. Imaging techniques allow visualization of the vascular system without the use of contrast agents. Agents such as gadolinium are available for contrast enhancement but must be used with caution in patients with renal insufficiency (Davis, 2009).

Mild cognitive impairment (MCI): A subjectively sensed, and objectively verifiable, loss of memory that may result in difficulties with word finding, naming, or complex skill execution; it does not generally impair a person's ability to carry out normal activities of daily living. Mild cognitive impairment is also known as *cognitive impairment, not dementia* (CIND), and *age-associated memory impairment* (Davis, 2009).

National Institute of Aging (NIA) criteria: New criteria for diagnosis of dementia due to AD. A workgroup in partnership with the National Institute on Aging and the Alzheimer's Association published new criteria for the diagnosis of dementia due to AD. The workgroup developed three categories: (a) probable AD dementia, (b) possible AD dementia, and (c) probable or possible AD dementia with evidence of AD pathophysiological process (McKhann et al., 2011).

Neurofibrillary tangles (NFTs): Linked to AD and memory loss, cognitive function, and ability to care for oneself in the final stage of AD. The tangles may appear as mushy grey matter and are widely seen in postmortem exams of patients with suspected AD (Snowdon, 2003).

Neuropil threads (NTs): A mixture of proteins that may be related to diseases related to aging including AD. Neuropil threads are composed of tau and Ab-amyloid proteins. The cellular composition of neurofibrillary tangles (NFTs) and neuropil threads make up the altered tau protein, while extracellular amyloid plaques consist of strings of Ab-peptide (Ferreira & Bigio, 2011).

Primary care providers (PCPs): Nurse practitioners, physician's assistants, and medical doctors that initially evaluate and provide healthcare for patients (Leifer, 2009).

Quantitative MRI (qMRI): A type of tomography imaging used in a medical setting using powerful magnetic fields to create images of the body. The images produced assist in the evaluation of organs and the supporting structures of the skeleton without the use of contrast agents employed in other imaging techniques. Quantitative MRI has demonstrated robust statistical confidence in limited populations of AD patients, promoting the advancement of further studies using similar technology in the evaluation of AD (Fearing et al., 2007).

Type of practice (TOP): Internal medicine, family medicine, osteopath, general practitioner, and *nurse practitioner* are types of medical practices that may encounter patients aged 60 and older (Wenger et al., 2009). I will not evaluate nurse practitioners, as they are outside the scope of this research.

World Health Organization (WHO): The World Health Organization is a global organization independently renowned for overseeing issues relating to health, guiding healthcare, establishing policies, monitoring health on a global level, and advising policy makers (WHO, 2012).

Assumptions

The study population was composed of physicians in Modesto, California. The estimated minimum sample size will be 97 physicians in order to conduct the bivariate and multivariate analysis. The population of physicians in Modesto was assumed similar in terms of diversity, socioeconomic status, and education to the population of physicians in other cities and towns in California. The study population was assumed to be treating populations similar to those treated by doctors in other cities and towns in California. The city of Modesto is within a 100-mile radius of larger cities located in Northern California such as San Francisco, Oakland, Sacramento, Fresno, and San Jose. The population for this study will be assumed to be reflective of cities within this radius, which are similar to Modesto in terms of healthcare, socioeconomic factors, education, culture, diversity, employment, and age distribution based on types of home, home values, opportunities for K-12 education and higher education, and access to healthcare facilities.

Slightly more than sixteen surveys were considered successfully completed and enough data was gathered to evaluate the research questions. The significance of sixteen completed surveys correlates to statistical model predicted as being statistically significant per the G*Power output needed for evaluating the smallest sample size. My goal is to achieve an 80% or greater response rate from the survey instrument and

discussed in Chapter 4. I assumed that study subjects answered the survey in a frank and honest manner. I further assumed that data collected helped better explain the results in Chapter 4 as they may relate to both the DOI and KAB research theories.

Scope and Delimitations

To date, there are no other studies, which evaluated the predictors for physicians' use of the new NIA Alzheimer's assessment protocol for the early detection of AD. An aim of this study was to magnify the need to assess and detect the early signs of AD. Literature such as the ICD-10, *DSM-IV,* and some professional journals do not align with the NIA or with researchers who have stated that AD is 100% identifiable under a microscope. Presently, patients are diagnosed by their doctors with a disease and labeled as Alzheimer's patients.

This study will not directly involve patients. The inclusion of age and sex of the provider on the survey may lead to a correlation suggesting a particular age or sex of a practitioner who may or may not use the new protocol, as well as other relevant covariates, as illustrated in Table 1 below and discussed further in Chapter 3. For evaluating respondents' level of knowledge, respondents will be scored on number of right and wrong answers from the ADKT consisting of 30 questions. The level of attitudes was evaluated via the three dependent variables. The level of behaviors was also be assessed through responses related to the three dependent variables.

Table 1

Covariate Variables

Subquestions for RQs 1-3	A	B	C	D	E	F
	Independent variable (IV) explored: Years since graduating from medical school	Independent variable (IV) explored: Physicians' area of specialty	Independent variable (IV) explored: Percentage of patients aged 60 and older	Independent variable (IV) explored: Physicians' Age	Independent variable (IV) explored: Physicians' gender	Independent variable (IV) explored: Knowledge of AD

Note. Research theory used = DOI; evaluation methodology = KAB; data source = Schultz survey; level of measurement = bivariate; analysis procedures: Pearson's or chi square.

Limitations

A convenience sampling strategy was selected for this research. It was intended that volunteers were reflective of other physicians in Modesto, California. Convenience sampling was selected because the sample will be taken from one geographic area. I am aware that findings from this study may not reflect other states and localities, as demographic factors may skew data in some unknown manner.

Significance

The U.S. National Institute on Aging ranked AD as the sixth most deadly disease in the U.S. (Tiedeman et al., 2011). The benefits of early detection and accurate diagnosis of AD, like many other diseases, include improved disease management and quality of life. This study may lead to social change by promoting awareness of the importance of early AD diagnosis. Accurate diagnosis may assist families in reviewing finances, legal planning, discussing home care and long-term care alternatives, and evaluating safety practices (Leifer, 2009). This study may promote social change by encouraging providers to (a) implement routine procedures for the detection of possible dementia in primary care offices and clinics, (b) begin early diagnostic evaluations for persons suspected of exhibiting AD symptoms, and (c) partner with those who are likeminded to provide care planning at the earliest possible time following a diagnosis, and (d) document the diagnosis and care plan in a person's medical record (Attea & Johns, 2010).

In 2010, the National Institutes of Health (NIH) announced the blueprint for the Neuroscience Research Initiative on the Human Connectome Project to share information about the structural and functional connectivity of the healthy brain using state-of-the-art imaging instruments, analysis instruments, and information technologies to map human brain function. The data from this study are expected to help develop a foundation to advance knowledge of how the brain changes with age and AD. This new information may change how providers evaluate, treat, and care for elderly patients with advancing stages of dementia leading to AD McNab et al. (2013).

This study may promote the use of the NIA criteria to detect early signs of AD and

to promulgate NIA's recommendations as a new gold standard. On a global scale, the early detection of AD may affect social change by directly improving the lives of those with AD and their caregivers.

Summary

AD of the dementia type has reached the level of an epidemic. The purpose of this study was to explore each of the two dependent variables through a series of research questions and related narrative fields (which will not be directly evaluated but may be helpful in explaining the data in Chapter 4) by exploring participants' knowledge, attitudes, knowledge, and patterns using the NIA criteria for all-cause dementia and the early detection of AD.

Chapter 2 will identify gaps between physicians' current use, intent to use, or intent not to use the NIA AD protocol (the dependent variables) through a series of three research questions and related narrative fields (which will not be directly evaluated but may be helpful in explaining the data in Chapter 4). In addition, in Chapter 2 a detailed review of relevant AD studies using DOI theory, KAB survey quantitative methods, and an in depth literature on the research topic presented. Next, in Chapter 3 a description of the research methodology that was used to frame statistical models, the pilot study and data collection process is presented. In Chapter 4 the results of the pilot study were presented as well as the discussion of the characteristics of the sample population was discussed. A comprehensive statistical analysis of the data also covered. The final chapter, Chapter 5 discloses the interpretation of the data collected from Chapter 4 and possible implications for Social Change wrap up the final chapter.

Chapter 2: Literature Review

Introduction

As Baby Boomers age, an estimated 11–16 million seniors in the United States of America will have some form of AD (Okie, 2011). Thus, there is a need for early AD dementia diagnosis, and the new NIA AD diagnostic protocol needs to be explored to assess if physicians are using the protocols or not. A workgroup in partnership with the NIA and the Alzheimer's Association published new criteria for the diagnosis of dementia due to AD (McKhann et al., 2011). The workgroup developed three categories: (a) probable AD dementia, (b) possible AD dementia, and (c) probable or possible AD dementia with evidence of AD pathophysiological process. The first two are intended for all clinical settings, while the third was established for research purposes only (McKhann et al., 2011). The following discussion will outline the need for this study.

The expense for treating current patients with AD in 2011 was reportedly $130 billion and may top $1 trillion by 2050 in Medicare and Medicaid expenses. Comparably, approximately 10% of seniors between the age of 70 and older have dementia (Okie, 2011). The significance of the growing population in terms of sheer numbers, incidence of AD, and expense for treating the disease by providing patients with various levels of activities of daily living is illustrated in Figure 2. Seniors with AD may lose their higher level of function requiring assistance with activities of daily living such as bathing, toileting, eating, dressing, and administration of medications.

Created from data from the National Alliance for Caregiving and AARP.[102]
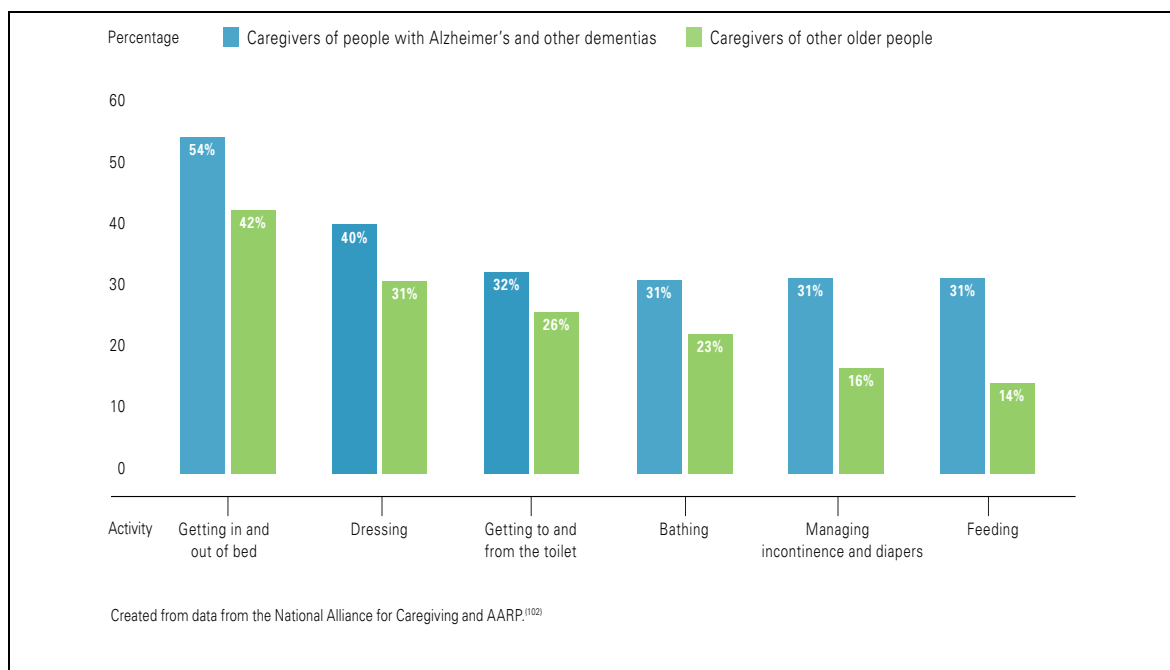
Figure 2. Modification of a graph adapted from Alzheimer's Association, (2012c). 2012 Alzheimer's disease Facts and Figures. Retrieved from http://www.alz.org/downloads/Facts_Figures_2012.pdf

In some states, such as Minnesota, according to Okie (2011), policy change efforts to achieve an early AD diagnosis because in 2011 Minnesota dissuaded doctors from diagnosing patients with AD because of the negative consequences for the patient, such as suicide. Efforts to change policies are underway to revise policies from past practices of dissuading doctors from diagnosing AD patients to encouraging an earlier diagnosis of AD through laws passed by President Obama known as the Affordable Care Act. The Affordable Care Act falls inline with the new NIA AD diagnostic criteria suggesting doctors should inform their patients of the diagnosis, seeing the benefit of at last knowing what has been causing the patient problems. The lack of communication from the GP to the caregiver's family was previously identified as an obstacle to satisfaction with care, i.e., a lack of communication from the GP is when the GP is

reluctant to place a note in a patient's record with a diagnosis of AD (Schoenmakers et al., 2009). Specifically, some of the feelings patients have once they receive a diagnoses of AD are the shame, disgrace, humiliation, and possible stigma of having a death sentence. However, in contrast, the early diagnosis offers patients and their family's time to prepare for the more difficult stages of AD. The candor of discussing the disease and providing early counseling far outweighs the negative connotations (Okie, 2011). In addition, some doctors may lack specific training for evaluating and treating the elderly (Schoenmakers et al., 2009).

Current projections for new cases of AD indicate by the year 2040, more than 80 million people will be affected by AD (Forlenza, Diniz, & Gattaz; 2010; Leifer, 2009). A meta-analysis of the approximate prevalence of AD in the United States indicates an increase from 1% at 65-69 years of age, to 13% to 17% at 85-89 years of age, and 24% to 31% at 90-94 years of age (Bassil & Grossberg, 2009). I suggest use of the phrase, Classic Alzheimer's Disease Symptoms (CADS), which may be more suitable to assign a patient living with what is thought to be AD rather than an unfounded diagnostic term as AD. At this time, AD has not been absolutely diagnosed and after a patient dies, an autopsy can be performed to examine brain tissue. During the autopsy, the results of the autopsy can then be used to conclusively describe the cause of death due to AD (Christensen & Lin, 2007). As Okie (2011) reported, some physicians and agencies avoid the use of AD as the diagnosis or eliminate AD as a diagnosis from health services for the patient (Okie, 2011). Patients and/or family members caring for a loved one may initially seek help from their primary care physicians (PCPs; Leifer, 2009). In turn, PCPs must be

aware of AD symptoms and should screen elderly patients for AD. Family doctors (73%) and internists (11%) were the first physicians consulted regarding the concern of AD. After reporting symptoms to their family doctors, 62% of patients with AD remained undiagnosed (Leifer, 2009). The medical community described and referenced AD in two primary resources the International Classification of Diseases (ICD) and/or the Diagnostic and Statistical Manual: Edition IV (DSM). The need to examine the utilization patterns with regard to the new NIA AD protocol exists because no other study to date has undertaken this task. In order to examine the utilization patters of physicians one must look closer at three key areas (a) a historical review of AD milestones, (b) examine changes in ICD-9, ICD-10, and the *DSM-IV*, and (c) explore what new research has discovered in the last 27 years in regard to AD diagnostic criteria by looking at the new NIA AD criteria.

This chapter included the literature review, an explanation of the literature search strategy, theoretical foundation, conceptual framework, and a review of the study's key variables and/or concepts.

Literature Search Strategy

The literature review began with a database search including EBSCO, Gale, Proquest, Pubmed, Medline, Sage Journals, and published dissertations hosted at the Walden University Library. Databases searched included, but were not limited to, Academic Search Complete, CINAHL Plus with Full Text, Health Sciences: A SAGE Full Text Collection, Heath and Medical Complete, Nursing & Allied Health Source, MEDLINE, Opposing ViewPoints Resource Center, and Proquest Central. Thoreau, the

Walden Library Virtual Catalog was consistently searched for additional articles. Secondary sources included books specific to AD, caregiving, and books complementing journal articles by the same authors. Other secondary sources were leads to primary sources, including the American Psychiatric Association, World Health Organization International Classification of Diseases ICD-10, Centers for Medicare & Medicaid Services, and the Diagnostic and Statistical Manual of Mental Disorders. Tertiary Alzheimer's organizations available on-line such as Alzheimer's Association, Alzheimer's Foundation, Alzheimer's Foundation of America, National Institutes of Health, and the National Institute on Aging lead to primary sources.

The following keywords were used: *Alzheimer's disease, AD, Alzheimer's disease intervention programs, intervention programs for Alzheimer's, magnetic resonance imaging (MRI)s for AD, training, causes of death, leading causes of death in the United States, old age, diseases, diseases of old age, aging process, caregiving, caregivers, nursing, nursing homes, symptoms of AD, causes of AD, cure for AD, treatment for AD, AD research, current AD research, AD studies, studies of AD, MRI studies of AD, AD organizations, support groups for AD, local AD support groups for AD, AD patients, and Alzheimer's organizations*.

This search covered years 2007 through 2015 but concentrated on the most recent 5 years. For this research, well over 400 sources were reviewed and only 65 were chosen as the foundation for this research. No research was discovered that addressed my topic, but several theoretical models were found that parallel the theoretical foundation used for this study.

Theoretical Foundation

Rogers's (1985) Diffusion of Innovation (DOI) theory was appropriate for this research because the DOI theory frames this research in such a way to collect quantitative data and describe the data as to how, why, or why not, and at what rate new ideas or concepts are used. This is the first application of the DOI theory to specifically study physician knowledge, attitudes and utilization patterns of the NIA criteria for all-cause dementia and the application of DOI theory is well documented in other healthcare studies. The survey results, once applied to the DOI theory, can be used to spread new ideas through social systems (Dingfelder & Mandell, 2011).

In figure 1 for example, as the DOI theory is applied to the new NIA AD diagnostic criteria the first two stages are self explanatory, i.e., *innovation—a new idea (*use of new NIA AD diagnostic criteria) and the second stage, *innovative-decision process*—where a practice group is committed to pilot testing the new concept. In the third stage of the DOI theory, *dissemination* is described and applied to inform users of a new idea and encourage them to use the new idea, i.e., using the new NIA AD criteria. In the fourth stage of the DOI theory, *adoption,* new users of the NIA AD criteria commit to using the innovation, i.e., continue using the criteria to evaluate patients for early diagnosis of AD. In the fifth stage, *implementation,* make the use of the NIA AD criteria the *gold standard,* the standard test covered by insurance companies and used by doctors for the assessment of patients with signs of AD. In the final stage, stage six is *maintenance*—is described as sustainability and implies the innovative idea was successfully adopted into the practice group requiring updates to policies or procedures

(Dingfelder & Mandell, 2011).

In this case, the DOI theory is ideal because of the four primary research questions proposed based upon a through literature review. The DOI theory and research questions solicit respondents to add their specific dialog responses. This is important because the DOI theory speaks to assisting in description of responses as to why or why not and responses not listed in the survey. The DOI theory has been used to better understand the dissemination and implementation of interventions in diverse fields, such as HIV/AIDS, substance abuse, and conduct disorder (Dingfelder & Mandell, 2010). Glasgow et al. (2012) also used the DOI theory to address the gap between current knowledge and practice related to the area of dissemination. Glasgow et al. focused on implementing research on five specific values: rigor and relevance, efficiency, collaboration, improved capacity, and cumulative knowledge. Similarly, there is potential for an intervention plan (that may be discovered through this research and presented in Chapter 5) to advance physicians' knowledge, attitudes, and behaviors for the early detection of AD. Because there are similarities in the use of DOI to explore new ideas, innovations, and specifically the implementation of new AD criteria, the DOI research theory was selected for this study.

The DOI theory has a long and proven history specifically in terms of studying conceptual ideas and evaluating empirical evidence (Dearing, 2009). Examples of how the DOI theory has been resourceful in research applicable to this study are well documented. Aday and Cornelius (2006) reported the value and importance of using DOI as a research theory also for similar research on HIV/AIDS and health interventions

including smoking cessation and tobacco control. The DOI research theory can also be applied herein.

Glasgow et al. (2012) used DOI theory in their research approach for the National Institutes of Health approaches to dissemination and implementation science: current and future directions, which explore approaches to start and prolong effective interventions. Glasgow et al. reported that by closing the gap between optimal patients care and what patients receive, there could be an impact on patients' health. There is an indication that one or more factors may lead toward an intervention that may detect and/or identify the early signs of AD with the new AD criteria. The research herein may identify variables as to why one or more groups may decline the use of the new AD criteria. Therefore, the DOI theory is appropriate to this study, will aid in further describing the application in later chapters, and may help explain data and possible correlation to social change applications.

The survey instrument explores the three dependent variables through six subquestions and applies the Knowledge, Attitudes, and Behaviors theoretical approach using a modified version of the original model (KAB) theory and is simply Knowledge, Attitudes, and Beliefs in this quantitative survey model (Aday & Cornelius, 2006).

Conceptual Framework

No one has determined or currently studied the knowledge, attitudes, and behaviors (KAB) of physicians with respect to the new AD protocol and extent of its use in clinical settings because current literature also indicates there are components strongly suggesting a gap in KAB in treating/diagnosing AD patients, possibly due in part to

current literature. There are conflicts in the literature with the current use of the term AD

to describe patients with AD. AD cannot be once and for all diagnosed until an autopsy is

performed and brain tissue is examined under a microscope to accurately make such a

diagnosis (Christensen & Lin, 2007). What continues to remain confusing is that if the

disease cannot be definitively detected unless examined postmortem under a microscope,

then how can a patient while alive can be labeled with AD. No detectable alignment or

collaboration is evident between the current version/edition of the ICD and the current

version/edition of the DSM, which physicians may reference to diagnose patients with

AD. I will evaluate physicians' KAB in regards to the use of the ICD, DSM, and the new

AD criteria as resources to detect/diagnose AD in light of the NIA and Alzheimer's

Association new updated AD criteria after 27 years of research and release of their joint

study.

In order to not over simplify the complexity or stress the enormity of the problem,

the macro approach for describing the crux of the problem begins with the description of

the working definition of the term dementia and drills down to the very root of the

research. The term dementia describes a wide array of brain illnesses, AD being the most

common form of the disease. GPs use a variety of diagnostic tools such as family reports

about the patient and documenting changes in the patient. A Mini-Cog Assessment

(Mini-Cog) or a Mini-Mental State Examination (MMSE) may be administered by GPs to

evaluate a person for AD (Kamenski et al., 2009; Leifer, 2009). Leifer recommended

using the MMSE to screen for cognitive impairment. Leifer also recommended the

benefit of using the original Mini-Cog Assessment with the MMSE and then compare the

two screening instruments to evaluate a person's cognitive abilities when screening for cognitive impairment. The Mini-Cog is widely accepted by GPs for the evaluation of a person suspected of AD. The Mini-Cog itself is easy to use, brief, and not influenced by education or language. The Mini-Cog uses the components of the MMSE that include specifically the three-item recall, testing the person for the ability to recall three words after roughly one minute, and a Clock Draw Test (CDT) provided in Figure 3 (Kamenski et al., 2009). In the CDT, the patient draws a picture of a clock with as much detail (hour hand, numbers 1-12 properly placed, and the current time) to assess the patient's understanding of time. Researchers have not conclusively indicated the relevance of the MMSE and the Mini-Cog among many other similar cognitive exams used for early detection and early intervention whereby the social change of staving off the early signs or symptoms of AD would result (Kamenski et al., 2009). There is no scientific test for those living with AD as of yet that accurately detects and ends with a conclusive diagnosis of AD. Cognitive tests like these are inexpensive and offer doctors evidence to test the patient for other diseases. The results of the family history, MMSE, and a CDT may not be enough to accurately diagnose a patient with dementia like AD.
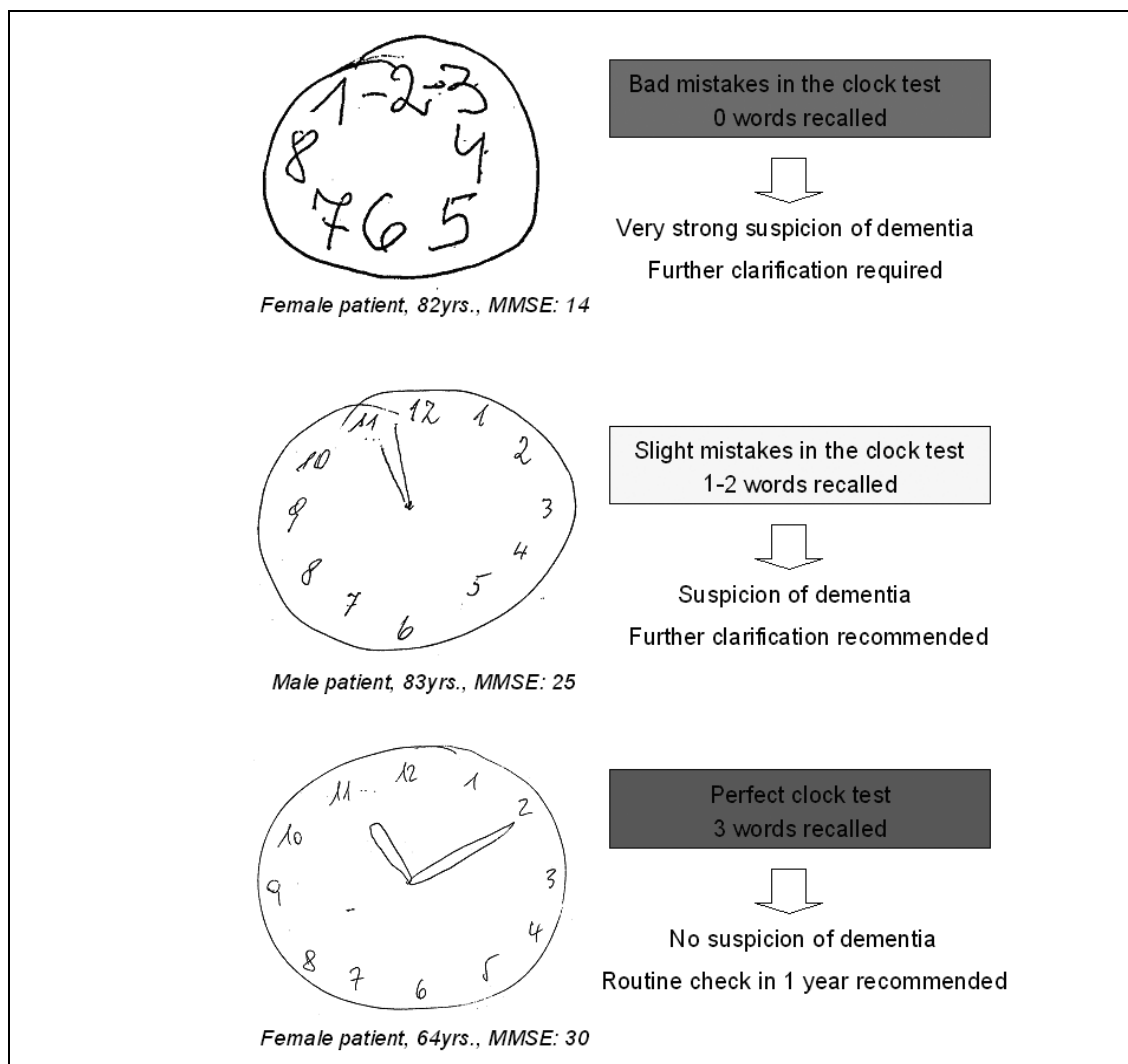
Figure 3. Modification of Clock Draw Test. Adapted from Kamenski et al., (2009). Detection of dementia in primary care: Comparison of the original and a modified Mini-Cog Assessment with the Mini-Mental State Examination. *Mental Health in Family Medicine, 6*(4), 209-217. Retrieved from http//ezp.waldenulibrary.org/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2010620651&site=ehost-live

Researchers published over the past 5 years identified errors of greater than 50% in GP diagnosis from the results of family history, MMSE, and the CDT when diagnosing a patient for AD because there may be other contributing factors influencing results of MMSE, such as a recent stroke. Not all GPs use one or all of the tests to diagnose a

patient for dementia-like AD. A gap exists in the standard use of results from family history, MMSE, and the CDT to diagnose a patient with dementia-like AD (Mangilasche et al., 2010).

The World Health Assembly is the governing body for the WHO. WHO manages the standards for healthcare and standardizing the diagnostic classifications for all epidemiological findings (International Classification of Diseases, 2011). WHO revised and updated the International Classification of Diseases (ICD) and released the draft version of ICD-10 in 2011. In Chapter 5, Part III, mental and behavioral disorders are listed; yet, none of the F01-F09 codes includes diagnostic criteria for AD. F01 describes vascular dementia; F02 describes dementia in other diseases classified elsewhere; F03 describes unspecified dementia; F04 describes amnestic disorder due to known physiological condition; F05 describes delirium due to known physiological condition; F06 describes other mental disorders due to known physiological condition; F07 describes personality and behavioral disorders due to known physiological condition; F08 is not listed and is omitted, and F09 describes unspecified mental disorder due to known physiological condition (CMS, 2012, p. 227-231).

It is not until closer examination of code F02, dementia in other diseases classified elsewhere, that Alzheimer's G30, specifically G30.9, is listed among 21 sub-diseases such as Creutzfeldt-Jakob disease, Parkinson's disease, and vitamin B deficiency. Under the heading of other degenerative diseases of the nervous system, types of AD are listed as AD with early onset, late onset, other AD, and AD unspecified (CMS, 2012). Typical characteristics of Alzheimer's disease, vascular dementia, dementia with

Lewy bodies, mixed dementia, Parkinson's disease, frontotemporal lobar degeneration,

Creutzfeldt-Jakob disease, and normal pressure hydrocephalus, which are also found in

the *DSM-IV-TR* (CMS, 2012). Arguably, coordinated consensus is lacking between the

ICD-10 and the DSM-IV-TR for defining the diagnostic criteria and symptoms of AD,

which GPs can in turn reference for an inferential diagnosis of AD. The *DSM-IV-TR*

described and listed criteria for a diagnosis of AD as seen in Figure 4. Both the ICD-10

and *DSM-IV-TR* lack consistency in cohesion and uniformity, which may lead to

misdiagnosis or failure in the early detection of AD. A recommendation by the medical

community at large and with the WHO to use the ICD-10 and/or the DSM-IV-TR

independently and/or dependently of one or the other.

In Figure 4 (which I created to illustrate) the diagnostic code of 294.1x,

according to American Psychiatric Association, 2000, defined as dementia of the

Alzheimer's type. In figure 4, for example, if a patient presents with multiple cognitive

defects and the manifestation is accompanied by memory impairment A(1) and one or

more A(2) aphasia, apraxia, agnosia, or disturbance in executive functioning may result

in cognitive deficits. The course of decline is characterized of symptoms such as

presenting gradual onset and declining cognition. Additionally, criteria from category

A(1) and A(2) must not be due to other conditions such as: conditions of the central

nervous system, i.e., Parkinson's disease, cerebrovascular disease, or neurosyphilis. The

flowchart and subset of criteria do align with the new NIA AD diagnostic criteria.
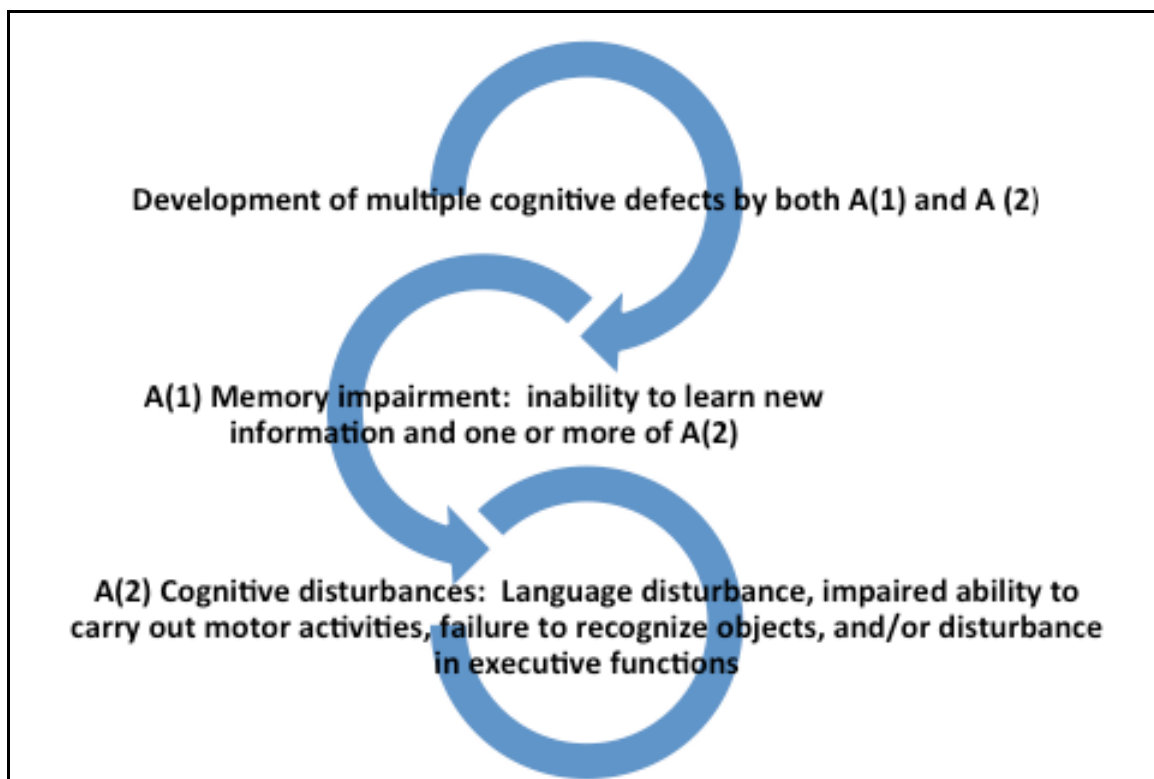
Figure 4. Diagnostic Criteria for AD Per American Psychiatric Association.
Note: Modification of a table adapted from American Psychiatric Association. (2002).
Diagnostic and statistical manual of mental disorders IVth edition. Washington, DC:
American Psychiatric Association.

Next, I used a three-tier approach to establish the conceptual framework for the

micro discussion for this study. I began with a past to present approach describing three

key areas. The three key areas include a discussion of AD from a historical approach,

moving forward to a present understanding of AD, and discussion of an overview of

current diagnostic criteria that are associated with AD. The theoretical foundation is

discussed last.

A historical examination of AD illustrates various milestones in the historical

research of AD. Alzheimer first discovered AD through microscopic analysis and is

credited for identifying beta-amyloid plaques and neurofibrillary tangles (NFT) – signs

physicians now see in autopsies and document in postmortem exams as a cause of AD

death (Snowdon, 2003). Moving forward, Snowdon conducted a longitudinal study that

provided empirical data and learned that, while some of the nuns he studied had either

more signs and symptoms or fewer signs and symptoms of AD, they had different

proportions of the disease seen during autopsy. Descriptive statistics have been used to

describe variables within various studies examining AD by such researchers as Vincent

and Velkoff (2010) who reported that by 2030, the population older adults would be

approximately 439 and a ratio of 1:5 will be age 65 and older. Independent variables such

as indirect cost of caring for persons with AD amounted to approximately $144 billion

dollars (Attea & Johns, 2010). Tiedeman et al. (2011) reported evidence that is seen in

MRIs and could be used in later stages of AD because of the same evidence seen in the

MRIs is also present at autopsy, all of which leads current research. Frantz (2011) listed

the new NIA and introduced the new criteria that were previously reported. The new AD

criteria are a revision after 27 years of scientific research and describe the stages of the

diagnostic criteria for AD.

Snowdon (2003) published results from his longitudinal research that focused on

postmortem results of dementia. Snowdon included 678 Catholic nuns ranging in age

from the mid 70s to 107 years old. Information obtained from the research included

midlife factors, physical and mental examinations, and neuropathologic data obtained

postmortem. Snowdon further expanded Alzheimer's postmortem findings by confirming

that an increased level of plaque and tangles are associated with AD.

In regards to the disease's origin, Alzheimer encountered a 51-year-old female known as Auguste D. in 1906. D displayed forgetfulness, confusion, and the inability to speak clearly. Upon her death, Alzheimer conducted an autopsy and discovered, through microscopic analysis, beta-amyloid plaques and NFT, signs now used in postmortem exams to diagnose AD (Snowdon, 2003).

The Snowdon Nun Research use postmortem results and health histories. A limitation to his research, he selected only 10 nuns for convenience with tracking rather than all of the nuns over the course of his 10-year research. While nuns displayed few-to-no symptoms of dementia before death, they had higher levels of plaques and tangles in postmortem exams. The nuns who displayed more empirical AD symptoms, such as memory loss, lack of concentration, and inability to speak, displayed a healthier brain upon cranial autopsy (Snowdon, 2003). An increased understanding about the relation between dementia and AD has grown as documentation of new patients and the awareness of AD grew (Christensen & Lin, 2007). The following examples and illustrations emphasize the importance and significance related to the selection for the research methods used herein.

While dementia is the more common disease, AD is one of many categories of dementia. AD is a term more appropriately used postmortem (Christensen & Lin, 2007). Medical journals, research articles, and various publications use the term AD in the context of a living person to describe symptoms that can only be cited as a cause of death, and found in research literature again to describe a patient with the disease as a cause of death. AD ranks sixth as a leading cause of all deaths in the United States and is the fifth

leading cause of all deaths in United States age 65 and older. Figure 5 illustrates the

significance of AD as a cause of death in comparison to other causes of death. By the

year 2050, the United States population is expected to grow 42% from 310 million to 439

million. The United States population is also expected to become much older with

approximately a ratio of 1:5 residents being age 65 and older by 2030 (Vincent &

Velkoff, 2010).
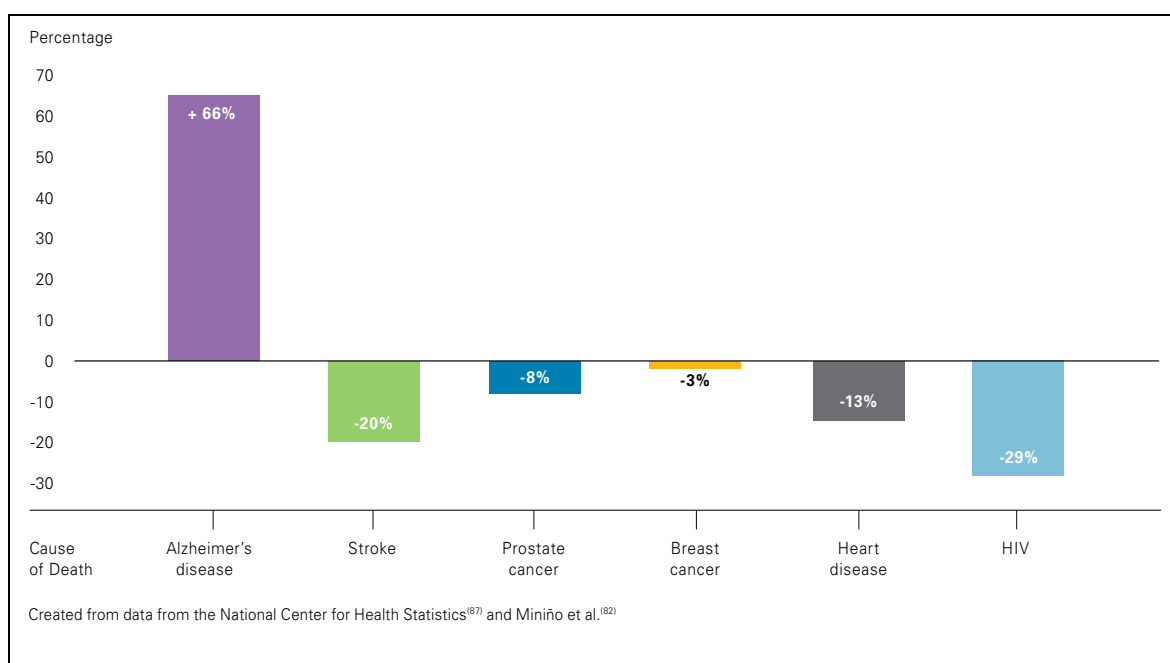
Figure 5. Common causes of death in the United States. Modification graph adapted from Alzheimer's Association, (2012a). 2012 Alzheimer's disease facts and figures. Retrieved from http://www.alz.org/downloads/Facts_Figures_pdf

In comparison to past understanding, Alzheimer's Association recently formed a

joint task force with the National Institute on Aging to review and revise criteria and

guidelines for the diagnosis of AD. There are new diagnostic criteria for AD, which could

improve diagnosis and facilitate continued research for a cure for the disease. The

National Institute on Aging and Alzheimer's Association recently partnered to publish

new guidelines for the diagnosis of AD and reportedly the first update in over 27 years

from the original published guidelines (Frantz, 2011).

Frantz (2011) reported the new criteria describing three stages of the diagnostic

criteria, the first being Stage 1: Preclinical. Stage 1 Preclinical symptoms, such as

memory loss, may be absent or difficult to detect. Pathological changes may already be

seen using biomarker tests which measure beta-amyloid accumulation in the brain,

indicating that AD has begun. Other examples of biomarker tests may include measuring

tau protein levels in spinal fluid or using imaging equipment to evaluate brain shrinkage.

Stage 2: Mild cognitive impairment may be a transitional phase between normal

forgetfulness and memory loss associated with AD. About 50% of those with mild

cognitive impairment develop dementia of the AD type. Of those 50%, approximately

25% may recover or regain normal functioning over time. There is no standard

neuropsychological test to evaluate mild cognitive impairment. Consequently, because

there is no standardized test for mild cognitive impairment, physicians adapt existing

tests developed for other purposes. A pattern of change in cognition, impairment of one

or more abilities, inability to function independently, and absence of dementia may be

indications of mild cognitive impairment. Stage 3: Dementia, is characterized by

symptoms where memory, thinking, and cognitive abilities are so severely impaired that a

person cannot function independently are indications the person has dementia. A

diagnosis of AD depends on clinical signs and symptoms with tests to rule out other types

of dementia or other diseases.

A diagnosis of AD with the new criteria recognizes the disease develops over time, starting slowly and becomes more aggressive. The criteria for a diagnosis of AD must include at least two cognitive domains such as memory loss, loss of executive function, loss of visuospatial ability, and loss of fluency with language, and behavior and personality change. A good example of memory loss in AD patients is seen when the patient attempts to learn new information and recall what to do with the new information, that is, stating to the patient that it is time to eat and the patient is unable to prepare to dine. Other examples of memory loss may include the person displaying difficulty using higher cognitive skills to assess situations for safety, evaluating risks of crossing the street, operating a vehicle, or even simple activities of daily living such as taking a bath and getting dressed.

An example of visuospatial loss may be wherein the person has trouble recognizing surroundings or family. An example of loss of language may be seen wherein the person has difficulty coming up with the right words to articulate themselves. An example of behavior and personality changes may be seen wherein the person might demonstrate changes in personality such as agitation, apathy, mood changes, or unacceptable social behavior.

The Alzheimer's Association suggested that using biomarkers for testing patients for AD. Although the biomarkers are currently in the test phase and are not meant for use in the clinical setting, the guidelines recommend using the biomarkers with clinical assessments to determine if a patient might be in the early stages of AD (Frantz, 2011). The overarching hope with the new diagnostic criteria for AD is to help better identify

people at a much earlier stage of AD, to find a way to delay the onset of AD symptoms for 5 million Americans with the disease now and projections of an additional 16 million in another 40 years, and to recommend protective actions that can now be taken in an attempt to reduce risks associated with AD (Frantz, 2011).

Fearing et al. (2007) reported evidence that no known cause or treatment exists for AD. The emerging literature from research in the past 5 years reinforced that there is no known cause or cure for AD (Christensen & Lin, 2007). Fearing et al. stated there is a need for GPs to receive more geriatric training and reported that additional research is indicated to include the use of MRIs as part of AD screening and new terminology for describing AD symptoms.

The past diagnostic criteria for AD is described in both the ICD and DSM, literature and information regarding AD is updated and released by the NIA, and various Alzheimer's organizations (American Psychiatric Association, 2000, Christensen & Lin, 2007; CMS, 2012, Jack et al., 2011, McKhann et al., 2011; National Institutes of Health. 2009). What is not known per se is physicians' KAB on the newest criteria for AD after the NIA and Alzheimer's joint effort releasing the updated criteria after 27 years of research and to what extent the criteria are being utilized by MDs. The research questions described in Chapter 1 are purposefully focused on physicians' current level of knowledge, attitudes, and behaviors and evaluated through Rogers's DOI theory. The rationale for the foundation of this theoretical research will extrapolate how physicians adapt new AD criteria by adopting or not adopting the new criteria into their practice using Rogers's diffusion of innovation theory.

The past understanding of the term AD is a standardized diagnostic category according to the 2012 ICD-9-CM Diagnosis Code 331.0: Alzheimer's disease, which was converted in 2012 as ICD-10-CM G30.9, in which AD unspecified is used to label a patient with the disease and to describe a disease from which a patient died and found/listed on death certificates (Lakkireddy et al., 2007). Throughout the literature, the incongruent use of AD was discovered, ranging from the use of a person alive or the cause of death in other uses of the term AD. The current use of the term AD by the medical community states AD cannot be definitively diagnosed until an autopsy is performed by examining brain tissue under a microscope in order to accurately make a diagnosis of AD (Christensen & Lin, 2007). Currently, brain samples are obtained postmortem (Christensen & Lin, 2007).

In January 2010, President Obama endorsed the National Alzheimer's Project Act. The Act is focused on improving AD research and services at all levels, as well as accelerating treatments to abate AD disease. The purpose of this research is to identify gaps between GPs presently testing patients for early stages of AD and the new NIA AD criteria. While there are many professional entities that have the responsibility for establishing consensus on standards of practice such as WHO, I identified a gap in standards to detect early stages of AD. In Figure 6, guidelines published by the Alzheimer's Association offer a checklist for early detection of AD entitled "Know the 10 Signs," offering possible detection and early signs of AD that can be observed by the person with the disease and/or a caregiver and reported to the physician, whereas in Table 3 the *DSM-IV*-TR provides the diagnostic criteria for dementia of the Alzheimer's type

and is the standard of diagnosis for AD.

Table 3 The Alzheimer's Association's 10 Warning Signs of Alzheimer's Disease (Alzheimer's Association, 2012)	
Alzheimer's disease (AD)	Normal aging
1. **Memory loss that disrupts daily life**. One of the most common signs of Alzheimer's, especially in the early stages, is forgetting recently learned information. Others include forgetting important dates or events; asking for the same information over and over; relying on memory aides (e.g, reminder notes or electronic devices) or family members for things they used to handle on their own.	What's typical? Sometimes forgetting names or appointments, but remembering them later.
2. **Challenges in planning or solving problems.** Some people may experience changes in their ability to develop and follow a plan or work with numbers. They may have trouble following a familiar recipe or keeping track of monthly bills. They may have difficulty concentrating and take much longer to do things than they did before.	What's typical? Making occasional errors when balancing a checkbook.
3. **Difficulty completing familiar tasks at home, at work or at leisure.** People with Alzheimer's often find it hard to complete daily tasks. Sometimes, people may have trouble driving to a familiar location, managing a budget at work or remembering the rules of a favorite game.	What's typical? Occasionally needing help to use the settings on a microwave or to record a television show.
4. **Confusion with time or place.** People with Alzheimer's can lose track of dates, seasons and the passage of time. They may have trouble understanding something if it is not happening immediately. Sometimes they may forget where they are or how they got there.	What's typical? Getting confused about the day of the week but figuring it out later.
5. **Trouble understanding visual images and spatial relationships.** For some people, having vision problems is a sign of Alzheimer's. They may have difficulty reading, judging distance and determining color or contrast. In terms of perception, they may pass a mirror and think someone else is in the room. They may not recognize their own reflection.	What's typical? Vision changes related to cataracts.
6. **New problems with words in speaking or writing.** People with Alzheimer's may have trouble following or joining a conversation. They may stop in the middle of a conversation and have no idea how to continue or they may repeat themselves. They may struggle with vocabulary, have problems finding the right word or call things by the wrong name (e.g., calling a watch a "hand clock").	What's typical? Sometimes having trouble finding the right word.
7. **Misplacing things and losing the ability to retrace steps.** A person with Alzheimer's disease may put things in unusual places. They may lose things and be unable to go back over their steps find them again. Sometimes, they may accuse others of stealing. This may occur more frequently over time.	What's typical? Misplacing things from time to time, such as a pair of glasses or the remote control.
8. **Decreased or poor judgment.** People with Alzheimer's may experience changes in judgment or decision making. For example, they may use poor judgment when dealing with money, giving large amounts to telemarketers. They may pay less attention to grooming or keeping themselves clean.	What's typical? Making a bad decision once in a while.
9. **Withdraw from work or social activities.** A person with Alzheimer's may start to remove themselves from hobbies, social activities, work projects or sports. They may have trouble keeping up with a favorite sports team or remembering how to complete a favorite hobby. They may also avoid being social because of the changes they have experienced.	What's typical? Sometimes feeling weary of work, family and social obligations.
10. **Changes in mood and personality.** The mood and personalities of people with Alzheimer's can change. They can become confused, suspicious, depressed, fearful, or anxious. They may be easily upset at home, at work, with friends, or in places where they are out of their comfort zone.	What's typical? Developing very specific ways of doing things and becoming irritable when a routine is disrupted.

Figure 6. Alzheimer's Association's 10 Warning Signs of Alzheimer's Disease. *Note:* Modification of a table adapted from Alzheimer's Association, (2012e). 2012 Alzheimer's Disease Facts and Figures. Retrieved from

http://www.alz.org/downloads/Facts_Figures_2012.pdf.

Dementia of the AD type must be differentiated from the typical deterioration in cognitive functioning associated with aging. The onset of dementia of the AD type is identified by one of two subtypes, which accompany early onset or late onset. The definition of onset as a subset of dementia with the AD type is used if the onset occurred at age 65 or under, whereas the definition of late onset as a subset occurs after age 65 (American Psychiatric Association, 2000). Figure 7 was briefly discussed in Chapter 1 and continues here to identify the diagnostic criteria per the *DSM-IV-TR*.

Table 2. Diagnostic criteria for 294.1x Dementia of the Alzheimer's Type (American Psychiatric Association, 2000).

A. The development of multiple cognitive defects manifested by both
  (1). memory impairment (impaired ability to learn new information or to recall previously learned information)
  (2). one (or more) of the following cognitive disturbances:
    (a). aphasia (language disturbance)
    (b). apraxia (impaired ability to carry out motor activities despite intact motor function)
    (c). agnosia (failure to recognize or identify objects despite intact sensory function)
    (d). disturbance in executive functioning (i.e., planning, organizing, sequencing, abstracting)
B. The cognitive deficits in Criteria A1 and A2 each cause significant impairment in social or occupational functioning and represent a significant decline from a previous level of functioning.
C. The course is characterized by gradual onset and continuing cognitive decline.
D. The cognitive deficits in Criteria A1 and A2 are not due to any of the following:
  (1). other central nervous system conditions that cause progressive deficits in memory and cognition (e.g., cerebrovascular disease, Parkinson's disease, Huntingtons's disease, subdural hematoma, normal-pressure hydrocephalus, brain tumor)
  (2). systemic conditions that are known to cause dementia (e.g., hypothyroidism, vitamin B12 or folic acid deficiency, niacin deficiency, hypercalcemia, neurosyphilis, HIV infection)
  (3). substance-induced conditions
E. The deficits do not occur exclusively during the course of a delirium.
 	
F. The disturbance is not better accounted for by another Axis I disorder (e.g., Major Depressive Disorder, Schizophrenia).
 	
Diagnostic criteria for 294.10 Dementia of the Alzheimer's Type Without Behaviorial Disturbance: if the cognitive disturbance is not accompanied by any clinically significant behavioral disturbance.
Diagnostic criteria for 294.11 With Behaviorial Disturbance: if the cognitive disturbance is accompanied by a clinically significant behavioral disturbance (e.g., wandering, agitation).
Specify subtype: **With Early Onset:** if onset is at age 65 years or below. **With Late Onset:** if onset is after age 65 years
Coding note: Also, code 331.0 Alzheimer's disease on Axis III. Indicate other prominent clinical features related to the Alzheimer's disease on Axis I (e.g., 293.83 Mood Disorder Due to Alzheimer's Disease, With Depressive Features, and 310.1 Personality Change Due to Alzheimer's Disease, Aggressive Type).

Figure 7. Diagnostic Criteria for AD per American Psychiatric Association. *Note:* Modification of a table adapted from American Psychiatric Association, (2002). Diagnostic and Statistical Manual of Mental Disorders IVth edition. Washington, DC: American Psychiatric Association; American Psychiatric Association.

The NIA described diagnostic AD criteria which updates previous AD diagnostic criteria published 27 years ago by the National Institute of Neurological Disorders and

Stroke (NINDS) and the Alzheimer's Disease and Related Disorders Association

(ADRDA) workgroup in 1984 (Jack et al., 2011). The new NIA criteria are similar to

diagnostic criteria found in the *DSM-IV-TR* (American Psychiatric Association, 2000).

The focus of this research will target the need for the early detection of AD. As a

secondary outcome of this research, data may indicate the need for a team approach

directly involving the patient, family members/caretakers, and physicians. Research is

ongoing and offers hope. Currently, there is a need for physicians to concentrate on early

diagnosis and treatment of AD (Christensen & Lin, 2007). Christensen and Lin stated that

modern care of AD includes the use of screening tools and *DSM-IV* diagnostic criteria,

well suited for the management of AD medications used to treat AD patients, and regard

for the caregivers well-being. Physicians can use appropriate screening tools, *DSM-IV*

diagnostic criteria, management of medications for the AD patient, and inclusion of the

needs of the patients' caregivers (Christensen & Lin, 2007).

An early diagnosis of AD may help ease tensions within the family and assist in

explaining why one's loved one has had a change in personality, mood, activities, and

behavior. A physician's early detection and diagnosis of AD may assist in prompting and

facilitating the necessity for reviewing family finances, legal planning, discussing home

and long-term care alternatives and evaluation of safety practices of eliminating

automobile responsibilities (Leifer, 2009). The prompt actions of a physician to detect

and record a diagnosis of AD may positively affect social change. By leveraging routine

procedures for the early detection of AD in primary care offices, clinics, and beginning

early diagnostic evaluations for persons suspected with AD symptoms, it may promote

the need to partner with those that are like minded, providing care planning at the earliest time following a diagnosis of AD. Subsequently, this would promote the importance of documenting the diagnosis and care plan in the person's medical record. In some instances, physicians are discouraged to document a diagnosis of AD (Attea & Johns, 2010).

Today, patients with AD or their loved ones oftentimes realize early on that something is wrong; either the patient suspects memory loss or is observed by their loved ones as having memory loss. At this point, problems with relationships are present almost 90% of the time and the patient knows something is wrong. Okie (2011) suggested the early detection and diagnosis alleviates the stress of suspecting something else is going on with one's health. Even with therapy to slow down or abate the progression of AD, the effective approach to deal with AD is detecting the disease as early as possible (Okie, 2011).

A gap in the existing standards for testing for AD dementia, the lack of early detection tests to diagnose AD, and the combination of an MRI prescribed as a diagnostic tool for assessing dementia is evident in current literature. More training for GPs is needed in the diagnostic tools for treating dementia AD. Universal evidence-based training is indicated for all disciplines at all levels for professionals and paraprofessionals (Gould & Reed, 2009). Fearing et al. (2007) illustrated in the Cache County Research of Aging close proximity of clinically diagnosed AD matching similarly diagnosed AD subjects with postmortem confirmation of the disease using MRI technology. Fearing et al. postulated the Cache County Research on Memory and Aging holds evidence that

supports quantitative MRIs could be used in helping to diagnose AD in later stages of the disease process.

As recent as 2008, researchers in France used an MRI to analyze whole-brain anatomy, which evaluated patients with AD with similar ages as control subjects. The MRI utilized a support vector machine as a means to better classify segments of whole-brain imaging (Magnin et al., 2009). The research included a study of gray matter from 16 patients with AD during autopsy. The researchers used resampling and statistical formulas extrapolating data to project robustness of the research results (Magnin et al., 2009). Consequently, the results demonstrated nearly 95% correct classification for AD, the control subjects yielded a mean specificity of nearly 97%, and the mean sensitivity was said to be nearly 92%. The researchers stated their use of MRI and testing methodology could statistically detect AD and consequently assist in the early detection of AD (Magnin et al., 2009).

The time and the need for a reliable test for the early detection of AD has arrived. Recent projections forcast that by the year 2040, more than 80 million individuals will be affected by AD (Forlenza et al., 2010). Current AD testing protocols do not include ordering an MRI for the early detection of AD because doing so is not the standard of care presently practiced in the United States due to the expense and lack of insurance approval, as it may not be medically indicated. In order for the MRI to become approved for the early detection of AD, the MRI could become the litmus test for the evaluation of AD. The need to revise current GP protocols when diagnosing dementia-like AD patients is based upon findings in current literature and case studies within the past 5 years. The

need to address a new combination of diagnostic standards to accurately describe patient symptoms is proposed, establishing a standard AD test, and possibly including an MRI in the early phase to detect AD as a baseline for comparison in the secondary phase of AD where MRIs have been most effective at detecting AD. The initial review of literature for the past 5 years indicates GPs missed diagnoses of AD patients. The need for this research may have lasting positive societal changes in the elderly wherein projections for AD are estimated that every 1/3 of every minute someone new develops AD. AD cases will significantly increase as early as 2040 or 2050 (Christensen & Lin, 2007).

However, until further research and the scientific/medical community prescribes the use of MRIs as a primary tool to clinically diagnose AD patients, new research presents GPs with an in office diagnostic test. Jack et al. (2011) reported the criteria for the clinical diagnosis of AD established by the National Institute of Neurological and Communicative Disorders and Stroke (NICDS) and the ADRDA going back as far as 1984. Jack et al. stated that if formal cognitive testing is not feasible, then cognitive functions could still be assessed. For example, the clinician can ask the patient to learn an address during the interview and ask the patient to recall the address a few minutes later (e.g., 3913 Pheasant Lane, Modesto, California). On the other hand, the clinician may ask the patient to name three items (e.g., a note pad, a stapler, and a pen), place them in various locations around the room and later ask the patient to recall the location of the items and recall the names of the items. The convenience of such a test does not require any expensive equipment, may be less sensitive to subtle cognitive dysfunction during

early stages of MCI, and do not typically evaluate cognitive domains beyond memory (Jack et al., 2011).

Several researchers reported that there will be increased numbers of AD over the near future. Christensen and Lin (2007) indicated the number of people in the United States with AD could triple by 2050 and currently there are over 5 million with AD. The challenge is to discover an early diagnosis of AD before the actual onset of dementia. A confounding issue with discovering an early diagnosis lies within the early symptoms of the disease itself. Magnin et al. (2009) stated that new technology exists today offering quantifiable evidence that MRIs, for example, offer proof that early detection of AD exists possibly through whole-brain vector imaging. Forlenza et al. (2010) acknowledged that challenges adopting new and promising procedures are in the experimental phases, some yet require validation, and the massive effort to introduce new information into clinical practice requires refinement and operational acceptance within the health care system.

AD is not observable per se; only symptoms and behaviors or signs patients display suggest a patient might have dementia or later stages of AD. Early signs of AD may go undetected for several years. Currently, research is underway to discover the etiology, develop accurate diagnostic tests, find effective treatment, and find a cure for AD (American Psychiatric Association, 2002; Christensen & Lin, 2007; Fearing et al., 2007; Forlenza et al., 2010).

The National Institute on Aging and the Alzheimer's Association published new criteria for the diagnosis of dementia due to AD identifying three categories: (a) Probable

AD dementia, (b) Possible AD dementia, and (c) Probable or possible AD dementia with evidence of AD pathophysiological process. The first two categories (Probable AD dementia and Possible AD dementia) are intended for all clinical settings. The third was established for research intentions only (McKhann et al., 2011).

The National Institute on Aging and the Alzheimer's Association developed a new standard of practice for the clinical diagnosis of AD. According to the workgroup in cooperation with the National Institute on Aging and the Alzheimer's Association, two sets of criteria were developed: (a) core clinical criteria that could be used by healthcare providers without access to imaging techniques or cerebrospinal fluid analysis, and (b) research criteria that could be used in clinical research settings that include clinical trials (Albert et al., 2011). This research will concentrate on the first core clinical criteria. Albert et al. stated that because AD is a slow and progressive disease without a defined onset of the disease, it is difficult for clinicians to identify transition points for individual patients because each patient presents different signs and symptoms or may be asymptomatic. What is now known about AD is that an AD patient's doctor may not see a predementia phase because it is difficult to identify (Albert et al., 2011).

For patients in the predementia phase, the workgroup recommended the term mild cognitive impairment (MCI) due to AD to refer to the symptomatic predementia phase of AD. This new criteria recommended by the National Institute on Aging and the Alzheimer's Association paralleled the same criteria proposed by the International Working Group and assumed that it is possible to identify those individuals with AD pathophysiological processes as the likely primary cause of their progressive cognitive

dysfunction (Albert et al., 2011). Table 2 lists the standard of practice for clinical

diagnosis of Mild Cognitive Impairment. Figure 8 illustrates the new NIA AD protocols

which are the principle focus of this research. Figure 8 illustrates how the ICD-10 and

DSM-IV view AD by labeling AD as Mild Cognitive Impairment rather than AD, as

updated by the new NIA AD criteria.

Table 2

Core Clinical Criteria for the Diagnosis of Mild Cognitive Impairment

Concern regarding a change in cognition	There should be evidence of concern about a change in cognition, in comparison with the person's previous level. This concern can be obtained from the patient, from an informant who knows the patient well, or from a skilled clinician observing the patient.
Impairment in one or more cognitive domains	There should be evidence of lower performance in one or more cognitive domains that is greater than would be expected for the patient's age and educational background. If repeated assessments are available, then a decline in performance should be evident over time. This change can occur in a variety of cognitive domains, including memory, executive function, attention, language, and visospatial skills. An impairment in episodic memory (i.e., the ability to learn and retain new information) is seen most commonly in MCI patients who subsequently progress to a diagnosis of AD dementia.
Preservation of independence in functional abilities	Persons with MCI commonly have mild problems performing complex functional tasks that they use to perform previously, such as paying bills, preparing a meal, or shopping. They may take more time, be less efficient, and make more errors at performing such activities that in the past. Nevertheless, they generally maintain their independence of function in daily life, with minimal aids or assistance. It is recognized that the application of this criterion is challenging, as it requires knowledge about an individual's level of function at the current phase of their life. However, it is noteworthy that this type of information is also necessary for the determination of whether a person is demented.
Not demented	These cognitive changes should be sufficiently mild that there is no evidence of a significant impairment in social or occupational functioning. It should be emphasized that the diagnosis of MCI requires evidence of intraindividual change. If an individual has only been evaluated once, change will need to be inferred from the history and/or evidence that cognitive performance is impaired beyond what would have been expected fro that individual. Serial evaluations are of course optimal, but may not be feasible in a particular circumstance.

The criteria for Probable AD dementia: Core clinical criteria are presented in

Figure 8.

		Probable AD dementia: Core Clinical Criteria
		Probable AD dementia is diagnosed when the patient meets criteria in Table 1 and has the following characteristics:
A		Insidious onset. Symptoms have a gradual onset over months to years, not sudden or over hours or days;
B		Clear-cut history of worsening of cognition by report or observation; and
C		The initial and most prominent cognitive deficits are evident on history and examination in one of the following categories.
D		Amnestic presentation: It is the most common syndromic presentation of AD dementia. The deficits should include impairment in learning and recall of recently learned information. There should also be evidence of cognitive dysfunction in at least one other cognitive domain as described in Table 1.
E		Nonamnestic presentations:
	1	Language presentation: The most prominent deficits are in word-finding, but deficits in other cognitive domains should be present.
	2	Visuospatial presentation: The most prominent deficits are in spatial cognition, including object agnosia, impaired face recognition simultanagnosia, and alexia. Deficits in other cognitive domains should be present.
	3	Executive dysfunction: The most prominent deficits are impaired reasoning judgment, and problem solving. Deficits in other cognitive domains should be present.
F		The diagnosis of probable AD dementia should not be applied when there is evidence of (a) substantial concomitant cerebrovascular disease, defined by a history of stroke temporally related to the onset or worsening of cognitive impairment; or the presence of multiple or extensive infarcts or severe white matter hyperintensity burden; or (b) core features of Dementia with Lewy bodies other than dementia itself; or (c) prominent features of behavioral variant frontotemporal dementia; or (d) prominent features of semantic variant primary progressive aphasia or non-fluentagramatic variant primary progressive aphasia; or (e) evidence for other concurrent, active neurological disease, or a non-neurological medial comorbidity or use of medication that could have a substantial effect on cognition.

Figure 8. Probable AD dementia: Core Clinical Criteria. *Note*: Modification of a table adapted from McKhann et al. (2011). The diagnosis of dementia due to Alzheimer's disease: Recommendations from the National Institute on Aging-Alzheimer's Association workgroups on diagnostic guidelines for Alzheimer's disease. Retrieved from

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3312024/?tool=pubmed. Doi: 10.1016/jalz.2011.03.005

An evaluation by the GP and/or PCP of the person reporting to said individuals can be clinically evaluated using the new criteria. The criteria for all-cause dementia: core clinical criteria and other diseases ruled out for consideration for a diagnosis of MCI. The use of these criteria is then necessary to follow in the continued evaluation and diagnosis of AD. If evidence is present for a diagnosis of probable AD dementia from Figure 8, then Figure 9 is invaluable to further refine a more specific diagnosis of probable AD dementia (Albert et al., 2011; McKhann et al., 2011). I postulate that a gap or incongruence exists wherein the ICD, DSM, and physicians' knowledge of the new NIA protocols for early AD diagnosis are incongruent and therefore emphasize the need for the framework of this study including assessing their knowledge of the new NIA protocols, attitudes for using the protocols, beliefs and behaviors to either currently use, intend to use, or intend not to use the NIA new AD protocol.

With the application of the DOI theory and KAB theory design to these research questions, this study will be used to explore and identify physicians' current KAB directly related to the new NIA AD criteria. The social change and potential implication may advance the diagnostic phase of AD/CADS patients compared to singularly using the ICD, DSM, or other previous methods spanning the course of the last 27 years.
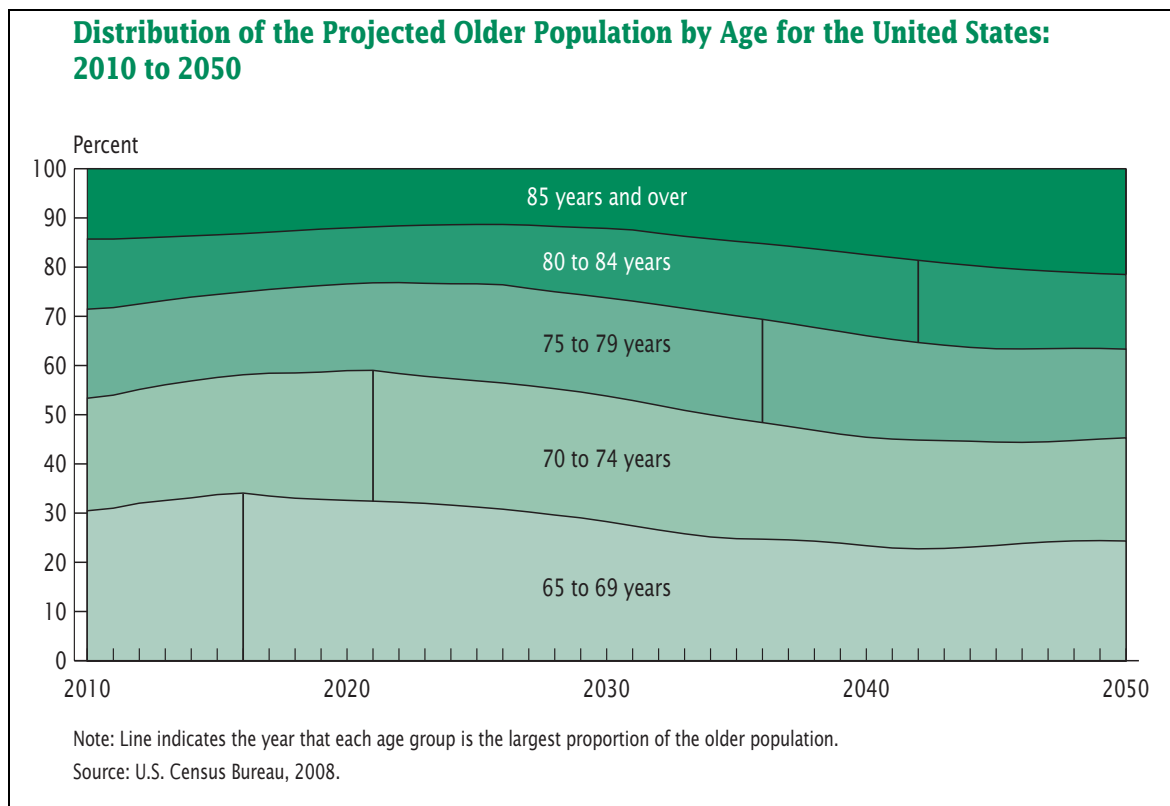
Key Concepts

The following discussion will illustrate a connection and use for the KAB survey and use of Rogers DOI theory to help better understand the relationship to the research

questions and methodology used for this study. There are very few researchers who explored the relationship(s) between physicians' KAB (characteristics such as years since graduating from medical school, area of specialty, percentage of patients aged 60 and older, physician's age, physician's gender, knowledge of the new NIA protocol for early detection of AD, and physician's knowledge of AD) and the physician's use, intended use, or does not intend to use the new NIA AD protocol. Unlike other diseases, for example, guidelines about early detection of breast cancer, colon cancer, and diabetes are well documented. However, in a recent study, similar characteristics or for the purpose of this study, six independent variables (IV), years since graduating from medical school, area of specialty, percentage of patients aged 60 and older, physician's age, physician's gender, and physician's knowledge of AD from a knowledge score was provided by completing a survey instrument (Wenger et al., 2009). In addition, Rogers's DOI theory has been used to better understand dissemination, application, and implementation of interventions within the healthcare community such as developing interventions for autism, HIV/AIDS, substance abuse, and conduct disorder (Dingfelder & Mandell, 2010).

Multiple researchers regarding AD underscored the importance and role families play in the support of a person with AD. The following discussion is an outline of the importance of families, support for the study, and reinforces the need for continued AD research. Much of the scientific research presently underway is focused on discovering the etiology of AD and a possible cure. The rationale for this study is supported by new information regarding AD was released by the NIA changed how we look at the many facets of AD and AD research.

Families provide a bulk of the care for their loved ones with AD. The Alzheimer's Association, a voluntary health association with more than 70 chapters nationwide, reported nearly 11 million American families and friends provided 12.5 billion hours of unpaid care for persons with AD at an estimated $144 billion dollars (Attea & Johns, 2010). The significance of the older population, Figure 9, may indicate an increased level of dependency on those younger than age 65 (Vincent & Velkoff, 2010). In addition, Tiedeman, Kim, Flurie, Korch-Black, and Brandt (2011) stated that dementia is characterized by deficits covering multiple areas of cognition. Such deficits are unable to be explained by mere aging or a typical decline in function. Symptoms of a neuropsychiatric are typically present as well as neurological findings. Etiology is a further basis for dementia. The most common cause for dementia is AD. Other causes are mixed AD and vascular dementia, Lewy body dementia (DLB), and frontotemporal dementia.

Distribution of the Projected Older Population by Age for the United States: 2010 to 2050

Percent

Note: Line indicates the year that each age group is the largest proportion of the older population.
Source: U.S. Census Bureau, 2008.

Figure 9. Distribution of Projected Older Population by Age. Modified graph demonstrating line for each group is expected to reach the largest percentage of older population specifically aged 65 and older. Adapted from "The Next Four Decades The older population in the United States: 2010 to 2050,"by Vincent, G. &Velkoff, V. (2010). *Population Estimates and Projection.* Retrieved from http://www.census.gov/prod/2010pibs/p25-1138.pdf

At this time, research is advancing in the area of MRIs to detect changes in the brain with the anticipation that early detection of AD may lead toward earlier AD treatment. AD is described as the accumulation of both neurofibrillary tangles (NFT)s, and neuropil threads (NT)s, with deposits of amyloid (Abeta) protein, which serve as the classic signs of AD. The NFTs, NTs, and Abetas are diagnostic evidence of AD at autopsy (Fearing et al., 2007).

Fearing et al. (2007) spoke of the close proximity of clinically diagnosed AD matching like diagnosed AD subjects with postmortem confirmation of the disease using

MRI technology. Fearing et al. postulated that quantitative MRI (qMRI) could be used in helping to diagnose AD in later stages of the disease. For now, AD can be 100% confirmed as a diagnosis for cause of death under microscopic examination during autopsies, but not confirmed in the living (Christensen & Lin, 2007). While there are various types of dementia and treatment for symptoms of AD, AD has no cure and is a diagnosis of exclusions made using the *DSM-IV*. The International Statistical Institute dates back to 1893, documenting causes of morbidity.

A review of current literature demonstrates a gap in the difference in the degree to which there is consensus/certainty about the diagnosis of AD after autopsy (high agreement/certainty) versus when the patient is alive and no brain tissue has been examined pathologically (lower agreement/certainty). With the advancement in research in recent years, a comparison of ICD-9 and ICD-10 demonstrates a minimal description of dementia like AD symptoms in ICD-9. In ICD-9, the term organic brain syndrome was associated with what we more commonly refer to as AD. Organic brain syndrome was coded as F-09, but with the release of ICD-10, the term organic brain syndrome was updated to AD. Since the release of ICD-9 and ICD-10, AD has been continually described as a disease within those living with AD rather than a cause of death as current literature describes in some peer reviewed medical journals. Whereas the CADS implies a patient displays or demonstrates signs/symptoms we now commonly refer to as AD, the revised ICD-10 describes AD as a term assigned to patients which is counter to Christensen and Lin (2007) and the Centers for Medicare & Medicaid (2012), which

stated that AD cannot be 100% confirmed as a diagnosis for cause of death until microscopic examination.

Incongruence and gaps are seen in the ICD-10 because of advancements and updates have been seen over the past 27 years as seen in the NIA updated report in 2011. The ICD-10 fails to describe the diagnostic criteria for AD by only describing other diseases associated within the classification of dementia. In other words, the ICD-10 does not address AD specifically, but rather combines AD with dementia, whereas the new NIA calls out in clear specificity the diagnostic criteria. AD was first listed in ICD-10 and revised the definition of AD as an organic brain syndrome as previously found in ICD-9. The lack of diagnostic criteria in the ICD creates a gap for healthcare providers. The new release of the DSM in 2013 intended to describe and to categorize AD as a syndrome of psychosis and depression previously used with AD. The ICD does list three stages of AD and attributes related to each of the three stages. Yet, what are absent from the ICD are diagnostic criteria for a differential diagnosis of AD. The *DSM-IV* does offer diagnostic criteria as described earlier; however, what is described is not consistent with the new criteria released by the NIA as of 2011.

The ICD-10 differs from the *DSM-IV* because the ICD-10 is a system used for categorizing health issues and diseases globally, provides a systematic surveillance of the health issues and diseases, and for making decisions about the budgeting of resources in other countries. In contrast, the *DSM-IV* is a diagnostic manual used largely by medical doctors such as psychologists and psychiatrists for diagnosing mental health disorders in individual patients or groups in research studies which only reinforces the notion from

the ICD-9 that AD is an outcome of growing old and previously described as organic

brain syndrome. AD has been consistently used to label a person with AD perhaps

because of the lack of a more definitive term (American Psychiatric Association, 2002;

Centers for Medicare & Medicaid 2012; Christensen & Lin, 2007).

Forlenza et al. (2010) acknowledged that there are indications for a standardized

diagnostic test or a checklist used to diagnose AD patients and training for the medical

profession. Alzheimer's Association Quality Care Campaign has a number of

professional training initiatives: improving hands-on care for people with dementia in the

U.S.A., diagnosis and biomarkers of predementia in AD, and a reaction to Dementia

Diagnosis in Individuals with Alzheimer's Disease and Mild Cognitive Impairment.

Figure 10 illustrates predictions of the widespread pattern AD may take in the coming

years. Christensen and Lin (2007) indicated the number of people in the United States

with AD could triple by 2050 and currently there are over 5 million with AD. In Figure

13, the higher proportion of AD can be seen in states such as Alaska, Washington, and

reaching as far south as Nevada. The significance of the rising numbers in AD and need

for early identification of AD onset is of the utmost concern because of the Autopsy-

confirmed AD versus clinically diagnosed AD in the Cache County Research on Memory

and Aging substantiate, meaning that there will be an increase of AD (Christensen & Lin,

(2007). Science and medicine have not produced a reliable test to detect the early stage of

AD.
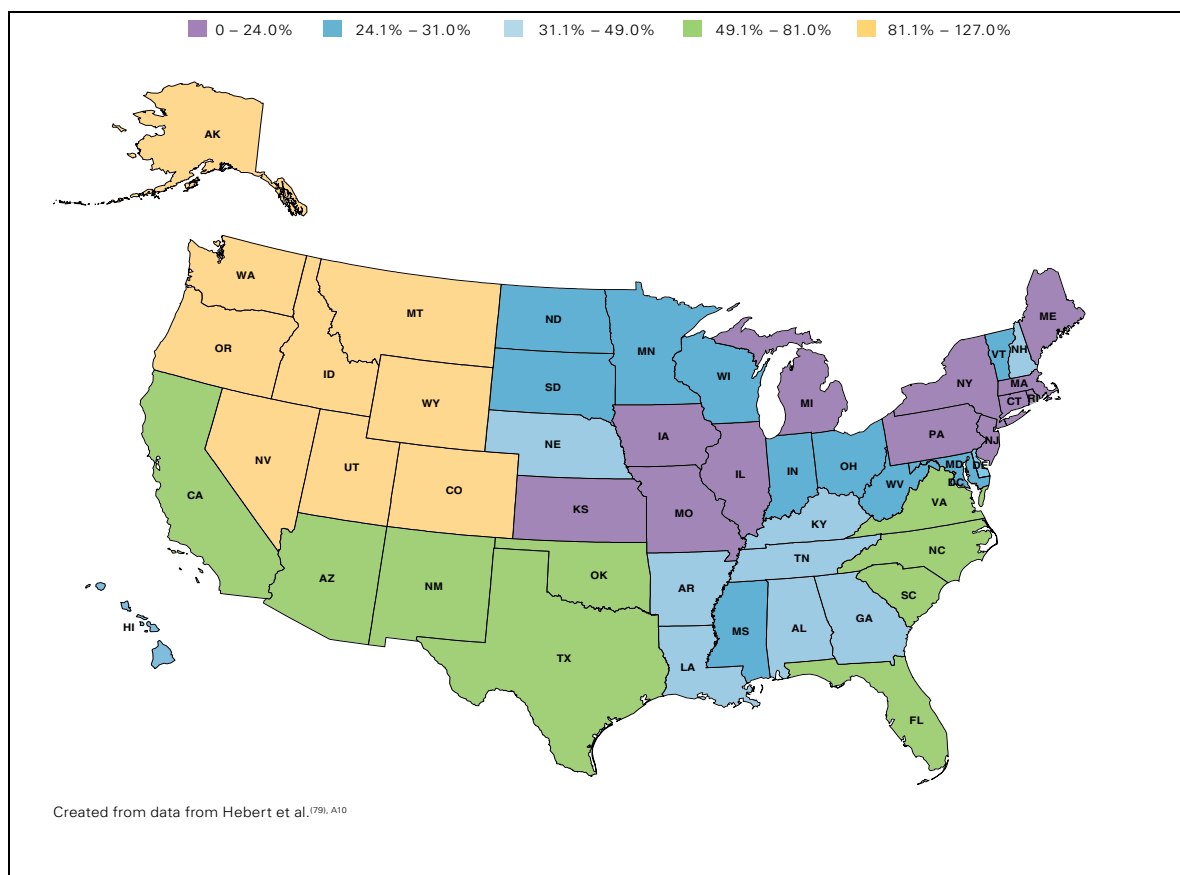
Figure 10. Projected Changes Between 2000 and 2025 in AD by State. Modification of a figure adapted from Alzheimer's Association, (2012b). 2012 Alzheimer's Disease Facts and Figures. Retrieved from http://www.alz.org/downloads/Facts_Figures_2012.pdf

The *DSM-IV* defined the diagnostic criteria for dementia of the Alzheimer type as the development of multiple cognitive incongruities to carry on day-to-day activities. The *DSM-IV* does outrank or one might say takes precedence over the ICD-10 within the United States of America and internationally. The *DSM-IV* is referenced offering diagnostic criteria for clinicians Activities of daily living (ADL) such as eating, dressing, bathing, and toileting, and learning new activities or recall previous memories such as names of spouses or family members of which are considered higher functioning activities are examples of difficulties found in AD patients (Leifer, 2009). Figure 11

illustrates a few of the ADLs provided by their caregivers. Furthermore, a failure at these

higher functioning psychomotor skilled activities and higher cognitive skills negatively

affects or impedes on social and/or occupational abilities. Characteristics of dementia of

the Alzheimer's type displays signs of acute onset decline in daily activities, which are

also known as ADL, and are not due to other causes of mental decline of ongoing

cognitive disorientation (American Psychiatric Association, 2002).
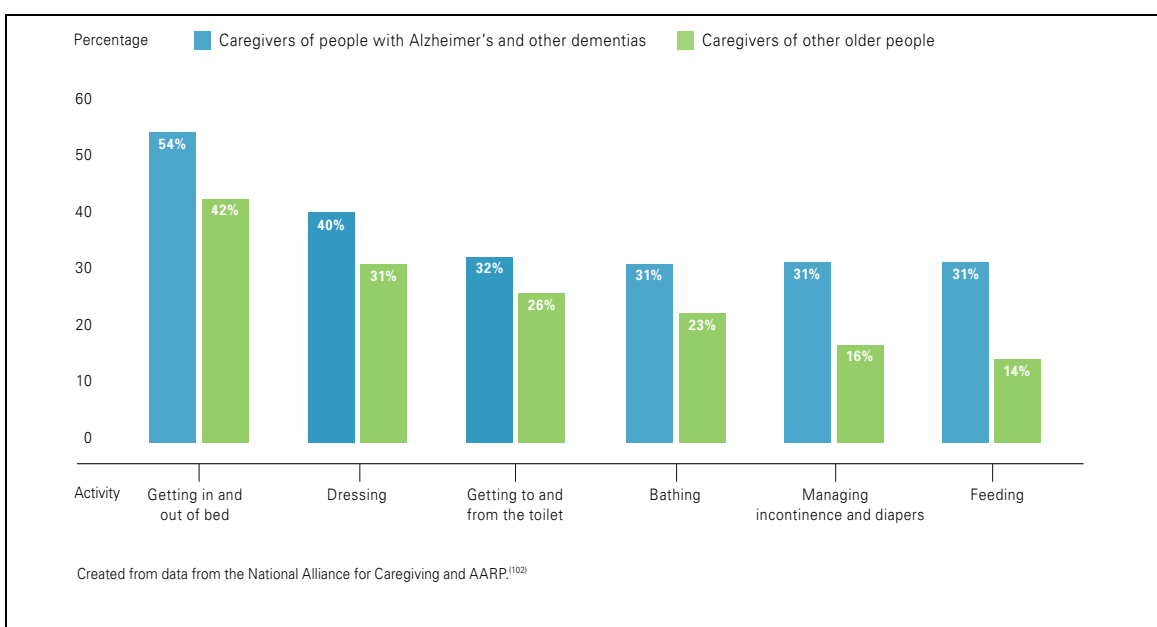
Figure 11. Proportion of Caregivers of People with AD vs. People providing ADLs.
Modification of a graph adapted from Alzheimer's Association, (2012c). 2012
Alzheimer's Disease Facts and Figures. Retrieved from
http://www.alz.org/downloads/Facts_Figures_2012.pdf

The Alzheimer's Association recently formed a joint task force with the National

Institute on Aging to review and revise criteria and guidelines for the diagnosis of AD.

The report indicated new diagnostic criteria for AD, which could improve diagnosis and

facilitate continued research for a cure for the disease (Frantz, 2011. The National

Institute on Aging and Alzheimer's Association recently collaborated with the

Alzheimer's Association to publish new guidelines for the diagnosis of AD, reportedly

the first update in over 27 years from the original published guidelines (Frantz, 2011).

Frantz (2011) reported the new criteria describing three stages of the diagnostic

criteria, the first being Stage 1: Preclinical. Stage 1 Preclinical symptoms such as

memory loss may be absent or difficult to detect. Pathological changes may already be

seen using biomarker tests which measure beta-amyloid accumulation in the brain

indicating that AD has begun. Other examples of biomarker tests may include measuring

tau protein levels in spinal fluid or using imaging equipment to evaluate brain shrinkage.

Stage 2: Mild cognitive impairment may be a transitional phase between normal

forgetfulness and memory loss associated with AD. About 50% of those with mild

cognitive impairment develop dementia of the AD type. Of those 50%, approximately

25% may recover or regain normal functioning over time. There is no standard

neuropsychological test to evaluate mild cognitive impairment. Consequently, because

there is no standardized test for mild cognitive impairment (MCI), physicians adapt

existing tests developed for other purposes. A pattern of change in cognition, impairment

of one or more abilities, inability to function independently, and absence of dementia

may be indications of mild cognitive impairment with criteria seen in stage three. The

third stage is described as dementia due to AD with characteristics and symptoms where

memory, thinking, and cognitive abilities are so severely impaired that a person cannot

function independently indicating the person has dementia (Frantz, 2011). These three

stages of AD are what the NIA now use for a screening and diagnosis of AD, unlike the

ICD-10 or the *DSM-IV*. A diagnosis of AD with the new criteria recognizes that AD

develops over time, starts slowly and becomes more aggressive. The criteria for a

diagnosis of AD must include at least two cognitive domains such as memory loss, loss

of executive function, visuospatial ability, and loss of fluency with language, and

behavior and personality. Examples of memory loss may include the person having

difficulty learning new information and/or executive functions wherein the person may

have difficulty evaluating safety risks or planning meals. An example of visuospatial loss

may be wherein the person has trouble recognizing surroundings or family. An example

of loss of language may be seen wherein the person has difficulty coming up with the

right words to articulate themselves or uses multiple words to describe a roll of paper

towels rather than just saying paper towel. An example of behavior and personality

changes may be seen wherein the person might demonstrate changes in personality such

as agitation, apathy, mood changes, or unacceptable social behavior.

The Alzheimer's Association report suggested using biomarkers for testing patients

for AD. Although the biomarkers are currently in the test phase and are not meant for use

in the clinical setting, the guidelines recommend using the biomarkers with clinical

assessments to determine if a patient might be in the early stages of AD (Frantz, 2011).

The overarching hope with the new diagnostic criteria for AD is to help better identify

people at a much earlier stage of AD, to find a way to delay the onset of AD symptoms

for 5 million Americans with the disease now and projections of an additional 16 million

in another 40 years, and recommend protective actions we can take now in an attempt to

reduce risks now associated with AD (Frantz, 2011).

Alzheimer discovered the very first case of AD over 100 years ago. Since the first discovery of AD to the present time, run rate projections mirror numbers close to or at epidemic proportions to the point, some may say AD has reached the scale of a pandemic. Like many pandemics of the past, AD lacks an accurate etiology, lacks consensus on diagnostic criteria, and lacks a treatment to cure the disease. Researchers continue to study AD with anticipation of discovering an accurate test to detect AD. Progress has been seen from various diagnostic exams such as mental exams, MRIs, various biomarkers being studied to identify AD.

These efforts and many others are all in an attempt discover the cause of AD and to develop a cure for AD. All known attempts to cure AD have failed to date, but some prescription medications do allow the patient with AD a brief and better quality of life before succumbing ultimately to AD. These examples and many other examples of research are all in a massive effort to find the cause and cure for the deadly disease. The true weakness for researchers lies only in the inability to identify the etiology and find a cure for AD. The strength seen in AD research thus far is the vast amounts of research dollars, committed researchers, and the backbone of family members keeping AD in the forefront of our minds each day. Unlike other research, this study stands apart by examining how physicians now choose or not choose to adapt the NIA's new AD criteria. Forlenza et al. (2010) reported there is a need to standardize AD testing or to use a checklist and increase AD training for the medical profession.

The emerging literature from research in the past 7 years reinforces the theory that there is no known cause or cure for AD (Christensen & Lin, 2007). Fearing et al. (2007)

stated there is a need for GPs to receive more geriatric training and reported that additional findings indicate the benefits of including MRIs as part of AD evaluations. This is another example of emerging research from the scientific community supporting the theory that as new emerging AD information surfaces.

I will focus on the question, how are physicians incorporating new research evidence into clinical practice. As new results emerge, such as the new NIA AD criteria for AD, in the pursuit of the etiology and cure for AD so should then the approach to advance physician's knowledge, attitudes, beliefs, and behaviors as they embrace the newfound knowledge as using the DOI research theory. The research questions in Chapter 1 are synchronous.

The following discussion illustrates a connection and uses of Rogers DOI theory to help better understand the relationship to the research questions and methodology used for this study. The following studies are classic examples of physicians adopting and applying Rogers DOI theory to take data from numbers to application. For example, physicians set out to evaluate the effectiveness of specific interventions on the adoption of medical evidence as applied to clinical practices. The results from this study indicated that the regularity of contact to strategies for furthering the acceptance of medical evidence into clinical practice convincingly affects their perceived effectiveness (Borenstein et al., 2003). In another example, in a recent study examining the opportunity to optimize technology and update imaging equipment to current trends, the researchers applied the DOI theory (Reiner, 2012). This is an interesting study given the fact that the NIA admits there are opportunities for the detection of AD early in patients, yet little is

known about cost versus benefit at this time to use imaging equipment for the early detection of AD symptoms (McKhann et al., 2011). In another study investigating using surgical innovations and associated factors, which prompt lymph node biopsy for breast cancer, used Rodgers DOI theory to advance an intervention plan identifying sentinel events (Wright, Gagliardi, Fraser, & Quan, 2011).

Therefore, the use of the DOI theory is applicable to this study by using the KAB theoretical approach to design the primary research questions and associated subquestions (Aday & Cornelius, 2006).

Summary and Conclusions

The overarching theme from the literature reviewed indicates little if any knowledge is known about the physicians and the choice to use or not use the new NIA AD diagnostic protocol. The literature review demonstrates the gap in current knowledge regarding the utilization patterns of physicians' use or choice to not use the new NIA AD diagnostic criteria. As of this time, no other researchers have investigated the utilization patterns of the NIA protocol by physicians. The benefits from this research will advance the current knowledge of the relationship between the various independent variables (potential predictors of use) and the dependent variable (use/non-use) by physicians'.

Chapter 3 is a detailed discussion of the research methodology and a rationale for the approach.

Chapter 3: Research Method

Introduction

The purpose of this study was to determine whether physicians' knowledge and background characteristics were associated with their use of, intention to use, or intention not to use the NIA protocol for the early detection of AD. I found no research that examined whether physicians are implementing or intend to implement the NIA's new recommendations, or how their implementation or intended implementation relates to their knowledge and background. This chapter includes a discussion of the research design, rationale, methodology, and threats to validity.

Research Design and Rationale

The methodology for this study was a quantitative correlational analysis of selected independent variables and outcomes. I explored three research questions that reflect three dependent variables (current use of the NIA protocol, intention to use the NIA protocol, and intention not to use the NIA protocol) and six independent variables (years since graduating from medical school, area of specialty, percentage of patients age 60 and older, physician age, physician gender, and knowledge of AD). Results from the survey instrument are expressed as percentages; descriptive and inferential analysis of the data is discussed.

Analysis of the data consists of two levels: (a) descriptive statistics describing the study sample and data and (b) a series of bivariate tests to identify any statistically significant associations of the independent variables with the dependent variables. DOI theory was used as a theoretical framework to help understand the data. The independent,

dependent and covariate variables directly related to this quantitative research study design have been identified in Chapters 1 and 2.

The total of correct answers on the 30-item ADKS served as a measure of participants' knowledge of AD. The covariate variables aided in discussing the data in two ways, that is, using their descriptive or inferential statistical values. The levels of measurement for the variables included nominal, ordinal, interval, and ratio. The appropriate statistic to use for the qualitative independent variables was Spearman's rho and for ordinal variables Pearson's product-moment correlation coefficient. To avoid family-wise errors (Type 1) due to the large number of variables being analyzed, I conducted a Bonferoni adjustment to test significance and rule out random chances that can be problematic with multiple comparisons. The adjustment checked the p value for significance more stringently in order to reject the null hypothesis. For example, if one were testing nine independent variables and each dependent variable, and the original alpha level was .05 ($p = .05$), one would divide .05 by 9 and get $p = .0056$. The threshold for significance was more stringent, adjusted to $p = .0056$, in order to reject the null hypothesis. A multivariate analysis was not conducted to explore possible combinations because none of the IVs was closely associated. A bivariate analysis was conducted to evaluate IVs , which, if combined, would indicate they were stronger predictors than IVs when linked in combination. Data collected from Part 1 of Appendix B was used in Chapters 4 and 5 to describe statistics, providing a descriptive statistical analysis.

I used Rogers's DOI theory as a theoretical framework in my analysis of data collected through a survey designed similarly to a KAB survey; I illustrated my findings.

I collected data through the survey for a 6-month period, which is described in detail. The DOI theory assisted me in determining how data from this research may be used in the development of an intervention plan that involves the adoption of the NIA protocol. The rationale for selecting a KAB survey design for this research was based largely on previous uses of KAB surveys in similar epidemiological research. However, the design of this study primarily concentrated on advancing the understanding of physicians' knowledge, attitudes, behaviors, and utilization patterns in relation to the NIA criteria for all-cause dementia. A discussion of the exact survey methodology follows.

The ADKS, developed in 1988 by Dieckmann, Zarit, Zarit, and Gatz, was the first published quiz to test the level of knowledge of Alzheimer's disease among caregivers, mental health professionals, nursing home staff, and other individuals interacting with dementia patients. Results from the ADKS helped to develop an educational baseline to stimulate dialogue, clarify fallacies, and appraise other educational programs (Gilleard & Groom, 1994). Currently, the ADKS is one of only two published tests exploring knowledge about dementia with a sample population consisting of members and nonmembers of AD society. The ADKS is incorporated into this study to assist in exploring physicians' KAB. The ADKS consists of 30 questions and is found in Part 2 of Appendix B.

As previously stated, Rogers's DOI theory was applied to better understand the dissemination and implementation of interventions within the healthcare community, such as interventions for autism, HIV/AIDS, substance abuse, and conduct disorder (Dingfelder & Mandell, 2010). Roger's DOI theory was also used in a breast cancer risk

assessment study, in which the researchers applied the DOI theory. In the breast cancer risk assessment study, the researchers applied the results of the study and applied the DOI theory to develop an intervention program (Guerra, Sherman, & Armstrong, 2009). The application and use of DOI theory may also be helpful in further explaining the data in Chapter 5.

The ADKS has been used in two other studies. The purpose of one of these studies (Dieckmann et al., 1988) was to determine the AD awareness of undergraduate students. The second study, conducted by O'Conor in 2001, was designed to determine an effective way of educating people about AD (Sullivan, Finch, & O'Conor, 2003). The ADKS is designed for use in research contexts and is capable of assessing knowledge about AD among laypeople, patients, caregivers, and professionals (Carpenter, Balsis, Otilingam, Hanson, & Gatz, 2008). The survey design for this research advances what Dieckmann et al. and possibly others have done, in the sense that this study focuses on physicians' KAB related to the NIA Alzheimer's diagnostic protocol. The ADKS could be used to explore individuals' current knowledge of AD. The results could be administered again following a seminar, intervention, implementation of AD training, or in-service to evaluate participant's newfound understanding of AD and/or assess the effectiveness of public health campaigns (Carpenter et al., 2008).

Other designs such as a qualitative approach were considered; however, these designs failed to align with current research and studies discussed in Chapter 2 and would not have facilitated direct comparison between samples. This research proposal does include a recommendation for exploring the development or use of intervention program.

Methodology

The methodology was a quantitative correlational analysis of selected

independent variables and outcomes. My intention was to conduct a multivariate analysis

following the multivariate analysis of the data from Table 3 illustrated the data analysis

plan for this study. However, upon conducting the bivariate analysis and upon examining

the results of the bivariate analysis I discovered no associations and concluded the

multivariate analysis was unnecessary in the absence of significant results from the

bivariate analysis.

Table 3

Priori Power Analysis to Determine Total Study Sample Size

Exact correlation	Bivariate normal model
Options	Exact distribution
Analysis	A priori: Compute required sample size
Input	Tail(s) = One
	Correlation ρ H1 = 0.7071068
	α err prob = 0.05
	Power (1-β err prob) = 0.95
	Correlation ρ H0 = 0
Output	Lower critical r = 0.4259020
	Upper critical r = 0.4259020
	Total sample size = 16
	Actual power = 0.9507112

Table 4 correlates the six research questions to the data analysis plan. A

multivariate analysis may illustrate a statistically significant relationship; with the

dependent variables, showing which independent variable may influence a physician to

use the new NIA protocol. For example, when examining knowledge (K) from the

acronym KAB, the results for K might have a 51% or greater statistical relationship with

the dependent variables. A possible recommendation might be theoretically indicated and

associated with DOI theory to design an educational intervention.

Table 4

Data Analysis Matrix for DOI/KAB/Alzheimer's Study

	RQ **A, B,** and **C** with Associated Sub-research Question 1	RQ **A, B,** and **C** with Associated Sub-research Question 2	RQ **A, B,** and **C** with Associated Sub-research Question 3	RQ **A, B,** and **C** with Associated Sub-research Question 4	RQ **A, B,** and **C** with Associated Sub-research Question 5	RQ **A, B,** and **C** with Associated Sub-research Question 6
Predictors for using NIA early detection protocol	Independent Variable (IV) explored-Years since graduating from medical school	Independent Variable (IV) explored-Physicians' area of specialty	Independent Variable (IV) explored-Percentages of patients aged 60 and older	Independent Variable (IV) explored-Physicians' age	Independent Variable (IV) explored-Physicians' gender	Independent Variable (IV) explored-Physicians' Knowledge of AD
KAB Concept	Physician's knowledge of Criteria	Physician's attitude towards using reference material	Physician's attitude towards using reference material	Physician's behavior of testing and diagnostic criteria	Physician's behavior of testing and diagnostic criteria	Physician's knowledge of AD
Data Source	Survey Instrument Part II	Survey Instrument Part II	Survey Instrument Part II	Survey Instrument Part II	Survey Instrument Part II	Survey Instrument Part III
Level of Measurement	Bivariate	Bivariate	Bivariate	Bivariate	Bivariate	Bivariate
Response value	Median	Percentage	Percentage	Median	Male/Female median	Number of correct right or wrong answers from ADKS 30 question test
Source: Schultz Survey Instrument	DV A, B, C, and Subquestions 1-6	DV A, B, C, and Subquestions 1-6	DV A, B, C, and Subquestions 1-6	DV A, B, C, and Subquestions 1-6	DV A, B, C, and Subquestions 1-6	DV A, B, C, and Subquestions 1-6 (ADKS 30 question test)
Literature reference	(Wenger et al., 2009).	(Wenger et al., 2009).	(Wenger et al., 2009).	(Wenger et al., 2009).	(Wenger et al., 2009).	(Wenger et al., 2009).
Analysis Procedures	Pearson's or Chi Square	Pearson's or Chi Square	Pearson's or Chi Square	Pearson's or Chi Square	Pearson's or Chi Square	Pearson's or Chi Square

A recommendation for an educational intervention was discovered through the

interpretation of the findings and discussed in Chapter 5. When I evaluated the data in

Chapter 4, a greater sensitivity response to the questions logically indicated a need for an

intervention. A discussion of the results of this research are presented in greater detail in

Chapter 5, in which I suggested several possible directions or areas in which research could continue.

Currently, I found no research on predictors for utilization of the NIA Alzheimer's assessment protocol by primary care physicians. While perspicacious, existing published empirical data on physicians' knowledge of and use of the NIA AD protocol require further exploration.

Population and Sample

The targeted population (general practice physicians, family practice doctors, and internal medicine physicians) for this research was selected by examining the number of physicians within approximately 10 listed cities in California's Central Valley region using Superpages.com and information from a large medical treatment facility and Dr. Joseph Provenzano, DO. Doctor Provenzano expressed an interest in helping me with my research topic and became instrumental in connecting me with a large medical treatment facility in Stanislaus County. The selection criteria were further refined to Modesto and Stockton, California, which are located within Stanislaus County. Both Modesto and Stockton are comparable in demographics (e.g., socioeconomic status, level of education, income, race, sex, and access to care) to cities such as Sacramento, San Jose, and San Ramon. The city of Modesto has 109 family medicine practices and general practice surgeons listed with the local medical society. Physicians from two major healthcare organizations will be invited to participate in the survey: Sutter Gould Medical Foundation and Kaiser Permanente located in Stanislaus and San Joaquin counties in

Northern California. With the use of both facilities, it should be possible to achieve the

minimum number of respondents.

In order to conduct the bivariate and multivariate analyses for the study, I needed

16 subjects for each predictor variable in the multivariate model (see Table 5), for a total

of 97 subjects for the study (see Table 6). I will discuss my actual power analysis in

Chapter 4 in detail.

Table 5

Priori Power Analysis to Determine Total Study Sample Size

Exact correlation	Bivariate normal model
Options	Exact distribution
Analysis	A priori: Compute required sample size
Input	Tail(s) = One
	Correlation ρ H1 = 0.7071068
	α err prob = 0.05
	Power (1-β err prob) = 0.95
	Correlation ρ H0 = 0
Output	Lower critical r = 0.4259020
	Upper critical r = 0.4259020
	Total sample size = 16
	Actual power = 0.9507112

Table 6

Multivariate Regression Analysis to Determine Total Sample Size for Study

Anticipated effect size ($f2$)	0.15
Desired statistical power level	0.8
Number of predictors	6
Probability level	0.05
Results (minimum required sample size)	97

The individual predictor and total minimum sample size were calculated using the

G*Power 3.1 sample size calculator (Faul, Erdfelder, Buchner, & Lang, 2009). A one-

tailed test was selected because a one-tailed test provides more power than a two-tailed

test and because multiple factors will be examined (Faul et al., 2009). A two-tailed test

was rejected, given that responses to my survey questions are mostly dichotomous and I

am not concerned about the direction of the association, as with clinical trials dealing

with medication and therapies where adverse reactions (negative associations) are of

interest and concern. I determined my minimum sample size to be 97. Although the

minimum sample size is 97, I strived for a higher response rate in order to achieve a

higher sensitivity and greater statistical value (Faul et al., 2009).

The effect size was set at $(f^2) = 0.15$ (considered a medium effect size), and a

statistical power level set at 0.8. Six predictors were identified in Table 6 and accounted

for in the calculation to determine the minimum sample size, a probability level of 0.95,

and standard deviation of 0.5.

Participant Recruitment and Screening

I initially collaborated with Sutter Gould Medical Center, and this partnership

included the support of the medical director. I have spoken with the local chief of

operations, and she indicated she could assist in gathering a large group of physicians to

complete the survey instrument.

An invitation letter was sent to 200 potential survey participants from two of the

109 listed practices within Stanislaus County. The invitation announced the survey and

sought out voluntary participants. An ideal candidate for the survey was identified as

being a physician who was involved in diagnosing persons with AD and practices within

Stanislaus County. Prospective participants were screened via the survey instrument in

Appendix B, Part 1. The exclusion population consisted of those individuals removed via the survey instrument in this survey. The final sample size is discussed in Chapter 4.

Online Survey Procedure

The rationale for deploying the survey via an online format was thought to be cost effective and time efficient, avoided the potential for duplication of data from the same respondents, aided in tracking completion rates, was valuable in sending out reminders to complete the survey, and assisted in all attempts to achieve the appropriate sample size. The first part of the online survey prescreened volunteers and prevented unqualified respondents from continuing the survey. Unqualified candidates (those who did not select A for Question 1, selected a response other than A for Question 2, and selected a response other than B for Question 3) were directed to the exit page of the online survey. Disqualified volunteers were provided additional information regarding the NIA AD protocol as well as an explanation for why they were not allowed to proceed with the survey. Demographic data was collected through the survey. No identifiable information was collected. Qualified candidates were prompted to complete the informed consent form and were able to print a copy of the consent form. All parties acknowledged the consent form electronically.

Respondents completed the online survey I developed and hosted by Qualtrics. Several opportunities were presented at the start of each section and/or at the end of each section for respondents to indicate whether they wanted to either exit or continue the survey. I utilized Qualtrics online statistical software to build my survey instrument, and then securely hosted the survey through Qualtrics. I subsequently performed quantitative

analysis through my selected criterion using SPSS software. I coordinated my efforts

with my contact at a large medical facility in Stanislaus County in California to launch

my survey instrument. She and others at the facility assisted me by sending 900

invitations via a fax to their healthcare members and invited them to participate in my

online survey.

Data Analysis

Table 5 illustrates the six subquestions, the research theory behind each question,

the data source intended to gather the data for this research, the level of measurement, the

literature resource associated with subquestion, and intended analysis procedures.

The operational phase of the survey took place via notifying volunteer pool

participants the survey was active online via an email with instructions to begin the

online survey. The independent variables were physicians/clinicians and their responses

to survey questions. The dependent variables were either the physicians' use or intent to

use of the NIA protocol. The covariate variables and confounding variables were

uniquely defined as independent variables that may influence a study but have a

relationship with independent or dependent data (Creswell, 2003).

The covariate variables for this study included demographical data such age, sex,

type of practice, and number of years since graduating from medical school and are cross

referenced to the survey questions. The data included were variables collected during the

sampling/completion of the surveys. Responses from Part 2 of the survey were scored

and compared to right and wrong responses documented by Carpenter et al. (2008). An

example of a sample item from the survey appears as, "True or False It has been

scientifically proven that mental exercise can prevent a person from getting Alzheimer's disease." Data was analyzed using IBM SPSS Statistics 21. Data were screened and descriptive statistics used to summarize computed demographic characteristics of the participants and responses to Part 2 of the survey. A comparative analysis evaluated distributions on both independent and dependent variables to evaluate appropriateness of various statistical procedures. The intent was to categorize responses by gender and age concerning the survey instrument. A completed discussion and analysis of all data is further discussed in Chapter 4.

I considered one area of investigation: to explore providers' knowledge, attitudes and utilization patterns of the new NIA AD protocol investigating provider perceptions and opinions regarding the feasibility of incorporating the new NIA AD criteria recommended by the NIA and Alzheimer's Association through responses to the two primary research questions and discussed next.

Research Questions and Hypotheses

Research Question 1: Are a physician's background characteristics and knowledge associated with the physician's use of the National Institute on Aging (NIA) criteria for the detection of Alzheimer's disease (AD)?

> *Subquestion 1A*: Is the number of years since a physician graduated from medical school associated with that physician's use of the NIA criteria for the detection of AD?

$H_0$1A: The number of years since a physician graduated from medical school is not associated with that physician's use of the NIA criteria for the detection of AD.

H_a1A: The number of years since a physician graduated from medical school is associated with that physician's use of the NIA criteria for the detection of AD.

Subquestion 1B: Is a physician's area of specialty associated with that physician's use of the NIA criteria for the detection of AD?

$H_0$1B: A physician's area of specialty is not associated with that physician's use of the NIA criteria for the detection of AD.

H_a1B: A physician's area of specialty is associated with that physician's use of the NIA criteria for the detection of AD.

Subquestion 1C: Is the percentage of patients over the age of 60 years in a physician's practice associated with that physician's use of the NIA criteria for the detection of AD?

$H_0$1C: The percentage of patients over the age of 60 years in a physician's practice is not associated with that physician's use of the NIA criteria for the detection of AD.

H_a1C: The percentage of patients over the age of 60 years in a physician's practice is associated with that physician's use of the NIA criteria for the detection of AD.

Subquestion 1D: Is a physician's gender associated with that physician's use of the NIA criteria for the detection of AD?

$H_0$1D: A physician's gender is not associated with that physician's use of the NIA criteria for the detection of AD.

H_a1D: A physician's gender is associated with that physician's use of the NIA criteria for the detection of AD.

Subquestion 1E: Is a physician's age associated with that physician's use of the NIA criteria for the detection of AD?

$H_0$1E: A physician's age is not associated with that physician's use of the NIA criteria for the detection of AD.

H_a1E: A physician's age is associated with that physician's use of the NIA criteria for the detection of AD.

Subquestion 1F: Is a physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, associated with that physician's use of the NIA criteria for the detection of AD?

$H_0$1F: A physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, is not associated with the physician's use of the NIA criteria for the detection of AD.

H_a1F: A physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, is associated with the physician's use of the NIA criteria for the detection of AD.

Research Question 2: Are a physician's background characteristics and knowledge associated with the physician's intention to use the National Institute on Aging (NIA) criteria for the detection of Alzheimer's disease (AD)?

Subquestion 2A: Is the number of years since a physician graduated from medical school associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0$2A: The number of years since a physician graduated from medical school is not associated with that physician's intention to use the NIA criteria for the detection of AD.

H_a2A: The number of years since a physician graduated from medical school is associated with that physician's intention to use the NIA criteria for the detection of AD.

Subquestion 2B: Is a physician's area of specialty associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0$2B: A physician's area of specialty is not associated with that physician's intention to use the NIA criteria for the detection of AD.

H_a2B: A physician's area of specialty is associated with that physician's intention to use the NIA criteria for the detection of AD.

Subquestion 2C: Is the percentage of patients over the age of 60 years in a physician's practice associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0$2C: The percentage of patients over the age of 60 years in a physician's practice is not associated with that physician's intention to use the NIA criteria for the detection of AD.

H_a2C: The percentage of patients over the age of 60 years in a physician's practice is associated with that physician's intention to use the NIA criteria for the detection of AD.

Subquestion 2D: Is a physician's gender associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0$2D: A physician's gender is not associated with that physician's intention to use the NIA criteria for the detection of AD.

H_a2D: A physician's gender is associated with that physician's intention to use the NIA criteria for the detection of AD.

Subquestion 2E: Is a physician's age associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0$2E: A physician's age is not associated with that physician's intention to use the NIA criteria for the detection of AD.

H_a2E: A physician's age is associated with that physician's intention to use the NIA criteria for the detection of AD.

Subquestion 2F: Is a physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0$2F: A physician's knowledge about AD, as indicated by his or her

performance on the Alzheimer's Disease Knowledge Scale, is not

associated with the physician's intention to use the NIA criteria for the

detection of AD.

H_a2F: A physician's knowledge about AD, as indicated by his or her

performance on the Alzheimer's Disease Knowledge Scale, is associated

with the physician's intention to use the NIA criteria for the detection of

AD.

Pilot Study

I attempted to get four subject matter experts to serve as my expert panel and to

review then comment on the pilot study. The expert panel members were physicians

meeting the same qualifications described in Appendix B. The purpose of the expert

panel served as a checks-and-balances mechanism for the survey instrument before

conducting the pilot study.

I conducted a pilot study to ensure that physicians understood the questions, to

verify the clarity of the question(s), and to check the cohesion/sequencing of the

questions. The number of participants needed for the pilot study is estimated at between

three and five. The respondents were asked to provide their feedback as part of their

instructions. For example, the respondents were asked to answer each question as though

they were answering the survey.

Respondents were asked to provide feedback to each question and invited to

provide general comments about the survey itself at the conclusion of the pilot survey.

Comments from the pilot study were then evaluated and considered for incorporation when and where indicated. The pilot study will not validate the actual survey instrument. Rather, the pilot study provided an opportunity to make refinements based upon respondent feedback. The pilot study was deployed in a similar fashion as the actual survey instrument in the following sequence.

To begin, invitations to participate in the pilot study were sent to approximately three to five candidates. In the invitation, I asked potential participants to complete the pilot study and to provide feedback. The specific feedback sought from the pilot study respondents related to the clarity of the questions, respondents' understanding of the questions and available responses, and the sequencing of the survey questions.

A reasonable expectation was that some candidates may not have the time or strong enough interest to complete all of the steps necessary to complete the pilot study. If two to five respondents complete the pilot study, there may be enough feedback to address issues such as sequencing, clarity, and overall understanding of the instrument. The pilot study respondents were tentatively identified as three physicians willing to assist pro bono.

Once three to five strong candidates were identified by the initial invitation, they received the pilot survey with instructions to answer each question as though they were answering the actual survey instrument. Respondents were asked to provide feedback to each question and invited to provide general comments about the survey itself at the conclusion of the pilot survey. Respondents to the pilot survey were then asked to return their completed survey instrument.

I evaluated feedback from the pilot survey responses and received no indications to make any corrections to the survey. Consequently, there were no changes made or recommended and I shared this information with the research department at Walden University. I requested permission to contact the survey pool to begin my survey and received approval from Walden University (add the approval number here—unless it's already been given elsewhere). The respondents from the pilot study were included in the survey pool.

<div align="center">**Instrumentation**</div>

A combination of questions from this research discussed in Appendix B and the addition of 30 questions from the AKDS (Carpenter et al., 2008) in totality served as the backbone of this survey instrument. Permission to use the AKDS was received as seen in the correspondence in Appendix A. The AKDS is well documented for assessing respondent's knowledge of AD. The additional 30 questions assisted in assessing respondent's knowledge of AD and added statistical value as related to Research Question 6.

Carpenter et al. (2008) revised and increased the ADKS sensitivity to accurately reflect current understanding of AD. Permission was sought and received from Carpenter to use the 30 question ADKS within the scope of the research herein (see Appendix A). The appropriateness of the 30-question survey in combination with this exploration may further advance current knowledge of AD and possibly advance the benefits of early AD diagnosis.

Carpenter et al. (2008) stated that an analysis of the psychometric properties of

the ADKS indicate the scale has enough statistical sensitivity for reliability and validity.

In the development of the ADKS, the research was conducted specifically to develop a

survey instrument. As such, the population selected was chosen to validate the 21question

survey instrument for Carpenter's research and subsequent development of one

instrument with thirty questions. Unlike Carpenter's ADKS survey, which used a random

half of the ($n = 384$) initial respondents and reduced the survey population to ($n = 26$) for

the pilot study (Carpenter et al., 2008), I intend to use all of the data received after the

data are cleaned. According to Carpenter et al. (2008), the ADKS was proctored twice to

40 respondents and ranged in age from 22 to 87 years ($M = 48.9$ years, $SD = 21.2$), and

their scores on the ADKS ranged from 19 to 30 ($M = 24.2$, $SD = 2.4$), indicating

variability in the respondent's knowledge about AD (Carpenter et al., 2008). The test-

retest interval ranged from 2 to 50 hr ($M = 20.4$, $SD = 15.9$), and the test-retest reliability

coefficient was .81, $p < .001$, indicating appropriate test-retest reliability (Carpenter et al.,

2008).

Carpenter et al. (2008) stated that validity was confirmed for the ADKS by

calculating data from performance on the ADKS and ratings of self-reported knowledge

about AD from the respondent pool. Data from specific groups/subgroups were

significant, that is, for dementia caregivers, $r = .46$; for AD professionals, $r = .39$; for

older adults without cognitive impairment, $r = .41$; and for undergraduates, $r = 20$

(Carpenter et al., 2008). Consequently, respondents do have some

understanding/knowledge of AD (Carpenter et al., 2008). The ADKS was used in other

applications to assist in training and the development of educational intervention

programs (Carpenter et al., 2008).

Data Analysis

Data was analyzed using IBM SPSS Statistics 21. Completed surveys were evaluated and screened for completeness. Incomplete surveys were eliminated from the overall survey results. I conducted a bivariate linear regression analysis on selected independent variables and the outcome/dependent variables. I selected independent variables based on the literature and which variables hypothesized may be related to the outcome. The rationale for selecting specific independent and/or covariate variables as discussed in Chapter 2 suggested a possible independent or dependent relationship within the six research questions which may identify why physicians will or will not use the NIA protocol for the early detection of AD (Wenger et al., 2009).

For example, one research question examines years in practice might be associated with the use or likely use of the protocol, and then I ran that analysis and evaluated the data as possible strong predictors. I did this for several independent variables. Then I selected the top variables with the highest statistical association or value and ran the analysis in a model together to see if together or a combination of them gives a stronger value. Next, I ran a multivariate regression analysis on my top independent variables and my outcomes. After running combinations of these variables, I evaluated the data to determine if I get a strong association value. After running various combinations, I tried to identify and suggest a combination, which showed the strongest association to potential predictors. Unfortunately, there were no significant combinations to further report results from the multivariate analysis and terminated the multivariate

analysis. I will present my findings from the bivariate analysis in Chapter 4 and discuss the implications of the findings in Chapter 5 in detail.

Threats to Validity

Consideration for both internal and external validity was evaluated. A plausible internal threat to internal validity was examined regarding the selection of variables. The expert panel and the pilot study evaluated the selection criteria to both expose and recommend solutions for correction. A possible threat to statistical conclusion lied in part with the uncertainty of reaching the totality of expected responses to the survey instrument. The approach taken to achieve successful completion of statistical analysis was achieved by conducting a Priori Power analysis. The Priori Power analysis mathematically calculated a minimal statistical sensitivity rate needed to achieve significant value for the study. The number needed is 97 respondents. At this time, I know of no other researcher exploring a similar topic and know of any existing threats to external validity.

There are several strengths to the current study. The ADKS originally published by Dieckmann et al. in 1988 consisted of a 30-item multiple-choice tool to evaluate what respondents know about AD. Since then, the ADKS has been used throughout research endeavors about AD with specific consideration for both dependent variables (e.g., Sullivan & O'Conor, 2011) and independent variables (e.g., Carpenter et al., 2008; Proctor, Martin, & Hewison, 2002). Since 1988 and to the present time, much has been learned and published about AD (Carpenter et al., 2008). The ADKS does not account for current knowledge of AD today because of the advancements in testing and knowledge

about AD. However, the ADKS was developed to address what was then currently known in about AD in 2008 and was considered up to date (Carpenter et al., 2008). Carpenter et al. acknowledged some internal consistency reliability being low and attributed it to the true/false response format and relatively high item difficulty indexes resulting in lower variances. Whereas internal threats posed similar issues again because the data from the ADKS study have not been validated (Carpenter et al., 2008).

Ethical consideration were undertaken to ensure Institutional Review Board (IRB) application was submitted and approved, consensus from my committee and University Research Review was achieved, and all documentation was either emailed or faxed to the IRB. Ethical consideration for survey participants was taken. Appendix B provides an outline of the online survey beginning with prequalifying questions. If the participant does not meet the inclusion criteria for the study, they were sent to an exit screen with a hyperlink to where they may learn more about the newly released NIA AD criteria. I completed the NIH Office of Extramural Research Protecting Human Research training in preparation of deploying my survey instrument (Certification of training Number: 1153705) as seen in Appendix C.

The participant must acknowledge they are aware of and have receipt of information for the informed consent before entering the survey. Participants may exit the survey at any time and were presented with an exit screen with a hyperlink to where they may learn more about the newly released NIA AD criteria. Participants' information collected from the survey instrument and responses were encoded into an Excel spreadsheet that was then password protected. All survey data was backed up, virus

protected, password protected, and stored on password encrypted external hard drive. All collected information and results from the survey instrument were encoded to protect respondents and to provide anonymity. All data were accessible via a secured and password protected account and accessed by the researcher and research committee. The data will be archived after 5 years. In my job, there are no conflicts of interest. I have no affiliations to any research company, group, and/or individual.

Summary

In this chapter I addressed the approach this research utilized to answer the primary research question. I will explore physicians' knowledge, attitudes, and behaviors toward the NIA AD new protocols. In addition, in this chapter I discussed the research design, rationale, methodology, and threats to validity. In the following chapter, Chapter 4 the research data is presented.

Chapter 4: Results

Introduction

The purpose of this study was to explore the relationship between six independent variables and two dependent variables. The independent variables were: the number of years since graduating from medical school, physicians' area of specialty, percentage of patients aged 60 and older, physicians' age, physicians' gender, and physicians' knowledge of AD. The two dependent variables were (a) current use of the NIA protocols and (b) intention to use the NIA protocol. This is how they appear in RQ1 and RQ2:

Research Question 1: Are a physician's background characteristics and knowledge associated with the physician's use of the National Institute on Aging (NIA) criteria for the detection of Alzheimer's disease (AD).

Research Question 2: Are a physician's background characteristics and knowledge associated with the physician's intention to use the National Institute on Aging (NIA) criteria for the detection of Alzheimer's disease (AD).

I examined the associations between the variables using a quantitative, correlational research design, as described in Chapter 3. This chapter also details the data analysis, such as descriptive statistics, univariate and bivariate analyses, as well as outcomes from each detailed analysis performed. I will discuss the expert panel review, the pilot study, data collection, characteristics of the study population, details of analysis, and results, followed by a detailed discussion of each of the two research questions.

Expert Panel and Pilot Study

Before launching my pilot study and during the development of my survey, I sought the expertise and opinions of two clinicians, Dr. Amy Bader and Dr. Joseph Provenzano. My purpose in asking for their opinions was to gain insight into the pilot study process and eventually to obtain consensus validity of the full survey instrument. Neither Dr. Bader nor Dr. Provenzno participated further after providing their initial comments in serving as my expert panel review committee. Neither of them suggested changes and had similar comments that the invitation was easy to follow and the survey was easy to complete. I reported my findings to my committee members and to the Walden University Institutional Review Board. Subsequently, I was allowed to conduct my pilot study (IRB approval number 03-10-14-011114).

Participants in the pilot study included four subject matter experts, physicians who were similar to the participants for the main study. The physicians who participated in the pilot study met the same qualifications and inclusion criteria for the study as described in Appendix B. The pilot study provided an opportunity to make any changes or refinements to the survey and/or the data collection process before launching the main study.

Two of the four participants did not respond. The other two participants completed the online survey with no problems and indicated no changes were necessary to the survey. Two participants had no suggestions for improvement and responded the same, "no changes," indicating they had reviewed the pilot study contents, had no problems understanding the survey questions, and had no additional comments for improvement. I shared these initial findings with my committee and the Walden

University and requested permission to conduct the main study. I was granted full permission to proceed with my data collection process. Walden University's approval number for this study is 03-10-14-0111148 expiring March 9, 2015. I did not include the respondents from the pilot study in the survey pool, nor were they invited to participate in the actual online survey instrument.

Data Collection

Qualtrics online statistical software was used to build my survey instrument, then securely host the online survey, and subsequently perform quantitative analysis through my selected criterion. A contact at a large medical facility in Stanislaus County, California assisted me by sending 900 invitations via a fax blast to their members that invited them to participate in my online survey. The survey instrument was deployed online on March 19, 2014 and was closed on September 25, 2014 (six months and six days). After screening potential candidates for eligibility to participate (described in Chapter 3), study participants completed the informed consent process, answered the survey questions, and submitted their responses electronically. I expected to meet my minimum sample size within 90 days; however, because of low participation numbers (N = 17) I consulted with my contact at the large medical facility, my committee, and the Walden Institutional Review Board (IRB). I requested an extension of 90 additional days to collect additional data. During this extension period, I was able to collect only 42 additional surveys. I consulted again with my contact at the large medical facility, my committee, and Walden's IRB committee and requested a second extension for data collection. Additionally, I took the advice from my second committee member Dr. Stoodt

and expanded my survey collection area over to the next closest county. I was more purposeful in my approach and sent invitations with the online survey to specific organizations with similar participant criteria within San Joaquin County. The new survey base included agencies located within San Joaquin County, California and added additional 30 respondents to my pool for a grand 89 respondents.

My efforts to achieve the minimum sample size began with a population of ($N =$ 900) and expanded to ($N =$ 2,700) potential participants, unfortunately, my efforts were not successful in reaching the minimum sample size for this study. My contacts within both counties sent each potential participant the initial invitation, which included the online survey link and two additional reminders to complete the survey. In spite of my efforts to recruit additional participants, I collected 89 surveys of which 17 were disqualified because they were administrators and did not meet the inclusion criteria for my study. Additionally, 18 other surveys were removed for due to incomplete answers with too much missing data to compute any research variables. I consulted with my committee members and the College of Health Sciences research coordinator, we decided to suspend participant recruitment because of constraints of time and resources, and established sufficient good faith effort was applied for participant recruitment. I received approval to proceed directly to data analysis and interpretation given my concerted efforts at trying to achieve the minimum sample size, and realizing that findings involved required cautious interpretation given the reduced power of the study to detect an effect. The Bonferroni adjustment is recognized to reduce the risk of type I error rates, also known as false positives. Furthermore, the Bonferroni adjustment is an acceptable

mathematical adjustment, commonly used by Epidemiologists, that provides valid and

reliable statistical data and effect power to identify type I errors (Bender & Lange, 2001).

While a Bonferroni adjustment is unnecessary with regard to sample size and p values

and the Holm calculation method, also used by Epidemiologists for other studies, it may

be more suitable for smaller sample statistical inferences (Aickin & Gensler, 1996). I

decided to use and apply the Bonferroni adjustment to my data set based upon the

consistent research findings on the topic of Bonferroni adjustments and the

appropriateness for application to my findings. The data collection remained true to the

plan as discussed in Chapter 3 and no discrepancies were further noted. In Chapter 5, I

will discuss in detail recommendations for future researchers interested in conducting

research with similar study subjects as this dissertation. I downloaded the final data to my

computer for analysis. I will discuss my results next.

Results

Characteristics of the Study Population

Again, I evaluated specific focused area: providers' knowledge, attitudes and

utilization patterns of the new NIA AD protocol examining provider perceptions and

opinions regarding the feasibility of incorporating the new NIA AD criteria

recommended by the NIA and Alzheimer's Association through responses to two primary

research questions. Because of the low return rate, both participants that were responsible

for diagnosing Alzheimer's disease and those who were not were included in the study.

Findings from the overall sample were compared with those from the sample of eligible

participants to confirm the findings. The overall sample consisted of 55 participants, while the subset of qualified individuals consisted of 19 of the overall 55.

Overall sample. Within the overall sample, the vast majority of participants predominantly practiced in Stanislaus County or San Joaquin County (54, or 98%). There were 22 physicians and 33 nurses providing completed surveys. Twenty respondents (36%) indicated they were responsible for making a diagnosis of AD. A majority of my respondents (38, or 69%) was not board certified. Of those that responded (17, or 31%) the 17 participants responding to the area of specialty not all could be grouped into similar categories because respondent's did not further identify their area, although respondents were given the opportunity with option "c" as other to fill in their specialty did not. For example, responses could have been nurse practitioner, non-NP, LPN, etc.

The majority of the overall sample was not responsible for diagnosing Alzheimer's patients within their role in the healthcare system (35, or 64%). The respondents included physicians, nurses, and nurse practitioners and as such, I assumed they had existing training or knowledge to be able to spot early signs of AD within the limits of their clinical practice. Twenty-two respondents (40%) were aware and 32 (58%) were not aware of the new NIA protocols. Slightly more participants were female (33, or 60%) than male (22, or 40%). Most participants were not board certified (38, or 69%). The majority of participants did indicate they did not use the NIA criteria to diagnose Alzheimer's disease (46, or 85%). More than half the respondents indicated they did not intend to use NIA criteria in the next 12 months (27, or 54%). Seventeen respondents indicated they were board certified, however, not all of the respondents indicated their

specialty as those that did and identified passing boards as a gerontologist or nurse

practitioner.

Of those respondents, one reported being a gerontologist; the others were board

certified or nurse practitioners. Regarding the knowledge assessment, scores ranged from

0 to 30 as reported from my from the ADKS survey portion of my survey. The sample's

scores on this assessment ranged from 13 to 28, indicating none of the participants had

100% correct on this assessment; the maximum score was 28, or 93%. However, the

average score was 21.31, which corresponded with 71% correct. The standard deviation

of 2.79 indicated that much of the sample was clustered between the scores of 62%

correct to 80% correct. The average score of 71% indicates respondents knowledge of

AD may be lacking and thus provide an indicator for more AD training for healthcare

providers. Table 7 presents frequencies and percentages for selected nominal variables.

Table 7

Frequencies and Percentages for Selected Nominal Variables (N = 55)

Variables	*n*	%
Responsible for Alzheimer's diagnosis		
No	35	64
Yes	20	36
Predominant county of practice		
Stanislaus or San Joaquin County	54	98
Tuolumne County	1	2
Gender		
Female	33	60
Male	22	40
Board certified/"specialty"		
No	38	69
Yes	17	31
Currently used NIA Criteria		

No	46	85
Yes	8	15

Note. Not all respondents answered questions relating to currently used and intend to use NIA criteria. Due to rounding error, percentages may not add up to 100.

Participants in the overall sample ranged in age from 24 to 80, with an average observed age of 51.02 years (*SD* = 13.72). Participants had graduated between 0 and 56 years before data collection, with an average length of 24.44 years since graduation (*SD* = 15.16). Participants reported the proportion of their patients who were older than 60 ranged between 0–100%; on average, 36.91% of participants' patients were over the age of 60 (*SD* = 27.53). Participants were also assessed for knowledge regarding Alzheimer's disease using the ADKS, and knowledge scores fell between 13.00 and 28.00. A perfect score was not achieved representing 30/30 questions answered correctly. The scores indicated a low knowledge of AD. The average score for the gathered sample was 21.31 (*SD* = 2.79). Table 8 presents means and standard deviations for continuous variables evaluating data from 55 completed surveys.

Table 8

Means and Standard Deviations for Selected Continuous Variables (N = 55)

Variable	*M*	*SD*
Age	51.02	13.72
Years Since Graduating	24.44	15.16
Percent of Patients Older than 60	36.91	27.53
Knowledge [a]	21.31	2.79

Note. Not all respondents answered questions relating to age, years since graduation, percent of patients older than 60, and knowledge.
[a]Knowledge was assessed using the correct results from the Alzheimer's disease knowledge test used in the survey with 30 True/False responses

Subset data. Of the 20 who responded that they were legally responsible for diagnosing Alzheimer's disease, one responded that they were an RN, and was excluded from the subset. Of those who provided their job specialty, one was a primary care physician, one was an ophthalmologist, and one was an anesthesiologist. Demographic information for the final subset of 19 (minus the RN) responsible for Alzheimer's diagnosis is presented in Table 8 below. A majority of this subset was from Stanislaus or Joaquin County (18, or 95%) and were male (11, or 58%). More of this subset was not board certified (13, or 68%) than were certified (6, or 32%). In addition, most did not use the NIA criteria at the time of data collection (14, or 74%). Demographic information for the subset of participants who were responsible for Alzheimer's diagnosis are presented in Table 9.

Table 9

Frequencies and Percentages for Subset Sample (N = 19)

Variables	*n*	*%*
Predominant county of practice		
Stanislaus or San Joaquin County	18	95
Tuolumne County	1	5
Gender		
Female	8	42
Male	11	58
Board Certified		
No	13	68
Yes	6	32
Currently use NIA Criteria		
No	14	74
Yes	5	26

Note. Not all respondents answered questions relating to currently use and intend to use NIA criteria. Due to rounding error, percentages may not add up to 100.

The subset of participants who were responsible for Alzheimer's diagnosis ranged in age from 28 to 79, with an average observed age of 50.68 years (*SD* = 13.26). These participants had graduated between 1 and 50 years before data collection, with an average length of 21.74 years since graduation (*SD* = 14.22). Participants reported the proportion of their patients who were older than 60 ranged between 20–95%; on average, 42.25% of these participants' patients were over the age of 60 (*SD* = 18.95%). Participants were also assessed for knowledge regarding Alzheimer's disease using the ADKS, and knowledge scores fell between 14.00 and 25.00. A perfect score was not achieved representing 30/30 questions answered correctly. The scores indicated a low knowledge of AD. The average score for the gathered sample was 21.55 (*SD* = 2.39). Table 10 presents means and

standard deviations for continuous variables evaluating the subset of participants who

were responsible for Alzheimer's diagnosis.

Table 10

Means and Standard Deviations for Subset's Continuous Variables (N = 19)

Variable	*M*	*SD*
Age	50.68	13.26
Years Since Graduating	21.74	14.22
Percent of Patients Older than 60	42.25	18.95
Knowledge[a]	21.55	2.39

Note. Not all respondents answered questions relating to age, years since graduation, percent of patients older than 60, and knowledge.
[a]Knowledge was assessed using the correct results from the Alzheimer's disease knowledge test used in the survey with 30 True/False responses

I collected data using an anonymous online survey. The variables for the analysis

were obtained through the categorical responses of the participants from the online

survey instrument. I categorized the variables in nature from the multiple choice

responses collected from the survey instrument. Logistic regressions were conducted

separately on each subset of variables. For each research question, a bivariate analysis

was conducted using chi square analysis of the six covariates.

The following sensitivities for my data analysis were set in place as discussed in

Chapter 3. As outlined in Chapter 3, the individual predictor and total minimum sample

size were calculated using the G*Power 3.1 sample size calculator (Faul, Erdfelder,

Buchner, & Lang, 2009). I selected a one-tailed test, because a one-tailed test provided

more power than a two-tailed test and because I examined multiple factors (Faul et al.,

2009). I rejected using a two-tailed test because responses to my survey questions were

mostly dichotomous. Based on these calculations, and assuming a medium effect size ($f^2 = .15$) and assuming a generally accepted power of .80, approximately 97 participants are required to discern significant relationships at the $\alpha = .05$ level.

After concluding the analysis, I conducted a post-hoc power analysis to determine the power of each analysis to successfully reject the null hypothesis when it is in fact false. Based on an alpha of .05, an achieved sample size of 55, and a normal distribution, power for the analyses to inform research question one ranged from .06 to .23. Using the same parameters, the power for the analyses to inform research question two ranged from .05 to .67.

Results for the Bivariate Analyses

Research Question 1

Are a physician's background characteristics and knowledge associated with the physician's use of the National Institute on Aging (NIA) criteria for the detection of Alzheimer's disease (AD)?

To examine the relationship between background characteristics and the use of NIA criteria for the detection of Alzheimer's disease, six simple logistic regressions were first assessed through hypothesis testing. The resulting hypotheses were:

Subquestion 1A: Is the number of years since a physician graduated from medical school associated with that physician's use of the NIA criteria for the detection of AD?

$H_0$1A: The number of years since a physician graduated from medical

school is not associated with that physician's use of the NIA criteria for

the detection of AD.

H_a1A: The number of years since a physician graduated from medical

school is associated with that physician's use of the NIA criteria for the

detection of AD.

Subquestion 1B: Is a physician's area of specialty associated with that physician's

use of the NIA criteria for the detection of AD?

$H_0$1B: A physician's area of specialty is not associated with that

physician's use of the NIA criteria for the detection of AD.

H_a1B: A physician's area of specialty is associated with that physician's

use of the NIA criteria for the detection of AD.

Subquestion 1C: Is the percentage of patients older than 60 in a physician's

practice associated with that physician's use of the NIA criteria for the detection

of AD?

$H_0$1C: The percentage of patients older than 60 in a physician's practice is

not associated with that physician's use of the NIA criteria for the

detection of AD.

H_a1C: The percentage of patients older than 60 in a physician's practice is

associated with that physician's use of the NIA criteria for the detection of

AD.

Subquestion 1D: Is a physician's gender associated with that physician's use of the NIA criteria for the detection of AD?

$H_0$1D: A physician's gender is not associated with that physician's use of the NIA criteria for the detection of AD.

H_a1D: A physician's gender is associated with that physician's use of the NIA criteria for the detection of AD.

Subquestion 1E: Is a physician's age associated with that physician's use of the NIA criteria for the detection of AD?

$H_0$1E: A physician's age is not associated with that physician's use of the NIA criteria for the detection of AD.

H_a1E: A physician's age is associated with that physician's use of the NIA criteria for the detection of AD.

Subquestion 1F: Is a physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, associated with that physician's use of the NIA criteria for the detection of AD?

$H_0$1F: A physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, is not associated with that physician's use of the NIA criteria for the detection of AD.

H_a1F: A physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, is associated with that physician's use of the NIA criteria for the detection of AD.

Because six analyses were conducted on the same dependent variable (use of the NIA criteria for AD detection), a Bonferroni correction was applied to the resulting p values. The critical alpha was divided by the number of times the analyses were conducted on the dependent variable, and resulted in a final critical alpha of (.05/6), or .008. Thus, significance was determined for any model or individual predictor if the corresponding p value was at or below .008.

Years since Graduation

First, a logistic regression assessed whether years since graduation predicted NIA use. The use of NIA was coded as 0 = No and 1 = Yes. The results of the logistic regression did not show a significant model, $\chi^2(1) = 0.51$, $p = .475$, Nagelkerke $R^2 = .02$. This suggests that years since graduation did not predict NIA use. Table 11 presents results of the logistic regression. These results were replicated using the subset of participants who were responsible for diagnosing Alzheimer's disease ($\chi^2(1) = 2.30$, $p = .130$, Nagelkerke $R^2 = .16$).

Specialty

A logistic regression was conducted to assess if certification "specialty" predicted NIA use. NIA use was coded as 0 = No and 1 = Yes. The results of the logistic regression did not show significance in the full model, $\chi^2(1) = 0.15$, $p = .695$, Nagelkerke $R^2 = .01$. Note: that the individual predictor can have a slightly different p value. This suggests that certification did not predict NIA use. Table 11 presents results of the logistic regression. These results were replicated using the subset of participants who were responsible for diagnosing Alzheimer's disease ($\chi^2(1) = 0.83$, $p = .363$, Nagelkerke $R^2 = .06$).

Percent of Patients Over 60

A logistic regression then assessed if the percent of patients older than 60 predicted the use of NIA criteria. NIA use was coded as 0 = No and 1 = Yes. The results of the logistic regression did not show a significant model, $\chi^2(1) = 1.86$, $p = .173$, Nagelkerke $R^2 = .06$. Note: that the individual predictor can have a slightly different p value. This suggests that the percent of patients older than 60 did not predict NIA use. Table 11 presents results of the logistic regression. These results were replicated using the subset of participants who were responsible for diagnosing Alzheimer's disease ($\chi^2(1) = 0.47$, $p = .492$, Nagelkerke $R^2 = .03$).

Gender

The following logistic regression assessed if gender predicted NIA use. NIA use was coded as 0 = No and 1 = Yes. Since gender was a nominal variable, it was dummy-coded to have female as the reference category. The results of the logistic regression did not show a significant model, $\chi^2(1) = 0.04$, $p = .839$, Nagelkerke $R^2 = .00$. This suggests that gender did not predict NIA use. Table 11 presents results of the logistic regression. These results were replicated using the subset of participants who were responsible for diagnosing Alzheimer's disease ($\chi^2(1) = 2.54$, $p = .112$, Nagelkerke $R^2 = .17$).

Age

Next, a logistic regression assessed if age predicted NIA use. NIA use was coded as 0 = No and 1 = Yes. The results of the logistic regression did not show a significant model, $\chi^2(1) = 0.67$, $p = .414$, Nagelkerke $R^2 = .02$. This suggests that age did not predict NIA use. Table 11 presents results of the logistic regression. These results were

replicated using the subset of participants who were responsible for diagnosing Alzheimer's disease ($\chi^2(1) = 1.63$, $p = .201$, Nagelkerke $R^2 = .12$).

Knowledge

The final logistic regression for Research Question 1 assessed if knowledge predicted NIA use. NIA use was coded as 0 = No and 1 = Yes. The results of the logistic regression did not show a significant model, $\chi^2(1) = 2.53$, $p = .112$, Nagelkerke $R^2 = .08$. This suggests that knowledge of Alzheimer's did not predict the use of NIA criteria. Table 11 presents results of the logistic regression.

This analysis was then conducted using the subset of participants who were responsible for diagnosing Alzheimer's disease. Results of this analysis suggested a significant relationship between knowledge of Alzheimer's, and the use of NIA criteria to diagnose Alzheimer's ($\chi^2(1) = 7.97$, $p = .005$, Nagelkerke $R^2 = .47$). The results suggested that approximately 47% of the variance in whether these participants used NIA criteria was accounted for by differences in their Knowledge of Alzheimer's. However, assessment of the individual predictor (knowledge) using the Wald statistic did not suggest that knowledge was significantly predictive of NIA use (Wald $z = 3.64$, $p = .056$). However, these findings are possibly due to the low sample size.

Table 11

Results for each Logistic Regression Predicting NIA Use

Source	B	SE	z	p	OR	95% CI for OR
Hypothesis A Years Since Graduating	0.02	0.03	0.71	.477	1.02	[0.97, 1.07]
Hypothesis B						

Certified (ref: not certified)	0.32	0.80	0.40	.692	1.37	[1.09, 1.44]
Hypothesis C						
Patients older than 60 under care of respondent	0.02	0.01	1.37	.171	1.02	[0.99, 1.05]
Hypothesis D						
Male (ref: female)	-0.16	0.79	-0.20	.840	0.85	-
Hypothesis E						
Age	0.02	0.03	0.81	.417	1.02	[0.97, 1.08]
Hypothesis F						
Knowledge	-0.21	0.13	-1.60	.110	0.81	[0.63, 1.05]

Note. Due to the high standard error, the 95% confidence interval could not be computed for gender.

Research Question 2

Are a physician's background characteristics and knowledge associated with the physician's intention to use the National Institute on Aging (NIA) criteria for the detection of Alzheimer's disease (AD)?

To examine the relationship between background characteristics and the use of NIA criteria for the detection of Alzheimer's disease, six simple logistic regressions were first assessed through hypothesis testing. The resulting hypotheses were:

Subquestion 2A: Is the number of years since a physician graduated from medical school associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0 2A$: The number of years since a physician graduated from medical school is not associated with that physician's intention to use the NIA criteria for the detection of AD.

$H_a 2A$: The number of years since a physician graduated from medical school is associated with that physician's intention to use the NIA criteria for the detection of AD.

Subquestion 2B: Is a physician's area of specialty associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0$2B: A physician's area of specialty is not associated with that physician's intention to use the NIA criteria for the detection of AD.

H_a2B: A physician's area of specialty is associated with that physician's intention to use the NIA criteria for the detection of AD.

Subquestion 2C: Is the percentage of patients older than 60 in a physician's practice associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0$2C: The percentage of patients older than 60 in a physician's practice is not associated with that physician's intention to use the NIA criteria for the detection of AD.

H_a2C: The percentage of patients older than 60 in a physician's practice is associated with that physician's intention to use the NIA criteria for the detection of AD.

Subquestion 2D: Is a physician's gender associated with that physician's intention to use the NIA criteria for the detection of AD?

$H_0$2D: A physician's gender is not associated with that physician's intention to use the NIA criteria for the detection of AD.

H_a2D: A physician's gender is associated with that physician's intention to use the NIA criteria for the detection of AD.

Subquestion 2E: Is a physician's age associated with that physician's intention to use the NIA criteria for the detection of AD?

> $H_0$2E: A physician's age is not associated with that physician's intention to use the NIA criteria for the detection of AD.

> H_a2E: A physician's age is associated with that physician's intention to use the NIA criteria for the detection of AD.

Subquestion 2F: Is a physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, associated with that physician's intention to use the NIA criteria for the detection of AD?

> $H_0$2F: A physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, is not associated with that physician's intention to use the NIA criteria for the detection of AD.

> H_a2F: A physician's knowledge about AD, as indicated by his or her performance on the Alzheimer's Disease Knowledge Scale, is associated with that physician's intention to use the NIA criteria for the detection of AD.

Years since Graduation

The first logistic regression assessed if years since graduation predicted Intent. Intent was coded as 0 = No and 1 = Yes. The results of the logistic regression did not show a significant model, $\chi^2(1) = 3.17$, $p = .075$, Nagelkerke $R^2 = .09$. This suggests that years since graduation did not predict Intent. Table 12 presents results of the logistic

regression. These results were replicated using the subset of participants who were responsible for diagnosing Alzheimer's disease ($\chi^2(1) = 0.47$, $p = .495$, Nagelkerke $R^2 = .04$).

Certification

A logistic regression then assessed if certification predicted Intent. Intent was coded as 0 = No and 1 = Yes. Since certification was a nominal variable, it was dummy-coded to have NO as the reference category (i.e., Yes = 1, No = 0). The results of the logistic regression did not show a significant model, $\chi^2(1) = 0.13$, $p = .724$, Nagelkerke $R^2 = .00$. This suggests that certification did not predict Intent. Table 12 presents results of the logistic regression. These results were replicated using the subset of participants who were responsible for diagnosing Alzheimer's disease ($\chi^2(1) = 0.22$, $p = .641$, Nagelkerke $R^2 = .02$).

Patients over 60

A logistic regression then assessed if percent of patients older than 60 predicted Intent. Intent was coded as 0 = No and 1 = Yes. The results of the logistic regression did not show a significant model, $\chi^2(1) = 0.32$, $p = .572$, Nagelkerke $R^2 = .01$. This suggests that the percent of patients older than 60 did not predict Intent. Table 12 presents results of the logistic regression. These results were replicated using the subset of participants who were responsible for diagnosing Alzheimer's disease ($\chi^2(1) = 0.00$, $p = .966$, Nagelkerke $R^2 = .00$).

Gender

The next binary logistic regression assessed if gender predicted Intent. Intent was coded as 0 = No and 1 = Yes. Since gender was a nominal variable, it was dummy-coded to have female as the reference category. The results of the logistic regression did not show a significant model, $\chi^2(1) = 1.82$, $p = .178$, Nagelkerke $R^2 = .05$. This suggests that gender did not predict Intent. Table 12 presents results of the logistic regression. This analysis was then conducted using the subset of participants who were responsible for diagnosing Alzheimer's disease ($\chi^2(1) = 4.97$, $p = .026$, Nagelkerke $R^2 = .35$), which did not indicate any relationship at the Bonferroni corrected alpha level of .008.

Age

A logistic regression next assessed if age predicted Intent. Intent was coded as 0 = No and 1 = Yes. The results of the logistic regression did not show a significant model, $\chi^2(1) = 0.02$, $p = .894$, Nagelkerke $R^2 = .00$. This suggests that age did not predict Intent. Table 20 presents results of the logistic regression. These results were replicated using the subset of participants who were responsible for diagnosing Alzheimer's disease ($\chi^2(1) = 0.25$, $p = .618$, Nagelkerke $R^2 = .02$).

Knowledge

The final logistic regression assessed if knowledge of Alzheimer's predicted Intent. Intent was coded as 0 = No and 1 = Yes. The results of the logistic regression did not show a significant model, $\chi^2(1) = 0.06$, $p = .800$, Nagelkerke $R^2 = .00$. This suggests that knowledge did not predict Intent. Table 12 presents results of the logistic regression.

These results were replicated using the subset of participants who were responsible for diagnosing Alzheimer's disease ($\chi^2(1) = 0.35$, $p = .556$, Nagelkerke $R^2 = .03$).

Table 12

Results for Each Logistic Regression Predicting Intent

Source	B	SE	z	p	OR	95% CI for OR
Hypothesis A						
Years Since Grad	-0.03	0.02	-1.71	.087	0.97	[0.93, 1.00]
Hypothesis B						
Certified (ref: not certified)	0.22	0.63	0.35	.724	1.25	-
Hypothesis C						
Patients Older than 60 under care of respondent	0.01	0.01	0.56	.573	1.01	[0.99, 1.03]
Hypothesis D						
Male (ref: female)	0.78	0.58	1.34	.181	2.18	-
Hypothesis E						
Age	-0.00	0.02	-0.13	.894	1.00	[0.96, 1.04]
Hypothesis F						
Knowledge	0.03	0.10	0.25	.800	1.03	[0.84, 1.25]

Note. Due to the high standard error, the 95% confidence interval could not be computed for certification or gender.

Summary

A complete analysis of the data provided over the course of six months was conducted as described in Chapter 3 first using a correlational and a bivariate analysis statistic to assess the data for possible correlation. Consequently, further analysis was conducted evaluating the data for possible bivariate and multivariate correlations. There was no statistical correlation using a multivariate analysis and determined no further reporting was indicated. My next step was to apply a Bonferroni correction as discussed in Chapters 3 and 4. I applied the Bonferroni correction for the original .05 alpha. The modeling was unable to provide enough statistical sensitivity to identify one or more

statistical correlations between physicians' background characteristics/AD knowledge and their use of and intention to use the NIA criteria. I will discuss my interpretation of the findings next in Chapter 5.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

Clinicians rely on a patient's history and physical examination when formulating their diagnoses. Clinicians often do not diagnose dementia during patient visits and approximately half of the patients with dementia symptoms ranging from mild to moderate have never received diagnosis of dementia or Alzheimer's disease (AD) from a clinician (USPSTF; as cited in Boustani, Peterson, Harris, & Lohr, 2003). Primary care clinicians need a screening test with measurable outcomes when constructing their patient diagnosis and treatment plans, one that could be used during a single office visit and correlated to the *DSM-IV-TR* (Boustani et al., 2003).

Still, a recent study recommends three such in office test for the early diagnosis of AD leading toward other AD tests such as the Clock Draw test (CDT, Jack et al., 2011). In office tests such as the Mini-Cog uses the components of the MMSE that include specifically the three-item recall, testing the person for the ability to recall three words after roughly 1 minute, and a CDT (Kamenski et al., 2009). Jack et al., (2011) identified a four-item recall test. Primary care clinicians need a screening test with measurable outcomes, which could be used during a single office encounter and correlated to the *DSM-IV-TR* (Boustani et al., 2003).

According to estimates (Christensen & Lin, 2007), there are over 5 million diagnosed cases of AD in the United States and that number could reach or exceed 15 million by 2050 according to studies indicating AD may be underreported for the actual numbers of reported cases of AD (Christensen & Lin,

2007). Furthermore, because AD may be underreported AD can be diagnosed in

the early stages of the disease within the primary care setting (Christensen & Lin,

2007 and Fearing et al. 2007). Additionally, the rates of AD diagnoses will

increase annually as the elderly population in the United States increases

(Christensen & Lin, 2007). Lindesay et al. (2010) reported that physicians still

use the word *senile dementia* when diagnosing a patient with AD-type dementia.

However, the current literature states that, to make an accurate diagnosis, an

autopsy must be performed and brain tissue examined under a microscope

(Christensen & Lin, 2007). In summary, because AD may go underreported, may

be misdiagnosed, and is not clearly defined as seen in the DSM-IV-TR then

additional research to choreograph medical terminology associated with the

diagnostic term "AD".

In this study I sought to understand how many physicians are aware of the new

NIA criteria and if they intend to use them in the future. I further examined physicians

patterns of use of the new NIA AD criteria. What is still lacking is consensus on the exact

symptoms of AD that GPs can use to diagnose early-, middle-, and late-stage AD in their

patients. No studies have been conducted exploring physicians use or willingness to use

the new NIA AD criteria (Jack et al., 2011).

The demographics used in this study did not result in one or more demographic

being statistically sensitive enough to predict which might predict future use of the new

NIA criteria. The lack of respondents and completed surveys affected my ability to

conduct a multivariate analysis as discussed in Chapter 3 and the overall results of my

survey despite tireless efforts to achieve the minimum sample size. Specific

demographics such as the number of years since graduating from medical school, area of

specialty, percentage of patients over age 60 years, physician gender, physician age, and

knowledge about AD, as indicated by performance on the ADKS were examined. The

framework for this chapter includes a discussion of the interpretation of the findings,

limitations of the study, recommendations for action, implications for social change, and

ends with the chapter conclusion. The purpose of this research investigated physician use

of the NIA AD protocol through a series of two primary research questions concerning

the relationship between various physician background characteristics and use of and

intention to use the NIA criteria for all-cause dementia and the early detection of

Alzheimer's disease. Next, I will present my interpretation of the findings.

Interpretation of the Findings

My interpretation of the key findings is presented with caution due to the limited

sample size being reported because the findings did not reach the minimum required for

any of the analyses to be statistically significant for a multivariate analysis. The results

were sound for a correlational and a bivariate analysis. The following discussion

represents my interpretation of my findings.

My statistical analysis indicated there are no independent indicators clearly

predicting if or when a physician will or will not use the NIA diagnostic criteria for

diagnosing a patient with AD. Likewise, the U.S. Preventive Services Task Force

(USPSTF; as cited in Boustani, Peterson, Harris, & Lohr, 2003) reported insufficient data

for offering a conclusive recommendation either for or against routinely screening

patients, aged 65 and over, with dementia symptoms. When examined separately none of

the six (A-F) hypothesized factors were related to the use of NIA criteria to diagnose

Alzheimer's disease. The six analyzed factors included years since graduation,

certification, percent of patients older than 60, gender, age, and knowledge about

Alzheimer's disease. The results for each bivariate analysis were not significant at the $\alpha =$

.05 level, or at the Bonferroni corrected level of $\alpha = .008$. As such, none of the analyses

could be used to describe the strength or direction of bivariate relationships between any

factor and the use of NIA criteria. The results from Chapter 4 confirms previous research

presented in Chapter 4 in that no one variable or combination of multivariables presented

a model to predict the use of the new NIA AD diagnostic protocol criteria. Additionally,

the small sample size greatly reduced the possibility of finding associations, which may

have been found in a multivariate environment if indeed there were some associations.

My descriptive findings demonstrated that the average score on the ADKS was

about 20–30 questions correct and that there was a wide range of scores. Also, when

examined separately, none of the six hypothesized factors were related to the intention to

use of NIA criteria to diagnose Alzheimer's disease or, relatedly, the intention to not use

NIA criteria. The six analyzed factors included years since graduation, certification,

percent of patients older than 60, gender, age, and knowledge about Alzheimer's disease.

The results for each bivariate analysis were not significant at the $\alpha = .05$ level, or at the

Bonferroni corrected level of $\alpha = .008$. As such, none of the analyses could be used to

describe the strength or direction of bivariate relationships between any factor and the

intent to use of NIA criteria in the future confirming the published literature, i.e.,

(USPSTF; as cited in Boustani, Peterson, Harris, & Lohr, 2003).

I examined all variables simultaneously. The goal of these analyses was to

determine if the full set of factors was able to significantly predict the use, or intent to use

NIA criteria. Though each variable was assessed independently, the inclusion of multiple

variables typically contributes to increased predictive ability in a regression model

(Pallant, 2010). As such, one model was conducted for each dependent variable (i.e., use

of NIA criteria and intention to use NIA criteria). Intention to use the NIA criteria was

assessed to examine RQ2,the intention to use.

I calculated my statistical analysis using a binary logistic regression model to

predict significan trelationships within the data collected from my survey instrument then

univariate to predict significant relationships within the data collected from my survey

instrument. Results from the univariate model and binary logistic regressions did not

indicate any significant relationship between the factors of interest and either the use of

NIA critieria or the intention to use NIA critiera. When I further evaluated the data using

a univariate model the data were non-significant at both the critical alpha of $\alpha = .05$.

When I applied the Bonferroni adjustment setting the alpha, $\alpha = .008$, my results

indicated the number of years since graduation, certification, percentage of patients older

than 60, gender, age, and knowledge of Alzheimer's disease were not significant

predictors. I used critial alpha of $\alpha = .05$ and also applied the Bonferroni correction alpha

of $\alpha = .008$ when I interpreted the results from the models. The statisical models

demonstrated no significant associations and no predictive relationships were found at

these levels in that the variables were non-significant for further interpretation and possible predictions.

Limitations of the Study

Results of this study should be interpreted with caution. Traditional caution for a binary logistc regression suggests that for each predictor variable, the sample should include responses from at least 10 participants with "yes" responses to the dependent variable, and 10 participants with "no" responses. For each simple binary logistic regression, only approximately 20 participants were necessary as a minimum, however, for the larger models in the multivariate analyses, up to 120 participants may have been necessary to determine statistical significance (Peduzzi et al., 1996). Other suggestions for sample size requirements, even those for simple binary regression, suggest up to 300 participants minimally (Hsieh, Block, & Larsen, 1998). The statistical models presented in Chapter 3 indicated a G*Power sample size of 97 was needed for a multivariate analysis and my final collection of survey respondants would have been 97 or greater. As discussed in previous chapters, a multivariate was not statistically supported with only 89 respondents. However, a Priori Power analysis was conducted and indicated a total sample size of 16 was required and 89 surveys were collected. After cleaning the data I removed 34 surveys the sample size. The 34 surveys were removed because they were not healthcare providers or did not provide completed surveys. My critieria for what constituted a completed survey filtered to ensure the respondent was a healthcare provider such as either a doctor or nurse and answered all of the survey questions. As

such, the reporting sample size of 55 participants may have been insufficient to determine significance where it did exist.

A clear limitation of this survey was that respondents did not clearly indicate they were a physican, indicate they were board certified and if so which board they had passed, or nurse and if a nurse what level of nursing degree they held, i.e., LPN, RN, or Nurse Practionier and of those 20 repondents they did not complete the entire survey. My survey was designed with filters to prescreen respondents at the onset of the survey based upon initial repsonses. For example, if a respondent answered they were a technician or administrator by profession they were automatically disqualified and exited the survey. However, if the respondent indicated they were either a physician or nurse by profession the online survey automatically advanced them to the next question. A better designed survey may have captured the actual number of actual physicians, type of physicians/area of practice, certification, and or specialty and or specific number of nurses indicating their specific nursing license/area of practice. This question had 17 positive responses. One respondent indicated she/he was a gerontologist, another optomitrist, and others were nurse practionioners.

However, one question within the survey did ask about one's advanced training, are you board certified and if so please indicate by writing in your response. Additionally, each of the demographic questions and subsequent questions allowed the respondent to "fill-in" or indicated an area for additional write in responses. Another limitation of the study involved external validity due to the utilization of a convenience, or non-random sample technique. A convenience sampling strategy was selected for this research.

Convenience sampling was selected because the sample was taken from one geographic area (two northern California counties). I am aware that findings from this study may not be applicable to other physicians in California, in other states and localities, as demographic factors may skew data in some unknown manner, however, I intentionally selected my six variables as they were supported by the literature review from studies presented in Chapter 2.

Recommendations for Action

An interesting outcome observed in Table 11 found in Chapter 4 regarding knowledge of AD—hypothesis F approached significance. The *beta* of (-0.21) predicts the opposite of the *p value.* In other words as the *p* value increases by one so should the beta—this is an anomaly requiring further research. This is interpreted as knowledge of AD increases the intent of using the New NIA AD diagnostic criteria decreases even after a Bonferroni corrected level of $\alpha = .008$ and counter intuitive. Furthermore, this discovery may correlate to the actual number of doctors and nurses completing my survey. My recommendation for future research is to examine this potential predictor in greater detail.

The results of my study advances the current knowledge for future studies examining which factors may influence the use of new diagnostic tools for diagnosing patients with early symptoms of AD and the implementation of the NIA AD criteria. Despite the limitations of a low response rate, new information is valuable for future researchers in that this study provides important and initial ground work for continued research. As mentioned in earlier chapters, no other research to date examined the

potential criteria which may predict physicians intention to use or not to use new diagnostic criterion for the early diagnosis of AD.

I advocate the following modifications for future researchers exploring the same topics as I. I would first address the need for increasing and obtaining more respondants to the survey instrument. I sought out several key personnel and for one reason or another they backed out. My recommendation is to work with key personnel that advocate the need for continuing research to advance knowledge on the three research questions presented herein. One might seek out multiple key advocates from three to five counties with similar demographics. Additionally, one might consider using a paper survey versus an online survey following a presentation on a topic such as new criteria for diagnosing AD. A pre-test and post test could successfully evaluate pre and post knowledge, attitudes, and behaviors for patients with AD and those attitudes and behaviors for paitents with AD. I would also revise the title of my survey to sound more inclusive of a wide range of eligible healthcare providers and remove the wording gerontoligist. Additionally, I would refine my demographic questions at the onset of the survey to inquire more detials about respondent's level of training, certification, and speciality degrees/boards.

Because there was such a low response rate to my survey instrument I would recommend future researchers continue this initial work to seek out which if any predictors can successfully predict when physicians' will or will not use the NIA diagnostic criteria. As continued research comes closer to discovering the etiology of AD one might presume therefore a diagnostic tool or tests will parallel the same discovery. I

would further recommend continued training on current diagnostic methodologies in the form of continuing education and in-service training. For example, a pretest on the subject of diagnostic criteria could be distributed to a group of attendees. The pretest could then be collected followed by a presentation regarding NIA diagnostic criteria for diagnosing AD. Following the presentation, one could then reassess the attendees and evaluate newfound knowledge, change in attitudes regarding AD, and evaluate a change in behaviors toward the new diagnostic criteria (Wright et al., 2011).

Additional research is recommended using the same survey instrument herein and build upon my findings to continually advance the discoveries elucidated. Additionally, future studies should strive for an increased sample size for greater statistical power analysis. Data from a larger respondent pool may provide clear evidence with which to predict physicians' knowledge, attitudes, and behaviors about AD criteria. While there is limited data from my study regarding providers knowledge, attitudes, and beheaviors of AD I would suggest one could possibly develop an intervention program involving a pretest, training on AD diagnostic criteria, and post test to assess learning outcomes (Davis, et al., 1999). The learning outcomes could then be assessed and matched with a training program and potentially linked to a policy and/or procedure implementing new AD diagnostic criteria. I would also recommend the use of Roger's diffusion of innovation theory to implement a change in policy and/or procedures within an organization. Rogers's (2003) diffusion of innovations (DOI) theory is appropriate to use for implementing change in knowledge. As previously recommended, a partnership with the NIA reference materials and a robust training program Roger's DOI model is

recommended for closing the gap in AD knowledge within an organization as discussed in Chapter 2.

I further recommend a study expanding the new knowledge herein to evaluate the source documents used by healthcare providers when making a diagnosis of AD. For example, exploration of physicians use of desktop references, training in medical school, specialty training, and or use of the International Classification of Diseases (ICD) and DSM-IV-TR is recommended. The use of the diagnostic term senile dementia used in the DSM IV falsely promotes the notion that dementia naturally occurs as one ages. Boustani et al. (2003), reported the many benefits of early detection of AD within a physicians' office and that following an interview and clinical examination by a physician could be accomplished within the guidelines of the DSM-IV-TR There is an established partnership with the NIA and the Alzheimer's Association, which published new criteria for diagnosing patients with dementia of the AD type symptoms almost 30 years ago. Additionally, respondents to my survey instrument are not fully aware of the new NIA AD protocols and updates. In addition, none of my respondents indicated which if any protocols they followed for making a diagnosis of AD and a topic for future researchers to explore. I reported in Table 7, 36% of my respondents were responsible for making an AD diagnosis and were unaware of the new NIA criteria.

What may be lacking is an alignment or collaboration between the current version/edition of the ICD, use of the current version/edition of the DSM, which physicians may reference to diagnose patients with AD and consistent guidelines for physicians to reference in their assessment of AD symptoms as discussed in Chapter 2. I

recommend an alignment between ICD, DSM, and NIA align terminology, definitions, and codes found in both the ICD and DSM with a future study to discover additional associations, benefits, and or correlations especially regarding AD.

Implications for Social Change

The key findings and recommendations for action presented here may have significant implications for social change. Healthcare providers need more training regarding AD symptoms, presentation of signs of AD, and earlier diagnosis to improve the diminishing lifespan of those afflicted with this deadly disease. , As presented in Chapter 2 and from the recommendation discussed in recommendations for Key Finding 3, physicians and the healthcare community at large need to develop consistent terminology for the various types of dementia and dementia of AD.

As such, the medical community could benefit from aligning their desktop reference and terminology to accurately describe, code, and reference AD. An alignment or collaboration is highly recommended between the current version/edition of the ICD and the current version/edition of the DSM, which physicians reference to diagnose patients with AD. The passé use of the diagnostic term senile dementia as used in the current edition DSM IV falsely promotes the notion that dementia naturally occurs as one ages and both the ICD and DSM should parallel one another. I developed the acronym Classic Alzheimer's Disease Symptoms (CADS) and defined CADS in Chapter 2 as a way to refer to patients with dementia of the AD type. The social change and potential implication may advance the use of diagnostic phrase, "Classic Alzheimer's Disease Symptoms (CADS)," rather than labeling patients with the term "Alzheimer's Disease"

or even "being senile." Rather than labeling a living patient with AD, I would recommend referring to living patients with dementia of the AD type as having (CADS).

Until the healthcare sector has a biomarker and begins early testing for signs and symptoms of AD as recommended by the NIA and Alzheimer's Association, we will continue to see misdiagnosed patients and under reporting of AD (USPSTF; as cited in Boustani, Peterson, Harris, & Lohr, 2003). Furthermore, close coordination with the World Health Organization, DSM, and ICD is needed to unite physician desktop references such as the DSM and ICD also used by both insurance companies in the United States and billing coding specialists to complete insurance claims for patient treatment; currently a gap exists as identified and discussed in Chapter 2.

Significance

The U.S. National Institute on Aging ranked AD as the sixth most deadly disease Alzheimer's Association (2012a). The benefits of early detection and accurate diagnosis of AD, like many other diseases, include disease management and improved quality of life. An accurate and early diagnosis may also decrease stress for those seeking a reason for loved ones' sudden changes in personality, mood, activities, and behavior. An early diagnosis of AD may thus help ease tensions within a family.

My study may lead to social change by promoting awareness of the importance for early AD diagnosis and the use of new diagnostic guidelines and materials such as the NIA criteria. Accurate diagnosis may assist families in reviewing finances, legal planning, discussing home and long-term care alternatives, and evaluating safety practices (Leifer, 2009). This study may promote social change by encouraging providers

to implement routine procedures for the detection of possible dementia in primary care patients during office and clinic visits. Additionally, this study may illuminate the needs and benefits for early diagnostic evaluations for persons suspected of exhibiting AD symptoms, partner with those who are likeminded to provide care planning at the earliest possible time following a diagnosis, and document the diagnosis and care plan in a person's medical record (Attea & Johns, 2010).

Conclusion

Patients and/or family members caring for a loved one with CADS may initially seek help from their primary care physicians (PCPs) (Leifer, 2009). At this time, there is no cure or known cause for AD. Furthermore, AD cannot be used as a diagnosis for the living because there is no definitive diagnostic biomarker. Currently, after a patient dies when an autopsy is performed to examine brain tissue and during the autopsy, the results of the autopsy are conclusively used describing the cause of death due to AD or other causes (Christensen & Lin, 2007). Okie (2011) reported that some physicians and agencies avoid using a diagnosis of AD. An accord is lacking regarding early diagnostic criteria and the exact symptoms of Alzheimer's disease that physicians' use to diagnose AD patients. In the last three years, Jack et al. (2011) co-authored a study with the Alzheimer's Association, which undertook significant efforts to revise previous diagnostic criteria for physicians' to use when evaluating patients with dementia type AD. An in office test may help physicians detect the early symptoms of AD based upon new National Institute of Aging criteria. Therefore, it is important for PCPs to be familiar with and to employ consistent diagnostic approaches and nomenclature.

My study explored the patterns of use related to the new National Institute of Aging Alzheimer's disease protocol was conducted because no other researcher to date has explored this area. The findings support the need to improve primary care providers' initial diagnostic skills for evaluating dementia/AD patients including the use of the new NIA criteria. I encourage future researchers to conduct a qualitative study to explore why the clinicians do not intend to use the NIA criteria and to learn what it will take to get clinicians to adopt the new NIA AD criteria. I greatly hope my findings advance the current knowledge and understanding of Alzheimer's disease. At the very least, I hope I have inspired future researchers to pick up where I left off.

In summary, doctors can benefit from additional AD knowledge training, using a standardized in office test to screen patients with AD symptoms, and routine diagnostic criteria from the NIA is available for doctors to reference for all stages of AD in an overarching goal for earlier detection of Alzheimer's disease and treatment of AD. Until a cure for AD is discovered earlier, detection of AD symptoms is indicated and early treatment for the early signs of AD and/or CADS may extend patients' quality of life.

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Appendix A: Letter of Permission to Use Survey Instrument
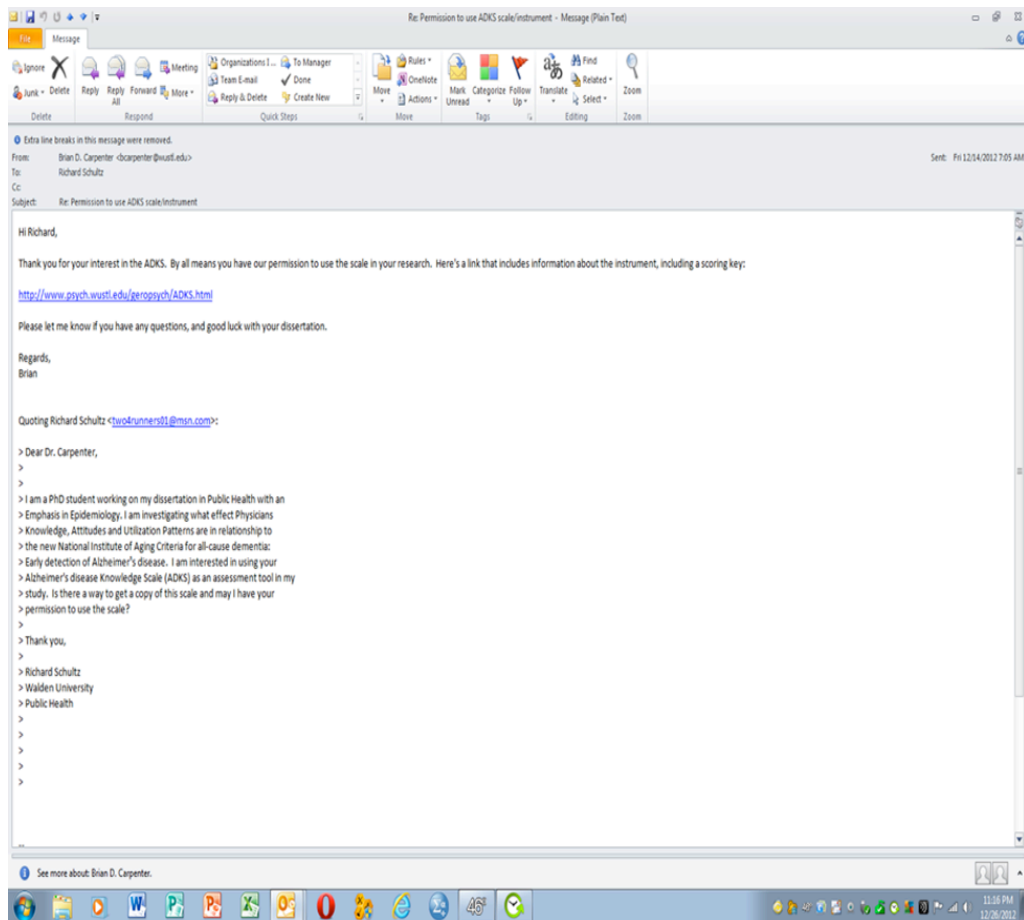
Appendix B: Alzheimer's Disease Survey

Introduction

Hello and thank you for volunteering about 15 – 20 minutes to complete the survey. You were selected as a potential participant in this study because you are thought to be involved in direct care and work with patients diagnosed with dementia. This study is being conducted by a researcher named Richard Schultz, who is a doctoral student at Walden University.

Instructions: This is an online survey. The survey will take you though a pre-qualification process to ensure the survey instrument itself is accessed by appropriate healthcare providers. Please read the instructions carefully for each section. Please proceed.

Please click "Next" to continue or click on "exit" to leave the survey and return later.

Alzheimer's Disease Survey Pre-qualification Questions

Instructions: Congratulations and welcome to the *pre-qualification questions*. There are three questions that will screen for appropriate respondents to this survey. The survey will take you though a pre-qualification process to ensure the survey instrument itself is accessed by appropriate healthcare providers. Please read the instructions carefully for each section. Please answer the following three questions.

1. What is your role within the healthcare system?
   a. __Physician
   b. __Nurse
   c. __Technician
   d. __Administrator
   e. __Other, please describe

2. In your role within the healthcare system are you medically and legally responsible for diagnosing a person with Alzheimer's disease?
   a. __Yes
   b. __No

3. Which county do you predominantly practice?
   a. __Tuolumne County
   b. __Stanislaus County
   c. __Sonoma County
   d. __Sacramento County

*Note: If the respondent replied b, c, d, or e to question #1 then the respondent does not meet the criteria to continue and is taken to the end of the survey and thanked for their time.

*Note: if the respondent replied b to question #2 then the respondent is not qualified to continue and is taken to the end of the survey and thanked for their time.

*Note: if the respondent replied a, c, or d to question #3 then the respondent is not qualified to continue and is taken to the end of the survey and thanked for their time.

Please click "Next" to continue or click on "exit" to leave the survey and return later.

Survey Pre-qualification Ineligible Page

Thank you for answering the survey pre-qualification questions. Unfortunately, you do not meet the selected criteria necessary to continue with the remaining survey questions. We appreciate your time and continued dedication to Alzheimer's patients, their families, and caregivers.

Instructions: Although you do not meet the criteria to proceed with the rest of the survey, we ask you to click on the hyperlink below to learn more about Alzheimer's disease, new criteria released by the National Institute of Aging, and their additional recommendations. Please visit the following website:

http://www.alz.org/documents_custom/Alz_Assoc_diag_criteria_guidelines_press _release_041911.pdf

Only if the respondent chose response "*A*" in question #1, responded "*A*" to question #2, and responded "*B*" to question #3 then the surveyor may proceed to the Survey Consent Form.

Please click "Next" to continue or click on "exit" to leave the survey and return later.

Alzheimer's Disease Survey Consent Form

Congratulations! You successfully qualified to complete the Alzheimer's Disease Survey. Based on your answers to the previous three questions you are ready to start the survey. But first, you will need to familiarize yourself with the following consent form.

You were selected as a potential participant in this study because you are a direct care staff working with patients diagnosed with dementia. Please read this form and ask any questions you have before agreeing to be part of the study. This study is being conducted by a researcher named Richard Schultz, who is a doctoral student at Walden University.

<u>**Instructions:**</u> Congratulations and welcome to the *consent form.* Please read the consent form to continue and please fill in and complete all responses to the following fields. After completing the consent form, please click the "next" button to precede indicating you have read and consent to the terms of this survey.

Background Information:
The purpose of this study investigates what effect Physicians Knowledge, Attitudes and Utilization Patterns are in relationship to the new National Institute of Aging Criteria for all-cause dementia: Early detection of Alzheimer's disease.

Procedures:

If you agree to be in this study, you will be asked to:
- Sign and return this form directly to the researcher
- Complete a short demographic form, followed by a survey.
- The survey is the Alzheimer's Disease Knowledge Scale, consisting of 30 items.
    - **Voluntary Nature of the Study:** Your participation in this study is voluntary. This means that everyone will respect your decision of whether or not you want to be in the study. If you decide to join the study now, you can still change your mind later. If you feel stressed during the study you may stop at any time. You may skip any questions that you feel are too personal.
    - **Risks and Benefits of Being in the Study:** There are no physical risks and no benefits to participating in the study. Should there be any emotional upset while completing the surveys, participants can stop and decide not to continue with study or come back at a later time to complete the surveys.
    - **Compensation:** No compensation will be available for participating in this study.

- o **Confidentiality:** Any information you provide will be kept confidential. The researcher will not use your information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in any reports of the study.
- o **Contacts and Questions:** The researcher conducting this study is Richard Schultz. The researcher's faculty advisor is Dr. Richard Jimenez. You may ask any questions you have now. Or if you have questions later, you may contact the researcher at Richard.Schultzjr@waldenu.edu or the advisor at Richard.Jimenez@waldenu.edu.

The researcher will email and/or you may download a copy of this form to keep.

Statement of Consent:

I have read the above information. I have received answers to any questions I have at this time. I am 18 years of age or older, and I consent to participate in the study.

Printed Name of Participant   _____

Participant's Written Signature   _____

Researcher's Written Signature   _____

Note: The respondent cannot continue unless the consent form has been reviewed (indicated by clicking on a radio button) indicating acceptance and completion allowing the participant to proceed.

Please click "Next" to continue or click on "exit" to leave the survey and return later.

Part one is comprised of 8 background and demographic questions.

Part two is comprised of 30 brief questions (True and False), which ask specific knowledge questions about Alzheimer's disease and pose various statements. It's important to indicate an answer for every statement, even if you're not completely sure of the answer.

Instructions: Congratulations and welcome to the *Background and Demographic Information* portion of the survey. Please read each question and either fill in the answer or select the appropriate response from the choices below. After completing this section, please click the "next" button to proceed indicating you are ready to continue to the next section of the survey.

Background Questions and Demographic Information (Part 1)

1. How old were you on your last birthday (please write in):_____.

2. What is your gender?
    a. __Male
    b. __Female
    c. __Other, please write in:_____.

3. How many years ago did you graduate from medical school? (please write in)_____.

4. Are you board certified? If so, in which specialty are you certified?
    a. __Yes, (please write in):_____.
    b. __No

5. Do you use the new National Institute of Aging protocol for early diagnosing Alzheimer's patients?
    a. __Yes
    b. __No
    c. __Other: (please write in):_____.

6. If you do not use the National Institute of Aging protocol for early diagnosing of Alzheimer's patient's will you use the new protocol in the next 12 months?
    a. __Yes
    b. __No
    c. __Other (please write in):_____.

7. If you do not intend to use the new NIA AD protocol, are you aware of the new National Institute of Aging protocol for early diagnosing Alzheimer's disease?
   a. __Yes
   b. __No
   c. __Other:_____.

8. What is the percentage of patients aged 60 and older presently under your care?
   a. __20%
   b. __30%
   c. __40%
   d. __50%
   e. __Other:_____.

Please proceed and complete (Part 2).

Please click "Next" to continue or click on "exit" to leave the survey and return later.

Alzheimer's Disease Knowledge Scale *(Part 2)*

Instructions: Congratulations and welcome to the *Alzheimer's Disease Knowledge Scale* portion of the survey. Below are 30 statements about Alzheimer's disease. Please read each statement carefully and indicate whether you think the statement is true or false. If you aren't sure of the right answer, make your best guess. It's important to indicate an answer for every statement, even if you're not completely sure of the answer. After completing this section, please click the "next" button to proceed indicating you are ready to continue to the next section of the survey.

1. **True/False.** People with Alzheimer's disease are particularly prone to depression.

2. **True/False.** It has been scientifically proven that mental exercise can prevent a person from getting Alzheimer's disease.

3. **True/False.** After symptoms of Alzheimer's disease appear, the average life expectancy is 6 to 12 years.

4. **True/False**. When a person with Alzheimer's disease becomes agitated, a medical examination might reveal other health problems that caused the agitation.

5. **True/False.** People with Alzheimer's disease do best with simple, instructions given one step at a time.

6. **True/False.** When people with Alzheimer's disease begin to have difficulty taking care of themselves, caregivers should take over right away.

7. **True/False.** If a person with Alzheimer's disease becomes alert and agitated at night, a good strategy is to try to make sure that the person gets plenty of physical activity during the day.

8. **True/False.** In rare cases, people have recovered from Alzheimer's disease.

9. **True/False.** People whose Alzheimer's disease is not yet severe can benefit from psychotherapy for depression and anxiety.

10. **True/False.** If trouble with memory and confused thinking appears suddenly, it is likely due to Alzheimer's disease.

11. **True/False.** Most people with Alzheimer's disease live in nursing homes.

12. **True/False.** Poor nutrition can make the symptoms of Alzheimer's disease worse.

13. **True/False.** People in their 30s can have Alzheimer's disease.

14. **True/False.** A person with Alzheimer's disease becomes increasingly likely to fall down as the disease gets worse.

15. **True/False.** When people with Alzheimer's disease repeat the same question or story several times, it is helpful to remind them that they are repeating themselves.

16. **True/False.** Once people have Alzheimer's disease, they are no longer capable of making informed decisions about their own care.

17. **True/False.** Eventually, a person with Alzheimer's disease will need 24-hour supervision.

18. **True/False.** Having high cholesterol may increase a person's risk of developing Alzheimer's disease.

19. **True/False.** Tremor or shaking of the hands or arms is a common symptom in people with Alzheimer's disease.

20. **True/False.** Symptoms of severe depression can be mistaken for symptoms of Alzheimer's disease.

21. **True/False.** Alzheimer's disease is one type of dementia.

22. **True/False.** Trouble handling money or paying bills is a common early symptom of Alzheimer's disease.

23. **True/False.** One symptom that can occur with Alzheimer's disease is believing that other people are stealing one's things.

24. **True/False.** When a person has Alzheimer's disease, using reminder notes is a crutch that can contribute to decline.

25. **True/False.** Prescription drugs that prevent Alzheimer's disease are available.

26. **True/False.** Having high blood pressure may increase a person's risk of developing Alzheimer's disease.

27. **True/False.** Genes can only partially account for the development of Alzheimer's disease.

28. **True/False.** It is safe for people with Alzheimer's disease to drive, as long as they have a companion in the car at all times.

29. **True/False.** Alzheimer's disease cannot be cured.

30. **True/False.** Most people with Alzheimer's disease remember recent events better than things that happened in the past.

Please click "<u>Next</u>" to continue.

Thank you for completing the survey you and you are finished with the survey

Note: This concludes the survey, which includes both parts 1 and 2. Thank you for your assistance. If you would like to learn more about Alzheimer's disease, new criteria released by the National Institute of Aging, and additional recommendations, please visit the following website:

http://www.alz.org/documents_custom/Alz_Assoc_diag_criteria_guidelines_press _release_041911.pdf

Click Here if you would like to have a copy of the Consent Form emailed to you. Please provide your email address

here:_____

Please confirm your email address

here:_____

Appendix C: Certificate of Completion – "Protecting Human Research Participants"

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research
certifies that **Richard Schultz** successfully completed the NIH Web-
based training course "Protecting Human Research Participants".

Date of completion: 03/30/2013

Certification Number: 1153705